BRIEF FUNCTIONAL ANALYSIS AND INTERVENTION BASED ASSESSMENT: ARE BOTH EFFECTIVE IN DETERMINING BEHAVIORAL INTERVENTIONS FOR STUDENTS?

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Abstract: The effectiveness of determining the hypothesized function of problem behavior was examined through a brief functional analysis (BFA) and intervention based assessment (IBA). The students exhibiting problem behavior were assessed using both of these procedures. The hypothesized functions determined the function-based interventions. These interventions were implemented in an alternating treatments design to compare the two behavioral assessment methods for each participant. The effectiveness and efficiency of conducting an IBA compared to a BFA in a school is discussed.

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Procedural Integrity

Participant	**Preference Assessment**	**BFA**	**IBA**	**Intervention Sessions**
1	100%	100%	100%	100%
2	100%	100%	100%	100%

Table 2

Inter-rater Reliability

Participant	**Average Percentage On-Task**	**Range of Percentage On-Task**
1	93%	(89% - 98%)
2	90%	(82% - 96%)

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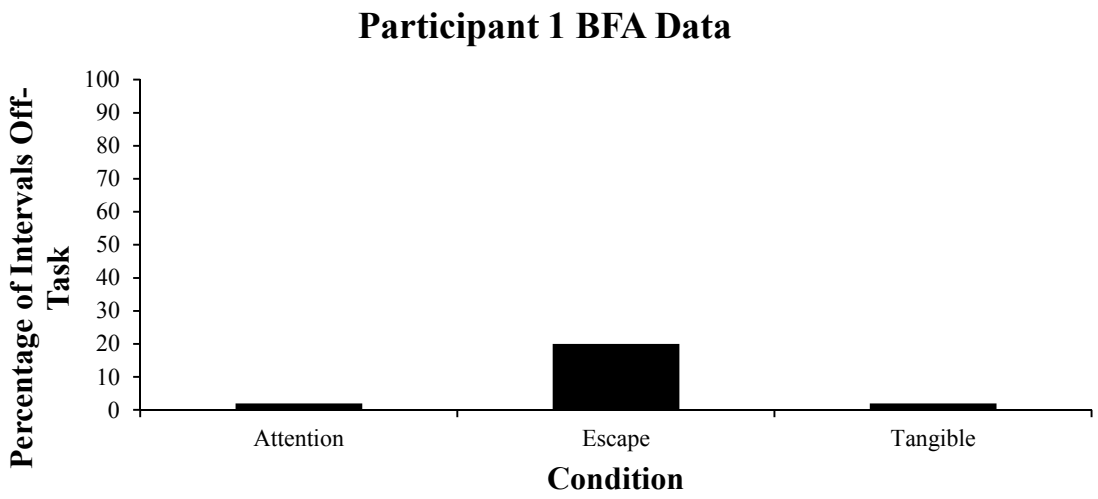

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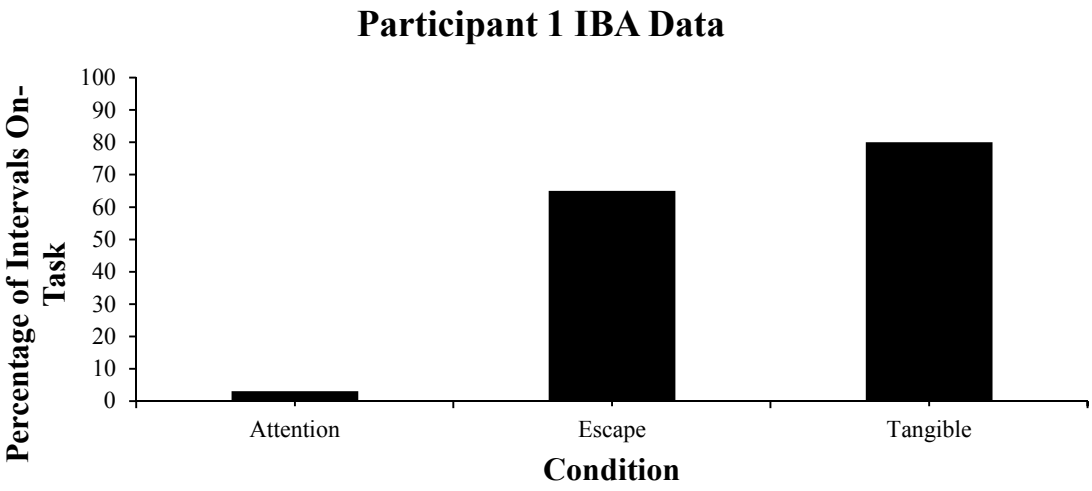
Figure 2



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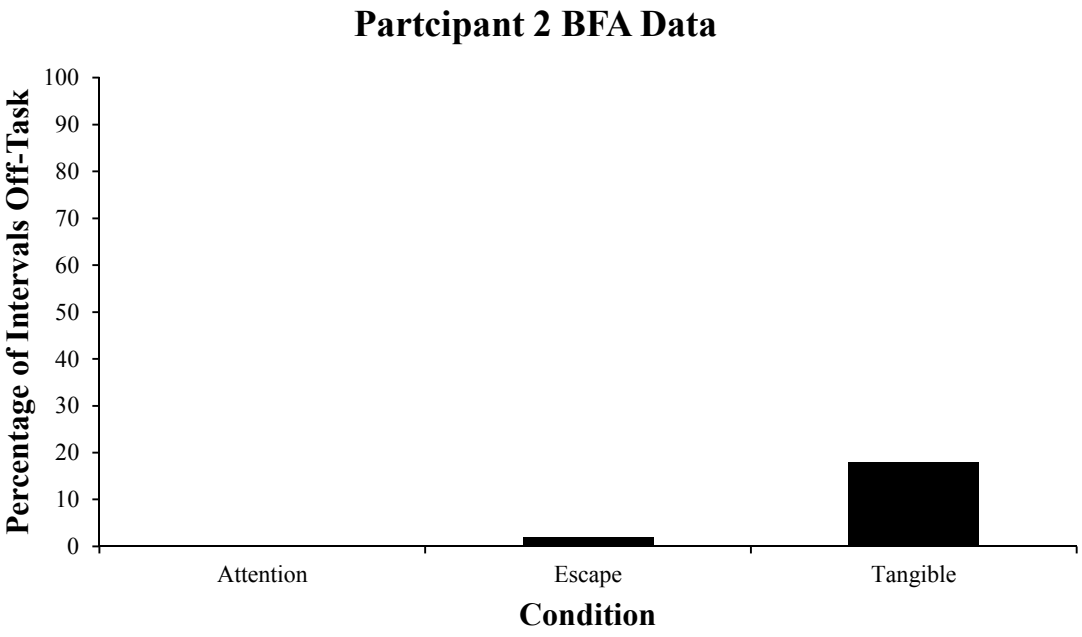

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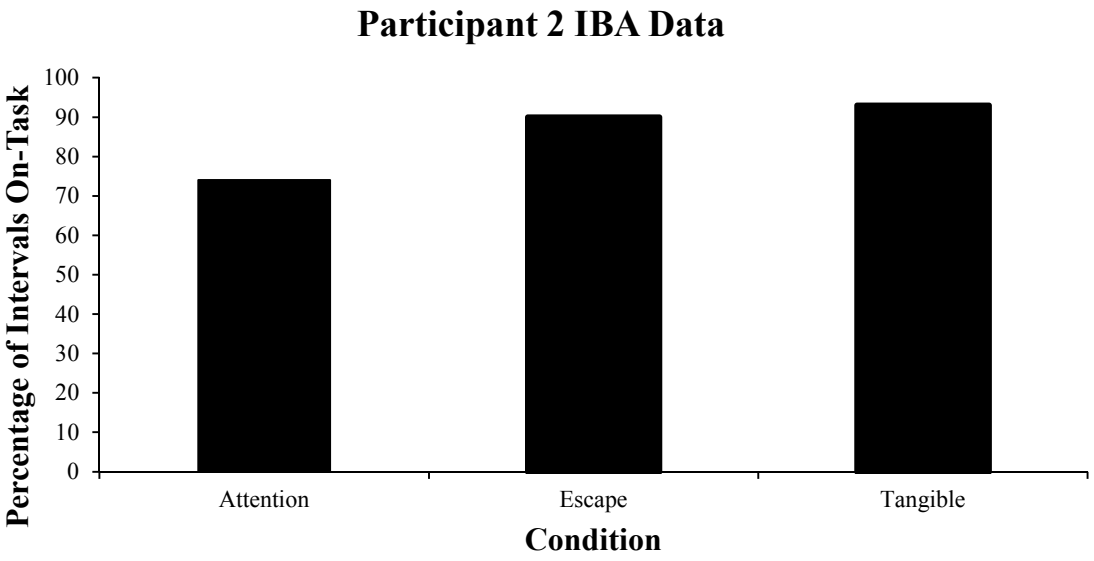

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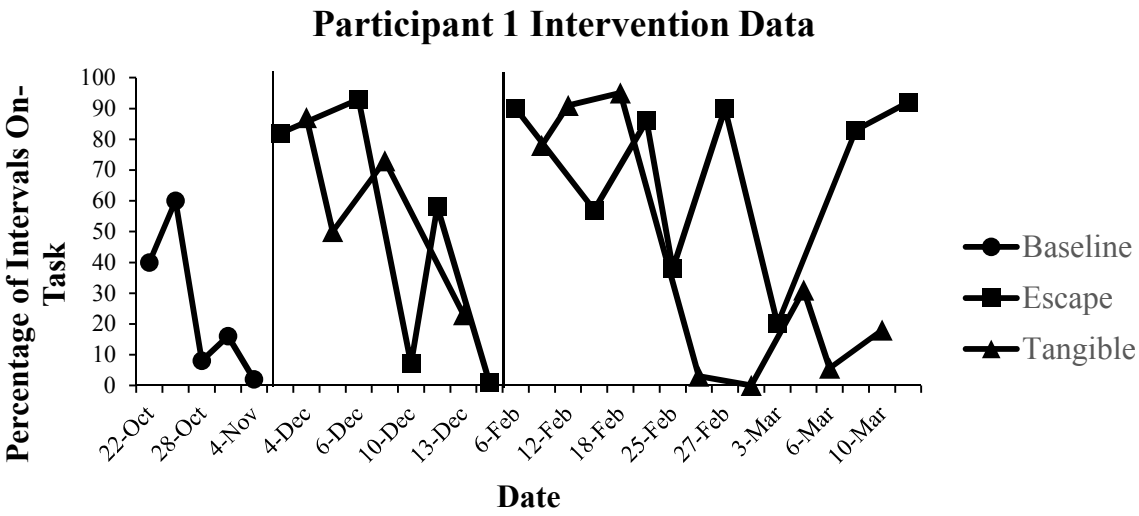

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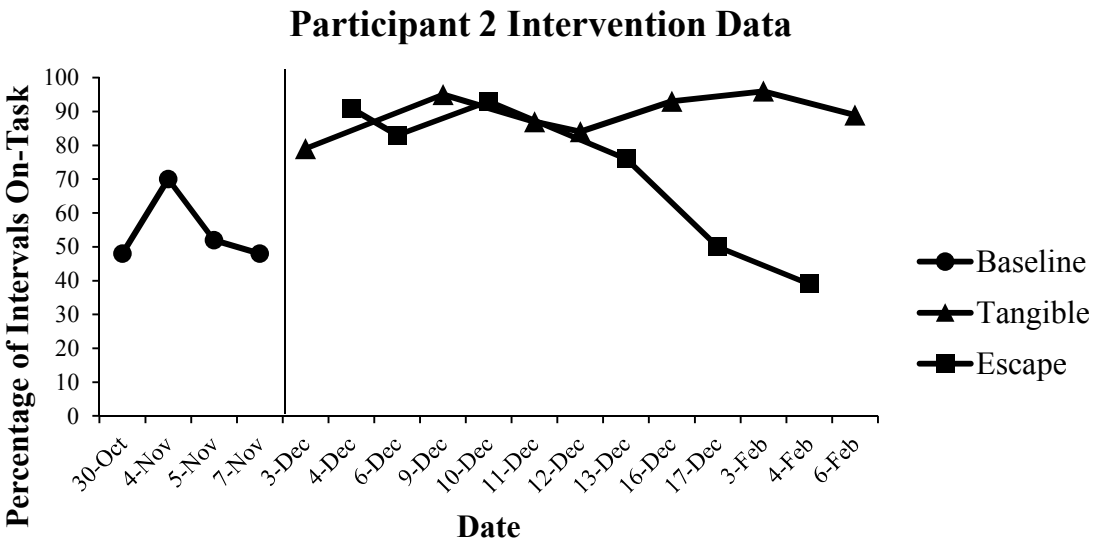

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CHAPTER I

INTRODUCTION

Applied Behavior Analysis

B.F. Skinner's, *The Behavior of Organisms* (1938), began the development of the experimental analysis of behavior, which is now known as behavior analysis. Applied behavior analysis (ABA) started by applying behavioral principles to problematic behaviors, but it did not account for the underlying function of the behavior. The history of functional analysis (FA) can be traced back to the discipline of ABA where ABA shifted to understanding and addressing the operant function of behavior before intervening (Dixon, Vogel, & Tarbox, 2012). The development of experimental functional analysis methodology created this shift in focus in the field of ABA toward an acknowledgement of the need for understanding the root causes of behavior (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982). Functional analyses, which stems from ABA, are often conducted as part of a functional behavior assessment (FBA).

Functional Behavior Assessment

Carr's (1977) theoretical model introduced an applied behavior analysis approach to functional behavior assessment (FBA). The model includes three possible operant mechanisms that are hypothesized to maintain problem behavior. These operant mechanisms involve positive reinforcement, negative reinforcement, and sensory reinforcement (Carr, 1977). The positive reinforcement hypothesis states that the problem behavior is a learned operant maintained by

positive social reinforcement. The frequency of problem behavior should decrease when the social consequences that are thought to maintain the behavior are taken away. The negative reinforcement hypothesis states that the problem behavior is maintained by avoidance and termination of an aversive stimulus following the occurrence of the problem behavior. The self-stimulation hypothesis or sensory hypothesis states that a certain level of stimulation is necessary, and when that stimulation is insufficient, the individual may engage in problem behavior in order to provide sensory stimulation (Carr, 1977). Without the knowledge of possible mechanisms that maintain problem behavior, a FBA would likely not be a valuable source of information.

By law, an individualized FBA is required for students who problem behavior continues even when preventative, class-wide strategies are put in place (IDEIA, 2004; Sugai et al., 2000). The purpose of a FBA is to evaluate environmental influences on a child's problem behavior and use these results to develop interventions that are based on the child's function of their problem behavior. Even though the law requires FBAs to be conducted, there are no guidelines on how they should be completed (Zirkel, 2011). A FBA may include various assessment procedures such as indirect assessments (e.g., teacher interviews, rating scales), descriptive assessments (direct observations), and functional analyses (Sterling-Turner, Robinson, & Wilczynski, 2001). In regards to a FBA, functional analyses are the most reliable way to determine the function of child's behavior compared to descriptive assessments that are often invalid for detecting the function of the behavior (St. Peter et al., 2005; Thompson & Iwata, 2007), therefore; only functional analyses will be discussed.

Functional Analysis

The relationship between environmental variables and self-injurious behavior for individuals with developmental disabilities was one of the first methods used to identify the function of behavior (Iwata et al., 1982). A functional analysis (FA) involves the systematic manipulation of antecedents and consequences of problem behavior across a series of test conditions. The conditions may include

attention, escape, tangible, alone, or play (Iwata et al., 1982). The purpose of a FA is to determine the function of a child's behavior under specific conditions (Cipani, 1990, 1994; Iwata, 1987, 1991). After determining the function of a child's behavior through a FA, then a function-based intervention can be implemented (Horner, 1994; Mace, 1994).

The major benefit to conducting a FA is identifying a treatment based on the function of behavior. Another benefit is identification of effective, precise, and individualized treatments for problem behavior. Literature has also shown that functional analyses are necessary in learning about the relevance that the antecedents and consequences have on the problem behavior (Hanley, 2012).

There are multiple issues when conducting FAs. There is some uncertainty with how valuable an FA is when designing interventions for low-frequency and high-intensity problem behaviors (Nelson, Roberts, Rutherford, Mathur, & Aaroe, 1999). Another issue is whether or not school personnel are willing and able to use FA (Cone, 1997; Nelson, Roberts, Mathur, & Rutherford, 1999). The problem behavior is also elicited, which could be problematic because it may strengthen and increase future rates of the behavior (Najdowski Wallace, Ellsworth, MacAleese, & Cleveland 2008). Although FAs are effective in identifying efficient ways to identify interventions, it is very time-consuming. A review of the literature has shown the average time taken to conduct a FA was six and a half hours, which did not include the time it took to do interviews, time between sessions, or time needed to train staff (Iwata et al., 1994; Tincani, Castrogiavanni, & Axelrod, 1999). Therefore, the introduction of brief functional analyses (BFA) attempted to fix this problem. But, problem behaviors still have to be elicited.

Brief Functional Analysis

A brief functional analysis (BFA) is the same as a functional analysis, but will often include fewer sessions and reduced session duration (MacDonald, Wilder, & Dempsey 2002; Northup et al., 1991). A BFA may also use contingency reversals to determine if the variables maintaining the

behavior can be used to also maintain an appropriate replacement behavior (Northup et al., 1991). There was total correspondence for all when comparing the behavioral functions identified by BFA and traditional FA for three participants as well as reduced total duration of time for the BFA (85 to 110 minutes) compared to the traditional FA (450 to 540 minutes; Tincani et al., 1999). However, Kahng and Iwata (1999) compared BFA and traditional FA for 50 individuals and found only a 66% correspondence. Correspondence was higher when results of the traditional FA were clearly differentiated compared to when the results were less clear. A review of the studies conducting BFAs showed that over 85% identified a hypothesized function, more than 96% of function-based treatments led to reductions in problem behavior, and 50% showed increases in appropriate behavior (Lydon, Healy, O'Reilly, & Lang, 2012).

The major benefit of a BFA is that it takes less time than a FA. The reduction in duration may improve social validity ratings for teachers and parents (Lydon et al., 2012). One criticism of a BFA is that it does not always align with the same function found during a FA. Another problem with BFAs is that there is no standardized format to conducting them (Lydon et al., 2012). Although BFAs do reduce time for the assessment process, the problem behavior still has to be elicited.

Intervention Based Assessment

An intervention-based assessment (IBA) emphasizes the development of interventions that are likely to be effective in resolving problem behaviors (McNamara, 1998). It is the term used to describe a problem-solving approach. The purpose of an IBA began with producing "treatment plans for nondisabled students with behavior or learning problems, or to be used as part of a multi-factored evaluation for children with suspected disabilities to identify effective interventions to be incorporated into their IEPs" (Telzrow, McNamara, & Hollinger, 2000, p. 445).

The IBA model is based on those problem-solving components identified as critical for the design of effective interventions (Flugum & Reschly, 1994; Macmann et al., 1996). These

components include an operational definition of the problem behavior, baseline data, clearly identified goal, hypothesized reason for the problem, systematic intervention plan, evidence of treatment integrity, data indicating student response to intervention, and comparison of student performance with baseline. Multidisciplinary teams (MDTs) are generally the ones who implement an IBA (Telzrow et al., 2000).

The main benefit of doing an IBA is that the problem behavior does not have to be elicited and intervention begins right away. IBAs also help to improve the validity of the referrals for special education eligibility determinations as there are direct measures of student performance, problem-solving continues until the intervention is effective, and the stipulation that eligibility must be based on evidence that is produced through interventions. Overall, IBA has been associated with a greater amount of appropriate referrals and a smaller amount of inappropriate referrals (McNamara & Hollinger, 2003).

Current Study

A primary purpose of conducting a BFA is to determine the hypothesized function of the behavior and create an effective intervention based on that function. Although IBAs do not directly assess function, is it still possible to use an IBA to determine an effective intervention? Therefore, the current study evaluates if IBAs are as effective as conducting a BFA in identifying effective interventions.

CHAPTER II

REVIEW OF THE LITERATURE

Applied Behavior Analysis

Baer, Wolf, and Risley (1968) outlined seven dimensions of ABA: applied, behavioral, analytic, technological, conceptually systematic, effective, and generalizable. The applied dimension is associated with what society views as the problem behavior. A specific behavior is chosen because of their importance to society rather than to theory. The behavioral dimension is often described along with pragmatism where it asked how is it possible to get an individual to do something effectively. It usually looks at what individuals can be brought to do rather than what they can be brought to say. Another question asked is not just was behavior changed but also, whose behavior was changed. The analytic dimension requires a demonstration of events that could be responsible for the occurrence or non-occurrence of a specific behavior (Baer, Wolf, & Risley, 1968). This dimension is important for using single-subject experimental designs to manipulate environmental variables and observe the effects such variables have on behavior, a practice at the heart of experimental functional analysis methodology (Dixon et al., 2012). The technological dimension means the techniques that make up a specific behavioral application are identified and described. The question to ask is whether a typically trained reader could replicate the procedure well enough to produce similar results based off only reading the description. The conceptual system dimension strives for relevance to principle. The description should be adequate for successful replication for the reader as well as show how similar procedures could

be derived from basic principles. The effective dimension considers whether the behavioral intervention produces a large enough effect to have practical value. If this is not the case, then the application has failed. The essential criterion is if the alteration in behavior is enough to be socially significant. A question that could be asked is how much did the behavior need to be changed, which is a practical question not a scientific one. The last dimension is generality, which is if the behavior change is durable over time, if it appears in a variety of settings, or if it spreads to a variety of other related behaviors. Usually, the more general the application of the behavior change, the better (Baer, Wolf, & Risley, 1968).

Watson (1913) was one of the first to lay groundwork for an analysis of how the environment determined behavior. He supported the stimulus-response paradigm (S-R) and thought that it could be helpful in predicting and controlling human behavior. Within this model, a stimulus was defined as something that precedes a response (Skinner, 1963). Watson believed that organisms adjusted themselves to their environment and these adjustments are either adequate or so inadequate that the organism barely maintains it. Second, certain stimuli lead organisms to make responses. He thought that given the response the stimuli could be predicted and given the stimuli the response could be predicted. He said that psychology (as viewed by a behaviorist) is purely objective and humans and animals should be seen as equally essential to obtain an understanding of behavior (Watson, 1913).

B.F. Skinner's, *The Behavior of Organisms* (1938), began the development of the experimental analysis of behavior. The experimental analysis of behavior includes a dependent variable, an independent variable, and treatment of relationships among variables. Skinner (1966) delineated six points related to the dependent variable. He wrote that behavior is the symptom of mental or physiological aspects, and are seen as the principal subject matter. He said observed behavior should not be expected to orderly, as it is a noisy "performance. Behavior is to be significant only in meeting certain standards. For example, the organism is seen as "adapting to

the environment." Changes in probability of response are treated as if they were responses or acts. For example, discriminating means to respond differently to two or more stimuli. Dimensions studied are quantifiable, but are not related to the probability of response. The rate of responding is seen as relevant to an experimental analysis because responses can be accurately counted and rate is relevant to the central concern of a science of behavior. Inner entities include traits, abilities, attitudes, and more. In true experimental analysis, the results from the techniques used to measure these psychological phenomena are not useful. The data are gathered in very loosely controlled environments and the scores have arbitrary features. Finally, a subject cannot correctly describe the probability that they will respond or the variables affecting that probability (Skinner, 1966).

Skinner (1966) identified three points associated with an independent variable. The stimulus is an important independent variable. Terms such as detect, classify, perceive, recall how something looked do not specify what an organism is actually doing. The concept of the discriminative stimulus and stimulus control are more reasonable independent variables. Experimental analysts do not manipulate inner states but instead manipulates the intake of food, aversive stimuli, a drug, age, and body weight. They do not use hunger, anxiety, and level of maturation, deprivation, or physiological effects of a drug. Third, "contingencies of reinforcement" are important features of independent variables. For example, conditioning, extinction, and delay of reinforcement are considered contingencies of reinforcement (Skinner, 1966).

Skinner (1966) described the treatment of relationships among variables. Behavioral processes usually include changes in probability as a function of manipulated variables. Relations between dependent and independent variables are rarely explored according to a prior "experimental design." Experimental control is emphasized rather than evaluating the importance of certain variables through statistical analyses. A field specifically for systematic analysis of

contingencies of reinforcement does not require theory. Future questions are seen as tentative statements for which there needs to be further research rather than formal hypotheses of scientific method (Skinner, 1966).

The experimental analysis of behavior is now known as behavior analysis. Skinner thought the S-R model was insufficient in explaining the majority of the problem behavior specifically behavior that appeared to have no obvious and clear antecedent environmental causes (Cooper et al., 2007). The S-R model should be replaced with a more descriptive, functional analysis of the relationship between the independent and dependent variable (Sturmey & Bernstein, 2004). The new model consisted of a three-term contingency known as the antecedent-behavior-consequence or stimulus-response-stimulus model. The model now accounted for behaviors that the S-R model was not able to explain. These problem behaviors were called operant, which means those behaviors that are influenced by the consequences of similar behaviors in a person's past (Cooper et al., 2007). A further description of the three-term contingency model is necessary.

Skinner proposed a model that consisted of the stimulus, the response, and the reinforcement. These three occurred in close temporal proximity to one another. At first, the discriminative stimulus has no control over the response and it does not elicit the response as in a reflex. Connections are established between a response and reinforcement. After these connections have been made, the temporal contiguity between the discriminative stimulus and reinforcement are relatively close. A discriminative stimulus that has developed in connection with one operant has an effect on another. Moreover, the contingency between the discriminative stimulus and reinforcement has been shown to be sufficient to give the discriminative stimulus some control over the response subsequently conditioned with the reinforcement (Morse & Skinner, 1958).

Identifying and manipulating the environmental variables that change the probability of its occurrence assist in understanding behavior. Repeated manipulation of environmental variables resulted in a functional relationship between environment (independent variable) and behavior (dependent variable; Dixon, Vogel, & Tarbox, 2012). The term "functional relationship" describes the relationship between behavior and environment, essentially became synonymous with a "cause-and-effect" relationship (Skinner, 1953). Functional analysis, at this time, meant an activity that shed light upon the potential ways in which the environment may control behavior (Skinner, 1953). It did not originally mean an experimental analysis (Dixon et al., 2012). The foundation for the development of a functional analysis of behavior included a focus on a single organism, the rate of response as the main dependent variable, the operant-respondent distinction with related difference between conditioned stimulus and discriminative stimulus, and the effects of various kinds of intermittent reinforcement (Michael, 1980). Early researchers established that the principles of behavior observed in animals studies were applicable to human behavior (Baer, 1960; Bijou, 1955) and provided the foundation for the development of ABA in general and the functional analysis of clinically relevant behavior in particular (Cooper et al., 2007). Ferster (1958) was one of the first to acknowledge the importance of functional relations between problematic behavior and environmental events. Functional analyses, which stems from ABA, are often conducted as part of a functional behavior assessment (FBA).

Functional Behavior Assessment

The functional approach has three phases. The descriptive phase is considered the information-gathering phase where the assessor is concerned with identifying the target behavior and potentially relevant variables that occur prior to and after the behavior. The antecedent and consequent events can be either proximal or distal stimuli. Assessment methods in this phase include interviews, self-reports, teacher or parent reports, self-monitoring, and direct observation (Cone, 1978).

The second phase is considered the hypothesis formulation or interpretive phase, which is when the assessor considers the causal relationships between the behavioral and context events that were documented in the descriptive phase. Hypothesis formulation can range from informal, unspecified processes to more formal, clearly specified processes such as the three-person panels (Carr, et al., 1994), the computing of conditional probabilities (Schlundt, Johnson, & Jarrell, 1985), or the expert systems (Hayes & Follette, 1993).

The three-person panel involves having a list of behavior occurrences on cards. The cards are categorized based on the hypothesized function of the behavior. Three people make up the panel. Two of the people are a part of the assessment process and the third person is a service provider. Each of the panel members goes through each card and formulates a hypothesis by themselves. They should ask themselves what they believe the student wanted to happen as a result of their behavior. A two-thirds rule is used meaning a card is kept if at least two of the members on the panel agree on the function of the behavior (Carr et al., 1994).

Another approach to hypothesis formulation is computing conditional probabilities between behavior and context variables that occur before and after it. When conditional probabilities differ from unconditional probability of a behavior, a functional relationship exists. A prerequisite is to evaluate the quality of interpretative statements that come from the analyses. Computing conditional probabilities enhances the replicability of this approach and helps to specify rules for interpreting functional relationships. It is expected that conditional probabilities are relatively reliable (Schlundt et al., 1985).

Expert systems proposed by Hayes and Follette (1993) includes logically derived algorithms or decision trees to enhance the replicability of the interpretative process. The approach leads to systematically gathering information typically in the interview phase. It is also expected that the expert systems are relatively high in their levels of consistency.

The final phase is the hypothesis testing or verification phase where the assessor tests the causal hypotheses from the interpretative phase. Testing hypotheses can range from informal suggestions (e.g., let's see what happens when you ignore) to systematic manipulations such as withdrawal or alternating treatment designs. To some, using only the term functional analysis in this phase may be overly restrictive. However, it is only strict in its requirement for manipulation because any event that can be controlled whether external or internal is available for functional analysis. Although applied work does not require experimental analysis, it is vital to include as much technological precision as possible (Baer, Wolf, & Risley, 1968). Some questions that are asked in the verification phase include: (a) what to manipulate, (b) how to manipulate it, and (c) what criteria to use to decide whether control has been achieved (Cone, 1997).

FBA is designed to obtain information about the function, or purpose, a behavior serves a person (Neef & Peterson, 2007). It encompasses four phases: collect data, develop hypothesis, formally test those hypotheses, and then develop interventions based on tested hypotheses (Ervin, Ehrhardt, & Poling, 2001). Following the development of a behavioral hypothesis, practitioners might implement experimental procedures such as a functional analysis to test the hypothesis, as an intervention developed based on incorrect hypothesis has the potential to worsen the behavior (Vollmer & Northup, 1996). FBA refers to a process of collecting environmental information to develop a hypothesis about the occurrence of problem behavior. FA describes the process of systematically manipulating environmental events to test behavioral hypothesis (Cone, 1997). FBAs can provide information about the relationship between behavioral and environmental events, a FA is often necessary to experimentally test/validate these relationships (Asmus, Vollmer, & Borrero, 2002; Gresham, Watson, & Skinner, 2001).

Carr's (1977) theoretical model introduced an applied behavior analysis approach to functional behavior assessment (FBA). The model includes three possible operant mechanisms that are hypothesized to maintain problem behavior. These operant mechanisms involve positive

reinforcement, negative reinforcement, and sensory reinforcement (Carr, 1977). The positive reinforcement hypothesis states that the problem behavior is learned operant maintained by positive social reinforcement. The frequency of problem behavior should decrease when the social consequences that are thought to maintain the behavior are taken away. The negative reinforcement hypothesis states that the problem behavior is maintained by avoidance and termination of an aversive stimulus following the occurrence of the problem behavior. The self-stimulation hypothesis or sensory hypothesis states that a certain level of stimulation is necessary, and when that stimulation is insufficient, the individual may engage in problem behavior in order to provide sensory stimulation (Carr, 1977). Without the knowledge of possible mechanisms that maintain problem behavior, a FBA would likely not be a valuable source of information.

By law, an individualized FBA is required for students who problem behavior continues even when preventative, class-wide strategies are put in place (IDEIA, 2004; Sugai et al., 2000). The purpose of a FBA is to evaluate environmental influences on a child's problem behavior and use these results to develop interventions that are based on the child's function of their problem behavior. Even though the law requires FBAs to be conducted, there are no guidelines on how they should be completed (Zirkel, 2011). A FBA may include various assessment procedures such as indirect assessments (e.g., teacher interviews, rating scales), descriptive assessments (direct observations), and functional analyses (Sterling-Turner, Robinson, & Wilczynski, 2001). In regards to a FBA, functional analyses are the most reliable way to determine the function of child's behavior compared to descriptive assessments that are often invalid for detecting the function of the behavior (St. Peter et al., 2005; Thompson & Iwata, 2007), therefore; only functional analyses will be discussed.

Functional Analysis

The first study to systematically investigate a problem behavior wherein "the investigator has attempted control over self-destruction by systematically manipulating the variables of which it might be a function" was on the function of self-injurious behavior in a child with schizophrenia (Lovaas, Freitag, Gold, & Kassorla, 1965, p. 68). Participants received social approval for appropriate behaviors, and following a period of acquisition, the behavior was then extinguished by withholding the social reinforcers. In the second phase, social approval was delivered contingent upon the subject pressing a lever, and once the lever-pressing rate had stabilized, the behavior was then again extinguished by withholding the social attention. In the third phase, delivering verbal attention contingent upon self-injurious behavior resulted in an increased frequency of that behavior (Lovaas, et al., 1965). There have been several other studies that focused on specific functions of problem behavior.

A primary theory in the literature on the function of problem behavior is that maladaptive behaviors were shaped and maintained by socially mediated positive reinforcement (Carr, 1977). An informal analysis led the authors to believe that attention from nursing staff was inadvertently positively reinforcing the psychotic speech of a psychiatric patient. This was one of the first studies to demonstrate how attention can positively reinforce challenging behavior (Ayllon & Michael, 1959). Hart, Allen, Buell, Harris, and Wolf (1964) began with the hypothesis that frequent crying behavior was reinforced by teacher attention. The crying was extinguished by training the teachers to give no attention to excessive crying and to provide immediate positive attention for appropriate behavior. Many more studies came about showing the effects of positive reinforcement on problem behavior in schools (Harris, Wolf, & Baer, 1964; Thomas, Becker, & Armstrong, 1968), the home (Baskett & Johnson, 1982; Budd, Green, & Baer, 1976; Hawkins, Peterson, Schweid, & Bijou, 1966), and even a reduction in self-injurious behaviors (Jones, Simmons, & Frankel, 1974; Lovaas & Simmons, 1969; Wolf, Risley, & Mees, 1964). Positive

reinforcement does not explain all challenging behavior, therefore, research on challenging behavior being maintained by negative reinforcement was conducted.

Another hypothesized function was that aberrant behavior might be maintained by negative reinforcement. Negative reinforcement states that problem behavior is learned, reinforced by escape or avoidance of an aversive stimulus, situation, or task (Carr, Newsom, & Binkoff, 1976). Much of the early work on negative reinforcement focused on self-injurious behavior. It was reported that children often self-injured in order to terminate an aversive situation (Dixon, Vogel, & Tarbox, 2012). Ferster (1958) noted that problem behaviors in psychiatric patients were inadvertently maintained by negative reinforcement. He stated that, rather than providing an adaptive behavior, punishment often reinforced problem behavior by allowing the individual to avoid or escape aversive situations. The first attempt to experimentally manipulate the environment to evaluate the negative reinforcement hypothesis focused the analysis on the antecedent stimuli that would likely control escape-maintained behavior (Carr, Newsom, & Binkoff, 1976). The study showed that levels of self-injury were high in situations with demands and low in situations that did not have demands. It was also possible that escape factors were apart of the maintenance of aggression (Carr et al., 1980).

A third hypothesized function of aberrant behavior is automatic reinforcement. "Automatic reinforcement is reinforcement that is produced automatically when a behavior occurs" (Dixon, Vogel, & Tarbox, 2012, p. 10). In other words, reinforcement is not dependent on the behavior of someone else to deliver it. It is sometimes described as reinforcement that is inherent in the behavior itself (Dixon, Vogel, & Tarbox, 2012). Animal studies showed that "automatically reinforced behavior is more likely to occur when an organism is deprived of stimulation because the behavior may be one of the only sources of environmental stimulation available to the organism" (Dixon, Vogel, & Tarbox, 2012, p. 10-11). Residential facilities were thought to be a setting in which individuals with disabilities may be deprived of stimulation. So

researchers began to conceptualize deprivation as a factor that may contribute to the maintenance of automatically reinforced behaviors (Green, 1967; McKinney, 1962; Murphy, 1982). For example, exposure to a high level of sensory stimulation decreased self-injurious behaviors in an isolated, severely intellectually disabled adult (Collins, 1965). Individuals that lacked adaptive behavior to increase stimulation often resorted to behaviors such as direct contact or manipulation of the body (Maisto, Baumeister, & Maisto, 1978). Results of another study showed that self-stimulatory behavior was "reliably decreased when a certain sensory consequence was removed, then increased when that consequence was permitted" (Rincover, 1978, p. 307). These three functions of maladaptive behavior were used to create a method, called functional analysis, to identify the function of a behavior for a specific individual.

The relationship between environmental variables and self-injurious behavior for individuals with developmental disabilities was one of the first methods used to identify the function of behavior (Iwata et al., 1982). A functional analysis (FA) involves the systematic manipulation of antecedents and consequences of problem behavior across a series of test conditions. The conditions may include attention, escape, tangible, alone, or play (Iwata et al., 1982). The purpose of a FA is to determine the function of a child's behavior under specific conditions (Cipani, 1990, 1994; Iwata, 1987, 1991).

The attention condition is when the experimenter and the participant enter a room equipped with various toys. The experimenter tells the participant to play with the toys while the experimenter "did some work." Contingent on each occurrence of problem behavior, the experimenter delivers statements such as "don't do that, you will hurt yourself," while also delivering brief physical attention. All other behaviors were ignored. The purpose of this condition is to see if positive reinforcement is a possible function for their behavior (Iwata et al., 1994). The next condition is the escape condition.

In the escape condition, the experimenter and participant sit at a desk. The experimenter presents tasks to the participant, using a "three-step" prompting sequence. The sequence begins with the experimenter presenting the task vocally. If the participant does not respond in 5 s, the experimenter repeats the instruction and provides a model prompt. If the participant does not respond in 5 s, the experimenter physically guides the participant to respond, after which the next task is presented vocally. The experimenter praises if the participant responds appropriately. If the participant engages in problem behavior, the experimenter turns away from the participant and does not give any more task demands for 30 s. The purpose of this condition is to see if negative reinforcement (escaping from demands) is maintaining the problem behavior (Iwata et al., 1994). Another condition is the alone condition.

In the alone condition, the participant is left in a room alone with no toys or items of any kind. The purpose of this condition is to see if automatic reinforcement is maintaining the problem behavior. It is supposed to mimic the types of "deprived" environments hypothesized to contribute to automatically reinforced behavior (Iwata et al., 1994). A fourth condition is known as the play or control condition.

In the play or control condition, the room has toys, but no demands are placed on the participant. The experimenter gives brief social and physical attention to the participant contingent on the absence of problem behavior every 30 s. Problem behavior is ignored. The purpose of this condition is to serve as a control condition. It serves as a control to the attention condition because the participant was not deprived of attention and attention was not delivered as a consequence of problem behavior. It serves as a control for the escape condition because the antecedent (demands) was not present and escape was not delivered contingent on problem behavior. Furthermore, it serves as a control to the alone condition because the relevant antecedent is not present (Iwata et al., 1994). The final condition is the tangible condition.

The tangible condition has been added to some functional analyses, as maintenance of the problem behavior may be a result of other forms of positive reinforcement such as food, toys, or other activities. This condition uses a modification of the attention condition. The condition is preceded by a brief period of access to preferred items. At the start of the session, preferred items are removed and returned to the participant for approximately 20 s, contingent on the occurrence of the problem behavior (Vollmer, Marcus, Ringdahl, & Roane, 1995). After determining the function of a child's behavior through a FA, then a function-based intervention can be implemented (Horner, 1994; Mace, 1994). Since the process and conditions of conducting a functional analysis have been discussed, the benefits and criticisms of FAs will be described.

The major benefit to conducting a FA is identifying a treatment based on the function of behavior. Another benefit is identification of effective, precise, and individualized treatments for problem behavior. Literature has also shown that functional analyses are necessary in learning about the relevance that the antecedents and consequences have on the problem behavior (Hanley, 2012).

There are multiple issues when conducting FAs. There is some uncertainty with how valuable an FA is when designing interventions for low-frequency and high-intensity problem behaviors (Nelson, Roberts, Rutherford, Mathur, & Aaroe, 1999). Another issue is whether or not school personnel are willing and able to use FA (Cone, 1997; Nelson, Roberts, Mathur, & Rutherford, 1999). The problem behavior is also elicited, which could be problematic because it may strengthen and increase future rates of the behavior (Najdowski Wallace, Ellsworth, MacAleese, & Cleveland 2008). Although FAs are effective in identifying efficient ways to identify interventions, it is very time-consuming. A review of the literature has shown the average time taken to conduct a FA was six and a half hours, which did not include the time it took to do interviews, time between sessions, or time needed to train staff (Iwata et al., 1994; Tincani,

Castrogiavanni, & Axelrod, 1999). Not only are there general issues with FAs, there are specific limitations to FAs in the schools.

School based FAs are often limited in regards to applications across target populations, behaviors, and settings. Due to practical and ethical considerations, the experimental FA may not be easy to conduct in school settings. Little is known about the effectiveness of interventions based on FA relative to interventions derived in other ways. Few studies have addressed the appropriateness of teaching school personnel to conduct FAs. The acceptability of FA procedures in schools is also often ignored. However, research where FAs have been empirically tested in school settings have shown to be effective in both feasibility and value for identifying the causes of problem behaviors and for creating effective treatments (Ervin et al., 2001). A final problem with regards to FAs in schools is the time it takes to conduct the FA (Iwata et al., 1994; Tincani, Castrogiavanni, & Axelrod, 1999). Therefore, the introduction of brief functional analyses (BFA) attempted to fix this problem. But, problem behaviors still have to be elicited.

Brief Functional Analysis

A brief functional analysis (BFA) is the same as a functional analysis, but will often include fewer sessions and reduced session duration (MacDonald, Wilder, & Dempsey 2002; Northup et al., 1991). Brief (90 minutes) assessments are conducted rather than several dozen 10-15 min sessions with several observations per day for many consecutive days (Iwata et al., 1994; Carr & Durand, 1985). The conditions still include attention, escape, tangible, alone, and play or control. A BFA may also use contingency reversals to determine if the variables maintaining the behavior can be used to also maintain an appropriate replacement behavior (Northup et al., 1991). Treatments derived from BFAs were shown to be effective over periods of up to 18 months (Cooper et al., 1992; Northup et al., 1994).

Since there is such a reduction in time with a BFA, it is necessary to know if it still corresponds to a traditional FA in determining the correct function of the behavior. Research found a total correspondence for all when comparing the behavioral functions identified by BFA and traditional FA for three participants as well as reduced total duration of time for the BFA (85 to 110 minutes) compared to the traditional FA (450 to 540 minutes; Tincani et al., 1999). However, Kahng and Iwata (1999) compared BFA and traditional FA for 50 individuals and found only a 66% correspondence. Correspondence was higher when results of the traditional FA were clearly differentiated compared to when the results were less clear. A review of the studies conducting BFAs showed that over 85% identified a hypothesized function, more than 96% of function-based treatments led to reductions in problem behavior, and 50% showed increases in appropriate behavior (Lydon, Healy, O'Reilly, & Lang, 2012).

The major benefit of a BFA is that it takes less time than a FA. The reduction in duration may improve social validity ratings for teachers and parents (Lydon et al., 2012). Furthermore, the results of a BFA can lead to effective interventions, which may make this method a viable option for practitioners in the schools (Vollmer & Northup, 1996). However, there are still some criticisms of BFAs. One criticism of a BFA is that it does not always align with the same function found during a FA. Another problem with BFAs is that there is no standardized format to conducting them (Lydon et al., 2012). Although BFAs do reduce time for the assessment process, the problem behavior still has to be elicited.

Intervention Based Assessment

An intervention-based assessment (IBA) emphasizes the development of interventions that are likely to be effective in resolving problem behaviors (McNamara, 1998). It is the term used to describe a problem-solving approach. The purpose of an IBA began with producing "treatment plans for nondisabled students with behavior or learning problems, or to be used as

part of a multi-factored evaluation for children with suspected disabilities to identify effective interventions to be incorporated into their IEPs" (Telzrow, McNamara, & Hollinger, 2000, p. 445).

The IBA model is based on those problem-solving components identified as critical for the design of effective interventions (Flugum & Reschly, 1994; Macmann et al., 1996). These components include an operational definition of the problem behavior, baseline data, clearly identified goal, hypothesized reason for the problem, systematic intervention plan, evidence of treatment integrity, data indicating student response to intervention, and comparison of student performance with baseline. Multidisciplinary teams (MDTs) are generally the ones who implement an IBA (Telzrow et al., 2000). An IBA model was created to assist MDTs in implementation.

The primary IBA model comes from the Ohio Department of Education. There are multiple components to this IBA model. First, there must be a description and analysis of concerns addressed. To do this, MDTs must state the problem and describe how it is impacting the child's learning as well as including baseline data. All domains must assessed including medical, health, vision, hearing, social-emotional/behavior, cognitive, pre-academic/academic, communicative status, motor/sensorimotor, employability skills, adaptive behavior, and family, educational, and developmental history. The results of these findings should communicate any suspected disabilities and the design of effective interventions. The effect of the child's environment on their learning should also be assessed. An observation must be conducted especially if there is a suspected learning disability (Telzrow et al., 2000). Then the second section is addressed.

The second section addresses the description and analysis of the intervention. There should be a description of the implemented interventions and how they will be monitored. The

results of the interventions should be described along with data from progress monitoring. The type of interventions that are likely to be successful are discussed and considered when developing the child's IEP or intervention plan (Telzrow et al., 2000). Then the final section can be addressed.

The third and final section addresses the eligibility determination, which is only necessary if the student is being evaluated because of a suspected disability. Documentation is provided that the intervention involves specially designed instruction, and that without this specially designed instruction, the child's behavior does or would have an adverse effect on his or her educational performance. Documentation is also provided that the child's characteristics meet the definition of a categorical disability under IDEA (Telzrow et al., 2000).

The main benefit of doing an IBA is that the problem behavior does not have to be elicited and intervention begins right away. IBAs also help to improve the validity of the referrals for special education eligibility determinations as there are direct measures of student performance, problem-solving continues until the intervention is effective, and the stipulation that eligibility must be based on evidence that is produced through interventions. Overall, IBA has been associated with a greater amount of appropriate referrals and a smaller amount of inappropriate referrals (McNamara & Hollinger, 2003).

Preference Assessment

There are multiple preference assessments utilized in the research including single-stimulus (Pace, Ivancic, Edwards, Iwata, & Page, 1985), paired-stimulus, multiple stimulus with replacement, and multiple stimulus without replacement (DeLeon & Iwata, 1996).

Single-stimulus preference assessment procedures consisted of presenting a stimulus to the participant. If they approached the item within 5 seconds, the stimulus is made available for an additional 5 seconds. If the participant does not approach the stimulus within 5 seconds, the

experimenter prompts the participant to sample the item. If the participant approached the item within 5 seconds, the stimulus is made available for an additional 5 seconds. If the participant did not approach the item within 5 seconds, the stimulus is removed and the next stimulus is presented (Pace et al., 1985). These procedures are implemented for various stimuli in randomized order several times each. If an item is selected or approached on at least 80% of the trials, it is considered to be a highly preferred item (Pace et al., 1985).

Paired stimulus procedures involve presenting two stimuli at the same time while prompting the participant to "pick one." Each of the stimuli, typically 6-8, are presented with each of the other stimuli an equal amount of times. The experimenter records which stimulus the participant chooses. Preference is determined by the ratio of trials that items were selected to trials that those items were available (Thomson, Czarnecki, Martin, Yu, & Martin, 2013).

In multiple stimulus with replacement (MSW), each session begins with 6-10 items in a straight line approximately 2 inches apart. The experimenter then instructs the participant to select one item. After the participant makes the selection, the item is returned or replaced in the array. Before beginning the next trial, the items are rotated by taking the item at the left end and moving it to the right end, then shifting all of the other items so they are spaced approximately 2 inches apart. These procedures are continued until either all of the items are selected or until no selection is made within 30 seconds of beginning the trial (DeLeon & Iwata, 1996).

Multiple stimulus without replacement (MSWO) procedures are similar to those of MSW except the items are not placed back in the array. For MSWO, each session begins with 6-10 items in a straight line approximately 2 inches apart. The experimenter then instructs the participant to select one item. After the participant makes the selection, the item is removed from the area or not replaced. Before beginning the next trial, the remaining items are rotated by taking the item at the left end and moving it to the right end, then shifting all of the other items so they

are spaced approximately 2 inches apart. These procedures are continued until either all of the items are selected or until no selection is made within 30 seconds of beginning the trial (DeLeon & Iwata, 1996). MSWO was used to determine preferences for this study as these procedures have been shown to identify a range of preferred items efficiently (DeLeon & Iwata, 1996). These procedures have also been an effective in identifying accurate predictions of preferred items in schools (Daly III et al., 2009).

Current Study

A primary purpose of conducting a BFA is to determine the function of the behavior and create an effective intervention based on that function. Although IBAs do not directly assess function, is it still possible to use an IBA to determine an effective intervention? Therefore, the current study evaluates if IBAs are as effective as conducting a BFA in identifying behavioral interventions.

CHAPTER III

METHODOLOGY

Participants and Setting

Two participants were selected from a rural school district in the South-Central United States. Students who were referred to the school's multidisciplinary data team for behavioral concerns were selected for consideration. Two students with high rates of disruptive behavior were selected to participate in the study. Participant 1 was a Caucasian male in the fourth grade. Participant 2 was a Caucasian male in the first grade. Each session lasted fifteen minutes per day. Baseline and treatment conditions occurred for each participant. The procedure of the study was explained to the participants' teachers, parents, and the school principal. Informed consent and assent were obtained from the parents and the children. The primary investigator of the study acted as an interventionist for the children participating in the study. Classroom activities that were occurring during the sessions included classroom instruction and independent seat work.

Materials

Materials included a MotivAider and cellular phone application. The MotivAider device vibrated to mark the fixed-interval in which the primary investigator would give a token to the student if they met criteria for that interval. The cellular phone application also marked the fixed-interval schedule, which allowed the primary investigator and a research assistant to determine inter-rater reliability. Data sheets were used to calculate percentage of on- and off-task behavior of the students for the 15-minute session. Token boards and tokens were used so students knew

depending on the intervention. A yellow board was used when the reward was a tangible item and a blue board was used when the student got to escape from the task. Example token boards can be found in Appendix A.

Dependent Variable

The dependent variable was the problem behavior exhibited by the participants. For both participants, the problem behavior targeted was off-task behavior in the classroom. Off-task behavior included verbal, motor, passive, and out of seat behavior. Operational definition used to encompass all off-task behaviors included any verbalizations not initiated by the teacher, are out of turn, and or are unrelated to the teacher's instruction or activity (e.g., making inappropriate noises), manipulating an object in a way that is inconsistent or inappropriate with the task, which includes using objects in a manner for which they were not designed or using objects unrelated to school tasks, not looking in the direction of the teacher or not attending to an assigned academic activity for 2 seconds or more, and bottom not in contact with the seat or designated space for 2 seconds or more. On-task behavior was operationally defined as body physically directed towards teacher or assigned tasks and attending to the specified task for the duration of the interval (i.e., looking at or actively working on the specific tasks, looking at the teacher who is in the process of doing instruction). Analysis of the problem behavior was conducted through the use of percentage of on- or off-task through the use of interval-by-interval data recording within a given observation period. Complete operational definitions are in Appendix B. Behavior observation data sheets to collect on- and off-task behavior can also be found in Appendix C.

Independent Variable

The independent variable was the assessment type used, either BFA or IBA to determine treatment. BFAs result in the identification of a hypothesized function for the problem behavior, which lead to a recommendation for a specific function based intervention. IBAs utilize the same

function based treatments but the recommendations for treatment are derived from brief assessments of those interventions. In other words, BFAs and IBAs can utilize the same functional variables in developing treatment recommendations, however, they arrive at the recommendation using different assessment methodologies.

If both result in the same treatment recommendation, then the two methods match, and the effectiveness of the recommended treatment was compared to a contraindicated treatment through a multiple treatment comparison. When this occurs, there was convergence between the two types of methods. If the two methods did not match, a multiple treatment comparison was also utilized. When this occurs, the two methods diverge in their treatment recommendations.

Experimental Design

In this study, an alternating treatment design was used. Each participant was assessed through an intervention based assessment and a brief functional analysis. Whether the assessment methods converge or diverge, an alternating treatments design was utilized to assess the effectiveness of the interventions in reducing problem behavior. The current study is not about whether the two assessment procedures converge, but instead about what works better to reduce the problem behavior.

Procedures

Permission to carry out the study was approved through the Oklahoma State University Institutional Review Board and the school district that the participants are in. The IRB obtained from Oklahoma State University, as well as the consent forms issued to the students can be found in Appendices D-F. Baseline data was collected for a minimum of three sessions and until an adequate amount of stable data is collected. The primary investigator conducted a preference assessment with each of the participants to ensure their preferred items were used during the assessment procedures. This protocol can be found in Appendix G. Both an intervention based

assessment (IBA) and a brief functional analysis (BFA) was conducted with each student. The IBA involved brief assessments of escape-maintained, tangible-maintained, and attention-maintained treatments. The BFA utilized 4 conditions including attention, escape, tangible, and control. The alone condition was not be used in the current study as the students targeted will be unlikely to have automatic reinforcement. The BFA took approximately 85-110 min, which was consistent with previous research (Tincani et al., 1999). After the interventions were determined, students were trained on the intervention protocol.

Procedural Integrity

Treatment fidelity was measured during all phases and sessions by the primary investigator or trained graduate research assistant. Fidelity occurred across all of the IBA and BFA conditions to ensure the primary investigator followed the procedures on the protocol. These protocols can be found in Appendices H and I. During the baseline sessions, only behavioral observations were conducted. During the intervention sessions, the primary investigator delivered the intervention for 15-minute sessions while a trained graduate research assistant took behavioral observation data. The primary investigator set the fixed-interval time on the MotivAider and the cellular phone application prior to each session. A trained graduate research assistant recorded the delivery of tokens to ensure fidelity. Since the experimental design was alternating treatments, integrity checks occurred across 100% of the sessions. A table demonstrating procedural integrity was at 100% during the IBAs, BFAs, and intervention sessions for each participant can be found in Table 1.

Inter-rater Reliability

A team of graduate students at Oklahoma State University measured inter-observer agreement. The graduate students were trained in observations and practiced observations before the study began to try to prevent any coding problems. Inter-rater agreement was distributed

across all conditions, treatments, and assessments. For Participant 1, inter-rater agreement was measured for 40% of the baseline sessions, 22% of the first intervention sessions, and 38% of the second intervention sessions. For Participant 2, inter-rater agreement was measured 25% of the sessions for baseline and for 38% of the intervention sessions. Inter-observer agreement was calculated by comparing the frequency of the on-task behavior recorded by the primary investigator and the frequency of the on-task behavior recorded by the research assistant. Inter-observer agreement did not fall below 80% for any of the sessions. A table showing the inter-observer agreement for each participant can be found in Table 2.

Treatment Phase

Baseline. Baseline data was collected for at least three data points or until stable using interval-by-interval data collection of on- and off-task behavior of each of the participants.

Multiple treatment comparison. Two treatments were determined based on the two types of assessment (BFA and IBA). Both of the treatments were conducted by the principal investigator or trained research assistant and applied in an alternating treatments design lasting 15-minutes per day.

For Participant 1, from the BFA, it was hypothesized that the function of his problem behavior was escape. From the IBA, it was hypothesized that the function of his problem behavior was tangible. For Participant 2, the BFA and IBA matched with tangible being the hypothesized function of his problem behavior. Therefore, the contraindicated treatment was determined to be escape-maintained as this was the next highest hypothesized function from the IBA. These results can be found in Figures 1-4.

When the tangible-function based intervention was implemented, a yellow token board was used. When the escape-function based intervention was implemented, a blue token board was used. Different colored boards were used to help the students differentiate between what they

were working for. Examples of the token boards can be found in Appendix A. Classroom expectations were also taped to the participant's desk during the intervention so they knew what was expected of them. These expectations included sitting nicely, raising your hand if you need help, following directions, using kind words, and respecting others. These expectations were reviewed with the student before beginning each session.

Participants were given the opportunity to earn a token every 15-25 seconds depending on their interresponse time at baseline. Interresponse time was calculated as average time off-task between each on-task interval during baseline session for each of the participants. Participant 1's interresponse time was 15 seconds, while Participant 2's interresponse time was 25 seconds. The MotivAider was set for 15 or 25 seconds depending on the participant. Concurrently, one to two observers were collecting interval-by-interval data of on- and off-task behavior during the intervention period.

The student earned a token by following classroom instructions defined as being on-task 80% of the time during that observed interval. If the student earned a token, they were told, "you got a token for following classroom expectations." If the student did not earn a token, the interventionist stated and pointed to the classroom expectation posted on their desk that the student was not following. If the participant earned enough tokens by the end of the 15-minute session, they were either given a break or access to their preferred time. If the participant did not earn enough tokens at the end of the 15-minute session, they were told, "your goal is to follow classroom expectations to earn tokens. We will try again tomorrow to earn tokens for a break/reward."

Procedures were adapted for Participant 1 as there was large variability in his response to both of the interventions. During this intervention, the student was told the following, "Today, you can work for skipping problems. For every problem that you do, you can cross one out. You must start your work within 10 seconds though in order to get to cross one out. Ready? Begin."

The timer was set for 10-seconds. When the timer went off, if the student did not begin the problem, he was given one reminder to start his work in order to get to cross a problem out. If the student started the problem, the interventionist waited for him to finish, gave verbal praise for working, and stated, "you get to cross one of the problem out." These procedures were continued until the worksheet was completed. The complete behavior intervention plans for both participants can be found in Appendices J - N.

Data Analysis

Visual analysis was used to determine if the treatment was more effective than baseline and if one treatment was more effective than the other treatment. When there was a stable level and trend established during baseline, the intervention phase began. Level refers to the magnitude of data. Level stability and level change are the two important factors of level to consider. Level stability is the variability or range in data points (Gast & Spriggs, 2014). When the range is small, then it is said that data are stable. Data is generally considered to be stable if 80% of the data points fall within a 25% range of the median level. Level change is the change in level in within the same condition (Gast & Spriggs, 2014). Trend is also considered when analyzing single case design. Trend is the slope or angle of the data. Slope is the steepness of the data path over time. A trend can increase, decrease, or stay the same (Gast & Spriggs, 2014).

CHAPTER IV

FINDINGS

Procedural Integrity

Procedural integrity did not fall below 100% across the IBAs, BFAs, or treatment phases for either of the participants.

Inter-rater Reliability

The results for inter-rater reliability for each participants can be found in Table 2. Inter-rater reliability was calculated across baseline and intervention phases. For Participant 1, inter-rater agreement calculated for the average percentage on-task was 93% and ranged from 89%-98%. For Participant 2, inter-rater agreement calculated for the average percentage on-task was 90% and ranged from 82%-96%.

Preference Assessment

Participant 1 was given the following items using the MSWO procedures described above: iPad, toy monkey, stickers, coloring, sticky notes, and toy alligator. The results revealed that the iPad was the highest preferred item across 3 trials. Participant 2 was given the following items: M&Ms, toy car, toy monkey, toy dinosaur, coloring, eraser, iPad, and stickers. The results revealed M&Ms to be the highest preferred item. However, the teacher expressed concerns with using candy. Therefore, the second highest preferred item was used, which was the iPad.

Treatment Phase

The treatment phase was implemented by the principal investigator or trained graduate research assistant during the same time that baseline data was collected each morning. The order of implementation of interventions in the alternating treatments design were counterbalanced to prevent order effects.

Participant 1. The first treatment phase consisted of the principal investigator or trained graduate research assistant giving a token every 15 seconds if the participant remained on-task at least 80% of the time during that interval. Visual analysis indicated there was significant variability and a decrease in trend for both of the interventions on percentage of intervals on-task compared to baseline. Therefore, a second treatment phase was implemented with a change in the escape function-based intervention. There was still variability in both interventions. However, there was in increase in trend for the escape function-based intervention compared to baseline. There was also a decrease in trend for the tangible function-based intervention that remained at low levels of percentage of on-task behavior. The intervention results for Participant 1 can be found in Figure 5.

Participant 2. The treatment phase consisted of the principal investigator or trained graduate research assistant giving a token every 25 seconds if the participant remained on-task at least 80% of the time during that interval. Visual analysis indicated an initial change in level of percentage of intervals on-task compared to baseline. However, as the intervention continued, percentage of intervals on-task began to separate. The tangible function-based intervention remained at high levels of percentage of intervals on-task compared to baseline, while the escape function-based intervention began to decrease in trend returning back to levels of on-task behavior exhibited during baseline. The intervention results for Participant 2 can be found in Figure 6.

CHAPTER V

CONCLUSIONS

The primary purpose of this study was to evaluate if IBAs are as effective as conducting a BFA in identifying the function of behavior. Further, the study also aimed to do determine if one function-based intervention was more effective in increasing on-task behavior than the other intervention.

Participant 1 exhibited an initial increase in on-task behavior with both interventions. However, there was a decrease in on-task behavior as well as an increase in variability after approximately two sessions of each of the interventions. Therefore, a second escape function-based intervention was implemented. Again, there was an initial increase in on-task behavior, but there was a large variability between sessions. By the final sessions, there was some separation between interventions. The escape function-based intervention showed an increase in on-task behavior while the tangible function-based intervention showed a decrease in on-task behavior. It is hypothesized that the function of Participant 1's behavior was escape-maintained. This is consistent with the hypothesized function from the BFA.

Participant 2 exhibited an increase in on-task behavior with both interventions. By the final sessions, there was separation between the effectiveness of the interventions. The tangible function-based intervention continued to show an increase in on-task behavior while the escape function-based intervention showed a decrease in on-task

behavior. It is hypothesized that the function of Participant 2's behavior was tangible-maintained. This is consistent with the hypothesized function from both the BFA and IBA since there was an agreement between both of the assessment procedures.

Implications for Practice

The results of this study continue to show the importance of function-based interventions. It is necessary for the function of the behavior to be identified in order to implement an intervention that is likely to be effective. BFAs continue to be an effective way to identify the function of behavior. It may be possible, especially in schools, for IBA procedures to be utilized to identify the function of behavior as intervention can begin right away, the problem behavior does not have to be elicited, and they are time efficient. Although IBAs may not be as effective as BFAs in identifying the function of problem behavior, IBAs may be the useful for hypothesizing the function of behavior for Tier 2 students, while a BFA may be necessary for Tier 3 students. It is important to note that some students may require Tier 3 services without first going through Tier 2 such as if a student is engaging in aggressive behaviors or if there are safety concerns (e.g., running).

Limitations

A few limitations of this study should be noted. First, the intervention was implemented by the principal investigator or graduate research assistant. It is unknown whether or not implementation of the interventions can generalize to teachers. Furthermore, teachers often do not have the resources to be able to deliver a token to one of their students every 15-25 seconds. Using interresponse time during baseline alone to the determine intensity of the intervention may not be the most effective way since it does not take into consideration topography of behavior. The ability to generalize to other individuals is limited as there were only two male students from

the same school in this study. Another limitation is not being able to use the most highly preferred item identified in the preference assessment for Participant 2. According to the results, the tangible function-based intervention was still the most effective at increasing on-task behavior for Participant 2. A final limitation is that this study did not fade out the intervention to ensure the intervention would still be effective at a lower intensity.

Future Research

IBA procedures are relatively new, and the procedures in this study have not been utilized in research previously. Therefore, future research should focus on refining IBA procedures and determine if it is an effective procedure to use in a variety of settings to identify function of problem behavior. It may also be beneficial to have teachers conduct the IBA to see if they are able to implement these procedures with fidelity. Future research should further this study by adapting the interventions as receiving tokens every 15-25 seconds is not a feasible intervention that can be continuously implemented with reliability. The topography of the behavior could be considered when deciding the intensity of the intervention. For example, talking out behavior will require a different level of intensity than physical aggression. Furthermore, fading out the intervention may also help with the resource issue. It is important to utilize teachers or caregivers in implementing the interventions to determine if the increase in on-task behavior can be generalized when others are conducting the intervention. Replication is necessary with more participants with various ages and settings.

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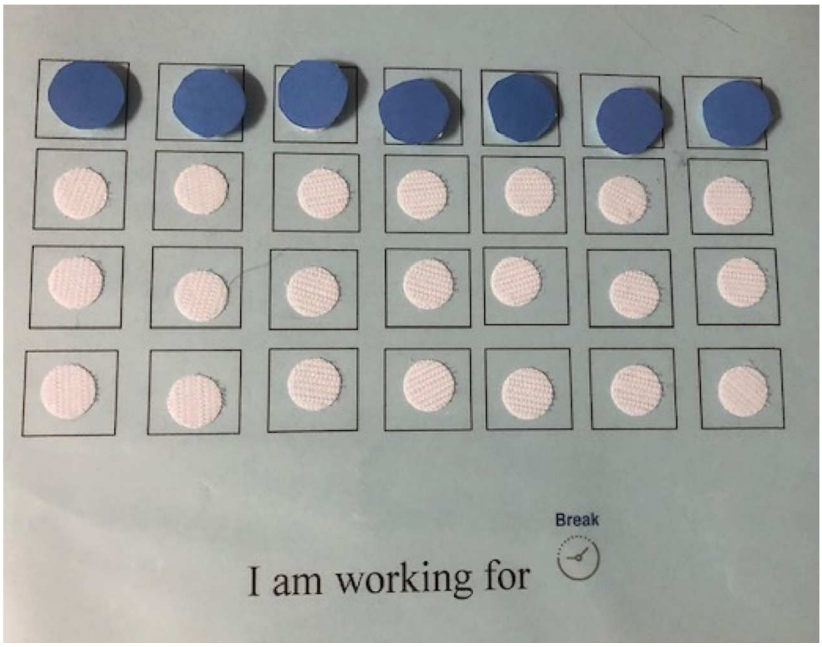
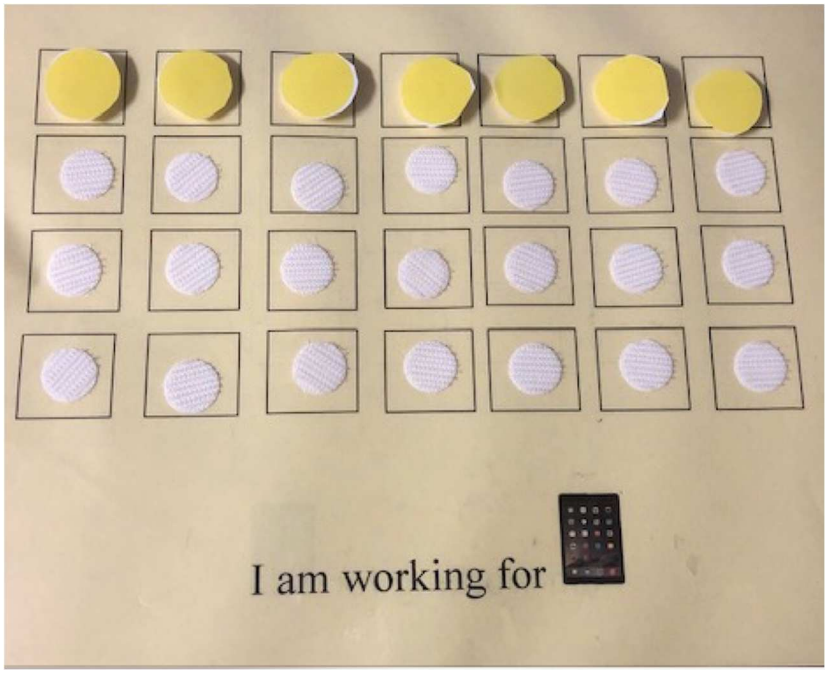
APPENDICES

APPENDIX Page

APPENDIX A





APPENDIX B

Behavior Definitions

VO: partial interval – Verbal Off-Task

- **Define:** any verbalizations that are not initiated by the teacher, are out of turn, and/or are unrelated to the teacher's instruction or activity (e.g., making inappropriate noises, talking out of turn)

MO: partial interval – Motor Off-Task

- **Define:** manipulating an object in a way that is inconsistent or inappropriate with the task demand which includes using objects in a manner for which they were not designed (e.g., banging the desk, slamming a book, laying on desk) or using objects unrelated to school tasks (e.g., fidget spinners, toys, etc.).

PO: partial interval – Passive Off-Task

- **Define**: not looking in the direction of the teacher or not attending to an assigned academic activity for 2 seconds or more (e.g., looking at the wall instead of teacher giving instruction, staring out the window)

OS: partial interval – Out of Seat

- **Define:** bottom not in contact with the seat or designated space (e.g., carpet space) for 2 seconds or more

TA: partial interval – Teacher Attention

- **Define**: adult vocally or physically interacts with specified student, attention is directed towards the student by an adult
- Can still be on-task if the context is appropriate

PA: partial interval – Peer Attention

- **Define**: peer vocally or physically interacts with specified student, attention is directed towards the student by a peer
- Can still be on-task if the context is appropriate

OT: whole interval – On-Task

- **Define**: body physically directed towards teacher or assigned task and attending to the specified task for the duration of the interval (i.e., looking at or actively working on the specific task, looking at teacher who is in the process of doing instruction)

APPENDIX C

Student/Grade:	_____	Date:	_____
Subject/Topic:	_____	Start/End Time:	_____
Teacher/Students:			

Attention Codes			
VO	Verbal Off-task	TA	Teacher Attention (+ - n)
MO	Motor Off-task	PA	Peer Attention (+ - n)
PO	Passive Off-task	OT	On-task
OS	Out of Seat		
◯	As Per Definition	/	Acceptable/Not Disruptive

Teacher Comment Ratio	
Instructive	
Corrective	
Praise	

	00-10	11-20	21-30	31-40	41-50	51-60 (Compare)
0	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
1	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
2	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
3	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
4	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
5	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
6	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
7	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
8	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT
9	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT	VO MO PO OS TA PA OT

Observer						Colleague						Reliability
Referred			Comparison			Referred			Comparison			
By	#	%	By	#	%	By	#	%	By	#	%	
VO:			VO:			VO:			VO:			VO: _____
MO:			MO:			MO:			MO:			MO: _____
PO:			PO:			PO:			PO:			PO: _____
OS:			OS:			OS:			OS:			OS: _____
TA:			TA:			TA:			TA:			TA: _____
PA:			PA:			PA:			PA:			PA: _____
OT:			OT:			OT:			OT:			OT: _____

APPENDIX D

Oklahoma State University Institutional Review Board

Date:	01/11/2019
Application Number:	ED-18-179
Proposal Title:	Brief Functional Analysis and Intervention-Based Assessment: Are Both Useful in Identifying Effective Interventions?
Principal Investigator:	Stephanie Smith
Co-Investigator(s):	Gary Duhon
Faculty Adviser:	Gary Duhon
Project Coordinator:	
Research Assistant(s):	
Processed as:	Expedited

Status Recommended by Reviewer(s): Approved
Approval Date: **01/11/2019**
Expiration Date: **01/10/2020**

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 223 Scott Hall (phone: 405-744-3377, irb@okstate.edu).

Sincerely,
Oklahoma State University IRB

Oklahoma State University Institutional Review Board

Date:	01/27/2020
Application Number:	ED-18-179
Proposal Title:	Brief Functional Analysis and Intervention-Based Assessment: Are Both Useful in Identifying Effective Interventions?
Principal Investigator:	Stephanie Smith-Kellen
Co-Investigators:	Gary Duhon
Other Research Personnel:	,
Faculty Advisor:	Gary Duhon
Processed as:	Continuation

Status Recommended by Reviewer(s): Approved
Continuation Approval Date: 01/27/2020
Expiration Date: 01/26/2021

The continuation of the IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are attached to this communication. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
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Sincerely,
Oklahoma State University IRB

APPENDIX E

PARENT/GUARDIAN PERMISSION FORM
OKLAHOMA STATE UNIVERSITY

Research Project Title:
Brief Functional Analysis and Intervention-Based Assessment: Are Both Useful in Identifying Effective Interventions?

Principal Investigator:
Stephanie Smith Kellen, M.A., Doctoral Student at Oklahoma State University

Your child has been identified by his/her teacher as a student who would benefit from participation in a research project that is designed to increase school success. This consent form contains important information to help you decide if it is in your child's best interest to take part in this study.

Purpose:
The purpose of this study is to determine if two different assessment methods are both effective in identifying interventions for children with behavioral concerns.

Procedures:
Informed consent and assent will be obtained from the parents and the children. Your child will then be assessed using two different assessment methods. After each of the assessment methods are completed, two different interventions will be implemented by the teacher. Data will be collected on the effectiveness of each of the interventions for your child using behavioral observation sheets (*show example sheet)*.

Your child will be pulled out of the classroom for 60-85minutes for an assessment of their behavioral difficulties. Once an intervention is implemented, your child may have a goal they need to try to reach for the day and/or be taught a new skill that will help them in the classroom. The intervention portion of this project will not take away any classroom time.

Risks of Participation:
During the assessment phase, behavioral problems may occur because of the nature of the assessment procedure. However, since the behavior is already occurring in the classroom, the risks associated with this project are not greater than those already occurring during the school day.

Benefits of Participation:
A benefit of this study is that it will provide a behavioral support for students who demonstrate behavior difficulties that may interfere with learning in the classroom. The study may lead to an improvement in behavior and academic engagement for your child. Additionally, the results will be used to create behavioral intervention plans for the

student that the teacher can implement to help with behavioral concerns, which may benefit the teacher, the student, and the student's peers.

Confidentiality:
The records and data of this study will be kept private. Data will be housed at Oklahoma State University and only the principal investigator, the academic advisor, and the graduate research assistants working on the project will have access to it. During data collection only the principal investigator, the academic advisor, and the graduate research assistants working on the project will have access to identifiable information. Demographic data (such as gender, age, and race) of the child is being requested, therefore, all data will be de-identified at the end of data collection. The results will be made available for both you and your child's teacher. Any written results will be done so anonymously and all identifying information will be removed from the data. De-identified data will be kept for 7 years after the study has been completed. Data will be kept for this length of time to cover applicable federal laws regulating research data storage for human subjects.

Compensation:
No monetary compensation will be provided for participating in this study. Benefits provided by the study are listed above.

Contact Information:
If you have any questions with regard to you or your students' involvement in this study, please contact us at your earliest convenience:

Stephanie Smith Kellen
Doctoral Student
Oklahoma State University
(701) 680-3991

Dr. Gary Duhon
Professor
Oklahoma State University
(405) 744-9463

For information on subjects' rights, contact the IRB Office, 223 Scott Hall, Stillwater, OK 74078, (405) 744-3377, or irb@okstate.edu

Participant Rights:
I understand that my child's participation is voluntary, that there is no penalty for refusal to participate, and that I am free to withdraw my permission at any time. Even if I give permission for my child to participate I understand that he/she has the right to decline.

Consent Documentation:

I have been fully informed about the procedures listed here. I am aware of what my child and I will be asked to do and of the benefits of my participation. I also understand the following statements:

I have read and fully understand this permission form.
I sign it freely and voluntarily.
A copy of this form will be given to me.

_____

____ I give my permission for my child to be included in the research project.

____ No, I prefer that my child not be included in the research project.

Parent/Guardian Signature: _____ Date: _____

Student's Name: _____

APPENDIX F

CHILD ASSENT/RECRUITMENT PROCESS
OKLAHOMA STATE UNIVERSITY

Research Project Title:
Brief Functional Analysis and Intervention-Based Assessment: Are Both Useful in Identifying Effective Interventions?

Principal Investigator:
Stephanie Smith Kellen, M.A., Doctoral Student at Oklahoma State University

Read the following sections along with me.

Purpose:
The purpose of this study is to see if two different types of assessments help to create an intervention for you in the classroom.

Procedures:
You will be assessed using two different types of assessments. After each of the assessment methods are done, the teacher will start an intervention to help you in the classroom. You will not have to do anything different during your day at school. The only thing is that you may have goals to try to reach or be taught a new skill to help you in the classroom.

Risks of Participation:
There are no risks with being a part of this project that are not already happening during the school day.

Benefits of Participation:
Participating in this study may help you by giving you support in the classroom. The study may also lead to an increase in classroom involvement.

Participant Rights:
You do not have to work on this project if you do not want to. You can stop at any time you want. You do not have to do anything that makes you feel uncomfortable or sad.

Comprehension Check:
If you say yes to being a part of this project, what will you be asked to do?

You have been told about the study.
You have been told what you have to do.
You have been told that you do not have to do anything if you do not want to.
You have also been told that you can stop any time you want.

Would you like to do this project?

____I would like to participate in the research project.

____ No, I do not want to participate in the research project.

Your Name:_____ Date: _____

APPENDIX G

Multiple Stimulus Without Replacement (MSWO)
Preference Assessment Session Description

Materials

- Between 6-10 stimuli
- Data sheet
- Pen

Procedure

- Items are presented simultaneously in an array. Once an item is selected access to the other items is blocked for the remainder of the trial. The item selected is then removed from the array on subsequent trials. This procedure is repeated for at least 3 sessions, or until a stable preference emerges.

Pre-session Sampling

- Prior to beginning, seat the student at the table and allow them to sample each item.
- For a toy, show the student how it works and then place the item on the table. If the student approaches the item allow them 5-10 seconds of access and then repeat this procedure with the next item.
- If the student does not approach the item after 5 seconds, the researcher will prompt the student to sample the stimulus for 5 seconds. After sampling the item, present the item again for 5 seconds. If the student approaches, allow 5-10 seconds of access; if they do not approach move on to the next item.

Presentation

- Each session will begin with all items randomly sequenced in a straight line on the table, each approximately 2 inches apart.
- At the start of the session, seat the student at the table or bring them to the table.
- The researcher will instruct the student to select one item by saying "pick one." Allow the student access to the item they chose for approximately 30 seconds.
- Once the student has made a selection they should be blocked from accessing additional stimuli during that particular trial.
- If the student makes contact with more than one item, give them the one they touched first.
- The stimulus selected will be removed from the line up for subsequent trials during that session.
- Prior to beginning the next trial, the sequencing of the remaining items will be rotated by taking the stimulus at the left end of the line and moving it to the right end, then shift the other stimuli so they will again be equally spaced on the table. The second trial will begin.
- Continue in this manner until all items are selected or until the student makes no selection within 30 seconds from the beginning of the trial. In the latter case, the

session will be terminated and remaining stimuli will be recorded as "not selected."

Data Collection

- Record the item selected during each trial using the data sheet

Preference Data

- Input the number of trials each stimulus was selected, and the number of trials each stimulus was included in the array. Calculate the percentage of trials each stimulus was selected by dividing the number of times the stimulus was included in the array by the number of times it was selected.
- Calculate and average percentage of times each stimulus was selected across administrations and sort the data from higher to lower preference.

APPENDIX H

Brief Functional Analysis Protocol

Materials

- Clipboard
- Observation sheets
- Tangibles (based on preference assessment)
- Pen

Procedures

1. Preference Assessment (see preference assessment protocol)
2. Control condition (5 minutes)
    a. Student has access to moderately preferred items, no task demands, intermittent attention is given, and all problem behavior is ignored
    b. These procedures are repeated until the 5 minutes are done
3. Attention condition (5 minutes)
    a. Student has access to moderately preferred items
    b. Researcher tells student they have work to do and turns partially away, but still able to keep eyes on the student
    c. If at any time the student engages in the problem behavior, 10-15 seconds of attention will be given by the researcher
    d. These procedures are repeated until the 5 minutes are done
4. Control condition (5 minutes)
    a. Student has access to moderately preferred items, no task demands, intermittent attention is given, and all problem behavior is ignored
    b. These procedures are repeated until the 5 minutes are done
5. Escape condition (5 minutes)
    a. Student is given a task that is at their instructional level
    b. The task is modeled by the researcher
    c. Student is told that it is time for them to work
    d. If student engages in the problem behavior, the student is given a 15-30 second break, then the task is given back again
    e. These procedures are repeated until the 5 minutes are done
6. Control condition (5 minutes)
    a. Student has access to moderately preferred items, no task demands, intermittent attention is given, and all problem behavior is ignored
    b. These procedures are repeated until the 5 minutes are done
7. Tangible condition (5 minutes)
    a. The researcher will have the highly preferred item where the student cannot touch it
    b. If the student engages in the behavior, they get access to the preferred item for 30 seconds

    c. Then, the researcher says “my turn” and takes the item away from the student
    d. These procedures are repeated until the 5 minutes are done
8. Contingency reversal attention example
    a. Appropriate Behavior (5 minutes)
        i. Attention will be given when the student engages in appropriate behavior
    b. Problem Behavior (5 minutes)
        i. Attention is contingent on the occurrence of the problem behavior.
        ii. Ran the same way as the attention condition (#3)
    c. Appropriate Behavior (5 minutes)
        i. Attention will be given when the student engages in appropriate behavior
9. Interobserver agreement
    a. Interobserver agreement will occur for at least 20% of the sessions

APPENDIX I

Intervention Based Assessment Protocol

Materials

- Clipboard
- Pen
- Observation Sheets

Procedures

- Principal investigator conducted sessions, therefore, gave the break, attention, or access to tangible item depending on condition.
- For escape, the student was told:
    - "Every 15-25 seconds you stay on-task and follow classroom expectations, you'll get a 10-15 second break."
        - If student stayed on task, the paper was turned over for 10-15 seconds.
- For attention, the student was told:
    - "Every 15-25 seconds you stay on-task and follow classroom expectations, you'll get 10-15 seconds of attention."
        - If student stayed on task, they received attention by the primary investigator.
- For tangible, the student was told:
    - "Every 15-25 seconds you stay on-task and follow classroom expectations, you'll get a 10-15 seconds on the iPad."
        - If student stayed on task, child was given access to their preferred item.
- Each condition took 10-minutes.
- Behavioral observation data will be gathered and used to determine if the student earned what they were working for.
    - 80% on-task behavior during the specified interval was considered following classroom expectations and met the criteria for escaping, gaining attention, or obtaining a tangible item depending on the condition.

APPENDIX J

Intervention A #1
Hypothesized Function: Escape

Materials

- Behavior chart
- Tokens
- Pen
- MotivAider

Procedures

1. At the beginning of the intervention time state the following while showing student his chart:
    a. *"Today, you can work for a break. Every 15 seconds you can earn a token towards a break. You will earn tokens for following classroom expectations. Once you earn all of these tokens* (show chart)*, you will be able to take a 5 minute break."*
    b. Review the following classroom expectations with them using the sheet on their desk.
        i. Sit appropriately and quietly
        ii. Raise your hand if you need help
        iii. Follow directions
        iv. Use kind words/tone
        v. Respect and be kind to others
2. Start MotivAider for every 15 seconds and start timer for 15 minutes
3. When the MotivAider goes off every 15 seconds
    a. If student **did receive a token**, give token to student and state the following:
        i. *"You got a token for following classroom expectations."*
    b. If student **did not receive a token**, state the following:
        i. Point to classroom expectation on desk that student was not following.
4. If student earns all 47 tokens during any time of the intervention, stop timer and give reinforcer
    a. Give verbal praise and state what the student did well.
    b. Let student take a 5 minute break.
5. After 15 minutes, show student his chart
    a. If he **did not earn** enough tokens for a break, state the following:
        i. "Your goal is to follow classroom expectations to earn tokens. We will try again tomorrow to earn tokens for a break/reward."
    b. If he **did earn** enough tokens for a break, state the following:
        i. Give verbal praise and state what the student did well.
        ii. Let the student take a 5 minute break.

APPENDIX K

Intervention A #2
Hypothesized Function: Escape

Materials

- Pen
- MotivAider

Procedures

1. At the beginning of the intervention time state the following while showing student his chart:
    a. *"Today, you can work for skipping problems. For every problem that you do, you can cross one out. You must start your work within 10 seconds though in order to get to cross one out. Ready? Begin."*
2. Start timer for 10 seconds
3. When the timer goes off in 10 seconds
    a. If student did not begin the problem, give one reminder.
        i. *"You must start your work in order to get to cross one problem out."*
    b. If student did start the problem, wait for him to finish, give verbal praise, and state the following:
        i. *"You get to cross one of the problems out!"*
4. Continue these procedures until the worksheet is completed.

APPENDIX L

Intervention B
Hypothesized Function: Tangible

Materials

- Behavior chart
- Tokens
- Pen
- MotivAider

Procedures

1. At the beginning of the intervention time state the following while showing student his chart:
    a. *"Today, you can work for time on the iPad. Every 15 seconds you can earn a token towards iPad time. You will earn tokens for following classroom expectations. Once you earn all of these tokens* (show chart)*, you will be able to have 5 minutes on the iPad."*
    b. Review the following classroom expectations with them using the sheet on their desk.
        i. Sit appropriately and quietly
        ii. Raise your hand if you need help
        iii. Follow directions
        iv. Use kind words/tone
        v. Respect and be kind to others
2. Start MotivAider for every 15 seconds and start timer for 15 minutes
3. When the MotivAider goes off every 15 seconds
    a. If student **did receive a token**, give token to student and state the following:
        i. *"You got a token."*
    b. If student **did not receive a token**, state the following:
        i. Point to classroom expectation on desk that student was not following.
4. If student earns all 47 tokens during any time of the intervention, stop timer and give reinforcer
    a. Give verbal praise and state what the student did well.
    b. Let student have 5 minutes of iPad time.
5. After 15 minutes, show student his chart
    a. If he **did not earn** enough tokens for iPad time, state the following:
        i. "Your goal is to follow classroom expectations to earn tokens. We will try again tomorrow to earn tokens for a iPad time/break."
    b. If he **did earn** enough tokens for a iPad time, state the following:
        i. Give verbal praise and state what the student did well.
        ii. Let the student have 5 minutes of iPad time.

APPENDIX M

Intervention A
Hypothesized Function: Tangible

Materials

- Behavior chart
- Tokens
- Pen
- MotivAider

Procedures

1. At the beginning of the intervention time state the following while showing student his chart:
    a. *"Today, you can work for time on the iPad. Every 25 seconds you can earn a token toward iPad time. You will earn tokens for following classroom expectations. Once you earn all of these tokens* (show chart)*, you will be able to have 5 minutes on the iPad.*
    b. Review the following classroom expectations with the student using the sheet on their desk.
        i. Sit appropriately and quietly
        ii. Raise your hand if you need help
        iii. Follow directions
        iv. Use kind words/tone
        v. Respect and be kind to others
2. Start MotivAider for every 25 seconds and start timer for 15 minutes
3. When the MotivAider goes off every 25 seconds
    a. If student **did receive a token**, give token to student and state the following:
        i. *"You got a token for following classroom expectations."*
    b. If student **did not receive a token**, state the following:
        i. Point to classroom expectation on desk that student was not following.
4. If student earns all 29 tokens during any time of the intervention, stop timer and give reinforcer
    a. Give verbal praise and state what the student did well.
    b. Let student have 5 minutes of iPad time.
5. After 15 minutes, show student his chart
    a. If he **did not earn** enough tokens for iPad time, state the following:
        i. "Your goal is to follow classroom expectations to earn tokens. We will try again tomorrow to earn tokens for a break/iPad time."
    b. If he **did earn** enough tokens for iPad time, state the following:
        i. Give verbal praise and state what the student did well.
        ii. Let the student have 5 minutes of iPad time.

APPENDIX N

Intervention B
Hypothesized Function: Escape

Materials

- Behavior chart
- Tokens
- Pen
- MotivAider

Procedures

1. At the beginning of the intervention time state the following while showing student his chart:
    a. *"Today, you can work for a break. Every 25 seconds you can earn a token toward a break. You will earn tokens for following classroom expectations. Once you earn all of these tokens* (show chart)*, you will be able to take a 5 minute break."*
    b. Review the following classroom expectations with the student using the sheet on their desk.
        i. Sit appropriately and quietly
        ii. Raise your hand if you need help
        iii. Follow directions
        iv. Use kind words/tone
        v. Respect and be kind to others
2. Start MotivAider for every 25 seconds and start timer for 15 minutes
3. When the MotivAider goes off every 25 seconds
    a. If student **did receive a token**, give token to student and state the following:
        i. *"You got a token for following classroom expectations."*
    b. If student **did not receive a token**, state the following:
        i. Point to classroom expectation on desk that student was not following.
4. If student earns all 29 tokens during any time of the intervention, stop timer and give reinforcer
    a. Give verbal praise and state what the student did well.
    b. Let student take a 5 minute break.
5. After 15 minutes, show student his chart
    a. If he **did not earn** enough tokens for a break, state the following:
        i. "Your goal is to follow classroom expectations to earn tokens. We will try again tomorrow to earn tokens for a break/reward."
    b. If he **did earn** enough tokens for a break, state the following:
        i. Give verbal praise and state what the student did well.
        ii. Let the student take a 5 minute break.

VITA

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