

COMPARATIVE ANALYSIS OF FUNCTIONAL ASSESSMENT
METHODOLOGIES AND FUNCTIONAL ANALYSIS FOR YOUNG CHILDREN
WITH OR AT RISK FOR EMOTIONAL OR BEHAVIORAL DISORDERS

By

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With love to Erin and Betsy.

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The prevalence of functional behavior assessments (FBAs) in schools continues to increase as a result of federal mandates and widespread school policy reform. As the use of FBAs in schools increases, it is necessary to improve their current condition by evaluating the concurrent and construct validity of the process components. Failure to establish FBA as a process with valid outcomes will adversely impact students who demonstrate challenging behaviors because a method for designing effective interventions will either be unused or the interventions that result from the process will be ineffective. There are a large number of descriptive methodologies that can be used within the FBA process. However, the outcomes of many of these methodologies have not been compared with each other or validated through functional analysis. Thus, there is a continuing need to empirically compare and validate the outcomes of these descriptive assessment methods. The two purposes of this investigation were: (1) to

compare the results of three commercially produced descriptive assessments with each other to determine concurrent validity, and (2) to compare the descriptive assessment results with the results of a functional analysis to determine construct validity.

Descriptive assessments including one checklist, an interview, and a direct observation were completed for four young children (ages 4-6) with or at risk for emotional and behavioral disorders. Teachers and researchers then completed functional analyses within the classroom setting of the same participants. Results of the assessments were kept independent from each other until completion. Teachers also completed a social validity questionnaire and interview. This study indicated that descriptive assessment results had low consistency with each other, 8/24 (33%) agreements between assessments, and that the outcomes of two of the three descriptive assessments (i.e., the interview and checklist) also had low agreement with the functional analyses with 3/8 (38%) agreements. However, the direct observations agreed with the functional analyses conclusions for all 4/4 (100%) of the participants. These results do not support the concurrent validity of the three descriptive assessments or the construct validity of the checklist or the interview, but do support the construct validity of direct observations.

CHAPTER 1 INTRODUCTION

This chapter provides a brief overview of the literature and presents the need to examine the validity of various assessments in the functional behavior assessment (FBA) process. This brief overview outlines the use of FBA with preschool-aged children who demonstrate challenging behavior and also highlights articles that have directly evaluated the results of these various assessments. The articles that have directly evaluated various assessments compare the reported results of the descriptive assessments to each other and to results of functional analyses. The literature provides a synthesis of the evolution of the FBA process, the need for distinct comparisons of the various assessments and a rationale for the current study. In addition, the contributions this study makes to improve the effectiveness of the FBA methodology, in both research and practice, are identified. Finally, this chapter presents the specific research questions that were addressed in this study.

Overview

As the utilization of functional behavior assessments (FBAs) increases, it is incumbent on researchers to improve FBAs' current practices by evaluating the effectiveness and the efficiency of this process. The increasing prevalence of FBAs is a direct result of two interrelated factors. The first reason for more widespread application of FBAs is the increased number of children who are engaging in challenging behaviors (Chandler & Dahlquist, 2002). The number of young children exhibiting challenging behaviors is rising. Many of these children may ultimately meet the criteria for

emotional/behavioral disorders (Fox, Dunlap, & Powell, 2002). According to Webster-Stratton (2000), 7% to 25% of preschool-aged children currently meet criteria that place them at risk for future development of oppositional defiant disorder or a conduct disorder. For example, Kaiser, Kai, Hancock and Foster (2002) tested 332 three-year old children enrolled in Head Start and found that 39% of boys and 22% of girls demonstrated behavioral deficits that placed them in the clinical range for both internalizing and externalizing problem behaviors on the Child Behavior Checklist (Achenbach, 1992). FBAs are one strategy that can be used to address children's needs; however, many of the FBA procedures used are problematic (Johnston & O'Neill, 2001). Increased effectiveness of FBAs are needed to appropriately meet the increasing needs of young children with challenging behaviors.

Second, the reauthorization of the Individuals with Disabilities Education Amendments (IDEA, 2004) has mandated the use of functional behavior assessments for all students who have been suspended for over ten days, who demonstrate behaviors that warrant consideration of a change in educational placement, or disciplinary measures such as placement in a more restrictive setting (i.e., an interim alternative educational setting) or expulsion. As a result, school districts now view the completion of an FBA as the first step in any significant intervention. This IDEA mandate has also impacted early childhood personnel working with young children ages 3 to 6 served under Section 619 of Part B of the act. The prevalence of FBAs in early childhood settings has been stimulated both by IDEA legislation (Nielsen & McEvoy, 2004) and recognition that the process of FBA represents an important methodology in addressing challenging behaviors demonstrated by young children (Fox, Dunlap & Powell, 2002).

Functional behavioral assessment is a process in which information is gathered regarding a specific behavior or set of behaviors in order to determine whether that behavior has any predictable relationship with the environment (O'Neill et al., 1997). Relationships exist when these environmental factors both predict the behavior and explain why it is maintained. Identification of these relationships increases understanding of why a particular behavior occurs or how behavior is reinforced and maintained by the specific environmental consequences (i.e., functions) they elicit. The FBA must identify the environmental factors surrounding challenging behaviors. Once environmental factors are identified and understood through an effective FBA, individualized interventions may be designed to replace undesirable behavior with appropriate alternatives that efficiently obtain the same functions of the challenging behavior. For example, if a child engages in challenging behaviors to receive teacher attention, an intervention is designed that gives the child increased access to teacher attention by demonstrating desired behaviors and decreased access to teacher attention for challenging behaviors. In most educational settings, information for FBAs is gathered using a combination of both indirect and direct descriptive assessment measures (Johnston & O'Neill, 2001). Indirect measures are those that do not require direct observation of the student. Indirect measures include interviews with parents, teachers, and children via the use of questionnaires, rating scales and record reviews. In contrast, direct measures typically consist of scatter plots (Touchette, MacDonald, & Langer, 1985) and observation worksheets that reflect a running narrative of antecedents, behaviors and consequences (ABCs) (Bijou, Peterson, & Ault, 1968) that are recorded as they are observed in natural settings.

An alternative method for gathering information to determine the function of a challenging behavior is a functional analysis (Sasso, Conroy, Stichter, & Fox, 2000). Functional analysis refers to the use of analog conditions, manipulating specific environmental conditions that follow challenging behaviors, to systematically identify consequences as they relate to the function of a behavior (Sugai, Horner, & Sprague, 1999). Following the manipulation of each of these conditions, the consequence that produces the highest level of behavior is identified as the function. The difference between the former two descriptive methods (direct and indirect) and the third method of functional analysis is that the descriptive methods generate correlational results while a functional analysis identifies causal relationships between behavior and the maintaining consequences (Lerman & Iwata, 1993). No combination of these three methods has been accepted as the standard protocol either by research literature or federal mandates (Scott et al., 2004).

A literature review of the research of the use of FBAs with young children demonstrating challenging behaviors revealed three distinct groupings: (a) studies that only employed indirect and direct descriptive methodologies to determine hypothetical functions; (b) studies that combined descriptive methodologies with functional analysis methodologies to determine functions; and (c) studies that directly compared the results of different assessments with each other and/or a functional analysis. Although some FBA methodologies have been available for use by teachers for over 20 years (Ervin, Ehrhardt & Poling, 2001), FBA methods are still in a fledgling state of development.

Studies that only used descriptive assessment methods in the FBA process remain the most prevalent for young children demonstrating challenging behavior. By using only

descriptive assessments, and not using functional analysis, the function identified in this body of research remains hypothetical. Interventions based on the hypothetical functions that are not experimentally manipulated (i.e., a reversal design) only provide correlational support (Kazdin, 1982). Additionally, in studies that only used descriptive assessments, many of the interventions implemented within the studies were either not directly related to the hypothetical function or included additional interventions that muddled whether or not the hypothetical function identification was accurate. For example, Grandy and Peck (1997) hypothesized that the function of the challenging behavior was teacher attention. However, rather than creating an intervention that limited teacher attention for challenging behavior and increased teacher attention for desired behaviors, researchers implemented a token economy that led to classroom privileges and that indirectly led to teacher attention. This lack of a direct connection between the determined function and the intervention implemented calls into question the accuracy of the determined function. It is impossible to determine if teacher attention was reinforcing the desired behavior or if it was another element of the token economy. As illustrated through this example, the body of literature using descriptive assessments gives minimal support to the accuracy or consistency of the various descriptive assessments.

Studies that employ both descriptive assessments and functional analysis methodologies also have certain shortcomings. First, researcher influence was pronounced in these studies that included the time consuming, technically complex functional analysis process. In many of the studies reviewed, a team of researchers worked with very few participants (i.e., Doggett, Edwards, Tingstrom & Wilcznski, 2001; Harding et al., 1999; Romaniuk et al., 2002). Another salient difference between

the descriptive methods in the studies that used both descriptive assessments and functional analysis and the sample that only used descriptive methods is that this sample was more parsimonious in the use of descriptive assessments. When functional analysis was also incorporated into the study's protocol, descriptive assessments were only used to the extent that they could guide the functional or structural analysis procedures. These studies used the descriptive assessment results to identify times and situations to conduct analog probes during the times or activities that teachers identified as the most problematic. For example, in both their studies Broussard and Northup (1995, 1997) only used direct observations of the participant and a brief interview with the teacher to determine what would make the analog conditions most representative of the natural environment. This makes it very difficult to determine what parts of the process are producing accurate and/ or consistent results. Therefore, the effectiveness and efficiency of various FBA methodologies are unknown.

There were eight studies that directly evaluated different aspects of the functional behavior assessment process. This group of studies that attempted to compare the results of different descriptive assessments with each other and with functional analysis procedures had several prominent characteristics. Overall, there was agreement between the different descriptive assessments results. There was also agreement between the descriptive assessment results and the functional analysis results. However there are three reasons why these results should be interpreted with caution. First, the descriptive assessment results informed one another and were not independent from each other as they were conducted, making direct comparison of separate results impossible. For example, in Ellingson, Miltenberger, Stricker, Galensky and Garlinghouse (2000),

Murdock, O'Neill and Cunningham (2005) and Newcomer and Lewis (2004), the results of the indirect assessment directly shaped and guided the direct descriptive observations thereby compromising their claims of independent consistency across assessment methods. This makes direct comparison impossible as the results of one assessment influence the results of another. The second interrelated factor with this assimilation of assessment methods is that by not being presented in different orders, the order of administration was not counterbalanced. As a result, the aforementioned three studies and Yarbrough and Carr (1997) presented their descriptive assessments in the same order, making it impossible to control for an order effect. In other words, there is a possibility that a participating teacher's previous responses to an assessment would shape responses to subsequent assessments.

The third salient factor is the use of the descriptive assessment results to guide the functional analysis procedures. Within this body of literature, only Cunningham and O'Neill (2000), and Sasso et al. (1992) conducted functional analysis procedures with five analog conditions: free play (control), tangible, escape, attention, and alone. Other studies only tested analog conditions that matched the results of the descriptive assessments. This difference is subtle yet critical. By only evaluating those hypothetical functions determined by the descriptive assessment, it is possible to confirm the results as *a* function but not *the* function (because different functions were not compared). Additionally, two studies, Murdock, et al., (2005) and Ellingson et al. (2000), did not use any experimental procedures to confirm the functions; this means that their results may show consistency across descriptive measures, but that does not confirm the accuracy of the function identified.

In conclusion, all three bodies of FBA literature indicate that there is a need to evaluate the effectiveness of current assessment procedures. By keeping the different assessment results separate from each other and from the functional analysis, it was possible to evaluate each instrument's results independently. This extends current FBA research that has attempted to evaluate the accuracy of different assessment methodologies.

Statement of the Problem

No single procedure or combination of procedures for functional behavior assessment has emerged as the most suitable for use with young children demonstrating challenging behaviors. Minimal empirical studies have evaluated the effectiveness and usefulness of various approaches. "Several authors have noted that research directly comparing the results of different approaches such as interviews and direct observations is sparse" (Johnston & O'Neill, 2001, p. 206). Failure to establish FBA as a meaningful process with valid outcomes will adversely impact countless children who demonstrate challenging behaviors. Absent a highly effective method for determining function and designing effective interventions, appropriate plans will either go unused or the interventions that result from the process will be ineffective. Teachers need to be equipped with strategies that determine the function of a challenging behavior reliably and accurately for the FBA process to be effective and useful. If the process is ineffective and does not decrease challenging behaviors, then the FBA process will become another bureaucratic chore that will not positively impact children (Scott et al., 2004).

Significance of the Study

This fundamental need to meet the demand for effective FBAs that can be implemented by teachers in a meaningful way leads to an important area of research: to

conduct a series of indirect and direct descriptive assessments and compare the outcomes of these assessments to each other and to the outcomes of a functional analysis methodology. This study extends and builds on the current literature that directly evaluated the results of different descriptive assessments. However, unlike these studies, the functional analysis in this study was independent of the descriptive assessment results, thus allowing an unbiased comparison of descriptive and experimental methodologies. The results of the various direct and indirect descriptive assessments were recorded independently and separation of the results was maintained until the end of the study. Additionally, the descriptive assessments' order of administration was counterbalanced across participants to maintain independence as well. The results of this research are an empirically validated step towards evaluating descriptive assessments that can be used both in continuing FBA research and in applied public school and early childhood settings.

Purpose of the Study

The specific questions this research study addressed were the following:

1. How do the functions of target behaviors identified through various descriptive functional assessments compare with functions identified through a functional analysis for young children's challenging behavior?
2. How do the functions of target behaviors identified through various descriptive functional assessments compare to each other?

CHAPTER 2 LITERATURE REVIEW

The purpose of this chapter is to review the literature on the use of functional behavior assessment (FBA) that address challenging behaviors in applied settings demonstrated by young children. This review focuses on the processes that comprise FBAs, in order to determine the most effective methodologies. First, the significance of completing FBAs will be traced in the context of an increase in the rate and severity of challenging behaviors demonstrated by young children. Second, this chapter will define functional behavior assessment, and outline the current components that comprise FBA. Third, the theoretical underpinnings will be outlined as they relate to its current application especially with young children. Fourth, specific aspects of this application will be examined through a targeted review of the empirical literature. This literature will be divided into three sections: (1) studies that used only descriptive assessments in the FBA process (2) studies that used both descriptive assessments and experimental analyses; and (3) studies that directly examined and compared the results of different descriptive assessment methodologies. Finally, a general discussion will address the shortcomings of current empirical literature and outline directions for future research.

Prevalence and Impact of Young Children with Challenging Behaviors

The prevalence of young children exhibiting challenging behaviors is increasing (Fox, Dunlap, & Powell, 2002), and children are at risk for future development of behavioral disorders (Webster-Stratton, 1997). The young children under consideration are defined as children under 8 years of age, in accordance with the age limit specified by

the Division of Early Childhood of the Council for Exceptional Children. Researchers have documented various prevalence rates across a number of different behavior disorders. For example, 7% to 25% of preschool-age children currently meet the criteria for a diagnosis of Oppositional Defiant Disorder (ODD) as defined by the Diagnostic Statistical Manual IV-TR (DSM IV-TR) (Webster-Stratton, 2000). The DSM defines Oppositional Defiant Disorder (ODD) as “a recurrent pattern of negativistic, defiant, disobedient, and hostile behavior toward authority figures that persists for at least 6 months.” Additionally, Kaiser, Kai, Hancock, and Foster (2002) tested 332 three-year old children enrolled in Head Start and found that 39% of boys and 22% of girls scored in the clinical range for both internalizing and externalizing problem behaviors. As the rate of challenging behaviors demonstrated by young children continues to increase, the need to manage and modify behavior in early childhood settings also increases. The inability to remediate these challenging behaviors will affect young children both now and in the future.

Behaviors such as tantrums, aggression, and chronic non-compliance exhibited by young children may have immediate and prolonged effects on academic achievement and appropriate socialization (Shonkoff & Phillips, 2000). The immediate effects of challenging behaviors for preschool-aged children are academic under-achievement and poorly developed social skills (Chandler & Dahlquist, 2002; Webster-Stratton, 1997). The long-term effects of unaddressed challenging behaviors are an increase in both rate and severity over time (Reid & Patterson, 1991). Early behavior problems have also been linked with more severe problems such as substance abuse, unemployment, criminal behavior, and diagnosis of a psychiatric disorder (Reid and Patterson, 1991).

Chandler and Dahlquist (2002) state that difficult behaviors are often rooted in the functions that they served at young ages, such as hitting a peer to attain a tangible object (e.g., a toy), and these behaviors may also increase in frequency, duration, and intensity as the child gets older. Ascertaining the function of a challenging behavior is the key to developing an effective intervention to extinguish it (Cooper & Harding, 1993; Iwata et al., 1982/1994; Gresham, 2003; O'Neill et al., 1997; Sasso et al., 2001) and may prevent its undesirable immediate and long-term consequences.

Defining Functional Behavior Assessment

The use of functional behavior assessments (FBAs) in school settings represents an important process in the effort to address increasingly prevalent problems with behavior in children. Using functional behavior assessment and functionally derived interventions, as opposed to interventions that are unrelated to the function of the behavior, is supported by research and considered “best practice” in the field (Arndorfer & Miltenberger, 1993; Gresham, 2003; Iwata et al., 1982/1994; National Institute of Health, 1989; O'Neill et al., 1997; Repp, Felce, & Barton, 1988; Sasso et al., 2001). Functional behavior assessment was designed to identify variables to manipulate through applied interventions to reduce challenging behaviors that interfere with or prohibit learning, and increase pro-social and adaptive behaviors that can lead to greater academic and social success (O'Neill et al., 1997).

In schools, the use of FBA represents a paradigm shift for educators that traditionally applied a standard system of consequences for all infractions (i.e., time out, a phone call to parents, a loss of privileges, suspension, expulsion). In early childhood settings, FBAs represent a valuable tool to help early childhood professionals address the behaviors that surpass usual challenging behaviors demonstrated by young children (Fox,

Dunlap, & Powell, 2002). With FBA, educators can design interventions that match the function of a challenging behavior in children. The function of a behavior refers to the purpose or outcome of the challenging behavior for the child (Scott et al., 2004). In other words, a function refers to the desired consequence that motivates a challenging behavior, and function-based interventions refer to environmental manipulations that allow a student to achieve the desired goal through other means (i.e., appropriate replacement behaviors). For example, if the function, or purpose, of a student exhibiting a challenging behavior is to receive teacher attention, then a challenging behavior could be extinguished by giving the student access to teacher attention by exhibiting appropriate behaviors and not providing additional teacher attention for the challenging behavior.

Functional behavior assessment, as defined for this literature review, is a process in which information is gathered regarding a specific behavior or set of behaviors in order to determine whether that behavior has any predictable relationship with the environment (O'Neill et al., 1997). The environment is comprised of all factors preceding (antecedents) and events following (consequences) the behavior. A relationship exists when these environmental factors predict the occurrence of the behavior and explain why the behavior is maintained. This assessment helps to understand why behavior occurs, or how behavior is reinforced and maintained by the specific environmental consequences (i.e., functions) they elicit. This assessment also identifies the environmental factors that precede a challenging behavior and make the challenging behavior more or less likely to occur. The purpose of an FBA is to understand environmental factors that surround the behavior so that individualized interventions may be designed to replace undesirable

behavior with appropriate alternatives that efficiently match the functions of the challenging behavior.

Because current empirical studies have applied the term *functional behavior assessment* broadly, the definition of FBA for this literature review requires further specification. As noted, functions typically refer to environmental *consequences* that follow a challenging behavior. The experimental evaluation of functions of behavior is referred to as ‘functional analysis’ within the literature. However antecedents, (also referred to as setting events or establishing operations) that precede and increase the likelihood of challenging behaviors, also play an important role in functional behavior assessment (Conroy & Stichter, 2003). Within the literature, experimental evaluation of antecedents is referred to as a ‘structural analysis,’ but may also simply be included as another aspect of an FBA. For the purposes of this literature review, studies that evaluate both the antecedents and consequences of behavior will be included as part of an FBA.

There are essentially three ways to generate functions of a challenging behavior: (1) indirect descriptive measures that establish *hypothetical* functions of a challenging behavior, (2) direct descriptive measures that establish *hypothetical* functions and (3) experimental analysis of an environment that can determine the *actual* function of a challenging behavior. However, for the purposes of this literature review direct and indirect measures will be combined and simply referred to as descriptive assessment measures in the three sections of literature that are reviewed (Sturmey, 1994). Indirect measures are those that do not require direct observation of the student and the challenging behavior. Typically, indirect measures include interviews with parents, teachers, (and the student if appropriate), questionnaires, rating scales and reviews of

school records. A number of commercially produced comprehensive interviews exist (see O'Neill et al., 1997 for an example). In addition, commercially produced behavior checklists, such as the *Motivation Assessment Scale* (MAS) (Durand & Crimmins, 1992) are designed for determining the hypothetical function of a behavior. The total number of indirect assessments of this type is difficult to determine. According to a literature review conducted by Floyd, Phaneuf and Wilczynski (2005) there are 19 commercially produced indirect assessments; however, this does not include those indirect assessments that are created by individual school systems or early childhood centers. Further, as Floyd et al., (2005) point out most of these other instruments have minimal research into their efficacy and validity; only O'Neill's interview and the MAS met their criteria for inclusion in a literature review of indirect descriptive assessment methods.

In contrast, direct measures require the direct observation of the child and the challenging behaviors. Direct descriptive assessments typically consist of scatter plots (Touchette, et al., 1985), and observation worksheets that reflect antecedents, behaviors and consequences (ABCs) (Bijou, et al., 1968) that are recorded in real time as they are observed. While some school districts and early childhood centers may adopt commercially produced FBA measures, they also may have created their own direct and indirect methods of gathering data to identify these functions. This means that there are a large number of descriptive methodologies that can be used within the FBA process.

Finally, the third type of procedure is an experimental approach, also referred to as functional and structural analysis. Functional analysis refers to the use of analogs, manipulating specific environmental conditions that follow challenging behaviors, to systematically identify consequences as they relate to the function of a behavior (Sugai,

Horner, & Sprague, 1999). For example, to determine the function of the behavior, analog situations representing possible consequences are manipulated (i.e., attention, tangible, escape, and control conditions). Following the manipulation of each of these, the consequence that produces the highest level of behavior is identified as the function. For example, to determine the function of a challenging behavior, each analog condition is conducted, contingently providing the targeted consequence following the occurrence of the behavior. For example, in the attention condition, the consequence of adult attention would be provided contingently every time the target behavior is demonstrated while all other possible antecedents and consequences are controlled to account for any variance. If the consequence of adult attention results in an increased rate of the behavior, as compared with other consequences administered in the same controlled environment, then it can be concluded that the function of this challenging behavior is adult attention. Structural analysis involves a similar process; however, rather than systematically manipulating the consequences that follow a behavior, a structural analysis manipulates the antecedents that precede the behavior to identify variables that set the occasion or serve an evocative effect.

All three of these assessment procedures have drawbacks. Indirect assessments rely on the subjective judgments of a third party, and direct observations can be context specific and inefficient in capturing the occurrence of a challenging behavior and its antecedents and consequences (Floyd et al., 2005). Direct observations can be inefficient because the probability of actually observing the challenging behavior may be relatively low, necessitating long and/or frequent observation periods (Scott et al., 2004). In this sense, the measures are inefficient because they may demand a considerable amount of

time from the practitioner but do not insure meaningful results. Functional and structural analysis have been identified as too time consuming, and technically complex for practitioners to conduct, and may lack external validity due to the high degree of experimental control (i.e., the highly controlled conditions in which it is conducted) (Arndorfer & Miltenberger, 1993; Ellingson, et al., 2000).

Regardless of the methodology, identifying and evaluating relationships between environmental antecedents and consequences and challenging behavior improves the opportunities to enable all students to meet academic and behavioral goals (Hanley, Iwata & McCord, 2003). As antecedents and consequences that are related to challenging behavior are identified, environments can be modified to reduce the occurrence of challenging behavior. This may be done by reducing the antecedents that increase the occurrence of the challenging behavior, giving students access to desired reinforcement through adaptive behaviors and/or limiting access to reinforcement for challenging behaviors. Creating effective interventions that reduce or eliminate challenging behavior at a young age can decrease the possibility that they will increase in frequency, duration and intensity as the child gets older. The theoretical framework for designing interventions according to function is rooted in the Behaviorist approach to human psychology. This theoretical framework and an historical perspective supporting FBA are described in the next section.

Theoretical Framework and Historical Perspective Supporting FBA

The theoretical framework for functional behavior assessment methodology can be traced back to the work of early behaviorists such as J.B. Watson and, so-called neo-behaviorists such as B.F. Skinner (1953). In fact, the term *function*, as it is used in this context, is often credited to Skinner's book *Science and Human Behavior* (1953). Skinner

(1953) states, “The external variables of which behavior is a function provide for what may be called a causal or functional analysis.” (p. 35). The subsequent work in the field of applied behavior analysis, codified by the creation of the *Journal of Applied Behavior Analysis* (JABA), expanded this theoretical framework to work with humans in applied settings.

Within this framework, researchers address behaviors by examining the environmental variables that maintain them, and operate on the assumption that functional relations not only exist, but also can be identified and manipulated. Early seminal work in JABA included an article by Bijou, Peterson and Ault (1968) that described a method to integrate descriptive and experimental data within field studies. Additionally, Sailor, Guess, and Rutherford (1968) conducted early work identifying “functions” of behavior and reported that for a 9 year old who engaged in frequent tantrums, the problem behavior “seemed to produce the effect of terminating contact with other individuals who usually were making some demand of her” (p. 238). While establishing the function of a behavior can be traced back to the work of early behaviorists, the emergence of a specific process for determining the behavioral functions is related to two more recent seminal events; the creation of a functional analysis methodology and the legal mandate of FBA in the Individuals with Disabilities Education Act (IDEA, 1997; 2004).

First, Iwata et al. (1982/1994) developed a methodology that used various environmental conditions, referred to as analog probes, in a clinical setting to identify a relationship between the environment and the function of self-injurious behavior. These analog probes included the following conditions: adult attention, escape from a task, an

alone condition and free play (Iwata et al., 1982/1994). The direct, systematic manipulation of environmental factors in a highly controlled environment in order to evaluate the function of a challenging behavior, in this case self-injurious behaviors, was termed 'functional analysis.' This procedure led to highly specific, highly effective intervention plans that incorporated the function of the challenging behavior and thus, decreased these behaviors. As the importance of finding the function of a challenging behavior became apparent, the methodologies broadened beyond experimental manipulation into more descriptive assessments. Following this groundbreaking research, a more formalized functional behavior assessment process emerged from the clinic setting and was implemented in more natural settings, such as the classroom.

The second critical event, the reauthorization of the Individuals with Disabilities Education Amendments (1997), provided the impetus to extend the methodology by making the use of functional behavior assessments (FBAs) mandatory for all students whose behavior warrants consideration for a change in educational placement or disciplinary measures such as extended suspension or expulsion. Although IDEA (1997) provided the impetus to expand the methodology of FBA, it did not specify what procedures should be used by individuals in schools when implementing an FBA resulting in varying forms of FBAs from state to state, district to district and even school to school. Despite its continually increasing prevalence in both educational systems and research settings, the effectiveness of FBA is still hampered by muddled definitions, an unspecified protocol and components that have not been empirically validated for use with various populations in numerous settings (Ervin, Ehrhardt, & Poling, 2001; Gresham, et. al, 2004; Scott et al., 2004; Sugai, et al., 1999).

While IDEA mandates have specific implications for public schools, the legislation has also continued to stimulate interest in the FBA process as it impacts early childhood settings such as child care centers (Neilsen & McEvoy, 2004). This prevalence has a clear relationship to the federal mandates regarding positive behavior support and the need for evidence-based practices for all ages (see Conroy, Dunlap, Clark, & Alter, 2005 for a review). As outlined by Arndorfer and Miltenberger (1993), there are specific implications for FBA in early childhood settings. These implications include examination of the utility of functional assessment methods in early childhood settings, especially including the use of various different descriptive assessments (i.e. indirect and direct assessments) and the viability of functional analysis procedures in early childhood settings. Thus, there is a need for examination of these specific components, as the role of FBA in early childhood settings continues to be prevalent in research and practice.

No single procedure or combination of procedures has emerged as the most suitable for application with young children demonstrating challenging behaviors. In concert with this shortcoming, minimal empirical studies have evaluated the effectiveness and usefulness of these various approaches. “Several authors have noted that research directly comparing the results of different approaches such as interviews and direct observations is sparse” (Johnston & O’Neill, 2001, p, 206). Failure to establish FBA as a meaningful process with valid outcomes will adversely impact countless students who demonstrate challenging behaviors, because a highly effective method for designing effective interventions will either be unused or the interventions that result from the process will be ineffective.

The application of various functional behavior assessment procedures in educational settings has outpaced current research. There is minimal research validating the effectiveness of different functional behavior assessment processes currently used for children with emotional and behavioral disorders (Sasso, Conroy, Stichter & Fox, 2001). “Given the different options available for conducting a functional assessment, the question regarding which approach practitioners ought to use to assess problem behavior is paramount” (Yarbrough & Carr, 2000, p, 133). The rising prevalence of young children’s challenging behavior in early childhood settings increases this urgency. Thus, educators need to be equipped with strategies that determine the function of a challenging behavior reliably and accurately for the FBA process to effective and useful.

Review of the Current Literature

Current research in the use of FBAs, including functional and structural analyses, with young children indicates that although there is considerable application of these methodologies, the use of FBAs with young children with EBD in applied or natural (e.g., classrooms, home) settings is still in its fledgling state. The first section of this review examines the use of both direct and indirect descriptive FBA assessment methodologies in natural settings (i.e., such as childcare centers, public school classrooms, and homes). The rationale for reviewing this group of empirical studies is that they can provide insight into the effectiveness of FBAs that are conducted without any type of systematic environmental manipulation. The second section examines FBAs that used both types of descriptive assessments and experimental analysis for FBAs. Examining this literature will provide a clearer picture as to what place, if any, functional analysis will hold in natural settings and what the ramifications of not using experimental analysis may be. The third section examines studies that specifically compared the results

of descriptive assessment methodologies with each other and with the results of a functional analysis. This purpose of this section of the literature review is to examine what research has been conducted thus far comparing, evaluating and possibly validating different components of the FBA process.

Method to Select Reviewed Studies

This literature search was completed in three steps. First, the author conducted a computer search of EbscoHost including Academic Search Premier, PsychINFO, Psychology and Behavioral Sciences Collection, and the Professional Development Collection databases), ERIC, and First Search. The following keyword combinations were used: *functional, assessment, assessment-based, analysis, behavior, experimental, school, preschool and young children*. Second, articles were cross-referenced that were identified in the computerized search to determine if research articles had been omitted. Third, the author consulted with researchers who have written extensively in this area to accumulate any other articles that may have been omitted in the first two steps.

To compare ‘descriptive assessments’ (direct and indirect) to ‘experimental analysis,’ it is necessary to differentiate the two terms. As previously described, descriptive assessment represents the use of methodologies including: direct observation, rating scales, interviews, and hypothesis development using antecedent behavior consequence (ABC) analysis (Bijou et al., 1968). Experimental analysis (i.e., structural analysis and functional analysis) uses analog probes to purposefully manipulate a variable within the environment and then develops hypotheses based on these controlled, manipulated environments. One important distinction between these two terms is that descriptive assessment methodologies identify only a hypothetical function; whereas,

functional analyses are able to identify a causal relationship (i.e., function) through experimental analyses (Lerman & Iwata, 1993).

However, certain characteristics of these research articles made separating descriptive methodologies from functional analysis a complex task in several ways. First, all descriptive studies included hypothesis testing, the addition or removal of a specific stimulus in the environment. This type of environmental manipulation is similar to a traditional FA. However, two features differentiated hypothesis testing and functional analysis: (1) the type of experimental control and (2) the number of functions tested in these controlled settings. Control of the environment is the distinguishing characteristic separating descriptive analysis from functional analysis (Sasso et al., 1992). For example, if researchers manipulated the environment to keep every other factor (curriculum, schedule) the same and only systematically changed the analogs, this was termed a functional analysis. Additionally, if a study tested multiple functions in this controlled environment then it was termed a functional analysis. For example, if a study systematically tested tangible items, adult attention and an alone condition, this was considered a functional analysis. However, if a study only performed a test of one hypothetical function based on the interviews or direct observations, this was still considered a validation of the findings from the descriptive assessment (Hanley, et al., 2003).

Another characteristic that made distinguishing descriptive methodologies from experimental analysis difficult is the absence of clearly standardized terminology in the research studies. In certain studies, the actual methodology is obfuscated by an imprecise use of terms. For example, Kamps et al. (1995) referred to their research as a “functional

analysis.” However, because of minimal environmental control, the methodology used in this study is more accurately judged to be a descriptive analysis, according to Sasso et al.’s (1992) definition. To counteract the use of imprecise terminology within the literature, the criterion for categorization was set that if individuals (researchers, teachers, parents) manipulated the environment to test multiple different functions in any way, in order to confirm a hypothetical function, then it was deemed an experimental analysis.

There are two final caveats regarding this differentiation. The first issue concerned studies that implemented interventions—even if interventions were implemented explicitly to confirm hypothesized functions. Regardless, these studies were still judged to fall under the ‘solely descriptive’ section of the literature review. The rationale for this decision is that while interventions may confirm *a* functional relationship, they do not necessarily confirm *the* functional relationship, unlike a traditional functional analysis. Other functional relationships may exist that would not be tested simply by implementing interventions guided by descriptive assessment results. For example, a descriptive assessment suggests that desire for a tangible object may be the function of the behavior and an intervention is implemented that provides increased time playing with the toy for desired behaviors and decreased time playing with the toy for challenging behaviors. Although this may be an effective way to reduce challenging behaviors, it does not indicate that this is either the only function or the primary function of the challenging behavior. The function may actually be the attention the student gets when playing with a toy, thereby making the real function, attention. As an aside, the efficacy of using interventions to confirm or disprove functional relationships will be discussed within the first section of this literature review, studies using solely descriptive assessment studies.

The second caveat was the issue of investigating antecedent-based assessments, at times referred to as structural analysis, and antecedent-based interventions. The rationale for including these studies within this review is based on the use of antecedents within classrooms and other natural settings. It has been noted that antecedent events play an important role in natural settings because less predictable patterns of behavior occur in these environments, less control over antecedents occurs, and schedules of reinforcement may not be consistently applied (Conroy & Stichter, 2003). Furthermore, it is reasonable to assume that teachers completing the FBA process will not limit the process in the widespread application of FBAs, solely to consequence-based assessment and intervention. Thus, studies that addressed antecedents are included in this review.

Additional criteria to determine which research studies would be included were also determined. First, only studies that occurred in homes, community-based childcare, and early childhood public school classrooms were used. Because this review is focused on the use of FBA in real-world settings, its use in highly controlled clinical settings was not applicable. As a result, a number of articles were excluded due to this potential lack of external validity. Second, for the first two sections, research studies directed solely toward populations with low-incidence disabilities, such as autism, or moderate and severe mental retardation were eliminated, as was research geared toward highly specific behaviors that are not typical of most young children who demonstrate challenging behavior, e.g. hair-twirling, eye-poking, breath-holding, were eliminated. Therefore, as long as at least one participant within the study had been classified as at risk for or having a high-incidence disability, the study was included within this review. Only the results of the children with high incidence disabilities were discussed in the first two sections of

this review. Criterion was established to focus on the application of FBA with a broad-based population – that is, young children with or at risk for emotional/behavioral disorders. However, for the final section of the literature review that consisted of studies that directly compared and evaluated the results of different descriptive methodologies, this criterion was expanded due to the dearth in this area of research. For the final section, results of students who were older or had more severe disabilities were also reported.

Third, in order to focus on FBAs with young children, each study was to include at least one participant 8 years of age or younger. Fourth, only research published in a peer-reviewed journal after 1994 was included. Because this methodology has been revised and refined extensively over the past ten years, articles pre-dating 1994 would not be applicable to current applications. These criteria were again expanded for the final section due to the limited number of studies in this area.

Results of the Literature Review

Thirty-two studies were found that met the criteria for inclusion in this review. Fourteen studies used descriptive methods only to identify the hypothetical function of a challenging behavior, ten studies used both descriptive methods and functional analysis to identify the function of a challenging behavior, and eight studies directly compared the results of descriptive assessments with functional analysis results. In the first two sections of this review, (1) solely descriptive assessments (indirect and direct), and (2) experimental analysis and descriptive combined, were evaluated by looking at: (a) participant and setting characteristics, (b) implementer characteristics, (c) components of the descriptive approach or analog conditions, (d) antecedents and functions identified, and (e) interventions implemented. In the final section, each of the eight studies is presented individually. These studies are discussed in terms of the aforementioned

characteristics, but their findings and implications are also summarized. Patterns of agreement or disagreement are also presented as well as methodological limitations. These eight studies are presented in chronological order. The studies in this final section are presented in greater depth, because their rationales and methodologies provided the foundation for the current study.

Descriptive Assessment Methodologies

This section of the paper will address the research found on the use of descriptive assessments in the formulation of FBAs in natural settings. Descriptive assessment methodologies, both direct and indirect, are procedures that evaluate the function of a challenging behavior but do not systematically manipulate the environment. Therefore, there is no experimental validation of the potential antecedents and consequences identified. In regard to FBAs with young children, descriptive assessments including interviews, checklists and direct observations (ABC recordings) are far more prevalent than the more technically complex, time consuming experimental analyses (i.e., functional analysis and structural analyses) (Arndorfer & Miltenberger, 1993; Reid & Nelson, 2002; Scott et al., 2004).

While descriptive assessments are less time consuming and less technically rigorous, the main drawbacks are that they can only generate hypothetical functions of behavior. Additionally, descriptive assessments often rely on the judgments of third party informants. This can be especially problematic as questionnaires and interviews were subject to the teachers' memories and biases of behavior in different settings (Shores, Wehby & Jack, 1999). Thus the value of these assessment methodologies hinges on the informants' accuracy of recall. Despite their current prevalence in educational settings, there still remains a shortage of literature in regard to studies that used only the

descriptive assessment methodologies. A surprising outcome of this review is that although IDEA (1997) produced a flurry of position papers (Sasso, et al., 2001), it did not appear to produce an accompanying flurry of empirical research that met the criteria for this literature review. In fact, there are six studies on or before 1997 and eight studies after 1997. A total of fourteen studies met the inclusion criteria (see Table 2-1 for a summary of information regarding each study). The following sections will highlight the findings of this group of studies and discuss methodological and practical limitations of the research.

Participant and Setting Characteristics

In terms of participant characteristics, there were a total of 274 participants in the solely descriptive studies, however, 210 participants were from a single study (see Chandler, Dahlquist, Repp, and Feltz, 1999). Because information about ethnicity and socio-economic level was omitted from most of the studies, particularly those with large numbers of participants, this level of detail is not discussed in the review. Omitting the Chandler et al. (1999) study that did not report gender, in the smaller studies that reported participant gender, only 9 girls (between the ages of 3-6 years old) out of the remaining 64 participants (14%) were evaluated in all of the studies. This is not surprising since typically boys demonstrate external challenging behaviors at a much higher rate at the preschool age than girls do (Webster-Stratton, 1997).

Table 2-1. Descriptive Methods for Young Children

Authors/ Year of Publication	Participant Characteristics (number, gender, age in years, label) Setting characteristics	Implementer Characteristics	Descriptive Methods	Functions Identified	Interventions Implemented
Dunlap, dePerczel, Clarke, Wilson, Wright, White, & Gomez (1994)*	3 males, 5-11 yrs**, EBD and ADHD, self-contained classrooms	Researchers	DO, HD, I	Not stated, Lack of choice (implied)	Use of choice in curriculum recommended
Storey, et al., (1994)	1 male, 6 yrs, no label, reg. ed. Classroom	Researchers & Teacher	I, DO	Attention, tangibles	Increased specific reinforcement using a reinforcement system
Clarke, Dunlap, Foster-Johnson, Childs, Wilson, White & Vera (1995)*	3 males, 5-11 yrs**, EBD and ADHD, self-contained classroom or separate work room	Researchers & Teachers	I, RR, DO, HD	Lack of interest in assignments	Incorporation of student interests
Kamps, Ellis, Mancina, Wyble, Greene, & Harvey (1995)	8 males, 2 females, 3-5 yrs, at risk for EBD, reg. ed. Classroom or Head Start classroom	Teachers-provided with training workshops, Researchers monitor and assist	DO, HD, TR	Adult attention, tangibles	Increased supervision, reinforcement for prosocial behavior, reduced attention for inappropriate behavior
Grandy & Peck (1997)	1 male, 6 yrs, no label, gen. ed. Classroom	Researchers and teacher	DO, HD, SA, TR	Teacher attention	Token economy (led to teacher attention)
Umbreit & Blair (1997)*	1 male, 4 yrs, at risk for EBD, childcare center	Researchers & Teacher	DO, HD, I, SA	Preference, choice	Pair preferred activity with non-preferred
Schill, Kratochwill, & Elliott (1998)	19 students, 12 male, 7 female ages 4-5 yrs, no label, Head Start classroom	Researchers & Teachers	DO, HD, I, CL	Skill deficit, attention, tangible	DRO, Time out, Modeling
Symons, McDonald & Wehby (1998)*	12 students, all male, 6 yrs, labeled EBD, self-contained classrooms	Researchers guided teachers through all FBA assessments	SP, HD, SA	Teacher attention, Varied with antecedents	Revised schedules, modified assignments, restructured access to attention

Table 2-1. Continued

Authors/ Year of Publication	Participant Characteristics (number, gender, age, label) Setting characteristics	Implementer Characteristics	Descriptive Methods	Functions Identified	Interventions Implemented
Blair, Umbreit, Bos (1999)*	4 students, 3 male, 1 female 5 yrs, at risk for EBD, childcare center	Researcher and teachers	DO, HD, I	Attention, choice, preferred task	Integrate choice and preference into curriculum
Chandler, Dahlquist, Repp, & Feltz (1999)	210 students, 3-6 yrs, 3 types of classrooms special needs (assorted disabilities), at risk, early childhood	Teachers-provided with training workshops, Researchers monitor and assist	DO, HD	Not stated	Varied for classroom/ child
Kennedy, Long, Jolivet, Cox, Tang & Thompson (2001)	3 students, 6, 6 and 8 yrs, 2 male, 1 female, 1 identified EBD, 2 'at risk', self-contained and gen. ed classrooms	Researchers and teachers	I, DO, HD	Teacher attention, Escape, Topographically specific-functions varied across contexts	Differential attention, self-monitoring, Eliminate certain consequences (school suspension)
Roberts, Marshall, Nelson & Albers (2001)	3 students, 1-1 st grade, 2-4 th grade**, all males, no identified disability, general ed. classroom	Researchers and teachers	I, DO, Diagnostic academic task	Escape motivated	Used curriculum based assessments to modify antecedents
VanDerHeyden Witt & Gatti (2001)	14 students, ages 2-4 yrs, 2 classrooms, speech delay, autism, hypothyroidism	Researchers and teachers	I, DO, HD,	Teacher attention (primary) escape, tangible, peer attention (secondary)	Differential reinforcement of alternative behaviors (DRA)
Packenhams, Shute & Reid (2004)	2 students, 1 male, 1 female, 8 & 9 yrs**, no identified disability	Teacher trained and completed assessments	I, HD through DO (ABC)	Teacher attention, escape (only options)	Task modifications specific directions, card to access teacher attention

Note. DO=direct observation; CL=checklist; I=interview; HD=hypothesis development; RR=record review; SA=structural analysis; SP=scatterplot; TR=teacher reports; DRO=differential reinforcement of other behaviors

* indicates a structural or antecedent based assessment used

** indicates only students in age range included

In regard to participants' disabilities, the publication dates of these studies and their methodologies are suggestive of a type of evolutionary process that occurs with FBA research, namely the progression of research with more severe, low-incidence disabilities (autism, profound mental retardation) to participants with less severe, high-incidence disabilities (EBD, mild mental retardation). Related to participants' disabilities is the issue of what types of behaviors were being demonstrated and addressed through functional behavior assessment. Behaviors such as noise making, talking out, property destruction, excessive off-task behavior and non-compliance represented the majority of the behaviors that were addressed in this sample of studies. The settings in which these studies took place are also a highly relevant area of consideration in regard to the widespread application of the FBA process. The studies in this sample used descriptive assessments in self-contained special education classrooms (39%), Head Start classrooms (11%), general education classrooms (39%) or childcare center rooms (11%). Four studies included different types of classrooms in the same study and Clarke et al., (1995) also reported using a teacher workroom for part of the assessment process.

The first notable aspect of the literature in regard to practical applications of FBA in the classrooms is the total number of participants used in this sample of studies. Omitting the Chandler et al. (1999) study, studies averaged about 6 participants per study, in terms of all participants (not only the ones that met the inclusion criteria for this literature review). However, Chandler et al. (1999) identified the importance of training teachers as the creators and implementers of the FBAs. Through a series of workshops, teachers were given the requisite knowledge to generate effective FBAs for entire classes.

The emphasis on training for class-wide implementation is indicative of the importance of implementer characteristics, as discussed in the next section.

The second notable aspect about this sample of studies is in regard to gender. The minimal representation of female participants is very likely an unavoidable aspect of this type of research. The omission of girls from all but the largest descriptive methods studies severely limits the generalizability of the results of the FBA process to this population. However, this proportion of males to females may be representative of the population schools and early childhood centers identify as necessitating an FBA.

The third practical consideration that is a strong point in regard to this sample of FBA studies is the issue of setting. FBAs that are set in highly controlled settings such as clinics threaten the applicability of this process. This is noted in this sample as all of the studies were conducted in natural settings. Even the use of separate rooms other than participants' classrooms threatens the external validity of the FBA process, as it exists today. The consequence of this artificial setting is that the generalizability of these studies remains questionable. Because of their countless responsibilities for an entire classroom of students, it is unlikely that teachers will be able to spend the necessary time required to conduct one-on-one descriptive assessments of students in separate classrooms.

Furthermore, unless the student's behavior is automatically reinforced, it is likely to be mediated in some way by social settings. Therefore, conducting assessments away from the typical classroom or early childhood center milieu may create artificial variables not typically found in the classroom settings. An additional consideration beyond the FBA setting is the consideration of who actually conducted and implemented the FBA.

Implementer Characteristics

Because educators will ultimately be responsible for generating effective FBAs, it is important to note who is generating the FBAs in research studies (Scott et al., 2004). In all of the studies in this section of the literature review, an effort was made to include general and special education teachers in the creation and implementation of the FBA (see Kamps et al., 1995; VanDerHeyden, Witt & Gatti, 2001). However, in 13 out of 14 (93%) of the studies, a number of highly trained researchers and trained graduate and undergraduate students worked with a small, select group of students (or an individual student) and the teachers' role appeared to be very limited. It is important to insure that this process will generalize to the personnel in early childhood centers and schools so that the process can be implemented after researchers leave. Furthermore, this may be the opposite of what is currently occurring in a typical classroom, which is a small number of teachers with minimal training are responsible for creating a large number of FBAs. While investigating who is completing FBAs is an important consideration, how the functions of the behavior are determined is the central issue in this literature review.

Components of the Descriptive Approach

In regard to the varying components of the descriptive approach, all fourteen studies used some combination of descriptive methods to determine a hypothetical function of a challenging behavior. The descriptive approach may include informant assessments such as interviews with the teachers, teaching assistants and/or the parents, a review of permanent records, and behavior checklists. In this sample of articles: 71% (n=10) used some type of interview, 7% (n=1) used a behavior checklist, 100% (n=14) used direct observation, 7% (n=1) used a scatter plot and 7% (n=1) explicitly mentioned performing a records review. All fourteen of the articles also engaged in some type of

hypothesis development in which the researchers and teachers collaborated to generate hypothetical functions for challenging behavior. It should also be noted that studies that evaluated antecedents of the challenging behavior used essentially the same methods of interviewing, behavior checklists, and direct observation for extracting information about the antecedents that precede challenging behaviors.

While underused in this sample, there are two advantages to the use of checklists. First, unlike an interview that is open to interpretation by the individual reviewing the answers, a hypothetical function is explicitly arrived at through the checklist scoring process. Second, behavior checklists are highly efficient and can be completed quickly without extra work. However, they do not have the advantage of direct observation of the child and all information in a behavior checklist is filtered through a third party informant (Shores, et al., 1999).

Direct observation is another descriptive approach. One of the primary methods of this descriptive approach is the use of an A-B-C procedure, in which the observer carefully records the antecedent, behavior, and consequence to establish a pattern of supporting environmental stimuli (Bijou et al., 1968) that either precede or follow the challenging behavior. Direct observation and/or generating an ABC (antecedent-behavior-consequence) hypothesis was used in all fourteen studies. The importance of direct observation is two-fold. First, it provides basic information that can guide other descriptive and analog methodologies. Second, it provides the requisite baseline data to determine if subsequent interventions are effective.

Besides the ABC analysis, another direct observation tool that has been widely used in research to systematically observe the antecedents and consequences of

challenging behavior is the *Functional Assessment Observation Form* (FAOF) (O'Neill et al., 1997). Although more technically complex than the ABC hypothesis sheet, the FAOF allows for the observation of chains and sequences of multiple behaviors and their antecedents and consequences. Identifying chains of behaviors can give insight into whether the challenging behaviors often occur in a hierarchy going from low-intensity to high-intensity (Chandler & Dahlquist, 2002). For example, a student begins poking his neighbor to avoid participating in 'Circle Time.' The teacher verbally prompts the student to stop bothering his neighbor. The student ignores the redirection and begins stomping the floor with his feet. When the teacher asks the student to get up, the student responds by screaming at the teacher and flipping over a nearby chair. Without careful identification of the target behavior, such as 'participating in group activities,' the focus may be placed solely on the high intensity behavior, when in fact the initial behavior, avoiding 'Circle Time,' is a more likely target for intervention strategies. In such cases, interventions can be designed that address the initial challenging behavior early in the chain before high intensity behavior occurs. In addition, the identification of behavioral chains provides evidence that is useful in analyzing environmental events that may precipitate all challenging behaviors. One important methodological consideration noted in Kennedy et al. (2001) and Grandy and Peck (1997) is that these direct observations should occur across settings and at different times of the day. The value of this consideration is that it provides important contextual information regarding the function of the behavior and reinforces the fact that behavior and its functions are often contextually specific.

A teacher interview is another prevalent indirect descriptive method. The use of a semi-structured or unstructured interview with a teacher provided important insight into the possible functions of a behavior for a number of studies that used only a descriptive methodology (e.g. Grandy & Peck, 1997; Kamps et al., 1995). The most common interview used was the Functional Assessment Interview (FAI). The Functional Assessment Interview (O'Neill et al., 1997) is a multi-step interview form designed to identify antecedents of the challenging behavior and establish the function of a child's challenging behavior. This is a comprehensive interview that has some empirical testing (Kinch, Lewis-Palmer, Hagan-Burke, Sugai, 2001) and is described by Gresham, Watson and Skinner (2001) as "the most comprehensive, up-to-date treatment of this topic" (p. 162).

Some different methods of assessment such as a careful review of records (Clarke et al., 1995) and the use of a scatter plot (Symons, McDonald & Wehby, 1998) go relatively unexplored in regard to research studies. In Pakenham, Shute and Reid (2004), one interesting point in regard to the use of formal descriptive assessments was that the teacher who participated in the study said "I already do all of this (formal descriptive assessments), I just never formalized it" (p.23). In light of this consideration, the need for less formal descriptive assessments and more effective ways to access teacher knowledge could be an important step in future research. Additionally, continuing to monitor teachers' perceptions of the FBA process is also an important aspect of current and future research. In this sample of studies, 6 out of 14 (43%) studies administered some type of treatment acceptability questionnaire following the study. Finding assessments that

teachers are willing to implement is as important as finding assessments that accurately identify the functions of challenging behavior.

Functions Identified

Accurately reporting descriptive statistics regarding the determined function for these studies was not feasible for two reasons. First, in the largest study, Chandler et al. (1999), the function of the challenging behavior for the 210 participants was not reported. Second, other studies did not directly report functions of behaviors. For example, some studies reported possible functions by calculating conditional probabilities between the target behavior and the consequences (i.e., Kennedy et al., 2001) or other outcomes as primary and secondary functions (i.e., Van Der Heyden et al., 2001). Therefore, only the most general observations can be made about patterns in this sample of literature regarding the three functions of behavior. This is unfortunate as evaluating base rates of behavioral functions across different populations may be an important area of future research (Gresham, 2003).

The functions of a target behavior that cause the behavior to increase in frequency are typically classified into three types. First, external positive reinforcement includes attention from teacher or peers or tangible rewards (Lalli & Goh, 1993). In this sample, this was the predominate function of challenging behavior- largely teacher attention, followed by peer attention and tangible items. Second, external negative reinforcement includes escape or avoidance of an unpleasant or undesirable stimulus, such as a difficult academic task. A third type of reinforcement is automatic reinforcement, in which the reinforcement is hypothesized to be internal and biologic in nature. This type of reinforcement often explains self-injurious or stereotypic behavior (Mace & Roberts, 1993) and was not a function of behavior for any of the participants in this sample of the

literature. The environmental relationships surrounding a challenging behavior can be further classified in terms of whether the variable precedes the behavior, which is an antecedent, or a reinforcer that follows the behavior, which is a consequence or a function of the behavior. Choice or lack of choice was the predominate antecedent that was manipulated in the five studies that evaluated antecedents in this sample.

With the exception of the predominance of teacher attention as the function of the behavior, there was no distinguishable pattern of the fourteen studies investigated in terms of positive versus negative reinforcement or antecedent versus consequence. The studies varied in terms of their participants. However, some general practical and methodological observations can be made. One notable methodological problem in the research was in regard to the functions determined within this group of studies. These studies often generated, or at least reported, functions that were very general. For example, Schill, Kratochwill and Elliott (1998) describe the function of five of their participants as “attention from adults and/or peers.” (p.128). This lack of specificity is problematic for a number of reasons. First, the lack of specificity makes it difficult to determine the appropriateness of the intervention. In other words, simply saying that attention was the function of the challenging behavior leaves the reader to wonder if access to any type of attention would ameliorate the challenging behavior or does the student require a specific intervention? To this point, the Schill et al. (1998) study did not find a statistically significant difference between the effects of function-based interventions and non-function based interventions. Typically, the greater the amount of specificity in all areas of applied behavior analysis, the more effectively behavior can be measured and modified. Determining the function of a behavior should lead to the

identification of an intervention to implement. If a consequence of a challenging behavior were positive reinforcement through increased adult attention, then an effective intervention would most likely be decreasing attention for challenging behaviors and increasing attention for adaptive or pro-social behaviors. Ultimately, the goal of accurately establishing the function of a behavior is to implement effective interventions.

Interventions Implemented

All of the studies recommended interventions and 93% (n=13) actually implemented the interventions. Descriptive methods within these studies generated similar (but participant-specific) interventions and all of the interventions reported at least initial success at stopping the challenging behaviors to some degree. Examples of the interventions were increasing teacher supervision (Kamps et al, 1995), increasing reinforcement for different behaviors (Schill, et al., 1998; VanDerHeyden, et al., 2001), and embedding preferred activities into existing curriculum (Blair, Umbreit, & Bos, 1999). A more notable aspect of these studies was the follow-up that occurred some time later. Packenham et al. (2004) reported a continued reduction of the challenging behavior five weeks later due to suggestion made as a result of the functional behavior assessment. This finding is surprising, considering Reid (2000) questions whether or not teachers will persist with interventions that are generated by functional assessment over time.

One criticism of specific articles reviewed was a lack of direct congruence between the identified function and the intervention implemented. For example, the intervention of increasing attention to desired behaviors and decreasing attention to challenging behaviors, (e.g. Kennedy et al. 2001; Storey, et al., 1994), while effective, did little to highlight the need for an individual FBA unless this intervention directly matches the antecedents and consequences identified through the FBA process surrounding the

individual target child. A different version of the same criticism was the use of multiple interventions that may or may not address the same function, but are implemented at the same time making it impossible to determine what intervention was actually addressing the identified function.

This lack of distinct function-based interventions is also seen with the insertion of a mediating intervention between the desired behavior and the reinforcement that addressed the function of the behavior. For example, Grandy and Peck (1997) determined that the function of a challenging behavior was teacher attention. However, rather than implement an intervention that directly linked teacher attention with desired behaviors, the researchers established a token economy, which targeted obtaining a tangible item, but indirectly led to increased teacher attention. This lack of direct connection between the determined function and intervention implemented calls into question the accuracy of the determined function or the potency of reinforcers that do not necessarily match function (e.g. tokens). It is impossible to determine if teacher attention was reinforcing the desired behavior or if it was another element of the token economy.

Finally, the use of interventions to confirm hypothesized functions is not methodologically problematic. However, what are problematic are the conclusions that authors of these studies draw from the use of these interventions. For example, by using a reversal design in the implementation of a function-based intervention, Kamps et al. (1995) failed to differentiate between a functional relationship that was established and proven effective and the actual functional relationship that exists for a student's challenging behavior. In other words, just because an intervention worked does not mean it addressed the primary function of the challenging behavior, it simply means that this

intervention is powerful enough to be effective even if it does not directly address the actual function of the challenging behavior. While this is a subtle distinction, it points to one of the cornerstones of applied behavior analysis which is the need for precision in language and in all aspects of empirical studies, or as Baer, Wolf and Risley (1968) described it, the *technological* dimension of empirical studies.

Summary

Descriptive assessment methods represent the vast majority of the assessments being used in FBAs. The wide range of descriptive assessments being used singularly or in varying combinations for the preschoolers in this review also indicate that no one assessment method or combination of assessment methods has emerged as the preeminent process for young children with or at risk for EBD. There are two additional conclusions that can be drawn from a review of these studies.

First and foremost, the issue of methods for accurately determining the function of challenging behavior remains unresolved. There are two major obstacles to resolving the question of what will be the most effective protocol of descriptive assessments for FBAs. First, there is the continued combining of different assessment results in a single study. In other words, studies continue to use interviews, checklists and direct observations without separating what procedures are giving consistent information with other assessments. The second obstacle is the fact that descriptive assessments can only yield hypothetical functions and there is no way to confirm the accuracy of any method without providing some type of environmental manipulation. In order to determine what is best in the widespread application of FBA, it is necessary to determine what components are the most accurate when compared with these environmental manipulations (i.e., a functional analysis).

Second after the most accurate ways to determine function in widespread applications are determined, research should address the issue of function-based interventions. This must be done after the process to accurately determine function has been empirically tested, because function-based interventions are unattainable without accurately determining the function first. This current research sample indicates that there is a gap between the research that has been done to accurately identify the function of a challenging behavior and the research that investigates the use of function-based interventions. Future research needs to concentrate on the implementation of recommended interventions and the rationales that they are based on. It is imperative that researchers delineate between individualized function-based interventions and the recommendation of improved classroom management skills. Researchers and practitioners must recognize that even if a methodology is highly accurate at determining the function of a challenging behavior, but does not lead to highly effective interventions, than the methodology is essentially useless. This leads to the next section of this literature review that includes empirical studies that combined descriptive assessments with functional analysis.

Descriptive Assessments and Functional and Structural Analyses within FBAs

The use of experimental analysis has been widely documented over the past twenty years. While analog assessment is a frequent design in studies in many behavioral journals, particularly the prestigious *Journal of Applied Behavior Analysis*, it has not crossed the research to practice gap in the widespread application of FBA in public schools (McKerchar & Thompson, 2004; Sasso et al., 2001). Explanations for this lack of widespread application vary, but clearly the technical complexities and the additional time and staffing demands that are required to complete these procedures are difficult to

overcome. Furthermore, aspects of functional analysis may seem counterintuitive to many practitioners, especially when conducting functional analysis that manipulate the environment in an effort to elicit, as opposed to prohibit, certain behaviors. Thus, there continues to be a limited amount of research in the use of functional analysis in classroom settings (Ervin et al., 2001).

Illustrating this point, the research base did not translate to a large number of studies within this literature review. Although many studies have used functional or structural analyses with young children, the two criteria that eliminated the majority of the studies were the use of these analyses in natural settings and their use with children with high incidence disabilities. Functional analysis, particularly, continues to be used largely in clinical settings and with more individuals with severe developmental disabilities. In three of the studies that are reviewed, researchers included participants with high-incidence and low incidence disabilities (Ellis & Magee, 1999; Harding et al., 1999; Romaniuk et al., 2002); only the high-incidence participants are discussed in this review. Ten studies met the criteria for inclusion in this section of the literature review (see Table 2-2 for a summary of information regarding each study). The following sections will outline the findings and discuss methodological and practical limitations of the research.

Table 2-2. Descriptive Methods and Functional Analysis for Young Children

Authors/ Year of Publication	Participant Characteristics (number, gender, age, label) Setting characteristics	Implementer Characteristics	Descriptive Methods and Functional Analysis	Antecedent Functions Identified	Interventions Implemented
Broussard & Northrup, (1995)	3 males, 6-9 yrs, at risk for ADHD or EBD, empty classroom and primary classroom	Teachers & researchers	DO, HD, BFA, 3 analog settings based on descriptive analysis	Teacher attention, peer attention, escape academic task	Contingency reversal – No extended intervention implemented
Umbreit (1996)	1 male, 5 yrs, mild MR, daycare center	Teachers & researchers (only training & data collection)	HD, I, DO, BFA-4 conditions	Escape difficult tasks	Modified curriculum, Social skills training
Broussard & Northrup (1997)	4 males, 6-9 yrs, ADHD or at risk for EBD or ADHD, primary classroom	Teachers & Researchers	DO, HD, and BFA	Peer attention	Token economy, DRO
Ellis & Magee (1999)	3 males, 6-10 yrs, mild autism, PDD, EBD, ADHD, separate classroom and primary classroom	Researchers (separate room FAs) and teachers (in class FAs)	DO, HD, FA-4 conditions (incl. peer attn., competition for teacher attn.)	Peer and adult attention, escape from demands	Token economy, Social skills training, task modification
Harding, Wacker, Cooper, Asmus, Jensen-Kovalan, & Grisolano (1999)*	3 males, 4 yrs., ADD, sight and hearing, at risk for EBD, primary classroom	Teachers & researchers	DO, SA, BFA-4 analog conditions	Specific v. general directions, social attention, reprimands	More specific directions, increased attention for prosocial behavior
Blair, Umbreit & Eck (2000)	1 male, 4 yrs., at risk for EBD, primary classroom	Teachers & researchers	DO, I, HD, FA-5 conditions	Attain tangibles	Social Skills training, No other interventions
Boyajian, Dupaul, Handler, Eckert, & McGoey (2001)	3 males, 4-5 yrs., at risk for ADHD, primary classroom	Researchers and teachers	DO, I, BFA-4 conditions	Attention, Tangible, Escape	Contingency reversal over longer period of time (11-18 days)
Doggett, Edwards, Moore, Tingstrom & Wilski(2001)	2 males, 6 & 7 yrs. old, no identified disability, primary classroom	Teachers (teachers implemented BFAs) & researchers	DO, I, BFAs-2 conditions	Teacher attention, peer attention	No interventions

Table 2-2. Continued

Authors/ Year of Publication	Participant Characteristics (number, gender, age, label) Setting characteristics	Implementer Characteristics	Descriptive Methods and Functional Analysis	Antecedent Functions Identified	Interventions Implemented
Romaniuk, Miltenberger, Conyers, Jenner, Jergens & Ringenberger (2002)	7 participants, 5-10 yrs, identified for problem behaviors also some participants Mosaic Down syndrome or mental retardation, separate classroom,	Researchers and therapists	I, Preliminary FA, BFAs-4 conditons	Choice, No Choice, Attention, Escape	No interventions
Stichter, Sasso & Jolivette (2004)*	1 male, 7 yrs., EBD, primary spec. ed. and gen. ed. classrooms	Researchers, Teachers provide descriptive information	DO, BSA- 3 structural variables	Low social demands, high structure	Integrate antecedents that decrease challenging behavior into school day

Note. DO=direct observation; CL=checklist; I=interview; HD=hypothesis development; FA=functional analysis; BFA=brief functional analysis; RR=records review; SA=structural analysis; DRO=differential reinforcement of other behaviors
* indicates a structural analysis

Participant and Setting Characteristics

The total number of participants for all ten of the studies was 28 participants or an average of 2.8 participants per study with a range of 1-7 participants. Only three of the participants in all ten of the studies were female 11% (n=3). Furthermore, while all studies included at least one participant who met the criteria of a high-incidence disability, three of the studies included participants with low-incidence disabilities. For example, in Ellis and Magee (1999) 1 participant had Attention Deficit-Hyperactivity Disorder (ADHD), but the other 2 participants were labeled with mild autism and pervasive developmental disorder (PDD). In Romaniuk et al. (2002) 3 of the 7 participants were diagnosed with Down syndrome or mental retardation. In Harding, et al. (1999) 1 participant had sight and hearing disabilities and 1 was identified with developmental disabilities. This indicates that functional analysis may have a wider range

of applicability with individuals with high-incidence disabilities than the research base reflects. In regard to practical limitations of this literature, the limited number of participants within these research studies is the first indication of the impracticality in making functional analysis an integral part of early childhood settings. The study with the most participants, Romaniuk et al., (2002) (n=7), is one of the most recent studies in this literature review. While this may suggest the possibility of widespread use of functional analysis within the classroom, there is very little other empirical research. Typically, functional analysis is time intensive and is completed on one individual child at a time. One possible explanation is that a low participant size is maintained as researchers place more emphasis on honing the methodology, exercising environmental control, or initiating novel interventions than addressing the need for widespread application. Another possibility is that functional analysis is only appropriate for students needing the most intensive assessments and interventions. It should be noted that studies ten years ago (e.g., Broussard & Northup, 1995) acknowledged the need for widespread application to more students in naturalized settings, although they continued to use very small sample sizes.

The second observation in regard to participants and settings is that the use of analogs in primary classrooms during regular classroom activities indicates some modification from the controlled, structured nature of analogs to more natural, less restrictive settings. One study that clearly modeled this assimilation is the Ellis and Magee (1999) study that conducted environmental manipulations both in the classroom and in a separate environment.

Implementer Characteristics

The roles of researchers and teachers took many forms within this sample of studies. In six (60%) of the studies, the participants' teachers or other school personnel were trained and conducted the analog conditions of the functional analysis. For three of the studies (30%), the researcher conducted the analog conditions. For the Ellis and Magee (1999) study, the researcher conducted the analogs in the separate room and the teacher conducted them in the classroom.

While researcher influence was also observed as a limitation for 'descriptive assessment only' studies, it was even more pronounced in functional and structural analysis trials. Between training teachers and/or conducting analog conditions, researcher influence was even more evident in these studies than the studies in the previous section. This is not surprising due to the highly technical demands of these types of analysis. However, this is important because the greater the influence researchers have on the design and implementation, the more difficult it will be to generalize the findings to teachers as implementers and determine external validity. Some studies included in the third section of this literature review have created protocols that teach teachers how to implement a functional analysis. Such creative methodologies and their effectiveness may be an important part of future research (Sasso et al., 1993).

In fact, the three studies that used researchers to implement the analog conditions introduced considerable bias considering the number of differences that a researcher conducting the analog conditions may have versus the teacher conducting analog conditions. For example, they did not evaluate whether adult attention from a novel person (the researcher) is more or less powerful than adult attention from a teacher. This ignores all of the idiosyncratic and qualitative variables that may be influencing the

occurrence for the behavior (i.e., tone of voice, appearance, person preference and so forth) that are introduced with researchers conducting the analogs. Finally, the issue of external validity is brought into question. Since these studies were not designed to address long-term widespread application, it is not necessarily a criticism of these specific studies but rather a shortcoming of the research base as a whole. The studies that used researchers to conduct the analogs were actually focused on a specific disability, such as ADHD (Boyajian et al, 2001) or the effects of antecedents as an environmental manipulation (Stichter, Sasso & Jolivette, 2004) and were not directed toward examining the implementation of FBA in school settings. Rather these studies were geared to investigate other aspects of structural and functional analysis and their applicability with individuals with a specific disability or the overall value of the use of antecedent manipulations. The next consideration is how the actual analog procedure took place and what components comprised its protocol.

Components of the Descriptive Approach and Analog Conditions

The preliminary descriptive components were similar to the sample of studies that only used descriptive methodologies. All of the studies (100%) used direct observations and some type of hypothesis development. Five of the studies (50%) also used a structured interview with the teacher and/ or other individuals who have contact with the participants. The only salient difference between the descriptive methods in this sample of studies and the sample of studies that only used descriptive methods is that this sample of studies was more parsimonious in its use of descriptive assessments. In evaluating the descriptive assessments listed in these 10 studies, it appeared that the descriptive assessments were only selected and used to the extent that they could guide the functional or structural analysis procedures. These studies used the descriptive assessment results to

identify times and situations to conduct analog probes during the times or activities that teachers identified as the most problematic. For example, both Broussard and Northup (1995, 1997) only used direct observations of the participant and a brief interview with the teacher to determine what analog conditions to conduct.

In studies using functional analysis, the five ‘traditional’ analog conditions were as varied as the participants with whom they were being implemented. The studies often included variations of the following conditions (1) alone or ignoring, (2) attention, (3) tangible reward, (4) escape or avoidance of a task and (5) free play. These are the classic conditions established by Iwata (1982/1994) and other researchers using functional analysis. Besides using two different settings, classroom and separate room, Ellis and Magee (1998) described another notable variation of their analog conditions. Two alternative analog settings were implemented: (1) peer attention with the use of a confederate peer attending the target behavior and (2) peer competition for teacher attention. These two contrived analogs represent another step toward integrating functional analysis into more natural settings and provide a more accurate means of assessment using functional analysis. The results indicated that peer attention did play a role in the function of one participant’s target behavior.

Romaniuk et al. (2002) provided another addition to the classic analogs by the testing choice or ‘control’ as a precursor of challenging behavior; this manipulation is considered a structural analysis. To test control, this study offered the participant the option to choose the activity in one condition and did not allow them to choose the activity in another condition. Not being able to choose the activity was the setting event or antecedent of the participant’s challenging behaviors. The examination of choice or

‘control’ as a possible pre is similar to the Blair, Umbreit and Bos (1999), a study reviewed in the ‘descriptive methods only’ section of this literature review.

The methodology of all of the functional analyses studies differed from those that were originally conceived of in Iwata et al. (1982/1994); because they took far less time, used descriptive methods to precede the analog settings, and were subject to more of the situations that occur in natural settings. Thus, while the roots of functional analysis can be traced back to Iwata et al. (1982/1994), the process has clearly evolved. This evolution also includes the use of structural analyses, manipulating antecedents in much the same way that a functional analysis manipulates consequences. This process was used with two studies, Harding et al. (1999) and Stichter et al. (2004). In Harding et al. (1999), variables such as general directions versus specific directions and group activity versus independent activity were manipulated. For Stichter et al. (2004), variables such as noise, structure, and levels of socialization were manipulated. Whether investigating antecedents or consequences, the important issue in these studies is determining the environmental factors that are related to the challenging behavior so that the functions may be accurately identified.

Functions Identified

As noted in Broussard and Northup (1995), the most prevalent functions typically identified, in general, are teacher attention, peer attention, and escape from academic demands. An overview of this sample of studies confirms this assertion and, similar to the sample of studies that used descriptive assessments only, it is impossible to descriptively summarize the most prevalent functions using descriptive statistics. However, it can be observed that no other pattern of identified functions emerged. In other words, there was not a clear difference in the number of participants whose function was either positively

reinforced (i.e., attention or tangible) or negative reinforced (i.e., escape). Furthermore, the explanation for why it is so difficult to make summative statements is a notable strength of this sample of studies. Namely, the high degree of specificity of function makes summative statements across participants difficult. A difference between this group of studies and the ‘descriptive methods only’ studies is that the functions that functional analysis determines are more specifically and precisely defined. Proponents of functional analysis view the lack of specificity with descriptive assessments as problematic. They assert that as functions are more generally defined, the intervention becomes more idiosyncratic and less effective (Sasso et al., 1992). Harding et al. (1999) noted that in their comparison of the two methodologies, the descriptive methodology produced results that were “difficult to interpret” (p. 329) and “brief experimental analyses were needed to clarify functional relations” (p.330). They did note that this was a result of not being able to observe the target behavior during descriptive analysis.

Another direction of the research within this sample of studies is the combining of structural analysis and functional analysis. As Romaniuk et al. (2002) points out, combinations of antecedents and established functions have not been extensively investigated through research methods. In this study, the antecedent of choice or control over tasks had different effects determined by whether the function of the challenging behavior was attention or escape. This study indicated that choice could serve as a powerful antecedent when the function of a challenging behavior was escape. Harding et al. (1999) used a similar design of measuring both antecedents and consequences. The next logical step after the accurate identification of the functions of challenging behavior

is the implementation of effective interventions that use the information gathered through these methods.

Interventions Implemented

Multiple types of interventions were used with these studies. Functional analysis methodology creates a complex issue when evaluating the interventions used with these studies. Within the ten articles reviewed, following the functional and structural analysis, an environmental manipulation was conducted that resulted in reducing the challenging behavior using a contingency reversal. There were also a variety of other interventions that occurred following the functional analysis. Five studies (50%) reported reducing the occurrence of challenging behaviors during the intervention phase, also referred to as the contingency reversal phase. However, the other 5 studies used other interventions including differential reinforcement of other behaviors (DRO), and implementing token economies.

It should be noted that Boyajian et al. (2001) reported a continued reduction of the challenging behavior six months later due to implementing contingency reversal elements into the milieu; thus, the contingency reversal became the intervention that was implemented over time. Contingency reversal involves establishing an environment that increases the rate of challenging behavior and implementing a phase of the opposite condition. For example, because a challenging behavior increases during a ‘no choice, high academic demand’ condition, the reversal contingency would be ‘participant choice and low academic demand.’ While this reversal accomplished the desired result, it may not be a situation that is appropriate across situations in the typical preschool environment. The reason this situation may not be appropriate to generalize to typical preschool environments is that at some point it is necessary to give children tasks that are

not preferred and to ask children to participate in activities that are not preferred. It should also be noted that even if an antecedent based intervention is implemented that decreases the probability of the challenging behavior, one will still have to implement an intervention that directly addresses the occurrence of the challenging behavior at some point.

The fact that a reversal contingency may not be appropriate for implementation in an early childhood environment illustrates a practical limitation in studies with this type of design. As Blair, Umbreit and Eck (2000) indicate, the reversal of the problematic contingency was not feasible in preschool settings, because it is not always possible to put children in the situations that will reduce challenging behaviors (i.e., always making sure there were a positive ratio of available toys to peers). In the natural setting of a preschool classroom, there will be times when there are not enough toys for everyone, or when access to a preferred toy may not be possible because another child is playing with it. Further, insuring that this does not ever happen to the student does not allow the participant to gain appropriate adaptive or social skills. It may be more appropriate to increase the amount of social skill instruction that precedes a functional behavior assessment to alleviate its use and then to have specific interventions in place that address the challenging behaviors after they occur.

A notable aspect of these studies was the follow-up that occurred some time later. Harding et al. (1999), Boyajian et al. (2001), and Ellis and Magee (1999) reported continued decreases in challenging behaviors for the participants as they followed up to six months later. The durability of these prescribed interventions is encouraging. As FBA research continues, more and more examples of effective interventions will be devised

and illustrated, allowing practitioners to make direct connections between the identified function and the intervention that is implemented.

Summary

The use of functional and structural analysis with young children with or at risk for EBD remains an important area of future research. Clearly, the research is still in the process of evolving from its setting in clinics with individuals with severe disabilities to settings with children in classrooms with mild disabilities. However, it is difficult to determine what role the methodical manipulation of the environment will play in the widespread application of functional analysis methodology in FBAs. Thus far, this methodology has not become a part of the protocol in the formulation of FBAs in schools. The concept of teachers deliberately manipulating the environment and tracking the increase or decrease of challenging behavior may never be feasible. In this sample of studies, functional analysis was used as one more method, albeit typically the most decisive and trustworthy method, to triangulate assessment methods and accurately determine the function of challenging behavior. There are three salient points that can be drawn from this sample of the literature.

First, similar to the first set of studies, no study with functional analysis procedures could be conducted with large numbers of children in the same setting, thus there continues to be small sample sizes and little replication has occurred. Researcher involvement and highly specific but varied methodologies make it difficult to foresee what role functional analysis will play in school and early childhood settings based on this sample of literature. The issue of data collection is also an important consideration. In all of these studies, functional analysis was a multi-person job and, while it was encouraging to see teachers taking an active role in conducting the analogs, it was still

necessary to have trained observers count and record the occurrences of the behavior. It is impossible to know whether early childhood centers and schools will be able to dedicate the appropriate amount of personnel for training and data collection that is necessary to both conduct the analog conditions but also to record the occurrences of behaviors. To the second point, if the interventions are not feasible or lack social validity, this dedication of time, personnel, and resources to functional analysis may not even be desirable.

Second, in each of these studies, functional analysis procedures depended on descriptive assessments and discerning the results from the different descriptive methods and the functional analysis were impossible. This leads to the question ‘Was the functional analysis, as part of an FBA protocol, necessary if descriptive assessments arrived at the same function?’ Additionally, a core principle of functional analysis is environmental control (Sasso et al., 2001) and functional analysis is only as effective as the amount of control that can be obtained. The difficulty is that classrooms by nature are free operant environments, especially compared with clinics (Scott et al. 2004) and establishing necessary environmental control may be difficult for educators with limited time and resources. For this reason, functional analysis may not be appropriate as one more component of a FBA protocol. It is important for future research to continue to use more classroom settings and to increase the amount of teacher influence to evaluate the role of functional analysis in classroom protocols.

Third, while functional analysis can develop more specific functions that lead to more effective interventions (Harding et al., 1999), they can also lead to interventions that are not practical or appropriate for implementation in the natural setting (Blair,

Umbreit & Eck, 2000). In consideration of these points, the ultimate role of functional analysis may be as an effective method to evaluate the accuracy of less obtrusive descriptive methodologies, however, it is difficult to see its widespread adoption as a component of a standard FBA protocol. Unlike the studies reviewed in this section that combined functional analysis and descriptive methodologies as a protocol to determine function, the next section will separately evaluate different descriptive methodologies using functional analysis as the standard to determine their accuracy.

Direct Evaluation of Descriptive Methodologies

A search for articles that directly evaluated different descriptive methodologies indicates a dearth of research in this area. Only eight studies were identified that evaluated the reliability of different descriptive methodologies when comparing the results with each other, such as comparing the results of a direct observation and a teacher interview. Furthermore, only six out of these eight evaluated the validity of these descriptive methodologies by comparing them to a functional analysis. Murdock, et al., (2005) and Ellingson et al. (2000) only compared different types of descriptive assessments with each other. This paucity in the research is particularly evident with children who are diagnosed or at risk for EBD (Gresham, 2003; Gresham et al. 2004; Fox, Conroy, Heckaman, 1998; Sasso et al., 2001). Due to the limited research in this area, it was necessary to expand the exclusion criteria beyond young children with EBD to include all ability and age levels of children. In fact, all but one of the studies included participants with more severe developmental disabilities and the age range was expanded to even include young adults, some of whom were evaluated in residential and vocational settings. Additionally, the criterion regarding the age of the research was also expanded from ten years to 15 years.

Finally, unlike the previous two bodies of literature, the interventions were not evaluated within this section of the study, because the focus of this review is to determine how accurately functions are identified via various descriptive methodologies. Evaluating function-based interventions will be an important area of future research but that area is premature until the methods for accurately identifying functions have been evaluated. Further, the rationale for omitting this aspect of the research study was to provide greater focus on the methodologies used to evaluate the assessments rather than evaluating the resulting interventions; therefore, the focus of this section is to examine the portion of the study that attempted to determine a primary function of the challenging behavior. Function-based interventions will be an important area of future research; however, research methods must first empirically determine whether the assessment methods can accurately arrive at the function of the challenging behavior.

All other criteria that were established for this review of the literature were maintained. One important criterion that was maintained between this body of research and the other two areas of research was limiting the specific target behaviors to exclude research geared toward highly specific behaviors that are not typical of most young children who demonstrate challenging behavior (e.g. self-injurious behavior, stereotypy, hair-twirling, eye-poking, breath-holding) were eliminated. Therefore, studies that compared descriptive assessments with functional analyses for bizarre speech (Mace & Lalli, 1991) stereotypy (Crawford, Brockel, Schauss, & Miltenberger, 1992; Paclawskyj, Matson, Rush, Smalls & Vollmer, 2001) or self-injurious behavior (Belfiore, Browder & Lin, 1993; Lerman & Iwata, 1993; Paclawskyj et al., 2001) for the majority of the participants were excluded.

Because the different assessment methods were evaluated separately and, in some cases, compared with the results of a functional analysis, these eight studies are unlike the other studies that used descriptive assessments and functional analysis in the FBA process. The studies in the previous two sections simply used various descriptive assessment methods and assimilated the results to develop a hypothetical function and/or guide a functional analysis. The studies that evaluated the different descriptive assessment methods listed the results of each method separately and reported agreement or disagreement between the methods. Because these studies more closely resemble the study being proposed, these eight studies will be presented in a study-by-study basis, in reverse chronological order, presenting the most recent study first (see Table 2-3 for a summary of information regarding each of these studies).

In Murdock, et al., (2005), eight junior high school students (7 classified as EBD, 1 classified as LD) were evaluated using three descriptive assessment methods. The three methods were a teacher team interview, a student interview and classroom observations. No functional analysis procedures were used. First, a team of teachers who worked with an individual student was assembled and the first author used a questionnaire to guide the interview process regarding specific challenging behaviors and the environmental factors that surrounded the behaviors. The responses were condensed into summary statements that included the challenging behaviors, and both antecedents and hypothetical functions.

Table 2-3. Direct Evaluations of Descriptive Assessments

Studies	Participants: Age, Gender, Disability	Setting	Who completed the FBA?	What descriptive assessments were used?	Agreement between descriptive assessments	How was the functional analysis completed?	Agreement between FA and descriptive assessments
Murdock, O'Neill & Cunningham (2005)	-8 junior high school age males -7 classified EBD -1 classified LD	General ed and resource classrooms	-Teacher Team completed questionnaire -Student questionnaire -Researchers and paraprofessional conducted direct observations	Teacher FAI, Student-FAI and FAOF	9/ 14 (64%) agreement on all three 13/ 14 (93%) agreement between teacher FAI and FAOF	N/A	N/A
Newcomer & Lewis (2004)	-9 years, Male, OHI -11 years, Male, at-risk -11 years, Female, at risk	General education classrooms	Researchers administered FAI and PBQ to teachers and students. Researchers completed direct observations and FAs	FAI (S-FAI), PBQ, Scatterplot, ABC	Assessments were consistent except for PBQ results with 2/3 participants	Based on descriptive assessments, each participant placed in one indicated and one control condition	Agreement between descriptive assessments and functional analysis for 2/3 participants
Cunningham & O'Neill (2000)	-3 years, Male, Autism -5 years, Male, Autism -5 years Male, Autism	Self-contained classrooms	Researchers administered descriptive assessments to teacher and classroom assistant. Teacher completed the FAO. Researchers completed FAs.	MAS, FAI, FAO, Informal question	Good consistency across methods and participants. Used rank orders for hypothetical functions	Each participant placed in 5 analog conditions in a separate school multi-purpose room	Rank order indicates good agreement of primary function between descriptive assessments and FA for 2/3 participants

Table 2-3. Continued

Studies	Participants: Age, Gender, Disability	Setting	Who completed the FBA?	What descriptive assessments were used?	Agreement between descriptive assessments	How was the functional analysis completed?	Agreement between FA and descriptive assessments
Ellingson, Miltenberger et al. (2000)	-19 years, Female, Severe M.R. -18 years, Male, Angelman's syndrome & profound M.R. -12 years Male, Severe M.R.	Self-contained classrooms	Researchers administered questionnaire to teachers and teachers completed questionnaire independently. Conducted direct observations	Questionnaire, Interview, and ABC	Questionnaires and interviews consistent with each other. Results from ABC were not consistent with questionnaire results	N/A	N/A
Yarbrough & Carr (2000)	-18.33 years Male, Autism & Profound M.R. -11.5 years. Female, Autism & Profound M.R. -12.4 years, Female DeLange Syndrome & Moderate M.R.	Self-contatined classrooms, vocational and community placements	Researchers administered adapted FAI to teachers and classroom assistants and conducted functional analysis	FAI followed by a Likert scale rating the resulting hypothesized functions. FAI also generated high and low likelihood antecedents	N/A	Based on FAI information high and low likelihood antecedents manipulated in natural settings and one hypothesized function is implemented across antecedents	Agreement between FAI and FAs consistent for high likelihood but not for low likelihood antecedents

Table 2-3. Continued

Studies	Participants: Age, Gender, Disability	Setting	Who completed the FBA?	What descriptive assessments were used?	Agreement between descriptive assessments	How was the functional analysis completed?	Agreement between FA and descriptive assessments
Calloway & Simpson (1998)	-3 years, Male, Developmental delays - 4 years, Male, Speech & Cognitive delays -4 years, Male, Speech & Language, Chronic misbehavior	Self-contained classrooms	Researchers conducted FBAs and administered descriptive assessment to teacher and paraeducators	Informal ranking process of 4 possible functions of misbehavior,	N/A	Based on preliminary assessments each participant placed in 1-3 analog conditions. Analysis occurred in small work room or isolated classroom	Minimal agreement between informal assessment and FA. Only one paraeducator for one participant agreed with the FA results for primary functions
Arndorfer, Miltenberger, Woster, Rortvedt, & Gaffney (1994)	-3 years, Female, Speech delays -13 years, Male, Down syndrome -5 years, Male, Autism & Mild MR -2 years, Male, FAS -5 years, Male, Bipolar disorder	Participants' homes	-Researchers administered MAS and FAI to parents. Researchers completed A-B-C direct observation assessments. - Researchers directed parents in FA conditions	MAS, FAI, ABC	-MAS consistent with FAI for 2/5* -FAI and A-B-C consistent 5/5. MAS and A-B-C consistent 2/5	Each participant was placed in two analog conditions either escape or attention**	Consistent agreement between ABC, FAI and FA. Inconsistent agreement for MAS and FA.

Table 2-3. Continued

Studies	Participants: Age, Gender, Disability	Setting	Who completed the FBA?	What descriptive assessments were used?	Agreement between descriptive assessments	How was the functional analysis completed?	Agreement between FA and descriptive assessments
Sasso et al. (1992)	-7.5 years, Female, Autism -13 years, Male, Autism	Self-contained classrooms	Teachers completed all aspects of FBA	ABC direct observation	N/A	Researcher conducted formal FA. Each teacher conducted 5 analog conditions in classroom	Consistent agreement between ABC results and FAs

*For the other 3 participants, the second function on the MAS was the same as the primary function for the FAI.

**One participant was placed in an interrupted play versus non-interrupted play condition.

The team scored the accuracy of the statements on a four-point Likert scale and then ranked the summary statements from least to most problematic for the student in the classroom. This final step of scoring summary statements for accuracy was developed in another study included in this review, Yarbrough and Carr (2000). Second, the first author conducted the same interview process with each individual student. Third, the first author and a paraprofessional conducted direct classroom observations using the Functional Assessment Observation Form (FAOF). Using the results from the teacher team interview as a guide, students were observed for 20-30 minutes, 1-3 times per week for three weeks. This resulted in a total range of 5-15 hours of direct observation. Inter-observer agreement was conducted for 19% of the sessions and averaged 80% agreement. Participating teachers also completed a social validity scale to assess the three-step process. There were four possible hypothetical functions (attention, escape, tangible and self-stimulation) that the three assessment methods could identify. However, tangible and self-stimulation were almost never identified in teacher and student summary statements. Results of the study indicated agreement of a hypothesized function for all three methods 9/14 (64%) of the time when either escape or attention was identified. When there was not agreement across all three methods, the teacher team interview and the direct observations still agreed four out of the other five times. Escape from a task or activity was the most prevalent function identified.

There are four conclusions that can be drawn from this study. First, these investigators achieved a moderate level of agreement across descriptive assessments. Second, although there was agreement across the results of different assessment methods (including a measure of confidence from participating teachers and students), the validity

of the results remains unconfirmed because no experimental procedure occurred. Thus, the results are correlational in nature. Without an experimentally rigorous functional analysis, the consistency across instruments does not necessarily indicate validity of the function. In other words, all of the descriptive assessment may agree with each other that the function is attention, but this may not actually be the function. This is especially true if the same individual is completing all of the descriptive assessments. Third, the nature of the participants limited the possible hypothetical functions that could be determined. It is unlikely that in this setting junior high school aged students with disabilities such as LD and EBD would engage in self-stimulation or have acquiring tangibles as the function of their behavior. In other words, this sample of students was unlikely to engage in stereotypy and also unlikely to argue over toys (although other tangibles could cause challenging behavior). By limiting possible functions to attention and escape, this increased the possibility for agreement across measures. Fourth, the findings of the descriptive assessments were not kept separate in this study, the direct observations were informed by the teacher team interviews “the behaviors listed on the observation form came directly from those listed on the teacher interview form.” (p.10). This makes the level of agreement between the teacher interviews and the direct observations less compelling.

In Newcomer and Lewis (2004), three elementary-aged students (one classified as Other Health Impaired, two not classified with any specific disability) were first evaluated using five descriptive assessment methods followed by a brief functional analysis was conducted. The five assessment methods were a teacher interview, a student interview, a teacher checklist, a scatter plot, and classroom observations. The functional

analysis procedures presented a limited number of conditions (attention v. no attention, preferred v. non-preferred peer groups, easy task v. hard task). These conditions were guided by the descriptive assessment results and while the article refers to all three experimental procedures as functional analyses, the manipulations of peer group and task difficulty is more aptly described as a structural analysis, because it is a manipulation of antecedents rather than consequences.

The five descriptive assessments were presented in the same order for all participants. First, the teachers were interviewed using an adapted version of the Functional Assessment Interview (O'Neill et al., 1997). After a hypothesis regarding function was formulated using the interview results, teachers were asked to complete the checklist, the Problem Behavior Questionnaire (PBQ), and a scatter plot for a minimum of five days. It should be noted that unlike the other assessment methods used in this study, the scatter plot does not lead to a hypothetical function, it is a direct observational tool that identifies patterns between occurrences of the behavior and times of day and/or activities (Touchette, et al., 1985). Targeted students were then interviewed using the student version of the FAI. Finally, the student was observed using the Antecedent Behavior Consequence (A-B-C) sheet. The observation periods were determined by results from the other descriptive assessments. The amount of time and number of observations for this descriptive assessment were not reported. These descriptive assessment results were assimilated to identify a primary hypothetical function that was tested through experimental analysis.

The experimental analysis was constructed using a single-case, alternating treatment design. The analyses occurred in natural classroom settings during both

academic and low structure tasks and targeted individually identified challenging behaviors. Each child was exposed to 10-minute analog probes featuring the hypothesized function condition, according to the descriptive assessments and a control or contra-indicated condition. There was a range of 13-22 sessions over 2- 7 days. The results of the experimental analysis showed clear differentiation of rates of challenging behavior across conditions for 2 of the 3 participants, supporting the summative results of the descriptive assessments for these 2 participants. There was only slight differentiation between the conditions for the third participant offering limited support to the result of the descriptive assessment.

The results of the descriptive assessments were also compared with each other. Newcomer and Lewis state that all of the descriptive assessments were consistent with two exceptions. For one student, the teacher interview and the checklist indicated attention was the primary function, but all of the other assessments including the experimental analysis indicated that escape was the primary function. Similarly, for another participant, the checklist identified attention as the primary function when all other assessments supported escape as the primary function. It is notable that neither of these 2 participants was the same individual that had limited support from the functional analysis. Therefore, all 3 participants had some type of assessment result that was inconsistent with other assessment results.

There are three conclusions that can be drawn regarding this research study. First, although there is some evidence to support the reliability and validity of descriptive assessments, in that they had fairly consistent results that were supported by an experimental procedure, the function of behavior in this case does appear contextually

relative and somewhat fluid. Second, the use of descriptive assessments as a ‘package’ with a specific order and one assessment informing the next one does not allow for scrutiny of the individual assessments and does make the results vulnerable to an order effect. Third, by limiting the functional analysis conditions to those suggested by the descriptive assessments, no other functions were experimentally tested. This means that if additional function of the behavior exists, but was not indicated by the majority of the descriptive assessments, then it was not evaluated experimentally.

In Cunningham and O’Neill (2000), three preschool aged children with autism were evaluated using four descriptive assessments and an experimental functional analysis. The four descriptive assessments were: an informal question to the teacher and classroom assistant (e.g. “Why do you think Dan bites?”), a teacher interview (the Functional Assessment Interview), a behavior checklist (the Motivation Assessment Scale), and descriptive observations (the Functional Assessment Observation Form). The functional analysis was then conducted replicating the procedure outlined in Iwata, Dorsey, Slifer, Bauman and Richman (1994/1982) presenting 5 analog conditions: demand (escape), attention, tangible, alone and free play.

The procedure for this study consisted of conducting the indirect descriptive assessments (the informal question, the interview, and the behavior checklist) with both the teacher and the classroom assistant after class hours. These were conducted separately for each teacher/classroom assistant dyad to determine if the two adults present in the classroom had similar perceptions of the challenging behavior and its antecedents and consequences. The MAS scores were then combined to give an average score for the primary function. The primary classroom teacher then completed the direct observations

for two hours a day for 4-5 days, resulting in a total of 10-12 hours of direct observation for each participating student. Inter-observer agreement was conducted for 20% of these sessions and ranged from 80%-100% agreement. The design for the experimental functional analysis was a single subject, multi-element design with 15-minute sessions being conducted in separate rooms that were made available to the researchers, e.g. a multi-purpose room adjacent to the gymnasium.

The results for the various different descriptive assessments were presented as a rank ordering of hypothetical functions of the target behavior. For the descriptive assessments, there was perfect agreement for the informal question and the interview for all dyads of teachers and assistants. The other assessments also had fairly good agreement in which all the assessments varied only somewhat, for example, the MAS listed escape as the primary function and tangible as secondary and the FAI listed tangible as primary and escape as secondary. For the functional analysis, 2 of the 3 participants had little differentiation between tangible and escape. However, this mixed result actually confirms the descriptive results that had similar mixed primary functions across the different assessments.

There are three conclusions regarding this research study. First, soliciting information from both the teacher and the classroom assistant determined that the two adults present in the room had similar perceptions regarding behavioral functions (i.e., inter-rater reliability). Second, the use of ranking the functions for each student and each assessment allowed for students whose challenging behavior may have dual functions but could have complex results. Subsequently complex interventions that may be difficult to implement in classrooms are the end product. Third, one aspect of the functional analysis

that may make its results less compelling was the low rate of challenging behavior demonstrated across all analog conditions. But because the greatest rate for the students, means of 10%, 10% and 9%, was consistent with the descriptive assessment results, the functional analysis appears accurate.

In Yarbrough and Carr (2000) 3 participants between the ages of 11 and 18 years old were evaluated. Two participants were classified autistic and the third participant was diagnosed with DeLange syndrome. There was only one descriptive assessment used. An adapted version of a Functional Assessment Interview was used with two professionals who had had up to two weeks of contact with the participating student. This descriptive assessment was followed by a brief functional analysis. The brief functional analysis manipulated both antecedents and consequences that had been identified by the descriptive assessment results.

The FAI was adapted in three ways. First, after information had been gathered using the standard FAI questions, summary statements were generated for each participant that outlined setting events, antecedents and consequences. Each professional who was interviewed then verified each statement for accuracy and rated each summary statement on a 7-point Likert scale for likelihood of the situation occurring. Next, the second professional would then evaluate and agree or disagree with these hypothesized summary statements. Lastly, these same steps would be taken with the roles of the two professionals reversed. If statements were generated that the second professional could not confirm witnessing, then a third professional, such as another classroom assistant, would be asked to confirm the statement and its likelihood rating. Following this

descriptive assessment process, a brief functional analysis was conducted using the results.

In the functional analysis, a reversal design was used in which the different hypothesized situations were compared with control conditions that regulated the presence of the hypothesized contributory variables. The 3 participants were placed in seven situations while one or two different hypothetical functions were tested in each condition. For example, the first participant was placed in a situation in which he had to clean a table. The hypothetical function was that his challenging behavior of self-injury was maintained by escaping difficult tasks. A control condition consisted of assigning the participant to a task he found easier, object identification. The frequency of the challenging behavior in these two conditions was then compared. Each participant was placed in two or three high and low-likelihood situations with one or two hypothetical functions of the challenging behavior being tested for each participant.

When the information gathered through the descriptive assessments was tested using an experimental functional analysis, a clear pattern emerged. In those situations that had a high-likelihood of eliciting problem behaviors, the informants accurately identified the surrounding environmental variables. For the situations that had a low likelihood of eliciting challenging behaviors, the functional analysis did not validate the informants' hypotheses of the antecedents and the functions of the challenging behaviors. The authors offer four interrelated factors that may explain this pattern: (1) infrequent opportunities to observe the low-likelihood situations; (2) stimulus complexity; (3) perceived strength of reinforcement; (4) the role of setting events. These factors should be interpreted with caution, as they are not experimentally validated. In terms of evaluating the efficacy and

efficiency of the descriptive assessment method (i.e., the FAI adaptation), it can be concluded that this method is effective for identifying the function for certain frequent behavior problems, but limited in detecting more subtle variables in low-likelihood situations. Unfortunately, the authors did not conduct a treatment acceptability measure, so it cannot be determined if this benefit is worth the time and energy investment for the participating professionals.

In Ellingson, et al., (2000), 3 participants, aged 19, 18 and 12, were evaluated using two different descriptive assessments. No experimental functional analysis procedures were used. The participants were all classified as either severely or profoundly mentally retarded and one participant was also diagnosed with Angelman's syndrome. All of the assessments occurred in special education classrooms in public schools. A second phase of this study investigated function-based interventions, but this phase of the research is outside the scope of this literature review.

The two descriptive assessments were each used in two different ways. The first descriptive assessment was an interview that was presented as both an interview with the first author asking follow-up questions and as a questionnaire that the teacher completed independently. The second descriptive assessment was a direct assessment that used the Antecedent-Behavior-Consequence (ABC) worksheet. These worksheets were simultaneously completed by both teachers and experts trained in Applied Behavior Analysis. The assessments were always presented in the same order: (1) the teacher completed the questionnaire independently, (2) the teacher was interviewed using the same questions as the questionnaire by the first author except follow-up questions were also asked, (3) using the information provided by the interviews and questionnaires an

ABC checklist was formulated and direct observations with the ABC instrument were conducted at the same time by both the classroom teacher and a trained expert. Two other trained behavior analysts conducted reliability checks on the hypothetical function determined for the interview and the questionnaire.

The results of the descriptive assessments were determined by the authors' evaluations of the interview/questionnaire and the ABC checklist results. All of the hypothetical functions were determined to be either attention or escape. For one participant, all of the different methods of assessment, including the second rater who supplied reliability data, agreed that the function of the challenging behavior was attention. For the second participant there was agreement that the function of the behavior was attention for all of the assessments except for the second rater of the questionnaire. For the third participant there was agreement from the indirect assessments; the interview and questionnaire agreed that the function of the problem behavior was both attention and escape. All of the direct observation results determined that the function of the problem behavior was attention.

There are three conclusions regarding this research. First, the agreement between the questionnaire, the interview and the direct observations are encouraging but in consideration for the amount of influence the questionnaire and interview had over structuring the direct observation, the agreement is less compelling. The construction of an ABC checklist using indirect assessments requires further testing, especially against a less structured ABC observation sheet and functional analysis. Second, the agreement between the questionnaire and the interview is a step toward making the process more efficient, (i.e., it only requires one person rather than two people); however, this result

may be idiosyncratic to the skills of the interviewer. Some interviewers may elicit valuable information through follow-up questions that a questionnaire completed independently could never draw out. Third, it is unclear whether the possible functions were in some way limited to the choices of attention or escape, or if this was simply a characteristic of these three specific participants.

In Calloway and Simpson (1998), three preschool aged children were evaluated using two descriptive assessments, an experimental analysis and an informal question posed to teachers and para-educators. The result of the descriptive assessment and the experimental analysis were then compared with the responses to the informal question. The 3 participants were male, ages 4, 4 and 3 and three were in an inclusive community early childhood special education classroom. Two participants were in the same classroom and one was in a different classroom; all assessments took place in the classroom setting. Two children had speech and language and cognitive delays and one participant was diagnosed with developmental delays and suspected autism. All three had been referred to this study for repeated demonstration of various problem behaviors.

The procedure for this study occurred in three phases. The first phase consisted of descriptive classroom observations and completion of the MAS. The researchers interpreted this information and generated a hypothetical function. Manipulating through analog conditions tested this hypothesized function. A reversal design was used with a contra-indicated activity to compare behavioral frequencies. These reversals took place every two or five minutes for either one 10 or 20 minute session. The second phase involved implementing an intervention directly related to this function. This was implemented not only to reduce the problem behaviors for the individual child, but also

to provide further validation of the function of the behavior as determined by the descriptive assessment and functional analysis.

In the third phase of the study, three classroom professionals, either the teacher and/or the classroom para-educators, were asked to identify a hypothetical function of the problem behavior. They had no knowledge of the results of the formal analyses. The classroom professionals were asked to identify the behavioral function using a ranking system of 1-4 for these choices: (a) avoidance, (b) attention, (c) self-expression, and (d) power/control.

According to the formal analyses, one student's function was confirmed as attention, the second student's function was escape and the third student's results indicated that the problem behavior was maintained by multiple functions: attention, power/control and escape. The results of the ranking system indicated that the classroom professional agreed with each other six out of nine opportunities (66%) in identifying the primary function. However when comparing the formal and informal analysis results, the classroom professionals only agreed with the formal analysis one out of nine times (11%).

There are three salient aspects about this research study. First, the use of 'self-expression' and 'power/control' as possible functions is divergent from most current literature regarding functions of problem behavior. Self-expression was the function chosen five out of nine times by the teachers and paraprofessionals, and it was not confirmed by any of the formal analyses. Further, the functions of self-expression and power/control are not even options on the MAS; therefore, a direct comparison between the interview and the MAS for some participants was not possible. Second, agreement

between the analog conditions and the descriptive assessments is difficult to determine since the analogs directly applied the results of the descriptive assessments, making it impossible to separately evaluate them. Third, in regard to the results of the informal analysis, this point to a larger consideration, namely that consistency does not equal accuracy. The professionals were consistent with each other 66% of the time, but they were only accurate in the sense that they agreed with the functional analysis 11% of the time.

In Arndorfer, Miltenberger, Woster, Rorvedt and Gaffeney (1994), five children ages 2 to 13 years old were evaluated using three descriptive assessments and a brief experimental analysis. Unlike the other studies included in this section of the literature review, all of the assessments occurred in the participants' homes. Parents served as the source of information for the indirect assessments and also conducted direct assessments. The 5 participants had been diagnosed with different disabilities including: (1) Down syndrome, (2) fetal alcohol syndrome, (3) autism and mild mental retardation, (4) developmental speech and cognitive delays, and (5) bipolar disorder. All of the participants were referred to this study due to repeated demonstrations of problem behaviors.

There were two phases of this research study. The first phase consisted of the parents completing the Motivation Assessment Scale (MAS) two times with one to two week delays between administrations. Repeated administrations were done to evaluate reliability over time. Before the MAS was scored, the first author conducted the FAI with the parents and the first and second authors independently reviewed the responses and generated hypothetical functions. The MAS was then scored to also determine a

hypothetical function. Then, a third researcher and the parents of the participant, who were unaware of the indirect assessment results, conducted three to five 30-60 minute direct observations using the FAOF. The parents received a brief training session on conducting a direct observation using the FAOF. A scatter-plot assessment determined specific times target behaviors were likely to occur and this guided the times the direct observations were conducted. Inter-observer agreement was conducted for 33% of all direct descriptive assessments. Using the results of direct observations, hypothetical functions of the problem behavior were formulated.

The second phase consisted of experimentally manipulating antecedents and consequences that had been identified through the descriptive assessments. A reversal design consisting of high-likelihood antecedents and consequences and low-likelihood antecedents and consequences was conducted. For example, a participant whose descriptive assessments indicated that attention was the primary function of her behavior had a session where her mother looked at, talked to, or touched her at least twice every minute and all problem behaviors were ignored. In the next condition, the mother looked at, talked to, or touched the participant's siblings at least twice every minute but gave contingent attention based on the participant exhibiting problem behaviors. These conditions were presented in 15-30 minute sessions on the same day for three of the children and over two to three days for the other two children. Only one session of each phase was conducted for each child in an effort to make the experimental analysis as brief, and socially valid, as possible.

The result of the descriptive agreement indicated agreement 16 out of 20 opportunities (four descriptive assessment results for 5 participants). For three out of the

four disagreements, the MAS was the instrument with divergent results. Additionally, agreement between the two administrations of the MAS indicated agreement for individual questions ranging from 56% to 75% ($M=64\%$). The experimental analysis supported the results of the interview and the direct observations for all five of the participants (100%). There was differentiation in the frequency of the problem behaviors throughout the reversal of the conditions.

There are three conclusions regarding this research study. First, this study bolsters the use of the FAI and the direct observations to generate accurate hypothetical functions of behavior, but draws the validity of the results of the MAS into question. Second, while the experimental analysis does offer support for the descriptive assessments, because it only tested one function, it is not possible to know if other functions of the behavior exist without testing multiple functions. Third, by only conducting sessions of each condition on one day for 3 of the 5 participants, there are contextual factors, and setting events that may not be accounted for and may impact the function of the problem behavior. It seems possible that this study may have sacrificed a degree of accuracy in an effort to increase efficiency and social validity of the experimental process.

In Sasso et al. (1992), 2 participants, ages 7 and 13 years old, were evaluated using a conventional functional analysis, a direct observation descriptive assessment and a teacher conducted functional analysis. Both participants were classified as autistic and the descriptive assessment and teacher conducted functional analysis occurred in self-contained special education classrooms. The conventional functional analysis occurred outside the classroom setting. The direct observation assessment was the ABC worksheet. However, it was completed during specific activities that are similar to the conditions of

the functional analysis conditions (i.e., presentation of a difficult task). The functional analyses consisted of a multi-element design based on Iwata et al. (1982/1994) featuring four conditions: alone, escape, attention, and free play and also including a tangible condition.

There were three phases of this study. First, researchers conducted a conventional functional analysis. Second, the first teacher was trained to complete an ABC observation. Then, the teacher conducted four 15-minute observations of the student. The environment was varied for the observations and included solitary play, a high demand, low teacher attention condition and a low demand and high teacher attention condition. After the direct descriptive observations were completed, a brief functional analysis within the classroom was conducted. The classroom teacher modified the environment to test the five analog conditions. The same procedure occurred for the second participant—the only difference was that the first teacher, rather than the researcher, taught the second teacher to conduct the descriptive assessment and the classroom based functional analysis. The results of this study indicated that in all three methods of assessment, escape and tangible were the functions of the problem behavior for one participant and escape was the function of the problem behavior for the other participant. Thus, there was 100% agreement for both participants.

There are three conclusions that can be drawn from this research study. First, this research article demonstrates flexibility in the functional analysis process, in that the same procedures can be applied across different settings and produce similar results. Second, this study suggests that functional analysis procedures may have broader applicability for classroom teachers. This runs counter to the concept that functional

analysis procedures are too complex to have broad-based appeal. Third, this idea that teachers can effectively train teachers suggests of the possibility of a much broader training model.

There are two conclusions that can be drawn from a summative evaluation of these eight studies that directly compared descriptive assessments with each other and/or some type of functional analysis. First, no descriptive assessment method has emerged as the preeminent method to accurately determine a hypothetical function. It appears that for indirect assessments, teacher interviews, both formal and informal, play an important role in identifying potential functions in seven out of eight of these studies. Their overall accuracy is further suggestion of the conclusion drawn earlier that research should continue to focus on the knowledge teachers already have about their students' behaviors and effectively and efficiently hone methodologies to access this knowledge. For direct descriptive assessments, ABC assessment sheets completed by both teachers and researchers do reveal accurate antecedents and functions. However, this conclusion is tainted by the second conclusion about the overall state of this research. Namely, that all of the methods, descriptive and experimental, were not conducted independently of each other with a high degree of control.

This second conclusion, that the assimilation of results for all of the methodologies muddled the final results, is pervasive throughout all eight of the studies. This is true both for the descriptive assessments and for the link between the descriptive assessments and the functional analyses. The end result is that no conclusions can be drawn about what single descriptive methodology is the most accurate. This occurred for a variety of reasons. First, some studies used a ranking system between raters that allowed for

multiple functions to be enumerated within the results. The second and most influential reason is that the descriptive assessments were used to guide the functional analysis. By not maintaining separation of the descriptive assessments from the functional analysis, the functional analysis can only verify or refute the hypothetical function that the descriptive assessments reveal. Conducted independently, functional analysis can establish the function of the challenging behavior (Iwata et al., 1982/1994). In future research, these results could then be taken back and compared with the independent descriptive assessments to determine which ones accurately arrived at the function.

In summary, the overall lack of comparative studies that evaluated descriptive assessments suggests that descriptive methods have not been validated by research. If descriptive assessments, such as rating scales, interviews, and hypothesis development using antecedent, behavior, consequence (ABC) analysis (Bijou, et al., 1968) indicate an inability to accurately determine the function of a young child's disruptive behavior, then their use is ill-advised. However, if descriptive methods adequately arrive at the same function as experimental analysis, then the use of these simpler, less time-consuming methods has been supported. Regardless of the outcome of the project, it is incumbent upon researchers to prepare school and early childhood center personnel with the best, experimentally validated procedures.

Comprehensive Summary of Research Literature

“Whether FBA can be effectively and efficiently accomplished outside a research setting remains to be seen”(Reid & Nelson, 2002, p.23). As Reid and Nelson suggest, the use of FBA as a durable, highly effective strategy in widespread applications in applied settings remains to be seen. A review of 32 studies that used FBA, predominately with young children with high incidence disabilities in natural settings, indicates three

conclusions that can be drawn from the current state of the research. First, in regard to the participants and settings, the use of functional behavior assessment is still clearly evolving in terms of its use with large numbers of young students with mild disabilities in classroom settings. Second, interventions generated by FBA, while effective in the studies in this sample, remain idiosyncratic and, at times, the relationship between the derived function and the function-based intervention could be described as tenuous at best. The third and the most important factor is that in terms of the FBA process the individual components that would make up a universal FBA protocol have not been established as valid and reliable for the widespread application of functional behavior assessment.

The first conclusion in regard to the research in this literature review concerns the participants and settings of FBA. Two considerations regarding the practical limitations of all of these studies are the types of disabilities that are being addressed and their use of large numbers of students. A third ancillary consideration is the type of behaviors that are being addressed within the FBA literature. What may be attributed to IDEA (1997) was this use of FBAs for children with disabilities other than developmental disabilities. In 1999, Nelson, Roberts, Mathur and Rutherford estimated that 80%-90% of functional assessment research had been conducted with children with developmental disabilities. The trend, however, to apply it to students with other disabilities or no disability at all is proliferating according to this sample of studies. This is encouraging and indicates that FBA is a highly flexible process with multiple levels of applications.

Combined with the problem of determining the ability to generate large numbers of FBAs, the problem of researcher influence is an important consideration. The question of

‘how well do these studies indicate what will occur in generalized application after the study?’ remains. This threat to external validity points to an important area of future research. There is a need for further research in this area that uses longitudinal methodology providing initial teacher training on the use of descriptive assessments, a series of temporally determined probes to evaluate implementation fidelity, and a final measure of effectiveness. Studies using a design such as this will allow researchers to minimize the impact that they are having on teacher implementation of the FBA process. This is a problematic shortcoming of the research that has not been answered to date.

A third point regarding this first conclusion is in regard to what types of behaviors research has addressed with FBA methodology. Studies clearly addressed a predominance of externalizing behaviors. While this is not surprising, as teachers are more likely to identify externalizing behaviors as problematic, it does point to another shortcoming in literature thus far. This is the question ‘can FBA procedures effectively address problematic internalizing behaviors?’ Internalizing behaviors, social withdrawal, isolation, and flat affect can be as problematic for students as externalizing behaviors (Chandler & Dahlquist, 2002). However, current research has not addressed whether these behaviors can be effectively addressed through functional behavior assessment.

The second conclusion is in regard to function-based interventions. While some interventions led to highly specific interventions directly related to the function of the challenging behavior, other interventions were only indirectly related to the function or were not related at all. Researchers and teachers implemented a number of effective interventions, manipulating both antecedents and consequences to reduce challenging behaviors; however, one practical and methodological limitation is evident from this

sample of literature. In regard to methodology, even studies that were directly linked to the intervention received far less emphasis than the process that arrived at the function of the behavior. Empirical research has not produced a ‘menu’ of validated interventions that directly match functions. However, the overall lack of emphasis on interventions is surprising as the ultimate goal of FBAs is the formulation of effective intervention and essentially FBA methodology will be judged on its effectiveness. In regard to practical limitations, a limitation that this sample of studies did not address is the question of teachers being able to sustain prescribed, function-based interventions for a number of students over time. This will be an important area of future research as widespread application of function-based interventions continues to broaden into different types of classrooms and different populations of students.

The third and most important conclusion regarding this literature is the lack of validity and reliability studies that directly evaluate the components that make up the FBA process. The reason this conclusion is the most important is that before widespread application for many children in applied settings with a variety of behaviors can occur, the process must be honed so that it is not only reliable and valid, but also accessible to minimally trained school personnel and highly efficient. Similarly, although effective function-based interventions are paramount to the process, it will be impossible to derive those without reliable and valid components. Unfortunately, even in the third section of this literature review, a section that was comprised of studies that directly evaluated descriptive assessments, useful evaluation of the components did not occur. There was still a lack of separation of the findings between the individual descriptive assessments and the descriptive assessments and the functional analysis that was often used to validate

the hypothetical functions. As a result in these research studies, it was very difficult to determine what components were most effective.

This leads to an important area of research namely, conducting a series of indirect and direct descriptive assessments and comparing the outcomes of these assessments to the outcomes of a functional analysis methodology. However, to rectify limitations in the existing research, independence of the descriptive assessment results and the functional analysis results is important to determine if the descriptive instruments are able to obtain valid functions independent of the functional analyses. Additionally, the results of the various direct and indirect descriptive assessments would need to be kept separate and counterbalanced across participants to maintain control for carry over and order effects. These assessments should occur in natural settings with consideration of total time of procedures and necessary levels of training with the goal of maximizing efficiency without sacrificing validity. While this literature review has indicated a number of problems with the widespread application of FBA in natural settings, it is vital that the methodologies be evaluated before issues of implementation, teacher training, and effective interventions are addressed. The results of this research are an empirically validated step towards establishing a universal protocol that can be applied consistently both in continuing FBA research and in applied settings.

Research Questions

The following questions were addressed in this study:

1. How do the functions of target behaviors identified through various descriptive functional assessments compare to each other?
2. How do the functions of target behaviors identified through various descriptive functional assessments compare with functions identified through a functional analysis for young children's challenging behavior?

CHAPTER 3 METHODS

This chapter outlines the methodology used to conduct this study. The goals of this study were to compare the functions determined by three descriptive assessments with each other and with the functions determined by functional analyses (FA) for young children who demonstrate challenging behaviors. Teachers' perceptions of the process and its results were also evaluated. This chapter presents the following information: (a) participants, (b) settings, (c) materials, (d) measurement procedures including dependent measures, the independent variables, data collection and type of data recording, and interobserver agreement. This chapter then outlines the experimental procedures including recruitment and training, pre-experimental assessments, descriptive assessments, and functional analysis. Finally, the methods of measuring social validity, procedural integrity, and the design and data analysis are presented.

Participants

Four teacher-child dyads participated in this study. In accordance with the policies set forth by the University of Florida Institutional Review Board, the principal investigator obtained informed consent from the participating teachers and caregivers of participating children (see Appendix A for approved IRB forms and participant informed consent forms). All participating teachers and the child participants' parents received a \$25 dollar gift card. Child participants were four children who met the following criteria.

- Children were between the ages of 3 and 6 years old.

- They were currently enrolled in a Day Care Center, Pre-kindergarten, Kindergarten, or First Grade class (general education or special education) in North Central Florida.
- They had been identified through teacher nominations, in that teachers have reported that these children are having challenging behaviors that are interfering with their learning and this behavior warrants an FBA.
- They had a Total Problem Score of no less than 60 on the Child Behavior Checklist (CBCL-TRF 1.5-5 or 6-18 years old) (Achenbach, 1992).
- They had consistent attendance at school, defined as 80% attendance or 4 out of 5 days a week, documented through school records.
- Teacher reports indicated average cognitive functioning.

Teacher participants were four individuals who met the following criteria:

- They taught children ages 3-6 years old.
- They had at least one child in the classroom who met the criteria above.
- They held at least an Associate of Arts degree,
- They served as the child participant's primary teacher for at least one month.

The flow chart of the teacher and child participant recruiting process is outlined in Appendix B. The following is a brief description of all four participant dyads.

Ramon. Ramon is a 4-year old Hispanic male. His primary teacher, Rose, is a Hispanic female. She has thirty years of experience in early childhood care settings; she has had 7 months of contact with the participating child, and holds a Bachelor of Arts degree. His teacher reported average cognitive functioning. The teacher report form of the Child Behavior Checklist (CBCL-TRF 1.5-5) (Achenbach, 1992) indicated that Ramon has a total score on the Total Problem scale of 110 (>97 percentile) with sub-scores in the clinically significant range for emotionally reactive behavior, anxious/depressed, withdrawn, attention problems and aggressive behavior. Ramon's challenging behaviors were disruptive vocalizations defined as raising his voice above

the classroom volume level, asking more than three questions in a 10-second interval or using profanity or “bathroom talk.”

Anthony. Anthony is a 5-year old African-American male. His teacher reported that Anthony has average cognitive functioning. His primary teacher, Terry, is a white female. She has 4 years of experience in early childhood care settings, has known the participating child for 6 months and has completed her Associate of Arts degree. The teacher report form of the Child Behavior Checklist (CBCL-TRF 1.5-5) (Achenbach, 1992) indicated that Anthony has a total score on the Total Problem Scale of 88 (>97 percentile) with sub-scores in the clinically significant range for emotionally reactive behavior, sleep problems, and aggressive behavior. Anthony’s challenging behaviors were crying, yelling “Mom” or “Mama”, rolling around on the ground, raising his voice above the classroom volume level and leaving his assigned area (defined as being more than 6 feet away from his assigned area).

Jimmy. Jimmy is a 5-year old African-American male. His teacher reported average cognitive functioning. His primary teacher, Amy, is a white female. She has 25 years of experience in an early childhood care setting, has known the participant for 7 months and holds a Bachelor of Arts degree. The teacher report form of the Child Behavior Checklist (CBCL-TRF 1.5-5 years old) (Achenbach, 1992) indicated that Jimmy has a total score on the Total Problem Scale of 61 (87 percentile) with sub-scores in the borderline range for aggressive behavior. Jimmy’s challenging behaviors were disruption defined as verbal defiance screaming, teasing, saying ‘No’, crying or whining.

Greg. Greg is a 6-year old African-American male. Teacher reports indicated average cognitive functioning. His primary teacher, Alison, is a Hispanic female. She has

1 year of experience in the classroom; she has had 7 months of contact with the participating child and has a Bachelor of Arts degree. The teacher report form of the Child Behavior Checklist (CBCL-TRF 6-18) (Achenbach, 1992) indicated that Greg has a total score on the Total Problem Scale of 95 (>98 percentile) with sub-scores in the borderline range for social problems and rule-breaking behavior and in the clinical range for thought problems and aggressive behavior. Greg's challenging behaviors were disruptive noises defined as tapping his pencil, whistling and raising his voice above the classroom volume level. Child and teacher information are summarized in Tables 3-1 and 3-2. All CBCL sub-scores are reported in Appendix C.

Table 3-1. Child Participant Information

Child Participant	Age	Race	Gender	CBCL-TRF Total Score
Ramon	4.9	Hispanic	Male	110 (97 th percentile)
Anthony	5.0	African-American	Male	88 (>97 th percentile)
Jimmy	5.5	African-American	Male	61 (87 th percentile)
Greg	6.4	African-American	Male	95 (>98 th percentile)

Table 3-2. Teacher Participant Information

Teacher Participant	Child participant	Years of Experience	Race	Months of Contact with Child	Current Level of Education
Rose	Ramon	30 years	Hispanic	7 months	Bachelor of Arts
Terry	Anthony	4 years	White	6 months	Associate of Arts
Amy	Jimmy	25 years	White	7 months	Bachelor of Arts
Alison	Greg	1 year	Hispanic	7 months	Bachelor of Arts

Settings

The settings for all of the assessment methods were the primary classrooms; a primary classroom setting was defined as the room in which the child participant spends the majority of his school day. For the first 3 participants listed (Ramon, Jimmy and Anthony), the setting was the 4 and 5-year-old classroom of a university-sponsored early childhood care center. The fourth participant's (Greg) primary setting was at a public elementary school multi-grade, self-contained, special education classroom. The pre-experimental assessments and teacher training occurred in the primary classroom with the teacher during non-student contact times, (i.e., planning periods, nap times or after dismissal). The indirect descriptive methods (interview and checklists were also conducted in the primary classroom of the individual child during non-student contact times, (i.e., planning periods, or naps).

The direct descriptive observations occurred during different classroom activities with the majority of the observations in the child participant's primary classroom setting. For the three participants in the early childhood center, the activities were primarily Centers Time and Free Play. For the student in Kindergarten participant (Greg), the activity was mainly independent work time. However, observations also occurred on the playground for all 4 participants and in the cafeteria for Greg. The functional analyses also occurred in the primary classroom setting. For the functional analysis, an area within the primary classroom was designated where other children were not located, e.g. an area in the corner of the room. Table 3-3 lists summaries of the phases, the assessments and the settings in which they took place.

Table 3-3. Summary of Assessments and Their Settings For Each Phase

Phases	Assessments	Settings
(1) Pre-experimental Assessments	Pre-experimental assessment interview, Child Behavior Checklist (CBCL-TRF)	Primary classroom during non-student contact times
(2) Descriptive Assessments (Indirect Descriptive Methods & Direct Descriptive Observations)	Indirect Descriptive Assessments: Motivation Assessment Scale (MAS), and Functional Assessment Interview (FAI)	Primary classroom during non-student contact times
	Direct Descriptive Observation: Antecedent-Behavior-Consequence (ABC) Analysis	Primary classroom, playground, and cafeteria (for Greg)
(3) Functional Analyses	Functional Analysis Conditions	Primary classroom where other children were not located

Materials

During the pre-experimental assessment phase, the Child Behavior Checklist-Teacher Reporting Form (CBCL-TRF 1.5-5 years old or 6-18 years old) (Achenbach, 1992) was used as a preliminary screening assessment to evaluate the prevalence of challenging behaviors. Additionally, a pre-experimental assessment interview sheet was created to access information that provided information needed for the descriptive assessments and the functional analysis phases (the interview guide is included in Appendix D- Instruments).

In the functional analysis phase, additional materials were required. The tangible condition required a toy or an object that is preferential to the participant. This toy was individually determined by asking the primary teacher “What is (the child’s) favorite thing to play with?” during the pre-experimental assessment phase. Ramon’s teacher identified Play-Doh as his preferred item for the tangible condition. Anthony’s teacher identified Spider-Man action figures as his preferred item. Jimmy’s teacher identified Legos as his preferred item. Greg’s teacher identified a miniature football as his preferred

item for the tangible condition. Additionally, materials were necessary for the task in the escape condition. The task was defined as a task that can be completed with approximately a 30 % success rate. A handwriting task (writing his name 10 times in a row) was used for the escape condition in the functional analysis for all 4 participants. This was determined by listing sample activities and asking the teacher to select an activity during the pre-experimental assessment phase. For the attention, free play and ignore conditions, a neutral activity, neither preferred nor non-preferred, was necessary. The primary teacher chose this from a list of examples of activities discussed during the pre-experimental assessment phase. All four teachers identified coloring with crayons in a coloring book as a neutral activity. Table 3-4 provides a summary of all materials necessary for functional analysis conditions.

Table 3-4. Summary of Child Participants' Preferred Items, Neutral Activities and Difficult Tasks

Child Participant	Preferred Item	Neutral Activity	Difficult Task
Ramon	Play-Doh	Coloring with crayons in a coloring book	Printing name 10 times in a row
Jimmy	Spider-Man Action Figures	Coloring with crayons in a coloring book	Printing name 10 times in a row
Anthony	Legos	Coloring with crayons in a coloring book	Printing name 10 times in a row
Greg	Miniature Football	Coloring with crayons in a coloring book	Printing name 10 times in a row

Additional materials that were required for data collection in the functional analysis phase are: (a) digital stopwatch to monitor the duration of the descriptive observation and functional analysis sessions, (b) a three-ring notebook that contained a laminated sign of

each of the scripted verbal prompts and (c) a Panasonic video camcorder to record each session of the functional analyses.

Measurement Procedures

Dependent Measures

The dependent measures were challenging behaviors that were defined individually for each participant. Similar to previous research that has directly evaluated descriptive assessment methods, a number of different behaviors were collapsed under the label challenging behavior (Arndorfer et al., 1994; Newcomer & Lewis, 2004; Sasso et al., 1992). Occurrences of any of the behaviors were then treated as an occurrence of the challenging behavior and counted together. The same individual dependent measures were evaluated across all assessment methods. Ramon's challenging behaviors were disruptive vocalizations defined as raising his voice above the classroom volume level, asking more than three questions in a 10-second interval or using profanity or "bathroom talk." Anthony's challenging behaviors were crying, yelling "Mom" or "Mama," rolling around on the ground, raising his voice above the classroom volume level and leaving his assigned area (defined as being more than 6 feet away from his assigned area). Jimmy's challenging behaviors were disruption defined as verbal defiance screaming, teasing, saying 'No,' crying or whining. Greg's challenging behaviors were disruptive noises defined as tapping his pencil, whistling, and raising his voice above the classroom volume level. Each of these behaviors that was considered a challenging behavior was assessed using a frequency count.

Independent Variables

The independent variables in this study were the different methods of assessing the function of behavior. Three different functional assessments instruments were used for

the descriptive assessment procedure: the Functional Assessment Interview (FAI) (O'Neill et al., 1997), the Motivation Assessment Scale (MAS) (Durand & Crimmins, 1992), and an Antecedent Behavior Consequence worksheet (ABC) (Bijou, et al., 1968) (see Appendix D for copies of all instruments not protected under copyright). A fourth indirect descriptive assessment, the Problem Behavior Questionnaire (PBQ) (Lewis, Scott & Sugai, 1994) was originally included as another 15-item Likert scale questionnaire used for determining the function of a challenging behavior. However, once data collection and analysis was completed, it became apparent that a comparison between the PBQ and the other descriptive assessments was not logical. The PBQ does not offer the same options for the hypothetical function of a challenging behavior as the other descriptive assessments do because it lacks tangible and sensory as possible functions and only includes attention, escape and setting events. This discordant scoring taxonomy made direct comparisons with the other methods of assessment impossible; therefore, although the PBQ was administered to all participants, the results are not compared with the other descriptive assessments or presented in Chapter 4.

The Functional Assessment Interview (FAI) (O'Neill et al., 1997) is a multi-step structured interview form designed to identify the function of a child's challenging behavior; and Gresham, Watson, and Skinner (2001) describes it as "the most comprehensive, up-to-date treatment of this topic" (p. 162). It takes approximately 45 to 90 minutes to complete, and it is divided into 11 sections. The first section obtains descriptions of the behaviors asking about the topography, frequency, duration and intensity. The first section also asks for predictable sequences or "chains" of behaviors. The second section elicits information about ecological events (setting events) that may

predict the occurrence of the behaviors; this includes medical issues and a description of the daily schedule that indicates enjoyable and problematic activities. The third section of the interview asks about specific antecedents that immediately precede the occurrence of the behaviors including times of day, people, activities, etc. The fourth section of the interview identifies the outcomes or consequences that may be maintaining the behaviors (i.e., the function of the behavior). This section includes questions about the behavior, the particular situation, what the individual gets and what the individual avoids as a result of the behavior. The fifth section asks the interviewee to rate the overall efficiency of the problem behavior on a 5-point Likert scale (1= low efficiency and 5= high efficiency) in terms of effort expended, frequency of reward as a result of the behavior and the time delay between the behavior and the reward. The sixth section of the FAI asks for alternative (replacement) behaviors that may already be in the participant's repertoire. The seventh section inquires about communication abilities of the individual. The eighth section obtains ancillary information regarding things one should do and should avoid when working with the individual. The ninth section asks for various items and activities that the participant enjoys or finds reinforcing. The tenth section elicits information about past interventions that have been attempted and their results. The eleventh section has the interviewer develop summary statements regarding distal setting events, immediate antecedents, the problem behavior and the maintaining consequence.

The checklist employed was the Motivation Assessment Scale (MAS) (Durand & Crimmins, 1992). The MAS was designed for determining the hypothetical function of problem behaviors and is a frequently used checklist. "The MAS has been the most extensively evaluated psychometric instrument developed for functional assessment"

(Sturmev, 1994, p.295). However, the studies of the MAS have revealed mixed results in regard to reliability and content validity (Floyd et al., 2005). This instrument uses a 6-point Likert scale with 16 items and asks the rater to evaluate the frequency of a specific behavior in various situations (0= Never, 1=Almost Never, 5= Almost Always, 6=Always). The direct observation method was the Antecedent, Behavior, Consequence (ABC) Analysis. The Antecedent Behavior Consequence (ABC) analysis is based on the procedure described by Bijou et al. (1968). In the ABC analysis, a running record of observed events is created. For example, if the teacher asked the child participant to put away the toys, and the child participant yelled at the teacher and the teacher allowed the child to play with the toys for 5 more minutes, this would be coded as a request (antecedent), yelling (behavior) and tangible (consequence) (Newcomer & Lewis, 2004; Sasso et al., 1992). This process has been used in numerous studies (for a review, see Heckaman et al., 2000; Lane, Umbreit, Beebe-Frankenberger, 1999; Scott et al, 2004).

Data Collection Procedures

After the recruitment of participants was completed, the principal investigator conducted individual pre-experimental assessment interviews with each of the teacher participants. Following the pre-experimental assessment phase, a research assistant (Research Assistant 1) conducted the FAI, the MAS and the PBQ. All research assistants were second and third year doctoral students with at least 2 years of previous experience as classroom teachers or school counselors; their training for this study is detailed in the recruitment and training section of experimental procedures. The indirect descriptive assessments were counterbalanced to control for an order effect. Research Assistant 1 completed the FAI with the primary teacher by asking each question and writing down all of the responses the teacher gave on the FAI interview form. Following completion of the

FAI, the same research assistant determined a hypothetical function based on the teacher's responses to the interview by writing down one of the four options of possible functions (attention, tangible, escape, or sensory). The same research assistant also had the teacher complete the MAS and the PBQ. The research assistant did not read these items out loud to the teacher, but if the teacher had a question about any of the items then the research assistant clarified the terminology of the questionnaire. Because the questionnaires could be completed before the FAI (due to counterbalancing), the research assistant did not tally or review the questionnaire responses. This insured that the results of one instrument did not influence his judgment of hypothetical function based on the FAI. Regardless of the order in which they were presented, Research Assistant 1 always scored the FAI immediately after its completion due to its more subjective scoring method, and the MAS and PBQ were scored by the principal investigator after all other assessments were completed.

A second research assistant, Research Assistant 2, conducted the ABC direct observation descriptive assessments for each participant for eight 15-minute intervals. In this process, the observer recorded the occurrence of the challenging behavior (B), the antecedent (A) events that precede the behavior and the events that followed the behavior, the consequences(C). A running record of ABC direct observations was conducted by recording each occurrence of the identified problem behavior, its antecedents and its consequences. ABC recording occurred across each 15-minute assessment condition. The research assistant then chose a hypothetical function of the challenging behavior, from the four possible functions, based on the observations he had done.

The participating teachers conducted the functional analysis conditions with assistance from the principal investigator. All sessions were videotaped. The primary investigator then reviewed the definition of the challenging behavior for the individual child and viewed each videotaped session. The rate of the challenging behavior per minute was calculated for each condition by watching the videotape, and using a paper and pencil, making a tally for each occurrence of the challenging behavior for each condition.

After all other assessments were complete, the teacher completed the social validity questionnaire and then was interviewed by the principal investigator using the social validity interview sheet. The principal investigator transcribed the verbal responses of the teacher during the interview. The teacher completed the questionnaire without knowledge of the results of the descriptive assessment and functional analysis and then answered the first nine questions of the interview before reviewing the results. This questionnaire and interview sheet can be found in Appendix E.

Interobserver Agreement

Interobserver agreement (IOA) was conducted for both the ABC direct observations and the functional analyses. For the direct observations (ABC), two trained observers watched 12/32 (38%), or 3 out of 8 of the same 15-minute intervals for all 4 participants. Both observers maintained a frequency count of occurrences of the challenging behavior. Agreement for occurrence of behaviors was computed by dividing the smaller total occurrences of behavior by the larger total occurrences of behavior and multiplying by 100 (Sasso, et. al, 1992). For the 4 participants, interobserver agreement ranged from 60%-100% with an average of 93%. For Ramon, agreement between the two observers ranged from 90%-100% with an average of 97%. For Anthony, agreement

between the two observers ranged from 83%-100% with an average of 94%. For Jimmy, agreement between the two observers ranged from 60%-100% with an average of 87%. For Greg interobserver agreement was 100%. Additionally, both observers were asked to separately formulate a hypothetical function of the challenging behavior based on their observations. They agreed on the hypothetical function of the behavior 3/4 (75%) times, the disagreement of hypothetical function was for Anthony in which the primary observer (Research Assistant 2) concluded tangible was the primary function, and the reliability observer (Research Assistant 3) concluded attention was the primary function. Research Assistant 2 based the hypothetical function on eight 15-minute observation sessions and Research Assistant 3 based the hypothetical function on three of the same 15-minute observations. For each participant, the two observers wrote down a hypothetical function after their last observation session and placed them in sealed envelopes. The principal investigator calculated the number of agreements and disagreements after all of the other assessments were completed.

For the functional analysis, the agreement percentages were computed on a session-by-session basis for an average of 37% of the sessions using the following formula- dividing the smaller total occurrences of behavior by the larger total occurrences of behavior and multiplying by 100 (Sasso et al., 1992). For Ramon, interobserver agreement was calculated for 8/21 (38%) conditions. The interobserver agreement ranged from 75%-100% with an average of 95%. For Anthony, interobserver agreement was calculated for 8/19 (42%) conditions. Interobserver agreement ranged from 80%-100% with an average of 98%. For Jimmy, interobserver agreement was calculated for 13/42 (31%) conditions. The interobserver agreement ranged from 66%-100% with an average

of 97%. For Greg, interobserver agreement was calculated for 7/18 (38%) sessions. The interobserver agreement ranged from 80%-100% with an average of 97%.

Experimental Procedures

Recruitment and Training

Child participants were identified through teacher nominations. Teachers completed the age appropriate version of CBCL-TRF (complete sub-scale results are listed in Appendix C) on the child to determine eligibility for inclusion. Teachers also participated in an individual one-hour workshop to establish a baseline of requisite knowledge about FBA. Prior to training, all teacher and parent consents were completed. All training sessions for participating teachers, research assistants, and the IOA collector occurred prior to implementing any of the assessments.

Participating teachers. Each participating teacher took part in an individual one-hour training session to review principles of functional behavior assessment and functional analysis (See Appendix F for outline of teacher training session). This training session included watching a video of a sample functional analysis that was created by the principal investigator and a discussion with the principal investigator of staffing adjustments that were necessary when the teacher was involved with functional analysis implementation.

Research Assistants. Research Assistant 1's training on indirect descriptive assessments consisted of reviewing challenging behaviors, reviewing the order of presentation for the indirect assessments and reviewing protocol instructions and scoring that accompanied each of the commercially distributed descriptive assessments. Research Assistants 2 and 3's training consisted of reviewing the method for completing the ABC worksheet and reviewing operational definitions of challenging behaviors. Practice

sessions were also held for Research Assistants 2 and 3, in which they viewed three 15-minute sessions of preliminary videotapes of the child participants until they reached 80% agreement in the completion of the ABC worksheets.

IOA data collector. The IOA data collector is a certified special education teacher with five years of experience working with children with emotional and behavioral disorders. The IOA data collector's training consisted of a review of each of the conditions of the FA session and a discussion of each participant's operationally defined challenging behavior. The principal investigator and the IOA data collector viewed videotaped sessions of the functional analyses until they reached 80% agreement for three consecutive sessions.

Phase I--Pre-experimental Assessments

After participants (i.e., children and teachers) had been identified, the following preliminary procedures were completed. These preliminary procedures included: (1) a review of cumulative school records to obtain demographic information, (2) establishing an operational definition of the challenging behavior for each of the child participants, and (3) establishing a preferential toy for the tangible FA condition, a difficult task for the escape condition, and a neutral activity for free play, attention and ignore. The target behavior or challenging behavior, as defined previously, were the behaviors that the teacher identified as the most frequently occurring, problematic behaviors of the child with the exception of Jimmy. For Jimmy, the first behavior identified was aggression toward peers. However, ethics would prohibit providing contingent reinforcement for the demonstration of aggression toward peers, such as in the functional analysis. Therefore, continued discussion with the teacher led to identification of other behaviors that were suggested to lead to aggression including verbal defiance, screaming, teasing, saying

'No', crying or whining. These behaviors were combined to become the operational definition of challenging behavior for Jimmy. To establish neutral and difficult activities, the principal investigator listed possible choices of activities and presented samples of a variety of worksheets that might be considered aversive to young children (i.e., a handwriting worksheet with the name listed 10 times, letter identification, multiple digit adding and subtracting).

Phase II--Descriptive Assessments

In this phase the identified primary teacher filled out the Motivation Assessment Scale, the Problem Behavior Questionnaire, and was interviewed using the Functional Assessment Interview by Research Assistant 1. Indirect assessments for each participant were conducted in a single 2-hour block. Within 2 weeks of the indirect assessments, Research Assistant 2 conducted eight, fifteen-minute direct observations to complete the ABC observation form. All observations occurred within the classroom, playground and cafeteria using the specifications previously outlined. The order of the indirect descriptive assessments were counterbalanced to control for an order effect and the direct observations occurred before the functional analysis for Ramon and Jimmy and after the functional analysis for Anthony and Greg to control for any potential effect the functional analysis may have had on the occurrence of the challenging behaviors in natural settings.

Phase III--Functional Analysis

In the next phase, the principal investigator and the participating teacher completed the functional analysis (FA), without any knowledge of the results of the descriptive assessments. The functional analysis occurred in the primary classroom and the participant teacher acted as the therapist delivering the appropriate consequences. The principal investigator monitored the time intervals, and provided prompts for the delivery

of the appropriate consequence for each demonstration of the challenging behavior. For the prompts, the principal investigator used laminated cards with the teacher's scripted verbal responses printed on them.

Five conditions for the functional analysis phase of this project were used: (1) tangible, (2) attention, (3) escape/ avoidance, (4) ignore, and (5) free play. There was a 1 to 2-minute break between each condition and the order of the conditions was randomly selected to control for order effects. For each condition, the principal investigator held up the laminated card with the verbal prompt for the teacher to say either upon every demonstration of the challenging behavior and/or every thirty seconds when non-contingent attention statements were required (i.e., escape and tangible). Before the attention condition of each session, the principal investigator modeled the delivery of the attention condition statement (i.e., placing a hand on the child's back); and the principal investigator modeled appearing busy with paperwork during the attention condition. Before the tangible condition, the principal investigator modeled presenting and effectively removing the tangible item. For all sessions the principal investigator offered correctives between conditions when necessary and modeled the other non-contingent attention statements. See Appendix G for a description of the functional analysis procedures.

With the exception of Jimmy's FA, if other children in the classroom entered the FA setting, they were directed away by the principal investigator. For Jimmy, it was necessary to include a peer confederate in the FA sessions, as the first FA conducted without a peer confederate did not replicate natural classroom conditions. The teacher indicated that other peers precipitated his challenging behaviors and that he was unlikely

to engage in his target challenging behaviors (verbal defiance, yelling, teasing, saying “No,” whining, crying) without a peer present. For the other 3 participants, the participating teacher and the child were the only individuals included in the FA sessions. The FA in the current study was not hypothesis driven but instead functioned independently of the descriptive assessments, as conducted by Iwata et al., (1982/1994). All conditions were videotaped and data were collected as previously described. The following is a description of each FA session.

Free Play. The free play condition was used as a control for the other four conditions. During free play, the participant had access to preferred toys, neutral activities and the teacher provided positive attention in a continuous, non-contingent rate, approximately 5 times per minute per free play session. No instructional demands were placed on the participant and demonstrations of challenging behavior were ignored.

Tangible. During the tangible condition, the participant was presented with the preferred item. The item was removed after a set interval of 20 seconds. The teacher maintained a distance of three to six feet from the participant. Upon demonstration of a challenging behavior, the teacher presented the participant with the tangible reinforcement with the statement “Now it’s your turn with the toy.” After 30 seconds, the tangible item was removed again with the statement “Now it’s my turn with the toy.” Demonstration of the behavior resulted in the item being returned. No other demands were placed on the child. All other behaviors that did not meet the response definition criteria were ignored, and the teacher provided non-contingent attention statements to the participant on a fixed 30-second interval (as prompted by the principal investigator).

Attention. In the attention condition, the teacher maintained a distance of 3-6 feet from the participant and pretended to be occupied with paperwork. When the participant engaged in the disruptive behavior, the teacher approached the participant, placed a hand on the child's back and gave a verbal reprimand that represents what might typically happen during demonstrations of this challenging behavior (i.e., "Stop doing that. You shouldn't do that because it is against the rules. You are not following directions when you do that"). Participant children had access to the neutral activity and no other demands were placed on them. When the behavior was not occurring, the teacher did not engage in social attention.

Escape. In the escape condition, the participants were assigned a predetermined task that was determined by the teacher to be challenging, but within their intellectual ability (i.e., copying their own name 10 times). Verbal instructions and modeling of the task were provided at the beginning of the session. When the participant engaged in the challenging behavior, the task was removed for 30 seconds and the teacher said, "Time to take a break." Following a 30-second break, the task and demand was presented again. The neutral activity was not available. The teacher provided non-contingent attention statements to the participant on a fixed 30-second interval.

Ignore. During the ignore condition, the participant was directed to stay in the assigned area. The preferred tangible item and neutral activity materials were accessible but no direct interaction with the teacher occurred and no demands were placed on the participant child. All demonstrations of the challenging behavior were ignored.

All five conditions were presented for a minimum of three sessions. However, after the third session, the principal investigator and a researcher with extensive experience in

single subject design reviewed all data and only conditions that continued to elicit challenging behavior and a control condition (either Free Play or Ignore) continued to be tested until stability in all the data occurred (Northup et al., 1991). This was done to obtain at least a three-point trend and to minimize the intrusiveness of conducting the functional analyses in natural settings.

Social Validity

Upon completion of all descriptive assessments and the functional analysis phases, the teachers completed a 9-item Likert-type rating scale to evaluate the acceptability of each of the assessment procedures and to determine how helpful and/or disruptive the assessments were to their classroom milieu. They were also given an opportunity to answer 14 open-ended questions regarding this procedure and the results of the various assessments in an interview with the principal investigator. The results were presented after the questionnaire and the first nine questions of the social validity interview had been completed, as outlined in the data collection procedures of this chapter.

Procedural Integrity

Procedural integrity data was collected for 21% of the FA conditions. Each FA condition had specific elements that were monitored. Procedural integrity was based on the teacher providing the appropriate consequence upon demonstration of the behavior for the escape, tangible and attention conditions. Procedural integrity was calculated by dividing the number of occurrences of the challenging behavior without the appropriate consequence/total occurrences of the challenging behavior X 100. Procedural integrity also monitored that continuous non-contingent attention was delivered for free play and that all challenging behavior was ignored for free play and ignore. For these conditions, ignore was evaluated by calculating the total number of challenging behaviors

demonstrated that did not receive a contingency/ total number of behaviors X 100. Free play was monitored to insure that the participant child had unrestricted access to desired toys and continuous non-contingent adult attention at a minimum of one attention statement every 10 seconds. If it was determined upon reviewing the videotape that access was not given, then this condition was conducted again.

The procedural integrity for Ramon was evaluated for 5/24 (21%) conditions. The range of the procedural integrity calculations was from 84%-100% with an average of 90.6%. The procedural integrity for Anthony was evaluated for 4/19 (21%) conditions. The range of procedural integrity calculations was from 80%-100% with an average of 95%. The procedural integrity for Jimmy was 9/42 (21%) conditions. The range was from 75%-100% with an average of 97%. The procedural integrity for Greg was evaluated for 4/18 (22%) conditions. The range was from 80%-100% with an average of 95%.

Design and Data Analysis

Design

A multi-element design was used to evaluate the relative differences across functional analysis conditions. No experimental design occurred for the descriptive assessments because the outcomes were not experimental.

Data Analysis

This study was separated into three phases: preliminary assessments, descriptive assessment methods and functional analyses. For the descriptive assessments, data analysis for two of the instruments produced permanent products. For the checklist, the MAS, has a simple scoring rubric in which the highest numbered score indicates the primary function of the problem behavior. The principal investigator scored this instrument after all other assessments had been completed for the child participant.

Scoring this instrument consisted of tallying the responses to the different items and then assigning a hypothetical function based on the highest score.

Because the FAI and the ABC direct observation sheet are both more subjective measures, both require some interpretation on the part of the scorer. Immediately after completing the Functional Assessment Interview, the research assistant (Research Assistant 1) who administered the indirect descriptive assessments assigned a hypothetical function based on the responses to the interview questions. The ABC was scored by both research assistants (2 & 3) who assigned a primary function to the challenging behavior upon completion of the number of 15-minute intervals observed. It should be noted that all results for every descriptive assessment were kept separate from every other instruments' results and were also kept separate from the functional analysis in order to avoid influencing any other procedures. For the descriptive assessments, all results were sealed in envelopes and were not discussed with other personnel involved with the research. The results were compared by the principal investigator after the final functional analysis session for each participant had been completed. Since different individuals were collecting the assessment data, the results from each instrument remained separate from the others.

For the functional analysis procedures, the principal investigator used a frequency count that was translated into rate per minute, for each analog condition to evaluate the relative differences between conditions. The highest rate within a specific analog condition was used to determine the function of the behavior (i.e. if the behavior occurs most frequently during the attention condition, then the function of the behavior would be identified as attention). All data was graphically displayed and visually inspected for

magnitude, trend, and stability to determine what analog condition elicited the highest rate of challenging behaviors and therefore represented the function of that behavior. Data was visually inspected using the criteria outlined in Hagopian et al., (1997) and also evaluated using criteria outlined in Tawney and Gast (1984). Each graph was evaluated for the highest number of data points across all sessions over all other conditions. Each data path was additionally evaluated for stability across all sessions, percentage of overlapping data points between conditions and any discernible trend in the rate of the behavior.

After all descriptive assessments and the functional analysis were individually evaluated to determine their results (i.e. what is the primary function according to the FAI, MAS, and ABC), the results for each participant were assimilated, using a form developed by the principal investigator. For comparing descriptive assessments, agreement results were calculated by creating ratios of agreements over the total possible agreements for the two other instruments for each participant ($\text{Agreements}/2$). This method of calculation of data is similar to the methodology used by Murdock et al., (2005). The total number of agreements for each descriptive instrument was then calculated across four participants ($\text{Agreements}/\text{Number of Other Instruments} \times \text{Number of Participants}$). Thus, there were 8 possible comparisons (2×4). For the total agreements of the descriptive assessments with the functional analysis, the ratio was calculated for each descriptive assessment across the four participants ($\text{Agreements} / 4$) and a total number of agreements for all descriptive assessment was calculated [$\text{Agreements} / \text{Participants} \times \text{Number of Descriptive Assessments} (4 \times 3)$]. Because each assessment only determined a primary function, a final summary was completed noting

agreement and disagreement between descriptive assessments and agreement and disagreement with the functional analysis. Then a summative statement regarding the agreement between assessments and with the functional analysis was developed. The final scoring sheet can be found in Appendix H.

The results of the social validity questionnaire were calculated by averaging the four teachers' responses per item. For the social validity interview, the principal investigator transcribed the responses and these transcriptions were evaluated for commonalities, agreement with questionnaire responses and salient points regarding process components and their results.

CHAPTER 4 RESULTS

This chapter presents the results of the current study. The purposes of this study were to compare the findings from three descriptive methods for determining the function of behavior with each other and to compare the findings across methods, with the results of a functional analysis. Also, teacher perceptions of the usefulness of the process and procedures were evaluated. Research questions were addressed through three specific examinations. First, the functions of young children's challenging behavior as identified through various descriptive functional assessments (e.g. the Motivation Assessment Scale, the Functional Assessment Interview and an Antecedent-Behavior-Consequence direct observation) were compared to assess concurrent validity across instruments. This examination evaluates the consistency of functions identified through commonly used descriptive assessments. Second, outcomes of these same methods were compared with functions verified through experimental functional analyses. This examination determines the accuracy or construct validity of descriptive methods. Third, social validity of the descriptive assessment and the functional analysis procedures and outcomes were evaluated to determine how palatable teachers found the various methods, how likely they were to use each in the future, and what impact they believed the results might have on future intervention strategies.

Individual results are first presented for each participant child. Then, results comparing outcomes across descriptive methods are delineated. Next, results of

comparisons between descriptive methods and functional analysis are presented. Finally, the results from the social validity questionnaires and interviews are presented.

As noted in chapter three, one deviation from the original planned procedures occurred. Originally, the Problem Behavior Questionnaire (PBQ) (Lewis, Scott & Sugai, 1994) was administered for each participant, along with the other assessments mentioned above. However, due to an incompatible scoring taxonomy, the results of this indirect assessment were not comparable with these assessments or the functional analyses. Therefore, these results will not be presented in the results section. The rationale for excluding this assessment was made post hoc. This decision was based on the instrument lacking two options for the function of a challenging behavior: tangible and sensory. Thus, it was impossible to determine if disagreements between the PBQ and other descriptive assessments, or functional analyses results, were a result of these two options not being available or were a result of genuine disagreement across methodologies.

Individual Child Participant Results

In this section, results from the three descriptive assessments and the functional analysis are presented for each child participant. Table 4-1 presents summative data regarding the results of all of the descriptive assessments and the functional analysis for each participant. The functional analysis column is presented in bold face as those results represent the function of the behavior as identified through experimental analyses as opposed to the hypothetical functions determined by the descriptive assessments. For the purposes of this study, the specific identified functions are presented to illustrate the agreements and disagreements between the different assessment methodologies. Because the identified function is idiosyncratic to the participant being assessed, the actual function identified is incidental to evaluating the agreements versus disagreements.

Table 4-1. Summary of the Functions of Challenging Behaviors Across Assessment Methods

Participant	MAS	FAI	ABC	FA
Ramon	Tangible	Tangible	Attention	Attention
Anthony	Tangible	Escape	Tangible	Tangible
Jimmy	Tangible	Attention	Tangible	Tangible
Greg	Sensory	Attention	Attention	Attention

Ramon

Ramon's challenging behaviors were disruptive vocalizations defined as raising his voice above the classroom volume level, asking more than three questions in a 10-second interval or using profanity or "bathroom talk." The MAS and the FAI indicated that the primary function was tangible. The ABC identified attention as the function of the challenging behavior. As seen in Figure 4-1, in Ramon's functional analysis, in comparison to the other conditions, the attention condition elicited the highest rate of the challenging behavior ($M= 2.6$ responses per minute with a range of 1.8 - 3.2 responses per minute). The other functional analysis conditions elicited the challenging behavior at substantially lower rates, tangible ($M= 1.73$), followed by escape ($M= 0.6$), free play ($M= 0.3$), and ignore ($M= 0.2$). Although overlap between the tangible and attention conditions occurred for 50% of the sessions (Tawney & Gast, 1984), the tangible condition demonstrated a decelerating trend across sessions 4-6. Based on visual analysis of the magnitude of the differences between conditions and the trends of the data, these results suggest that Ramon's challenging behavior is maintained by attention. This outcome only agrees with the ABC direct observation.

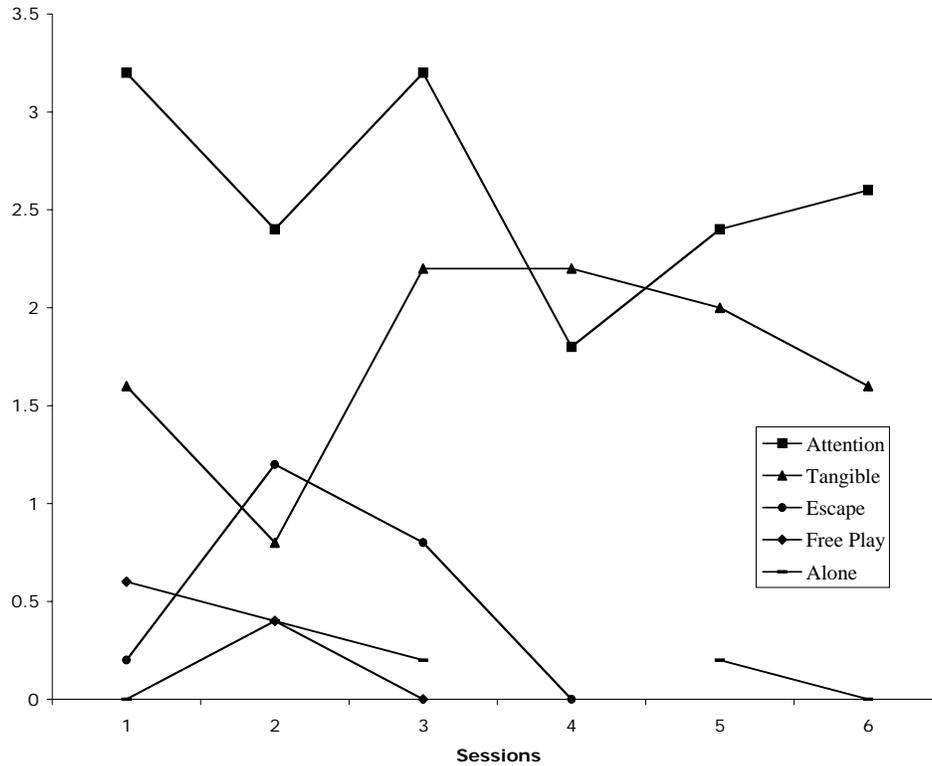


Figure 4-1. Challenging Behaviors per Minute During Functional Analysis for Ramon.

Anthony

Anthony’s challenging behavior was disruption defined as crying, yelling “Mom” or “Mama”, rolling around on the ground, raising his voice above the classroom volume level and leaving his assigned area (defined as being more than 6 feet away from his assigned area). For Anthony, the MAS and the ABC indicated that the primary function was tangible. The FAI concluded that the primary function of the challenging behavior was escape. For Anthony, the tangible condition elicited the highest rate of behavior ($M=1.0$ response per minute across all sessions). The other conditions elicited challenging behaviors at lower rates, attention ($M=0.3$), followed by escape ($M=0.1$), free play ($M=0.0$) and ignore ($M=0.0$). See Figure 4-2 for Anthony’s functional analysis graph.

There was no overlap in the data between tangible and the other conditions. These results

suggest that Anthony's challenging behavior is maintained by access to tangible items.

This outcome for the functional analysis agreed with the MAS and the ABC.

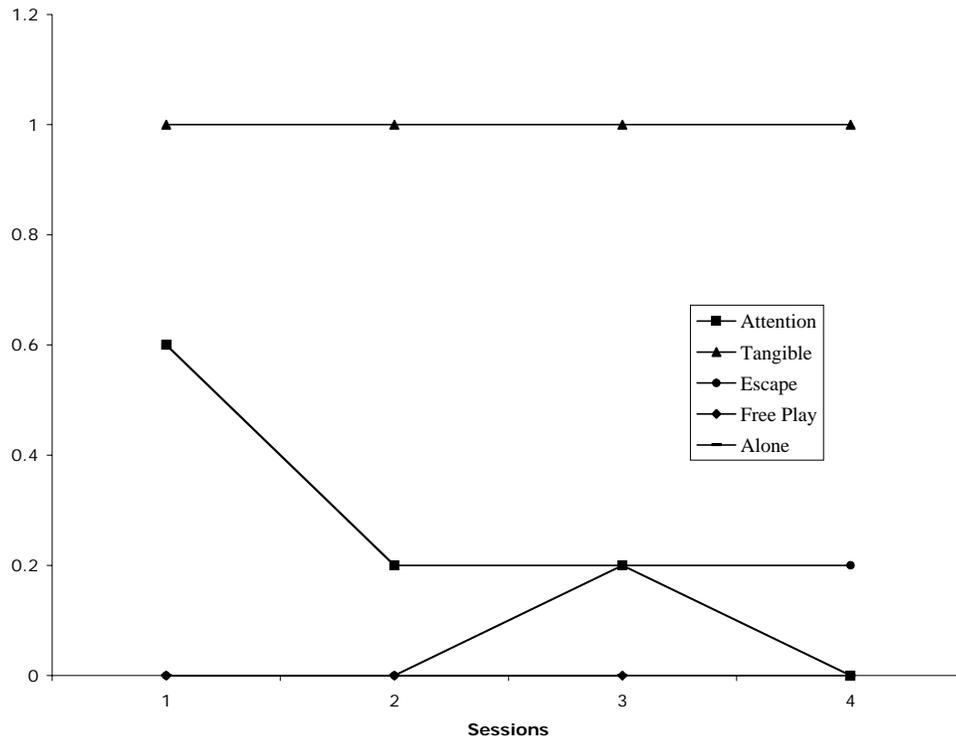


Figure 4-2. Challenging Behaviors per Minute During Functional Analysis for Anthony.

Jimmy

Jimmy's challenging behavior was disruption defined as verbal defiance, screaming, teasing, saying 'No', crying or whining. The MAS and the ABC indicated that tangible was the primary function. The FAI concluded that attention was the function of the challenging behavior. The methodology of the functional analysis for Jimmy varied from the other participants. Two functional analyses (no peer confederate present v. peer confederate present) were conducted for Jimmy. In the first FA, the conditions were identical to the other participants (i.e., no peer confederate was present). However, after conducting four sessions with all five conditions, the rate of the challenging behavior was

low: attention ($M= 0.15$), tangible ($M= 0.10$), escape ($M= 0.05$), free play and ignore ($M= 0.00$) and no apparent consistent differences between the conditions occurred. After these four sessions, all conditions leveled off to zero. After discussing the results of the initial FA with the teacher and observing Jimmy in the classroom, the researcher determined that the challenging behavior was likely to occur only in conditions where a peer was present. This discussion of the results with the teacher before completion of all assessments was atypical of the protocol used for all other participants. For other participants, results were only discussed after completion of all of the assessments. However, due to the rate of zero behaviors across all conditions, it was necessary to modify the protocol for Jimmy. Therefore, a second FA that included a peer confederate was conducted to assist in replicating conditions that were naturally occurring in the classroom. The teacher selected the peer confederate based on observed patterns of behavior in the classroom and parental consent was attained for the peer to participate.

As seen in Figure 4-3, during the second FA, the tangible condition had the highest mean rate of challenging behavior ($M= 0.34$ responses per minute with a range of 0.2 - 0.8 responses per minute) and an accelerating 3-point data path for sessions 9 to 11. Three of the other conditions elicited responses at considerably lower rates: attention ($M= 0.10$) ignore ($M= 0.0$) and free play ($M= 0.0$). One important consideration is that the rates of behavior were lower for all conditions for this participant compared with the other three participants. The escape condition elicited the challenging behavior at a similar rate as tangible ($M= 0.31$) and had 57% overlapping data points with the tangible condition. The escape condition initially demonstrated a high rate of behavior, however beginning at session 8, the behavior began a decelerating trend that leveled off to zero in

the last three sessions. This suggests that Jimmy's challenging behavior is maintained by access to tangible objects. This function agrees with the outcomes of the MAS and the ABC.

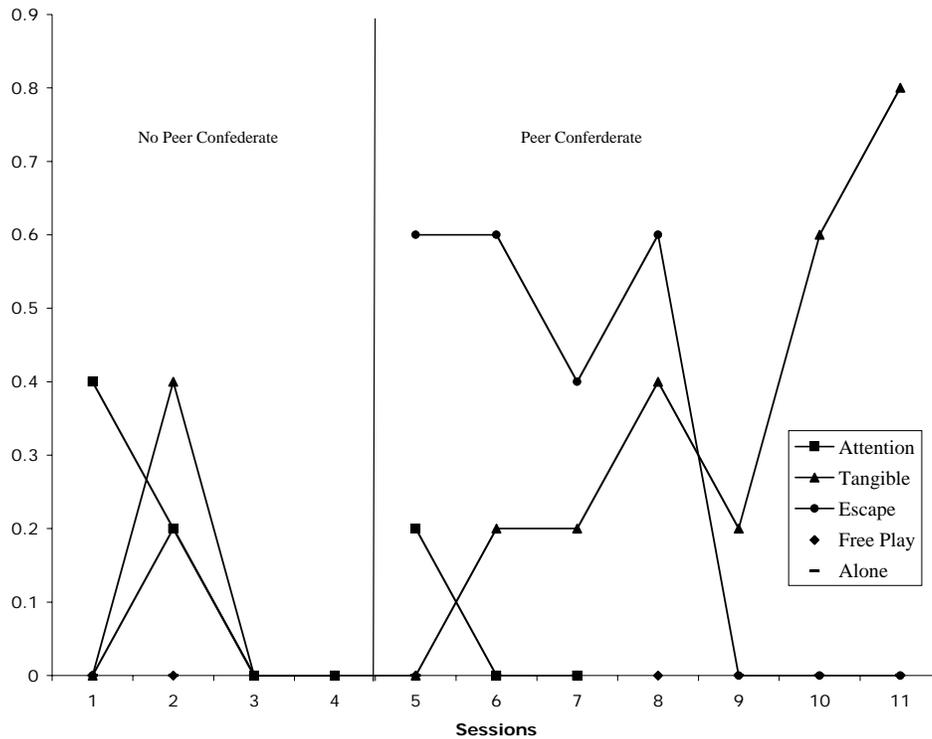


Figure 4-3. Challenging Behaviors per Minute During Functional Analysis for Jimmy.

Greg

Greg's challenging behaviors were disruptive noises defined as tapping his pencil, whistling, and raising his voice above the classroom volume level. For Greg, the MAS indicated that the primary function of challenging behavior was sensory. The FAI and the ABC concluded the challenging behavior was maintained by attention. For the functional analysis, the attention condition elicited the highest rate of challenging behaviors ($M= 1.5$ responses per minute with a range of 1.0 - 1.8 responses per minute) and an accelerating 3-point data path across sessions 1 to 3. The next highest average rates of challenging behaviors per minute were tangible ($M= 1.2$), ignore ($M= 0.3$), escape ($M= 0.2$), and free

play ($M= 0.03$). The tangible condition had 66% of overlapping data points with attention. Although the tangible condition elicited the highest rate of challenging behavior for the first session, the data path demonstrated a decelerating trend for the next two sessions. Based on visual analysis of the magnitude of the differences between conditions and the trends of the data, attention was concluded to be the function of the challenging behavior. This outcome agrees with the FAI and ABC. See Figure 4-4 for Greg's functional analysis graph.

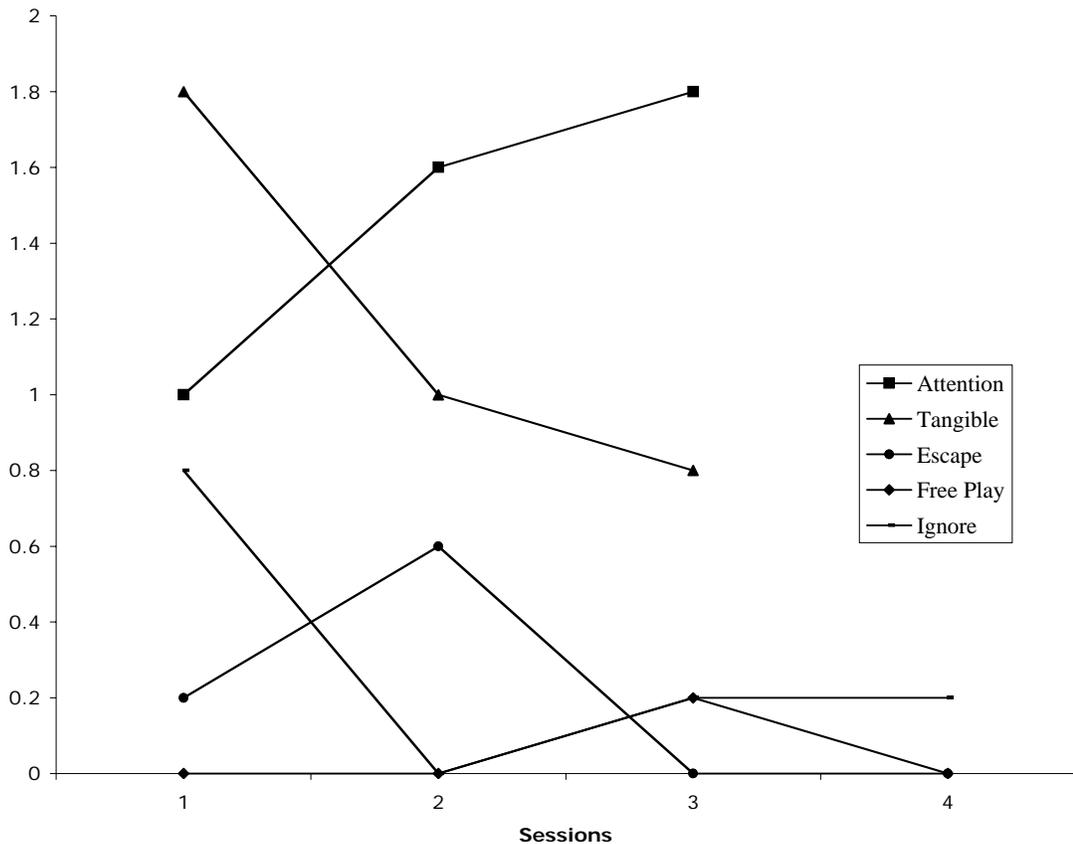


Figure 4-4. Challenging Behaviors per Minute During Functional Analysis for Greg.

Comparison of Outcomes of Descriptive Assessments

Agreements between descriptive assessments were based solely on the primary function that was determined by each descriptive assessment. For the MAS, the primary function was determined using the scoring rubric in which the highest numbered (and ranked) score indicates the primary function of the challenging behavior. For the FAI, the research assistant who administered the indirect descriptive assessments assigned one of four hypothetical functions (i.e., tangible, escape, attention, sensory) based on the responses to the interview questions. For the ABC, another research assistant assigned a primary function from one of the four possible functions upon completion of the eight 15-minute observation intervals.

Table 4-2 presents data regarding the total number of agreements for each descriptive assessment as it is compared with the other two descriptive assessments and with the functional analysis results. The agreement ratio for comparing descriptive assessments with each other was calculated by determining the total number of agreements over the total possible agreements with the two other instruments ($\text{Agreements} / 2$) (Murdock et al., 2005). Agreement for each descriptive assessment with the functional analysis is notated with an asterisk for each individual participant's descriptive assessment. The total number of agreements with other descriptive assessments was then calculated across all four participants ($\text{Agreements} / \text{Number of Other Instruments} \times \text{Number of Participants}$). Thus, there are eight possible comparisons ($\text{Agreements} / 2 \times 4$) for calculating the total agreements. For the total agreements of the descriptive assessments with the functional analysis, the ratio is calculated for each descriptive assessment across the four participants ($\text{Agreements} / 4$).

Table 4-2. Summary of Agreements Between Descriptive Assessments Compared With Each Other and with a Functional Analysis

Participants	MAS	FAI	ABC
Ramon	1/2 (50%)	1/2 (50%)	0/2 (0%)*
Anthony	1/2 (50%)*	0/2 (0%)	1/2 (50%)*
Jimmy	1/2 (50%)*	0/2 (50%)	1/2 (50%)*
Greg	0/2 (0%)	1/2 (50%)*	1/2 (50%)*
Total Agreements with Other Descriptive Assessments	3/8 (38%)	2/8(25%)	3/8 (38%)
Total Agreements with Functional Analysis	2/4 (50%)	1/4 (25%)	4/4 (100%)

*indicates agreement with function as determined by the functional analysis

In general, the total consistency between the three descriptive assessments was low. When comparing across descriptive assessments, the MAS findings were consistent with the ABC for total agreements of 3/8 (38%) and slightly greater than the FAI, 2/8 (25%) for total agreements. Across all participants, the MAS agreed with the FAI only once and the MAS agreed with the ABC twice. The ABC agreed with the FAI only once. Calculating the number of agreements over the opportunities for agreement for all descriptive assessments [Other descriptive assessments x All descriptive assessments x Total number of participants) (2x3x4)] indicates that they agreed with one another in 8/24 (33%) of all cases. For all 4 participants, a majority of descriptive assessments indicated the same hypothetical functions. In other words, of the three descriptive assessments, for each participant, two of the assessments had the same results. For example, for Jimmy, both the MAS and the ABC agreed that the hypothetical function of the challenging behavior was tangible. For 3 of the 4 participants, the hypothetical function that was

determined by more than one instrument was confirmed by the functional analysis. Data evaluating the results of each descriptive assessment in comparison to the results of functional analysis are presented in the following section.

The results of the three descriptive assessments were compared with the results of functional analyses conducted for all 4 participants. The MAS's hypothesized function agreed with the FA results for 2/4 (50%) of the participants. The FAI's hypothesized functions agreed with the FA results for 1/4 (25%) of the participants. Unlike the other descriptive assessments, the ABC's hypothesized functions agreed with the FA results for 4/4 (100%) of the participants. That is, for all 4 participants, both the ABC and FA were in agreement as to the function of behavior.

The overall agreement between the descriptive assessments and the functional analysis was 7/12 (58%). This was calculated as the number of agreements/number of participants x total number of descriptive assessments ($\text{Agreements}/4 \times 3$). However, the number of agreements was not evenly distributed across descriptive assessments because the direct descriptive observations (ABC) agreed with the FA conclusions for all 4/4 (100%) of the participants. Thus, the indirect descriptive assessments were only in agreement with the functional analysis in only 3/8 (38%) of cases. Other important considerations were how palatable teachers found the various methods, how likely they were to use each in the future, and what impact they believed the results might have on future intervention strategies. This was evaluated using a social validity questionnaire and interview.

Social Validity Questionnaire and Interview Results

Social Validity Questionnaire

The social validity questionnaire was created by the principal investigator and was comprised of eight questions on a 5-point Likert-type scale that was completed by each teacher participant after the results of all descriptive assessments and the FA were determined. However, these results were not presented to the teachers until after they had completed the questionnaire and answered the first nine questions of the structured interview. For the questionnaire's scale, 1 represented *Not at All* (helpful, useful, disruptive...) and 5 represented *Very* (helpful, useful, disruptive...). Items 1 through 6 asked how time consuming helpful or disruptive various assessments were, and items seven and eight asked about future participation in this type of study and value of the overall process. It should be noted that this questionnaire is multi-directional, in that for some items a higher score represents positive perceptions of the process and for some items a higher score represents negative perceptions of the process. For items #2, 3, 4, 7, & 8, a higher score represented a positive perception of this process and for items one, five, and six a higher score represents a negative perception of this process. Table 4-3 presents each item, the responses from all four teachers, and the average score for all of the teachers.

Table 4-3. Results of the Social Validity Questionnaire

Item	Ms. Rose	Ms. Terry	Ms. Amy	Ms. Alexis	Mean Score
(1) How time consuming were the checklists and interviews?	2.0	3.0	3.0	3.0	2.8
(2) How helpful was the training on Functional Behavior Assessment	5.0	5.0	4.0	4.0	4.5
(3) How helpful was the Functional Assessment Interview?	5.0	4.0	3.0	5.0	4.3

Table 4-3. Continued

Item	Ms. Rose	Ms. Terry	Ms. Amy	Ms. Alexis	Mean Score
(4) How helpful was the Motivation Assessment Scale?	4.0	4.0	3.0	5.0	4.0
(5) How disruptive was the direct observation descriptive assessment (ABC)?	1.0	1.0	1.0	3.0	1.5
(6) How disruptive was the functional analysis?	1.0	3.0	4.0	3.0	2.8
(7) Would you be willing to let another of your students participate in this study?	5.0	5.0	2.0	3.0	3.8
(8) How valuable was it to determine the function of the problem behavior?	5.0	5.0	3.0	5.0	4.5

The teachers rated the descriptive assessments as moderately low in terms of being time consuming ($M= 2.8$) with a range of 2-3. For the ABC direct observation, the teachers felt that having the research assistant observe natural classroom occurrences was not disruptive ($M= 1.5$) with a range of 1-3. The functional analysis procedures were considered more disruptive ($M= 2.8$) with a range of 1-4. Items 2,3,4 and 5 asked how helpful the training and various descriptive assessments were. The teachers rated the hour-long training session on functional behavior assessment and functional analysis, as helpful to very helpful ($M= 4.5$) with a range of 4-5. The FAI was considered slightly more helpful ($M= 4.3$) than the MAS ($M= 4.0$). In response to whether they would be willing to participate in this study again, the teachers' responses were mixed ($M= 3.8$) with a range of 2-5. According to the questionnaire, teachers did believe it was valuable to determine the function of the challenging behavior, ($M= 4.5$), with a range of 3-5.

Social Validity Interview

The social validity interview was created by the principal investigator and asked each participating teacher 14 open-ended questions regarding their experiences with this research project. The results of the descriptive assessment and the functional analysis were presented after the questionnaire and the first 9 questions of the 14-question social validity interview had been completed. According to interview responses, three out of the four teachers had previously conducted some type of FBA before. Amy, Jimmy's teacher, had never before completed an FBA. The teachers' defined the term *function* as 'what the student gets out of doing it (the behavior)', or 'what factors in the environment cause the behavior.' The teachers all responded that they liked all of the assessment methodologies. However, Terry, Anthony's teacher, noted that the FAI had a number of questions that "didn't seem to fit (this child) at all," and that it was a little lengthy. All of the teachers believed that the ABC was the best method of capturing the function of the behavior. Amy stated that the importance of the ABC was that "someone who is not involved" was observing the student because teachers who are within the situation "become immune" to a lot of the behaviors.

All of the teachers' responses to the questions about the use of functional analysis indicated that they believed the participating child had "gotten bored" with doing the same conditions repeatedly or that the child had "figured it out" and was deliberately manipulating the conditions. Rose, Ramon's teacher, noted that the best part of the FA was the use of the video camera because others "saw him in action- the videotape captured everything he did."

Before reviewing the results, the teachers were asked what they believed to be the function of the challenging behavior. All four teachers stated that they believed there

were multiple functions and two teachers stated that the function could be constantly changing. For example, Terry, Anthony's teacher, stated, "There are many functions. Sometimes it's attention, sometimes he wants to get out of doing things..." When the teachers examined the results of the different assessments, all of them agreed with the results of the different assessments even when different assessments concluded different functions of the behavior. The teachers explained these differences by attributing them to the different contexts. For example, Terry specifically identified that these different outcomes represented how the function of the behavior was fluid and often determined by a variety of environmental factors. She discussed that in Circle Time, a large group passive activity, the function of his behavior is escape, but on the playground or during Centers Time, getting access to tangibles is the function of his behavior. All of the teachers stated that they would consider the function of the challenging behavior in the future but only Ms. Alison, Greg's teacher, identified a specific strategy that she could use with this information about the function of his behavior, "I'm going to use a timer to control his access to attention..."

Summary

Results of the study indicated the descriptive assessments had relatively low consistency with each other 8/24 (33%) agreement, and that the indirect descriptive assessments (the FAI, and the MAS) also had low agreement with the functional analysis with 3/8 (38%) agreements. However, the direct descriptive observations (ABC) agreed with the FA conclusions for all 4/4 (100%) of the participants. Results of the social validity measures indicated that teachers felt all methods of assessment, including the functional analyses, were helpful, minimally disruptive, and that these results would impact their behavioral interventions. However, they identified the ABC direct

observation as the least disruptive, most valuable way to obtain information regarding the functions of challenging behaviors.

CHAPTER 5 DISCUSSION

The use of functional behavior assessments (FBAs) continues to increase as a result of increasing numbers of children engaging in problem behaviors (Chandler & Dahlquist, 2002), and a need to develop effective assessments and interventions that reduce these problem behaviors and increase adaptive behaviors. Unfortunately, the extensive use of FBAs in practice has outpaced its research base (Sasso et al., 2001). Failure to identify the most effective components of the FBA process with valid outcomes will have adverse effects on children and educators, because ineffective FBAs may lead to interventions that will not decrease challenging behavior or increase adaptive behaviors. There are a number of indirect and direct descriptive methodologies that can be used within the FBA process. However, limited research exists that compares the outcomes of these instruments with each other or validates them through functional analysis procedures. Thus, there is a continuing need to empirically compare and validate the outcomes of these descriptive assessment methods.

In this study, the outcomes of a series of indirect and direct descriptive assessments were compared with each other and compared with the outcomes of a functional analysis in order to answer two research questions. First, how do the hypothetical functions of target behaviors identified through various descriptive functional assessments compare to each other for young children's challenging behavior? Second, how do the hypothetical functions of target behaviors identified through various descriptive functional assessments compare with functions identified through a functional

analysis? Additionally, teachers' beliefs about the process and the results were evaluated through social validity measures. Unlike previous research, (a) the functional analyses were conducted independent of the descriptive assessment results, (b) they were completed within the classroom setting, and (c) the teacher, with assistance from the researcher, served as the therapist for implementing the five functional analysis conditions. All assessments were counterbalanced, and the results of the various assessments were kept separate from each other until completion. Teachers also completed a social validity questionnaire and interview.

The results indicated that the descriptive assessments had low consistency with each other, with 8/24 (33%) agreements. When comparing across descriptive assessments, the MAS findings were consistent with the ABC for total agreements of 3/8 (38%) and greater than the FAI outcomes, 2/8 (25%), for total agreements. The MAS agreed with the FAI only once and the ABC twice across all participants. Additionally, the ABC agreed with the FAI once. When the descriptive assessments were compared to the outcomes of the functional analyses, the findings varied according to instruments. The indirect descriptive assessments (FAI, and MAS) had low agreement with the outcome of the functional analyses with 3/8 (38%) agreements. However, the direct descriptive observations (ABC) agreed with the functional analyses conclusions for all 4/4 (100%) of the participants. Results of the social validity measures indicated that teachers felt all methods of assessment, including the functional analyses, were helpful, minimally disruptive, and these results would impact their behavioral interventions.

Limitations of this study are presented in the first section of this chapter. Then, interpretations of results are presented and compared with other studies that have directly

evaluated descriptive assessment methods. Next, extensions of this study and future research directions are discussed. Finally, the implications of this study's findings in regard to current practices in schools are presented.

Limitations

Although results of this study extend the literature regarding the reliability and validity of descriptive assessments and functional analyses in the FBA process, there are notable limitations to this study. First, the limited sample size of 4 participants impacts the generality of these findings and replications of this study are necessary to improve the external validity. By only having 4 participants in this study, the ability to draw conclusions about these results in widespread applications is severely limited.

Unfortunately, this is a limitation that is prevalent among previous research studies within the literature that have conducted direct evaluations of different functional behavior assessment components. For the eight studies in the direct evaluation section of the literature review, the mean number of participants is relatively the same in comparison to this study and only 3 participants each were evaluated in six of the eight studies. It is possible that the time-consuming, technically intensive nature of functional analysis makes using larger numbers of participants difficult. For example, the one study that used 8 participants (i.e., Murdock et al., 2005) did not conduct functional analyses. Therefore, to extend these findings, this study must be replicated using more participants in the same setting and more participants of different ages and characteristics in different classroom settings.

Second, the context in terms of settings (e.g. the playground) and situations (e.g., free play) for the occurrence of the behavior was variable across descriptive assessment instruments and may be a plausible explanation for the variability of the outcomes of the

instruments (Floyd, et al., 2005; Shriver, Anderson & Proctor, 2001). The teachers alluded to this in their open-ended responses during the social validity interview when they said that different assessments were just measuring the function in different contexts. As Repp and Munk (1999), explain, by extending instruments beyond their “domain of interest,” (p.154) the instrument itself cannot be accurately assessed. In other words, if the function of the challenging behavior is assessed during Circle Time, then that is the function of the behavior *during Circle Time*. The design of this study was not sensitive to the impact of different contexts, but rather compared agreement or disagreement of function across contexts. Questionnaires and interviews were subject to the teachers’ memories and biases of behavior in different settings (Shores, et al., 1999). Additionally, direct descriptive observations captured short intervals across multiple settings. Finally, the functional analysis only measured independent (or in the case of Jimmy, one peer present), structured or semi-structured activities. The difference in settings and situations is especially important in considering the functional analysis outcomes, as this process is regarded in research as the ‘gold standard’ and the only way to determine the actual rather than the hypothetical function (Lerman & Iwata, 1993).

Third, related to the previous limitation are specific limitations of internal and external validity for the functional analysis procedures. Although the functional analyses were conducted in situ, certain conditions could not be replicated in analogue assessments. For example, for Anthony’s teacher, specifically identified a large group, passive setting (e.g. Circle Time) that served as the specific antecedent to escape-maintained behavior. Unfortunately, this setting and activity could not be evaluated in the more individualized functional analysis settings because of practical limitations and

threats to internal control that incorporating greater numbers of other children would entail. Similarly, in some cases, specific target behaviors, identified by the teacher as problematic could also not be evaluated in the FA for legal and ethical reasons. Amy, Jimmy's teacher, originally identified aggression toward peers as his most frequently occurring, most problematic behavior. However, contingently reinforcing aggression toward a peer was not possible for ethical reasons and it was necessary to find other challenging behaviors that may be precursors to aggression. This may provide an explanation for Jimmy's extended functional analysis, overall low rates of behavior and variability across descriptive instruments.

One plausible explanation is that functional analysis as it was originally conceived may not be the 'gold standard' in natural settings with children at risk for EBD. This difference is feasible considering Iwata et al.'s (1982/1994) original description of functional analysis as a procedure that is being used in highly controlled clinical settings to counteract the debilitating effects of self-injurious behavior and used in lieu of punishment in the form of aversive stimulation. Sprague and Horner (1999) detail the need to develop and refine methodologies to determine the functions of high intensity behaviors beyond clinical settings. They suggest developing more sensitive systems of measurement (i.e., sequential analysis) and addressing lower intensity behaviors that are part of the same response class. This may allow researchers to gather knowledge about the functions of high intensity behaviors without eliciting and/or reinforcing the dangerous behaviors.

Evaluating the functional analyses data within this study also indicates that limitations existed with the internal validity of these functional analyses. For three of the

four participants, Ramon, Jimmy and Greg, there was overlap with a number of the data points including the condition that was concluded to be the function of the challenging behavior. This variability makes the functional analyses conclusions less persuasive. Gathering more data could have counteracted the variability for these three participants and made the functional analyses results more robust. This lack of a clear and stable trend in the data may be related to conducting the functional analyses in the classroom and having the teachers play a primary role in conducting the functional analyses. Conducting additional functional analysis sessions and gathering more data was difficult due to logistical constraints.

Finally, although the functional analyses were conducted in natural settings with the teacher implementing the conditions, these conditions were still contrived and subject to researcher influence. In order to maintain procedural integrity, the principal investigator guided the teacher through all conditions using prompts and cues. The principal investigator then coded the data and visually analyzed the data to determine the function of the challenging behavior based on it. This pronounced researcher influence is similar to the studies discussed in the second section of the literature review in chapter two. As the teachers also stated in the social validity interview, in some cases, the children appeared to habituate to the conditions and may have been active in manipulating the contingencies. For example, after Ramon had received contingent attention for his challenging behavior several times in the attention condition, he would engage in a challenging behavior, and repeat the teachers verbal prompt in unison with her (i.e., “Stop doing that...”) or at other times during the functional analysis conditions. While the data in this study do not reflect if the participants were deliberately

manipulating the contingencies, it is a worthwhile consideration, as functional analyses with populations other than developmental disabilities is still not supported by a robust research base (Ervin et al., 2001; Gresham, 2003; Sasso et al., 2001). Thus, researcher influence, high demand of time and personnel, and contrived settings continue to be problematic in assessing the implementation of functional analyses in natural settings (see Ervin et al., 2001 for a review).

Fourth, although the strength of the design of this study was to use different people to conduct different parts of the assessment; this may have contributed to the variability in the data. Using different respondents and data collectors (research assistants and teachers) was necessary to both maintain separation of the findings between the instruments and explore the efficacy of teacher-implemented functional analysis. However, the use of these different people also poses the possibility of introducing variability into the conclusions for the various assessments especially in the case of interviews. As different individuals complete the assessments, the differences may be a result of the person completing the assessment, as opposed to the assessment itself. An ancillary consideration is the use of trained graduate students, in conducting the ABCs and concluding hypothetical functions based on the FAI responses. This also limits the external validity when considering the application of FBA in early childhood settings. It is feasible that educators with less expertise and training are typically responsible for completing and interpreting these descriptive assessments; thus, the findings may differ based on level of experience (Conroy, Clark, Gable & Fox, 1999; Shellady & Stichter, 1999). It is also feasible that educators may have more expertise than the research assistants. The personnel completing the FBAs (i.e., behavior support team, classroom

teachers, behavior specialists, school counselors) is idiosyncratic to different educational settings and thus far little empirical research has been conducted on the effects of these staffing decisions (Scott, McIntyre, Liaupsin, Nelson & Conroy, 2004).

Fifth, evaluating only the primary function according to these assessments does not provide information regarding other aspects of the functional assessment process that may influence function, such as antecedent or setting events. For example, the FAI also gives information on specific antecedents or setting events, like medical or communication problems that may contribute to the occurrence of challenging behavior. Similarly, the MAS provides a rank order of hypothetical functions that may be valuable; thus, indicating that behaviors may be maintained by multiple functions. By only focusing on a single, primary function determined by each assessment, the overall value of the assessment method is underestimated. Although this is a limitation, there were two reasons for focusing only on the primary function determined by each assessment. First, for clarity these other functions were disregarded in order to calculate agreements or disagreements between assessment methods. This is unlike previous research identified (Calloway & Simpson, 1998; Cunningham & O'Neill, 2000; Murdock et al., 2005) that used either a rank order or matched primary and secondary functions. Second, in response to calls for a more efficient, effective FBA methodology that translates to efficient and effective behavioral intervention plans in educational settings, addressing multiple functions in a multi-component behavior intervention plan may not be feasible. Evaluating multiple functions within a behavior intervention plan for multiple children may be unrealistic (Johnston & O'Neill, 2001; Sasso et al., 2001; Scott et al., 2004).

Sixth, another limitation that may have contributed to the variability in the data are the broad definitions of the target behaviors for each participant. Specifically, these behaviors, defined under the term ‘challenging behaviors,’ addressed a wide range of actions across multiple topographies. Although these broad definitions are similar to those used in other studies (Murdock, et al., 2005; Newcomer & Lewis, 2004; Sasso, et al., 1992), this does suggest a weakness within the overall research literature. By defining behaviors more narrowly, the individual functions of specific challenging behaviors may be determined more accurately. The drawback to narrowly defining challenging behaviors is the possibility of low rates of occurrence of the behavior making the determination of the function more difficult.

Seventh, in regard to the social validity measures, the lack of anonymity for teachers completing the questionnaire and interview may have impacted their answers. Within this methodology, teachers completed the questionnaire and interview in a face-to-face meeting with the principal investigator. Because teachers may have felt pressure to answer questions in a specific way (i.e. saying that the functional analysis procedures were not invasive), their responses may not be representative of their actual perceptions. In the future, these questionnaires and interview sheets could be completed and returned anonymously, and this may give teachers greater comfort in discussing their true perceptions of the FBA process.

Eighth, because no intervention phase was initiated within this study, it is impossible to determine if any of the results would translate to effective function-based interventions for the students. Because the end goal of all FBA methodologies is to develop effective function-based interventions, this study only represents an initial step in

FBA research. Future research must focus on the impact of conducting accurate FBAs and then using them in effective function-based interventions. It is vital that functions can be accurately identified, but these results then must be translated to viable function-based interventions that can be implemented in widespread applications in natural settings.

Interpretations of Results

Comparison of Descriptive Assessments

One interesting outcome of the current study is that the overall low levels of agreement between descriptive assessments disagree with other studies that have conducted comparisons between descriptive assessments (Arndorfer et al., 1994; Cunningham & O'Neill, 2000; Ellingson et al., 2000; Murdock et al., 2005; Newcomer and Lewis, 2004). For example, Murdock et al. (2005) reported a higher level of agreements across all three descriptive assessment methods and a higher level of agreement between teacher interviews and direct observations. The current study only reported agreement between the FAI and the ABC for 1/4 (25%) participants. However, this discrepancy may be a result of comparing different instruments across studies. Two studies (Cunningham & O'Neill, 2000; Murdock et al., 2005) used the Functional Assessment Observation Form (FAOF) (O'Neill et al., 1997) as opposed to the ABC form for direct descriptive observations. Other studies used questionnaires created explicitly for that study or simply asked teachers to name what they believed was the function of the target behavior (Cunningham & O'Neill, 2000; Ellingson et al., 2000).

There are two other studies that used the Motivation Assessment Scale and then compared the results with other descriptive assessments. Compared with this study's results of 3/8 (38%) agreements, Cunningham and O'Neill (2000) used the MAS and agreed with other descriptive assessments for 8/9 (88%) opportunities. Arndorfer et al.

(1994) also used the MAS and had 4/10 (40%) agreements. Arndorfer et al., (1994) does point out that elevations on several subscales made the MAS difficult to interpret and that it was the secondary functions identified by the MAS that had high levels of agreement with other descriptive assessments. However, while these results are divergent from this study, this study is similar to studies that tested the reliability of the MAS using a test-retest format (Conroy, Fox, Bucklin & Good, 1996; Sigafos, Kerr & Roberts, 1994; Zarcone et al., 1991) or compared reliability with other instruments and analog assessment with individuals demonstrating self-injurious or stereotypic behaviors (Crawford et al., 1992; Paclawskyj et al., 2001). One possible explanation for the lower levels of agreement with this study may be related to the amount of independence between assessments that is maintained by having different personnel conducting the assessments and keeping the results of the assessment separate from each other. In evaluating the aforementioned studies, the greater the separation of completing the assessments, the lower the agreement between measures.

Four other studies compared the FAI's results with other descriptive assessments (Arndorfer et al., 1994; Cunningham & O'Neill, 2000; Murdock et al., 2005; Newcomer and Lewis, 2004). All four studies had higher levels of agreement when compared to this study. No studies to date have evaluated the test-retest reliability or stability of the FAI (Floyd et al., 2005) although one study compared teacher and student FAI responses and found a high level of agreement between teacher and student responders (Reed, Thomas, Sprague & Horner, 1997). One consideration regarding the lower level of agreement on the FAI is the role of response bias for the interviews, and the fact that the responder may be answering with only partial or incomplete knowledge (i.e., only considering specific

antecedents or unaware of antecedents that are shaping behavioral functions) (Gresham, et al., 2001). For example, for Anthony, whose FAI indicated escape as the maintaining consequence, the majority of the teacher responses centered on occurrences of the challenging behavior during Circle Time, a large group, passive activity. According to the transcript, the teacher did not discuss occurrences of the behavior across other contexts. This shortcoming of indirect assessments has been comprehensively discussed in the literature (Gresham, 2003; Johnston & O'Neill, 2001; Johnston & Pennypacker, 1993; Sasso, Peck, & Garrison-Harrell, 1998). Another consideration is that the way the data is summarized does not lend itself to summarizing a function and that the structure of the summary of information is prohibitive to concluding a primary function. This suggests that restructuring the interview form to be more direct in concluding a primary function may be a way to access this information more conclusively.

Five other studies used direct observations and compared them to other indirect descriptive assessments (Arndorfer et al., 1994; Cunningham & O'Neill, 2000; Ellingson et al., 2000; Murdock et al., 2005; Newcomer and Lewis, 2004). All five studies reported higher levels of agreement with the direct and indirect descriptive observations. Again, a possible explanation for higher rates of agreement across descriptive measures in other studies is the same lack of independence between assessment procedures and results making a confluence of results more feasible. For example, for Newcomer and Lewis (2004) and Murdock et al. (2005), the first author conducted the teacher interview and the direct observations generating hypothetical functions based on each of these assessments. This makes it possible that the results of the first assessment informed the results of the second assessment. Additionally, in studies that used the FAOF (Cunningham & O'Neill,

2000; Murdock et al., 2005), by virtue of the FAOF procedure, the variables considered in the FAOF are directly informed by responses from the FAI. In the FAOF, O'Neill indicates in two items "... Lists behaviors to be monitored" and "... List any additional possible functions of behavior, if necessary, in the Perceived Functions section" (O'Neill et al., 1997, p. 40). For studies that used the FAOF, all of this information is gathered from the FAI that was previously conducted. These results could reflect the inconsistent findings across commonly used descriptive assessments in this study. The next section compares these same outcomes with functions verified through experimental functional analyses. This examination helped to determine the accuracy or construct validity of descriptive assessment methods.

Comparison of Descriptive Assessments with Functional Analyses

The overall agreement between the descriptive assessments and the functional analysis was 7/12 (56%) agreements, but there was a clear difference between the number of agreements for direct and indirect assessments. The direct descriptive observations (ABC) agreed with the functional analysis conclusions for all 4/4 (100%) of the participants and the indirect descriptive assessments were only in agreement 3/8 (38%) times. This finding means that the two most prevalent indirect descriptive assessments in research studies, the MAS and the FAI (Floyd et al., 2005), only agreed with the functional analysis results, 2/4 (50%) times and 1/4 (25%) times respectively. This low level of agreement for the indirect assessments may be an important factor in guiding future research and practice and supports Scott et al.'s (2004) statement that "we have little or no evidence that alternative methods such as interview, questionnaire or rating scales protocols can be valid stand-alone methods of behavior analysis" (p.197).

A comparison of levels of agreement between indirect descriptive assessments and functional analyses indicates that the indirect descriptive assessments were lower in this study than in previous research that has compared descriptive assessments with functional analysis results (Arndorfer et al., 1994; Cunningham & O'Neill, 2000; Newcomer and Lewis, 2004; Yarbrough & Carr, 2000). However, Calloway and Simpson (1998) had similarly low levels of agreement when they compared teacher interviews to functional analysis procedures. Again, this disparity between the aforementioned studies and this study may primarily be due to the use of the descriptive assessment results in previous research to guide the functional analysis conditions. In these studies, the conditions in the functional analysis were in some way informed by all descriptive assessments, often serving as confirmation, as opposed to independently arriving at the function of the challenging behavior. For example, in Newcomer and Lewis (2004) hypothesis statements regarding antecedents for the challenging behavior were developed using descriptive assessments, then the experimental analysis consisted of a reversal design, with and without the hypothesized antecedents. Higher rates of challenging behavior in the antecedent condition confirmed the descriptive assessments. Other possibilities for the low level of agreement between indirect descriptive assessments and the functional analyses relate to issues discussed in the limitations section, that is, teachers' memories and biases of behavior in different settings (Shores, et al., 1999) and the limited knowledge regarding the effects of conducting functional analyses in natural settings with children with high incidence disabilities (Ervin et al. 2001).

The high level of agreement for the direct observations and the functional analysis is similar to the other studies that compared naturalistic direct observations with

functional analyses (Arndorfer et al., 1994; Ellingson et al., 2000; Murdock et al., 2005; Newcomer & Lewis, 2004 Sasso et al., 1992). However, the higher level of agreement in this study is more compelling considering the independence of assessments that was maintained between the ABC assessment and the functional analysis. For example, in Sasso et al. (1992) the direct observation assessment (ABC worksheet) was completed during specific activities that were similar to the conditions of the functional analysis conditions (i.e., presentation of a difficult task). Thus, the ABC was designed to mimic functional analysis conditions making an independent agreement between their results less compelling (Lerman & Iwata, 1993).

The high level of agreement between the ABC and the FA for this study may be related to the overall higher levels of observed target behaviors and consequences that were concluded to be the function of the target behavior. A review of the ABC direct observations indicates that for all 4 participants, the target behavior occurred between 10-25 times, and the consequence of the behavior that was concluded to be the hypothetical function occurred an average of 14.8 times across the eight 15-minute observation periods. This high rate of observed behavior is related to the type of high frequency challenging behaviors that were addressed concurrently for each child (e.g. yelling, asking three questions in a 10-second interval, leaving the assigned area). Addressing these types of behaviors may not be applicable for all children and certainly not for the low frequency, high intensity behaviors that often require an FBA according to federal mandates (Gresham, 2003). As Scott et al. (2004) point out, a behavior that happens one time for a 1-minute interval per day requires 3.5 hours of observation time to have a 50% chance of observing the behavior. Thus, increasing the efficiency and effectiveness of

direct observation is an important consideration for future research. To this end, a scatter plot could be used in conjunction with other direct descriptive assessments to make them more effective (Symons, et al., 1998).

There are two final considerations in regard to the overall contribution this study's results make to the research literature. The first consideration is the issue of the age of the participants. The use of FBA with young children, 8 years and younger, continues to garner researchers' attention as demonstrated in the first two sections of the literature review. However, only two studies in the third section (Calloway & Simpson, 1998; Cunningham & O'Neill, 2000) specifically focused on young children in their investigations. An evaluation of these three studies does not indicate that the methodology of FBAs with young children functions any differently than the other studies in this direct evaluation section. However, comparisons across studies are difficult due to very different descriptive methodologies. The results of this study add to this body of literature, but certainly more focus on FBA methodologies with young children in varying settings (i.e., preschool versus kindergarten) is necessary.

The second consideration in regard to these results is the issue of efficiency in conducting FBAs and the use of different methodologies in light of this consideration. The results of this study suggest that more efficient methodologies may not lead to accurate results in terms of either concurrent or construct validity. Rather, in this study a negative relationship appears to exist between efficiency and valid results- the greater the efficiency (i.e., the MAS and FAI) the less valid the results. This consideration is elaborated further in the implications for practice section. Another important and related consideration is the social validity of this study. The social validity results measured the

overall acceptability of the FBA process and its components, and the perceived value of their outcomes and are discussed in the next section.

Social Validity

Social validity of FBA processes and outcomes remains an under-investigated aspect of the research literature (Ervin et al. 2001; Floyd et al., 2005; Gresham, 2003). The social validity interview and questionnaire results in this study indicated that teachers understood the principles of functional behavior assessment and found the training to be helpful. The measures also determined that the teachers found the descriptive assessments helpful and minimally invasive. These social validity results are similar to those found in the studies that conducted direct evaluations (Murdock et al., 2005; Newcomer & Lewis, 2004; Sasso et al., 1992).

The respondents indicated that the functional analysis was more invasive and too contrived to be worthwhile. The ABC direct observations conducted by an outside observer (i.e., research assistant) were judged to be the most valuable and acceptable way of determining the function of challenging behaviors. However, the sentiment expressed most frequently was that, in regard to these students' problematic behaviors, the respondents were willing to take extensive measures to reduce the behaviors. One final aspect that is worth noting is that Alison, the only participant teacher in a public school with multiple grades, had corresponding scores to the teachers in the university-sponsored setting. This finding is encouraging because unlike a university sponsored early childcare facility, equivalent social validity scores and interview responses suggest that these procedures could be used in more widespread applications in public schools. An area of future research will be to evaluate what effect withdrawing researcher influence, thereby putting the onus of assessment and implementation on school

personnel, would have on perceptions of the FBA process and outcomes. There are a number of other important areas of future research that can extend the findings of this study to continue to improve FBA processes and outcomes.

Future Research

Clearly, this study is only a beginning. Future research based on comparisons of descriptive assessments with each other and with a functional analysis is necessary. Additionally, continuing to hone the methodology of functional analysis in more natural settings with increased teacher participation will be another important extension of the existing research base. There are four areas of future research that could extend the results of this study and continue to evaluate the effectiveness and efficiency of the FBA process in its widespread application within school settings. The four areas that will be discussed in this section are: (a) replicating this study to increase the total number of participants across sites and then systematically manipulating other variables, (b) evaluating the characteristics of the direct descriptive observations (ABC), (c) linking results of different methodologies to function-based interventions, (d) refining functional analysis methodology by reducing researcher influence and measuring the effects of the process over time.

As mentioned in the limitations section, a replication of this study is important to increase internal and external validity. The replication would add child and teacher participants making the results more robust. Because this study drew 75% of its sample from an early childhood center and 25% from a public school, it will be important to extend this study both within other early childhood centers and in public schools. The replication could also use different types of schools, grade levels, and classroom types to conduct the indirect and direct descriptive assessments and functional analyses. Also by

having different individuals complete the direct observations (i.e. teachers, paraprofessionals) this modification could help determine if the high level of agreement between the ABC and the functional analyses was a result of this specific instrumentation's value or the result of an experienced, graduate-level trained researcher accurately identifying behavior functions. These observations could be compared with the functional analyses and the level of agreement could be compared with the current study. There are other variables that could be manipulated after conducting replications across sites that add participants and control for the impact of specific personnel. The replication could also use more public school settings with more school staff involvement to determine the influence of conducting research outside a university sponsored setting. This includes continuing examination of staffing responsibilities and teacher training. As indicated in Scott et al., (2004b), additional research into the role of collaborative teams is necessary as their value in producing reliable and valid FBAs has not been established.

The next step in replicating this study would be to systematically modify what descriptive assessments could be incorporated into the descriptive assessment phase of the study including asking teachers what they believe the function is in more systematic ways (Calloway & Simpson, 1998; Cunningham & O'Neill, 2001; Yarbrough & Carr, 2000) or other descriptive assessments that may be in use in school settings. A scatter plot may be an important tool to use in future research. A scatter plot is a direct observational tool that tracks the occurrence of behaviors according to times of day and/or activities (Touchette, MacDonald, & Langer, 1985). While it does not arrive at a hypothetical function, and therefore was inappropriate for use in this study, it could be used in conjunction with other descriptive assessments to make them more effective

(Symons, McDonald & Wehby, 1998). This future research would be a way to build on the apparent value of direct observation methodologies that this study's results indicate. Additionally, measuring the effects of levels of training in FBA methodology will be an important area of future research (Cone, 1997; Ervin et al., 2001).

In consideration of evaluating different descriptive assessments, although the MAS and the FAI represent the most widely used indirect descriptive assessments (Floyd et al., 2005), educational settings may still employ a wide range of commercial instruments. This necessitates continuous empirical comparisons and validation as these instruments may have varying degrees of accuracy. This is relevant in consideration of the indirect descriptive assessment, the Problem Behavior Questionnaire (PBQ) that was ultimately excluded from these comparisons. While the discordant scoring taxonomy (i.e., no tangible or sensory options as possible functions) made one-to-one comparisons impossible for this study, specific practical considerations also exist. Individuals using the PBQ would be unable to assess if access to tangible items or sensory reinforcement served as the function of the problem behavior. Both of these conditions have been empirically validated as possible functions of children's challenging behavior (Carr, 1977; Iwata et al., 1990; Repp & Munk, 1999).

The next extension of this study is the continued examination of the direct observation instrument (ABC). Building on its high level of agreement with the functional analyses in this study, future research could focus on what attributes make this method effective and what modifications can be done to make it more efficient. The research assistant conducted eight 15-minute observations sessions, for a total of two hours. Future research should determine what the effect of systematically reducing the

total amount of time of the observations has on the accuracy of the assessment procedures. This is important because in the widespread application of FBA, assessment methods have to be as efficient as possible (Scott et al., 2004). Another extension of future research could examine the impact of lower rates of behavior and consequences on the overall accuracy of the assessment method. Finally, future research should further explore what other factors impact the high level of agreement between direct descriptive observations and the functional analysis outcomes including using different direct observation instruments (i.e., the Functional Analysis Observation Form) (FAOF) (O'Neill et al., 1997).

Another extension of this research would be to examine the link between these assessment results and function-based interventions. Future research should examine how well these results translate into practical interventions in school settings. This research should monitor what effects focusing on primary functions have on reducing overall challenging behavior. It will also help determine if the different assessment results could translate to different interventions across contexts. In other words, if the FAI indicated that in specific settings (i.e., Circle Time), challenging behavior is escape-maintained, could a different intervention be implemented in that setting as opposed to other settings where behavior is maintained by attention? This future area of research could focus on a decision-making system, (i.e., a flow chart or decision-making tree) that evaluates the comprehensive results of the assessment and links these results with empirically tested components of behavior intervention plans. These interventions could then be evaluated for overall effectiveness, durability and social validity.

Because functional analysis represents the “gold standard” for determining the function of challenging behavior, it is vital to continue to make this procedure more amenable to school personnel in natural settings (Sasso et al., 2001). Although this study conducted functional analyses in natural settings with teachers acting as therapists, procedural integrity necessitated pronounced researcher influence. Future research should focus on increasing the number of settings that these assessments occur in, documentation of specific antecedents and setting events, and a greater degree of experimental control of settings and antecedents while measuring their impact on the consistency of assessments by different instruments. Additionally, future research should focus on the process of training teachers to conduct functional analyses in natural settings with students with high incidence disabilities or at risk for the development of behavioral disorders. Researchers should also monitor procedural integrity, but not directly conduct the conditions. Measures of social validity should be used to monitor teachers’ perceptions of the process. Finally, probes could be used to evaluate the durability of this methodology within school settings and analyses of rates of challenging behavior and desired behaviors could determine the overall effect of functional analyses in school settings.

Implications for Practice

There are a number of implications of the result of this study in terms of the application of FBA in schools and early childhood centers. First, as mentioned in the limitations section, because these assessment measures produce more information than just a primary function (e.g. setting events, secondary functions, and so forth), their practical applications extend beyond primary functions for schools. The main goal of school personnel using FBA methodology should be to produce a comprehensive

behavior intervention plan (BIP), thus, other information from these assessments is relevant. However, this study indicates that if educators were to use multiple methods to evaluate function, these multiple methods could produce conflicting results. This could have a variety of effects. For example, educators could discard the results of one assessment over another. School personnel could attempt to formulate more complex intervention plans based on multiple functions across different contexts. Finally, school personnel could discard the lack of consistency across measures as indicative of a lack of validity and discount the whole process entirely as being nothing more than a meaningless, bureaucratic chore. In this instance, it is reasonable to assume that schools may choose to use the most efficient assessment methods, (i.e., questionnaires and interview forms), in order to satisfy legal or school policy reform mandates (Sasso et al., 2001; Scott et al., 2004). Based on the current study, the end result of this possible implication is more conflicting results because the more efficient methods, namely the questionnaire and interview, were more inconsistent than the more time-intensive methods, namely the direct descriptive observations. Considering this possible implication in terms of the comparisons with the functional analysis results indicates lower levels of accurately determined functions; thus continuing the potential cycle of FBA worthlessness. This is regrettable as correctly matching behavioral interventions to behavioral function is still viewed as the most promising method for decreasing undesired behaviors (Iwata et al., 1982/1994; Gresham, 2003; O'Neill et al., 1997; Sasso et al., 2001)

The results of the comparisons between descriptive assessment outcomes and the functional analysis indicate that their use of indirect descriptive assessments to determine

the primary function of challenging behavior may be imprudent. Because the indirect descriptive assessments were only accurate 5/12 (42%) of the time, educators would be more likely to determine the incorrect function than the correct function when using any single indirect descriptive assessment. However, this study also underscores the importance of direct descriptive observations. Because the ABC had 4/4 (100%) agreements with the functional analysis results, consistently integrating direct descriptive assessments into FBA protocols appears to be a recommended practice.

In regard to the use of functional analysis in natural settings, this study further demonstrated the difficulty of balancing strong internal validity, the hallmark of functional analysis (Sasso et al., 1992), and strong external validity, the generalizability of this methodology in applied settings. In this study, strong internal validity required continuous researcher involvement throughout the functional analysis process. Thus, it is difficult to conclude that these procedures could be effectively implemented in applied settings without researcher support or more extensive teacher training. However, this study did extend the existing FA literature by conducting the functional analysis in the classroom settings (unlike the majority of previous studies that conducted functional analyses in separate rooms away from the classroom). Of the eight studies that directly compared descriptive assessments with functional analysis, only Sasso et al. (1992) used the classroom setting to conduct the functional analyses.

Finally, there are three suggestions for individuals who are faced with continuing to produce FBAs, but want to increase the validity of the process. First, using direct observation methods, particularly ABC forms for high incidence behaviors may be a valuable way to increase the validity of the assessment. These ABC forms may be

supplemented with the use of other direct observation methodologies (i.e., scatter plots). Second, educators should use caution with indirect measures and use them in conjunction with these direct observation methods to evaluate antecedents and other possibly relevant information. Third, the use of functional analysis, or other experimental analysis, in widespread application does not appear advisable based on existing research. The limitations, technical demand and cost-benefit ratio do not support widespread use of this methodology at this time.

Summary

This study extends the continued investigation of reliability and validity of the descriptive components of the FBA process. By maintaining separation between the descriptive components, counterbalancing their order, and conducting functional analyses within the classroom setting, the purpose of this investigation was to individually compare the results of three commonly used descriptive assessment methods with each other to determine reliability and with a functional analysis to determine construct validity. Descriptive assessments including one checklist, a direct observation and an interview were completed for four young children. Teachers and researchers then completed functional analyses within the classroom setting of the same participants. All results of the assessments were kept separate from each other until completion. Teachers also completed a social validity questionnaire and interview.

This study indicated that descriptive assessments had low consistency with each other, 12/36 (33%) agreements, and that the interview and checklist also had low agreement with the functional analyses with 3/8 (38%) agreements. However, the direct descriptive observations agreed with the functional analyses conclusions for all 4/4 (100%) of the participants. Results from social validity measures indicated that teachers

felt methods of assessment were helpful, minimally disruptive, and results would impact their behavioral interventions. The results validate direct descriptive observation assessment methods and extend the literature by examining the use of functional analyses conducted within natural settings.

APPENDIX A
APPROVED IRB FORMS AND PARTICIPANT INFORMED CONSENT FORMS

University of Florida Institutional Review Board

1. **TITLE OF PROTOCOL:** Improving Functional Behavior Assessments: Comparing Descriptive Methodologies with Functional Analysis

2. **PRINCIPAL INVESTIGATOR(s):** Peter Alter, Doctoral Candidate, Department of Special Education, P.O. Box 117050, G-315 Norman Hall, Gainesville, Florida 32611-7050, 392-0701

3. **SUPERVISOR (IF PI IS STUDENT):** Maureen Conroy, Associate Professor Department of Special Education, P.O. Box 117050, G-315 Norman Hall, Gainesville, Florida 32611-7050, 392-0701, mconroy@coe.ufl.edu

4. **DATES OF PROPOSED PROTOCOL:** From 12/01/05 to 12/01/06

5. **SOURCE OF FUNDING FOR THE PROTOCOL:** Unfunded

6. **SCIENTIFIC PURPOSE OF THE INVESTIGATION:** The purpose of this investigation is to examine the Functional Behavior Assessment (FBA) process by comparing four commonly used descriptive assessment results with each other to determine consistency and with a functional analysis to determine construct validity.

7. **DESCRIBE THE RESEARCH METHODOLOGY IN *NON-TECHNICAL* LANGUAGE.** Each participating teacher will nominate a child in his/her classroom who is exhibiting problem behaviors that interfere with their ability to learn. Descriptive assessments: Problem Behavior Questionnaire, Motivation Assessment Scale, Functional Assessment Interview and an Antecedent, Behavior, Consequence direct observation sheet (see attached examples) will be completed for four young children (ages 3-6) by the researcher with information supplied by the primary teacher as part of a functional behavior assessment. Researchers will then complete functional analyses of the same participants. The results of these two types of assessments will be compared to determine the validity of descriptive assessment methods. The children will be included if they meet the following criteria:

- Children are between the ages of 3 and 6 years old.
- They are currently enrolled in a Day Care Center, Pre-kindergarten, Kindergarten, or First Grade class (general education or special education) in north-central Florida.

- They have been identified through teacher nominations, in that teachers have reported that these children are having problem behaviors that are interfering with their learning and this problem warrants an FBA.
- A Total Problem Score of no less than 60 on the Child Behavior Checklist Teacher Reporting Form (CBCL-TRF) (Achenbach, 1992)
- Students will not be classified mentally retarded as determined by a cumulative file review.
- Consistent attendance at school, defined as 80% attendance or 4 out of 5 days, must be documented either through school or teacher records.

Recruitment of child and teacher participants will occur by approaching schools that are already participating in a Positive Behavior Support (PBS) program, which describes functional behavior assessment as a cornerstone to its program. The initial contact will be made to the principal or childcare director of the PBS school. Principals or childcare directors will be asked to recommend teachers who teach children with problem behaviors that necessitate a functional behavior assessment. Teachers will then be approached to participate in this research study. After teachers sign teacher participation consent forms, they will make initial contact with parents/ caregivers about participating in this research study. If parents/ caregivers would like to have their child to participate, then the teacher will contact the researcher. The researcher will then contact the parent and gain the necessary consent for the child's participation in the study.

After recruitment of four teacher and student participant dyads has been completed, there are three phases of this investigation. In the first phase, pre-assessment procedures will be conducted. Participating teachers will be asked to attend a one-hour training session that will include explanations of operational definitions of problem behavior, functions of behavior, Functional Behavior Assessment, functional analysis and the descriptive assessment instruments that will be used. The teacher will be asked to identify and operationally define the most frequently occurring, problematic behavior demonstrated by the child, identify times or activities this behavior is likely to occur, and to identify a preferred classroom toy for the tangible condition of the functional analysis and a task that can be completed with an 85% success rate for the escape condition of the functional analysis. Additionally, the investigator will conduct a review of pertinent school records to determine consistent attendance and average cognitive ability.

The second phase of the procedure will consist of the completion of the descriptive assessments. The teacher will be asked to fill out the Problem Behavior Questionnaire, the Motivation Assessment Scale. A trained graduate assistant will interview teachers using the Functional Assessment Interview. The principal investigator will then conduct eight fifteen-minute direct observations of the student, during those times when problem behaviors are most likely to occur, in order to complete the Antecedent-Behavior-Consequence instrument. In the third phase, the principal investigator will conduct a functional analysis for each participating child. In this phase, we will manipulate five specific types of situations that may be maintaining the problem behavior in the classroom environment (1) attention (2) escape (3) tangible (4) alone (5) free play (control). During phase three, data will be collected using a real time, continuous recording system that calculates the frequency and duration of the problem behavior and the condition in which that behavior occurred and translates this data into rate of behavior per session. The condition in which the problem behavior occurs most frequently will be

determined to be the primary function of the problem behavior. For both the direct descriptive observations and the functional analysis, observations will occur in the classroom during naturally occurring activities and the researchers will not identify to the class the target child included in the observation. Once all of the phases have been completed the different assessments will be compared for agreement or disagreement, and findings will be used for the principal investigator's doctoral dissertation.

8. POTENTIAL BENEFITS AND ANTICIPATED RISK: The goal of this study is to improve the efficacy of the Functional Behavior Assessment process by evaluating frequently used descriptive assessments for consistency and validity. There are no anticipated risks. Teachers will be instructed to address problem behaviors through typical classroom intervention procedures. In the unlikely event that any type of the assessment procedures is judged to be eliciting excessive occurrences of the problem behavior then the session will be terminated and teachers will be asked to respond to the target child's problem behaviors using their typical classroom practices.

9. DESCRIBE HOW PARTICIPANT (S) WILL BE RECRUITED, THE NUMBER AND AGE OF THE PARTICIPANTS, AND PROPOSED COMPENSATION (if any): Four teacher participants will be approached by the principal investigator via the school principal and will be given an explanation of the investigation. The teachers will then be asked to nominate students whose problem behavior is interfering with their learning. After the student participants have been identified, the participants' family will first be approached through the teacher, if the parents/ caregiver is interested in participating, then the teacher will contact the principal investigator and the principal investigator will then meet with the parents/ caregiver to describe the study and obtain consent for participation . A total number of 4 students will be selected and the ages of the participants will range from 3-6 years old. A \$25 dollar gift card will be provided for all teacher and student participants who complete the project.

10. DESCRIBE THE INFORMED CONSENT PROCESS. INCLUDE A COPY OF THE INFORMED CONSENT DOCUMENT (if applicable). See Attached.

Please use attachments sparingly.

Principal Investigator's Signature

Supervisor's Signature

I approve this protocol for submission to the UFIRB:

Dept. Chair/Center Director Date

University of Florida
Department of Special Education
P.O. Box 117050/G-315 Norman Hall
Gainesville, Florida 32611-7050
Caregiver/ Parent Form

Consent Form for Improving Functional Behavior Assessments: Comparing Descriptive Assessment Methodologies with Functional Analysis for Young Children

The research study described below is being conducted by University of Florida graduate students/staff under the supervision of Dr. Maureen Conroy (Associate Professor, Special Education Department). The purpose of this study is to evaluate different descriptive assessments that are frequently used in the completion of a Functional Behavior Assessment by comparing the results of the different assessments with each other and with a functional analysis.

Your child's teacher has indicated that you may be interested in having your child participate in this study. If you agree to have your child participate in the study, all three phases described below will be conducted in your child's typical classroom settings, which for your child may be the childcare center, preschool, or classroom during typical activities (recess, lunch, free time, center time). Your child's typical routine will not be disrupted and your child will not be removed from their classroom at any time during the study. The research study will be implemented according to phases (as described below).

Phase 1: The first phase consists of pre-assessment procedures. We will review your child's cumulative school record to obtain additional demographic information for research. We will conduct an interview with your child's teacher/ early childcare provider to determine what behavior is most problematic and is interfering with your child's learning. In addition, we will ask your child's teacher what toys and activities your child prefers and what toys/activities/ or materials are difficult for your child. By identifying these materials, we can best assess your child's behavior.

Phase 2: The second phase consists of an interview, a direct observation process, and the completion of two behavior checklists with your child's teacher or early childhood provider. We will conduct the interview and behavior checklists during times when the children are not in the room, i.e., planning times, and directly observe your child in natural settings during typical activities. The interview and behavior checklists with the childcare provider/teacher will take approximately two hours and we will observe your child for approximately two hours. Your child will not be removed from the natural setting nor will his/her schedule be changed.

Phase 3: The third phase involves an assessment technique called functional analysis. We will create five specific types of situations that may be maintaining your child's behavior in the classroom environment (1) attention (2) escape (3) tangible (4) alone (5) free play. This will help us to determine the possible reason for your child's behavior. In rare

occasions, conducting functional analyses may increase your child's behavior. Although this is highly unlikely, if your child's behavior or another child's behavior becomes threatening or violent at anytime during this assessment period, we will terminate the session immediately and the teacher will be asked to follow typical intervention procedures for that setting.

We will also ask the teacher or early childhood provider to complete acceptability rating forms after all phases of assessment in order to give his/her opinion on how he/she viewed the use of these procedures.

We will be videotaping the sessions in the third phase in your child's classroom setting. This will be done to record the behaviors that occur during our sessions. These videotapes will be shown only under our direction to persons collecting and scoring the data, to you or the teacher or early childhood provider if), to students or other research at the University of Florida, and at professional presentations outside of the University for research or training purposes only. Dr. Conroy will strictly monitor the confidentiality of these videotapes. However, you should be aware that the showing of these videotapes might result in others being able to recognize your child/child's teacher or early childhood provider. In addition, data on your child's participation will be used for training or as part of a publication, but your child's name will not be used for data publication or presentation and records will be kept confidential to the extent provided by law. As required by the Alachua County School Board, the final research report will be submitted to the Board for review (e.g., conference abstract or research publication) and your child's name will not be used.

Each phase of the study will take approximately 2 weeks. Observations will take place approximately 2 to 3 days per week for approximately one hour each time. We will be providing some preliminary recommendations at the conclusion of the final phase of assessment.

Participation or nonparticipation in this study will not affect your child's placement in any educational programs. You and your child have the right to withdraw consent at any time without consequence.

There are no known risks for participation in this study; however, your child may continue to demonstrate some of his/her existing challenging behaviors during the assessment phases of the study. These behaviors may be the same behaviors that your child has been demonstrating in the natural setting and the childcare provider/teacher may implement typical natural setting procedures if the behaviors occur. Possible benefits of participation include identification of current reasons for your child's inappropriate behavior, improvement in your child's social behavior, and your child's teacher or early childhood provider. A one-time compensation in the form of a \$25 gift card will be awarded to you upon completion of the study.

For your information, if your child is injured during assessment or treatment and the investigator is at fault, the University of Florida Board of Trustees, and the State of

Florida shall be liable only as provided by law. Appropriate compensation for injury may be sought by contacting the Insurance Coordinator at 107 Tigert Hall, University of Florida, Gainesville, FL 32611, Tel: (352) 392-1325. Questions or concerns about research participant's rights may be directed to the University of Florida Institutional Review Board, Box 112250, the University of Florida, Gainesville, FL 32611, Tel: (352) 392-0433.

I have read the procedures described above for this project. I have received a copy of this statement and I agree to allow my child to participate. I am free to ask questions or to express any concerns that I have about the project. I am free to withdraw consent at any time, and this will have no effect on other services provided to my child. I understand that my child's teacher or early childhood provider will sign a separate form.

Signature

2nd Caregiver/Witness

Date

Date

Relationship to Participant

I give consent for my child, _____ to be videotaped during sessions to serve as a record of his/her responses and for the purposes stated in this consent.

Signature

2nd Caregiver/Witness

Date

Date

Relationship to Participant

Questions about this research project may be directed to: Dr. Maureen Conroy, (352) 392-0701 ext. 245.

University of Florida
Department of Special Education
P.O. Box 117050/G-315 Norman Hall
Gainesville, Florida 32611-7050

Teacher/ Early Childhood Care Provider Form

*Consent Form for Improving Functional Behavior Assessments: Comparing Descriptive
Assessment Methodologies with Functional Analysis for Young Children*

The research study listed below is being conducted by University of Florida graduate students/staff under the supervision of Dr. Maureen Conroy (Associate Professor, Special Education Department). The purpose of this study is to evaluate different descriptive assessments that are frequently used in the completion of a Functional Behavior Assessment by comparing the results of the different assessments with each other and with a functional analysis. This child's parent will also need to provide consent for this child to participate in this research project.

If you agree to participate with this child in this project, all three phases described below will be conducted in your classroom (e.g., childcare center or preschool classroom) during typical activities (recess, lunch, free time, center time) without removing or disrupting this child from his/her typical routine.

Phase 1: The first phase consists of pre-assessment procedures. We will ask you to attend a one-hour one-on-one training session to review basic principles of this study and complete a Child Behavior Checklist in regard to this student. We will review this child's cumulative school record to obtain additional information for research (specifically—IEP or IFSP, cognitive assessment, medical, behavior, and attendance information). We will schedule and conduct an interview with you, at your convenience, to determine what behavior is most problematic in interfering with learning, to determine when problem behaviors are most likely to occur, to establish a preferential toy for the tangible condition of the third phase, and determine an appropriate task for the escape condition of the third phase.

Phase 2: The second phase consists of an interview, a direct observation process, and the completion of two behavior checklists with you. We will conduct the interview and behavior checklists during times that are convenient to you when the students are not in the room, i.e., planning times and directly observe your child in natural settings during typical activities. The interview and behavior checklists with you will take approximately two hours and we will observe the child for approximately two hours. The child will not be removed from the natural setting nor will his/her schedule be changed.

Phase 3: The third phase involves an assessment technique called functional analysis. We will create five specific types of situations that may be maintaining the problem behavior in the classroom environment (1) attention (2) escape (3) tangible (4) alone (5) free play (control). This will be done in your classroom at times that you identify as problematic. This will help us to determine the possible reason for the child's behavior. Although

highly unlikely, if the child's behavior or another child's behavior becomes threatening or violent at anytime during this assessment period, we will terminate the session immediately and you will be asked to follow typical intervention procedures for that child and setting. These sessions will be videotaped in order to determine when problem behaviors occur most frequently.

Finally, we will also ask you to complete an acceptability rating form after all phases of assessment in order to give your opinion on how you viewed the use of these procedures in your classroom settings.

We will be videotaping the sessions in the third phase in the classroom. This will be done to record the behaviors that occur during our sessions. These videotapes will be shown only under our direction to persons collecting and scoring the data, to you or the parents if requested (e.g., as a training tape for treatment), to students or other research at the University of Florida, and at professional presentations outside of the University for research or training purposes only. Dr. Conroy will strictly monitor the confidentiality of these videotapes. However, you should be aware that the showing of these videotapes might result in others being able to recognize you. In addition, data on the target child's participation will be used for training or as part of a publication, but the name will not be used for data publication or presentation and records will be kept confidential to the extent provided by law. As required by the Alachua County School Board, the final research report will be submitted to the Board for review (e.g., conference abstract or research publication) and your child's name will not be used.

Each phase of the study will take approximately 2 weeks. Observations will take place approximately 2 to 3 days per week for approximately one hour each time.

Participation or nonparticipation in this study will not affect the child's placement in any educational programs. You have the right to withdraw consent at any time without consequence.

There are no known risks for participation in this study; however, the target child may continue to demonstrate some of his/her existing challenging during the assessment phases of the study. These behaviors may be the same behaviors that the child has been demonstrating in the classroom and you should implement typical procedures if the behaviors occur. Possible benefits of participation include identification of current reasons for the child's inappropriate behavior, and you will receive behavioral assessment and intervention training individualized for the target child's needs.

Results of this study will be shared with you and at the end of the study. No information will be shared with anyone other than you and the parent unless you authorize this to occur. However, if the parent requests information on the child's progress in the project, this information will be provided without additional consent from you. You cannot otherwise request the release of other data on this child without additional permission from the parent.

For your information, if you are injured during assessment and the investigator is at fault, the University of Florida Board of Trustees, and the State of Florida shall be liable only as provided by law. Appropriate compensation for injury may be sought by contacting the Insurance Coordinator at 107 Tigert Hall, University of Florida, Gainesville, FL 32611, Tel: (352) 392-1325. Questions or concerns about this research participant's rights may be directed to the University of Florida Institutional Review Board, Box 112250, the University of Florida, Gainesville, FL 32611, Tel: (352) 392-0433.

I have read the procedures described above for this project. I have received a copy of this statement and I agree to participate in this project. I am free to ask questions or to express any concerns that I have about the project. I am free to withdraw consent at any time, and this will have no effect on other services provided to this child. I understand that the child's parent has signed a separate consent form.

Signature _____
2nd Early Childhood Provider/Witness

Date _____
Date

Relationship to Participant

I understand that his child's parent has given consent for _____ to be videotaped during sessions and to serve as a record of his/her responses and for the purposes stated in this consent. I understand that established school guidelines for obtaining video consent for the classroom will be followed.

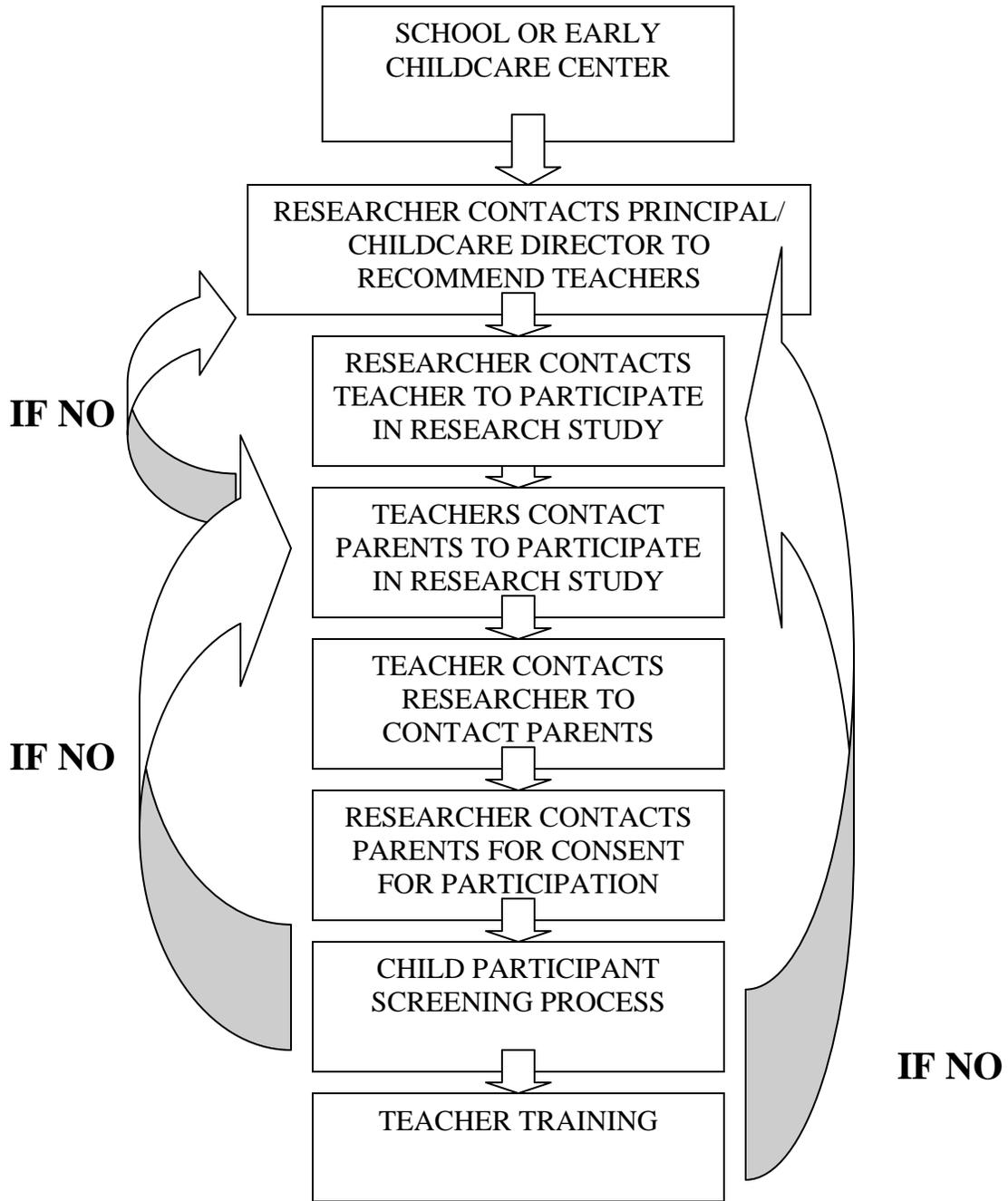
Signature _____
2nd Early Childhood Provider/Witness

Date _____
Date

Relationship to Participant

Questions about this research project may be directed to: Dr. Maureen Conroy, (352) 392-0701 ext. 245.

APPENDIX B
FLOW CHART OF TEACHER AND CHILD PARTICIPANT RECRUITING
PROCESS



APPENDIX C
STUDENT PARTICIPANT CHILD BEHAVIOR CHECKLIST (CBCL) SCORES

Student Total Scores and Percentile for CBCL (1.5-5)

Participants	Emotionally Reactive	Anxious/ Depressed	Somatic Complaints	Withdrawn	Sleep Problems	Attention Problems	Aggressive Behavior
Ramon	15 >97 percentile	13 >97 percentile	3 79 percentile	7 >97 percentile	4 73 percentile	7 >97 percentile	32 >97 percentile
Anthony	10 >97 percentile	7 95 percentile	1 <50 percentile	5 96 percentile	9 >97 percentile	5 89 percentile	33 >97 percentile
Jimmy	4 90 percentile	2 62 percentile	0 <50 percentile	2 <50 percentile	0 >50 percentile	3 58 percentile	26 96 percentile

Student Scores for CBCL (6-18)

Participant	Anxious/ Depressed	Withdrawn Depressed	Somatic Complaints	Social Problems	Thought Problems	Attention Problems	Rule-Breaking Behavior	Aggressive Behavior
Greg	4 76 percentile	4 90 percentile	2 89 percentile	7 97 percentile	7 >97 percentile	31 93 percentile	6 95 percentile	32 >97 percentile

APPENDIX D
INSTRUMENTS

Pre-experimental Assessment Checklist

1) Target behavior operationally defined

2) Preferred toy

3) Task that can be completed 30% of the time

4) Record Review Completed _____

5) CBCL Score _____

6) Times or Activities Problem Behavior Is Likely To Occur

APPENDIX E
SOCIAL VALIDITY MEASURES

Social Validity Questionnaire

Teacher: _____

Date: _____

School/ Center: _____

Age level of child: 3 years 4 years 5 years 6 years

(Circle one)

Please complete the items below by circling the number under the question that best fits how you feel about the assessment techniques conducted.

How time-consuming were the checklists and interview?

Not at all

Very

1

2

3

4

5

How helpful was the training on Functional Behavior Assessment?

Not at all

Very

1

2

3

4

5

How helpful was the Functional Assessment Interview?

Not at all

Very

1

2

3

4

5

How helpful was the Motivation Assessment Scale?

Not at all

Very

1

2

3

4

5

How disruptive was the direct observation descriptive
assessment (ABC)?

Not at all

Very

1

2

3

4

5

How disruptive was the functional analysis?

Not at all

Very

1

2

3

4

5

Would you be willing to let another of your students participate in this study?

Not at all

Very

1

2

3

4

5

How valuable was it to determine the function of the problem behavior?

Not at all

Very

1

2

3

4

5

Any additional comments:

Social Validity Interview

1. HAVE YOU EVER COMPLETED A FUNCTIONAL BEHAVIOR ASSESSMENT BEFORE?
2. HOW WOULD YOU DEFINE FUNCTION (OF A BEHAVIOR)?
3. WHAT DID YOU THINK OF THE PROBLEM BEHAVIOR QUESTIONNAIRE? WHAT WOULD YOU HAVE CHANGED ABOUT IT?
4. WHAT DID YOU THINK OF THE MOTIVATION ASSESSMENT SCALE? WHAT WOULD YOU HAVE CHANGED ABOUT IT?
5. WHAT DID YOU THINK OF THE FUNCTIONAL ASSESSMENT INTERVIEW? WHAT WOULD YOU HAVE CHANGED ABOUT IT?
6. WHAT DID YOU THINK OF THE COMPLETED DIRECT OBSERVATION WORKSHEETS? WERE THEY ACCURATE OR INACCURATE? WHY?
7. WHAT DID YOU THINK OF THE FUNCTIONAL ANALYSIS?

8. WHAT DO YOU BELIEVE THE FUNCTION OF (THE PARTICIPANT CHILD) THE BEHAVIOR IS?

REVIEW RESULTS

9. DO YOU AGREE WITH THE RESULTS OF THE DIFFERENT ASSESSMENTS?

10. DO YOU FEEL LIKE YOU ALREADY KNEW THIS INFORMATION? IF SO HOW DID YOU USE THE INFORMATION?

11. CONSIDERING (1) THE AMOUNT OF TIME EACH ASSESSMENT TOOK, (2) THE AMOUNT OF EFFORT EACH ASSESSMENT REQUIRED AND (3) THE FUNCTION EACH ASSESSMENT CONCLUDED- WHAT ASSESSMENT METHOD DO YOU BELIEVE IS THE BEST? WHY?

12. WILL THIS INFORMATION CHANGE HOW YOU STRUCTURE YOUR BEHAVIOR MANAGEMENT SYSTEM? HOW?

13. WILL YOU USE INFORMATION REGARDING FUNCTION TO CHANGE INTERVENTION STRATEGIES? HOW?

14. IS THERE ANYTHING ELSE YOU WOULD LIKE TO ADD?

APPENDIX F TEACHER TRAINING OUTLINE

What is a problem behavior?

In not so many words a problem behavior is a behavior that is a problem. It may be a problem either for the individual demonstrating the behavior or for the people around the individual, in this case the teacher and/ or the other students. Problem behavior might include any of the following results: cause physical or emotional harm to the child or another person cause damage to property disrupt classroom learning either for the individual or others

Common problem behaviors include but are not limited to:

1. Disruption- including yelling, talking out of turn, crying, and noise making
2. Off-task- refusing to complete work or participate in activities
3. Noncompliance- refusing to follow direction, intentionally slow responses, ignoring adult directives

What is an operational definition?

Operational definitions of problem behaviors must have three components:

1. precise- the behaviors must described be so that different people can read a description of the behavior and interpret it the same way (the Stranger Test)
2. positive- The Dead Man's Test- if a dead man can do the behavior that is being described then it does not pass the Dead Man's test

3. distinct- (have a clear beginning and ending) so that the behavior can be counted (Kaplan, 1995)

What is the function of a behavior?

1. The nature of the consequence that reinforces a target behavior is considered that behavior's *function*. In other words, if the reinforcing consequence of a behavior is gaining attention from the teacher, then the *function* of the behavior is teacher attention.
2. Researchers typically view function in terms of one of three classes: positive reinforcement either through a tangible object or attention; negative reinforcement through escaping or avoiding an unpleasant situation; or intrinsic reinforcement wherein the behavior is hypothesized to stimulate an intrinsic event (Alberto & Troutman, 2003).
3. For practitioners, the *function* is “a statement explaining why the student engages in this behavior.”
4. The difference between these two interpretations is subtle but critical. Function refers to the “purpose” of the behavior or how it helps the students to meet his or her needs, in terms of one of the three supporting consequences.
5. While when a practitioner answers the question ‘why does the student engage in this behavior?’ there are a host of responses. For example, in a practitioner might identify ‘unmet basic needs- hungry, tired’ as a function of behavior, however this explanation provides a reason why but not a function. If the statement is correct then the function might be to access sleep or food, or to escape activities that compete with

a search for food or sleep. The function of a behavior is often defined as ‘why the behavior occurs’

What is a Functional Behavior Assessment?

1. The FBA is a process in which information is gathered regarding a specific behavior or set of behaviors in order to determine whether that behavior has any predictable relationship with the environment (O’Neill et al., 1997).
2. The environment is comprised of all factors that came before (antecedents) and after (consequences) the behavior.
3. A relationship exists when these environmental factors both predict the behavior and explain why it is maintained. Identification of these relationships helps us to understand why behavior occurs, or how behavior is reinforced and maintained by the specific environmental consequences (i.e., functions) they elicit.
4. The purpose of an FBA is to understand behavior so that individualized interventions may be designed to replace undesirable behavior with appropriate alternatives that efficiently obtain the functions of the problem behavior.

What is a functional analysis?

A functional analysis is a procedure used to evaluate possible functions of a behavior by manipulating what occurs after the problem behavior takes place. This is different than the other assessments that schools often use, because we are actively changing the environment to test what consequences support this behavior. For this research study, we have five possible consequences that will be used to determine the function of the problem behavior (1) attention (2) escape (3) tangible object (4) alone (5)

free play. We will systematically apply each of these conditions after the behavior takes place and the condition that causes the behavior to occur most frequently is the function of the behavior. We will be doing this during regular classroom times but try not to disrupt the classroom environment. I can supply you with additional resources if this procedure is still confusing. **Watch FA Example Video**

What are the PBQ, MAS, FAI and ABC?

The Problem Behavior Questionnaire (PBQ) and the Motivation Assessment Scale (MAS) are behavior checklists that we are going to ask you to fill out. They are fairly brief- the PBQ has 15 questions and the MAS has 16 questions. Both checklists ask you to circle a number between 0-6. These assessments will be scored to determine a hypothetical function of the behavior. Here is what these forms actually look like (show forms).

The Functional Assessment Interview (FAI) is an interview that takes anywhere between 45-90 minutes. It has 11 sections and asks a variety of questions about behaviors and environmental factors before and after the behaviors.

The Antecedent-Behavior-Consequence (ABC) direct observation sheet provides a method to directly observe behavior in natural environments. A graduate assistant will simply watch the target child and record what happened before and after the target behavior. Again, we will be doing this during regular classroom times but try not to disrupt the classroom environment.

APPENDIX G FUNCTIONAL ANALYSIS PROCEDURES

Preliminary Steps

Prior to each FA session the following procedures will occur:

- Before going to the school/ daycare site the principal investigator will test the video camera and review FA conditions and procedures
- Review operational definition of target behavior
- Review order of conditions (the order of conditions are counterbalanced and will vary- the task analysis should be adjusted accordingly)
- Review specific procedure for each condition
- Obtain materials for all conditions: free play, attention, escape and tangible condition.
- Arrange room so that the area for the functional analysis is defined. It is not completely separate, but peer and target child movement and access can be controlled and/ or restricted.
- Set up video camera in unobtrusive location to capture as much of this area as possible
- Teacher and principal investigator review audible cue for non-contingent attention and end of session.

- Review non-contingent attention- the teacher will make statements directed toward participant child (not praise or redirection) “I see you’re using the red crayon.” “You’re wearing a blue shirt, today.”
- Set up free play condition with neutral activity e.g. coloring in a coloring book.

Free play condition

- Target child and peers are moved to defined area.
- Stopwatch and video camera are turned on
- Teacher says “You can play with whatever you want. I’ll tell you when to stop.”
- Teacher is in defined area 3-6 feet from child and offers non-contingent attention.
- Occurrences of the problem behavior will be ignored.
- If the target child attempts to access more attention or leave assigned area they will be gently redirected back to the activities.
- After five minutes have elapsed, the video camera is turned off and the teacher will take a 2 minute break:
 - Review next condition procedure (attention)
 - Clean up and set neutral activity
 - Put magazine or catalog in area for teacher to “look busy” during attention condition

Attention condition

- Target child and peers are in defined area
- Stopwatch and video camera are turned on
- Teacher says “You can _____(neutral activity, e.g. color in the coloring book). I’ll tell you when to stop.”

- Non-contingent attention is *not* provided. Teacher looks busy reading magazine 3-6 feet away.
- Attention is provided contingent on the demonstration of the problem behavior. At that time the teacher says “Stop doing that. You shouldn’t do that because it is against the rules. You are not following directions when you do that.” These verbal statements are paired with the teacher coming close to the student and putting a hand on their back.
- This same response is repeated upon each demonstration of the problem behavior
- After five minutes have elapsed the video camera is turned off and the teacher will take a 2 minute break:
 - Review next condition procedure (tangible)
 - Clean up
 - Put tangible item in a place where it is readily accessible

Tangible condition

- Target child and peers are in defined area
- Stopwatch and video camera are turned on
- Teacher says “You can play with (preferred item). I’ll tell you when to stop.”
- Teacher is in defined area 3-6 feet from child.
- Principal investigator signals teacher every thirty seconds to offer non-contingent attention.
- The tangible item or activity is provided initially for thirty seconds and then presented upon demonstration of the problem behavior. The teacher says “ You can play with _____ for little while.” After thirty seconds, the item is removed.
- This same response is repeated upon each demonstration of the problem behavior

- Principal investigator signals teacher every thirty seconds to offer non-contingent attention. Teacher is in defined area 3-6 feet from child.
- After five minutes have elapsed the video camera is turned off and the teacher will take a 2 minute break:
 - Review next condition procedure (escape)
 - Clean up put difficult task in place

Escape condition

- Target child and peers are in defined area
- Stopwatch and video camera are turned on
- Teacher says “I would like you to work on _____. I know it may be difficult but I want you to try your best. If you need a break, I will give you a break“
- Principal investigator signals teacher every thirty seconds to offer non-contingent attention. Teacher is in defined area 3-6 feet from child.
- Upon demonstration of the problem behavior, the teacher will say “ Time to take a break.” At this point, the task will be removed for thirty seconds and then returned.
- This same response is repeated upon each demonstration of the problem behavior
- After five minutes have elapsed the video camera is turned off and the teacher will take a 2 minute break:
 - Review next condition procedure (alone)
 - Clean up and remove activity

Alone condition

- Target child is in defined area (no peer access)
- Stopwatch and video camera are turned on

- Teacher does not offer any directions and does not stay in the area
- Preferred item and neutral activity are available.
- Problem behavior is ignored.
- It may be necessary to shorten this session (Peck, Sasso, & Stambaugh, 1998)

Post Session Steps

- Classroom is returned to typical set-up
- Brief interview with teacher for general feedback on FA procedures
- Monitor target child for increases in problem behavior as a result of FA conditions

APPENDIX H
FINAL SCORING SUMMARY CHART

Ramon

Instrument	Function identified	Agreement with Other Descriptive Assessments	Agreement with Functional Analysis
MAS	Tangible	FAI	No
FAI	Tangible	MAS	No
ABC	Attention	None	Yes
FA	Attention	ABC	

Anthony

Instrument	Function identified	Agreement with Other Descriptive Assessments	Agreement with Functional Analysis
MAS	Tangible	ABC	Yes
FAI	Escape	None	No
ABC	Tangible	MAS	Yes
FA	Tangible	MAS, ABC	

Jimmy

Instrument	Function identified	Agreement with Other Descriptive Assessments	Agreement with Functional Analysis
MAS	Tangible	ABC	Yes
FAI	Attention	None	No
ABC	Tangible	MAS	Yes
FA	Tangible	MAS, ABC	

Greg

Instrument	Function identified	Agreement with Other Descriptive Assessments	Agreement with Functional Analysis
MAS	Sensory	None	No
FAI	Attention	ABC	Yes
ABC	Attention	FAI	Yes
FA	Attention	FAI, ABC	

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BIOGRAPHICAL SKETCH

My professional goal to make a difference in children's lives has remained unchanged since I began working with children in 1994. I initially entered the field through an internship while pursuing my bachelor's degree in psychology at Furman. I worked as a residential counselor for children with emotional and behavioral disorders at the Marshall Pickens Children's Program in Greenville, South Carolina. I gained practical experience in cognitive behaviorism and worked under skilled professionals who taught me invaluable skills for working with children. I gained a tremendous respect for the field and knew working with children would be a lifelong goal. I use skills and knowledge from this first work experience often. It was also this experience that developed my interest in teaching at a university.

In 1997, I began teaching children with severe emotional disturbance in an inner city elementary school in Jacksonville, Florida. This was my first job as a public educator as I was hired without a degree in education. I began teaching under an emergency temporary certificate with the agreement that I would begin my master's in education immediately. Although typical of a first teaching job, this experience teaching in the inner city made me aware of the state of public education and has been the source for inspiration and practice for teaching many university-level courses. During that initial year, being a teacher and a student offered a unique perspective. I saw the impact a single teacher could have on a group of students, and I experienced the impact education professors could have on a group of teachers. As I moved back and forth from one role to

another, I began to recognize the importance and relevance of research in education. I had the opportunity to apply what I learned to how I taught. I saw a real connection between the training of teachers and the immediate benefit of that training to students. I enjoy teaching all ages, and I am continually excited to translate evidence-based practices into a learning environment that is structured, individualized, and, most of all, fun.

My passion for learning and love for the classroom led me to the Ph.D. program at the University of Florida where I could realize my goal in becoming an education professor at a university. During this experience of pursuing my doctorate, my skills have been both sharpened and broadened. Teaching courses and supervising teacher interns at the University of Florida has allowed me to put theory into practice. I have enjoyed incorporating my higher education knowledge with my practical classroom experience to improve tomorrow's classrooms. My abilities to analyze and synthesize research and apply new strategies for the classroom have been valuable assets. I am pragmatic and empathetic towards teachers' goals for themselves and their students. Additionally, my research activities have allowed me to gain experience in writing grants, presenting at national conferences, collecting and translating data collection, exploring multicultural aspects of learning, collaborating with other professionals and working closely with families of young children. Education is my passion.