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APPLYING A FUNCTIONAL ANALYSIS IN A SCHOOL SETTING

A Specialist Project submitted in partial fulfillment
of the requirement for the degree
Specialist in Education

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May, 2023

Applying a Functional Analysis in a School Setting
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ABSTRACT

APPLYING A FUNCTIONAL ANALYSIS IN A SCHOOL SETTING

Literature has implied that the use of functional analysis (FA) procedure within the school setting can be beneficial in determining the function of problem behavior. However, conducting an FA in a school setting can be challenging due to the expertise, resources, and experimental control needed to complete such an evaluation. The purpose of the current study was to examine the feasibility of conducting a FA within the school setting to determine the function(s) of severe problem behavior. The research questions are: (1) Can a multielement FA be used to infer the function of a student's problem behavior in a public high school setting? (2) Does a multielement FA with standard experimental procedures produce interpretable results when conducted with a severe behavior problem (i.e., aggression and self-injury)? A functional analysis was conducted in an empty high school classroom using the conditions of tangible, escape, and attention, along with a control condition. A teacher interview and free operant preference assessment were conducted prior to beginning the FA. The results indicated the functions of the student's behavior were escape from academic demands and access to food items. The implications of the results are discussed as well as future directions for research as it pertains to training and choosing appropriate personnel to conduct FAs within the school setting.

Keywords: functional behavior assessment, functional analysis, school setting, latency-based, trial-based, challenging behavior

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Introduction

Functional Behavioral Assessment

The purpose of a functional behavioral assessment (FBA) is to identify the function (e.g., escaping activities, accessing attention or a tangible item) of the problem behavior exhibited by the individual. Identifying the function of a behavior is critical for determining an effective function-based intervention. The origin of function-based interventions is often traced back to Carr (1977) who reviewed hypotheses for the occurrence of self-injurious behavior. In his article, Carr provided evidence that the “motivation” behind self-injurious behaviors included multiple reasons that could be broadly categorized as extrinsic or intrinsic reinforcement. Considering the motivation or function of the behavior makes it possible for more effective, efficient, and individualized interventions to be created for all types of behavioral concerns. Carr’s literature review led to the creation of functional analysis procedures pioneered by Iwata et al. (1982).

The concept of challenging behavior as being functional represented a paradigmatic change in the way that challenging behaviors are understood and in the way that interventions for challenging behaviors are developed (Dunlap & Fox, 2011). Even though a problem behavior (e.g., aggression) may appear similar for different students, the behavior can be maintained by different reinforcement contingencies (Vollmer & Northrup, 1996). Prior to the concept of behaviors having a function, challenging behaviors (e.g., tantrums, self-injury, aggression) were often viewed as unwanted responses that needed to be extinguished or suppressed, typically using punishment. Conducting an FBA is key to developing effective interventions and decreasing reliance on reactive strategies such as punishment (Horner & Carr, 1997).

In addition to being a way to develop effective interventions, an increase in the use of FBAs in schools is in part due to the federal mandates under the 1997 reauthorization of the

Individuals with Disabilities Education Act (IDEA-97) and its revision, IDEA-04, requiring that an FBA be conducted in certain circumstances (Anderson et al., 2015). Those circumstances include a child who has a disability and who has been suspended or expelled for more than ten school days for misconduct, if the student is involved in an incident involving drugs or serious bodily injury, or for behavior that interferes with the learning environment (IDEA, 2004). As a result, the use of FBAs has become common in the school setting. Under IDEA-04, schools are also expected to use FBA assessments proactively to intervene early with students who display persistent problem behaviors.

FBAs both describe and illuminate the functional, cause-effect relations between behavior and the environment (Steege et al., 2019). An FBA is a formal process for gathering information, clarifying problem behaviors, determining the function of the identified behaviors, and developing interventions that teach or improve appropriate behaviors. An FBA results in a hypothesis for the reason the behavior is occurring and the function that the behavior is serving for that student (Steege et al., 2019).

Initially, the possible functions of self-injurious behaviors were thought to be (a) attention positively reinforcing the behavior, (b) negative reinforcement through escape or avoidance from demands, (c) “self-produced reinforcement of a sensory nature” (Iwata et al., 1982, p. 9). The function of accessing something tangible was added later by Durand and Carr (1987). Over the years, authors have used various terms and conceptualizations of different behavioral functions such as automatic reinforcement, attention-seeking, environmental negative reinforcement, and obtain objects or events, to name a few (Broussard & Northrup, 1995; Cipani, 2018; Crone & Horner, 2003; Ervin et al., 2001; Horner & Carr, 1997; Iwata et al., 1990; Steege et al., 2019). However, even when other terminology is used, they typically still include either

positive or negative reinforcement related to the four primary functions of attention, escape, sensory, and tangible. That is, the function of behavior is either a positive reinforcement strategy to obtain something (e.g., attention, sensory stimulation, tangible item) or a negative reinforcement strategy to escape or avoid something (e.g., attention, sensory stimulation, a particular situation).

When conducting a comprehensive FBA, a wide-range of data needs to be collected on the student including environmental observations or analysis; academic, communication, and social-emotional strengths and weaknesses; antecedents and consequences related to the challenging behavior; and preferred reinforcers. This information is often collected through some combination of behavior rating scales, interviews, curriculum-based assessments, direct observations, or experimental analyses (Steege et al., 2019). While functional behavioral assessment is the broad term for a wide range of methods of collecting such data, there are different types of FBA methodology including indirect assessment, descriptive assessment, and experimental functional analyses. Within experimental functional analyses there are different types including brief functional experimental analysis, trial-based functional analysis, and latency-based functional analysis. Each type of FBA data will be briefly described.

Indirect Assessment

An indirect assessment is so named because information regarding antecedents (what comes before the behavior), consequences (what happens after the behavior), and other critical variables is gathered indirectly via record reviews, rating scales, and interviews (Steege et al., 2019). Information that is gathered from parents, teachers, staff, and in some cases the student is used to assess the target behavior. Record reviews and interviews are the typical choice for an indirect FBA procedure with the interviews being particularly helpful when it comes to

identifying and defining the target behaviors, obtaining the parent or teacher's perception of antecedent and consequent information, selecting a data-recording procedure, and forming provisional hypotheses regarding the function(s) of the behavior. Using only an indirect method is cost-effective and efficient but having only indirect information could lead to misinformation and incorrect hypotheses (Steege et al., 2019). When conducting a comprehensive FBA, indirect assessment is typically the first stage and is followed by other functional behavioral assessment methods.

Descriptive Assessment

Descriptive FBA procedures involve directly observing and recording occurrences of behavior and related environmental variables in the natural setting (e.g., a school classroom). In a descriptive assessment, target behaviors are operationally defined so they can be accurately observed and measured. The general descriptive FBA process involves observing and documenting occurrences of target behaviors and associated environmental events, but procedural variations are almost limitless (Steege et al., 2019). In cases where the target behavior happens infrequently or only under certain conditions, it may be necessary to train a paraprofessional or teacher to document the events using an Antecedent-Behavior-Consequence (ABC) log. The (A) stands for antecedent events that precede the occurrence of the behavior, the (B) is behavior that occurs, and the (C) is the consequences that are produced after the occurrence of the behavior. In this manner, sequences of behaviors are examined for similar patterns. For example, if a child frequently receives peer attention after exhibiting a target behavior, a hypothesis could be made that peer attention is maintaining the problem behavior. Like indirect assessment methods, descriptive assessments can only provide information for

correlations between environmental events and target behaviors, they do not demonstrate causation.

Experimental Functional Analysis

While functional assessment is used as a general label for the process of identifying environmental events that may be related to the occurrence of the problem behavior, the term functional analysis (FA) is reserved for the direct experimental manipulation of environmental events and systematic observation of their impact on the occurrence of behavior (Gresham et al., 2019). Specifically, functional analysis manipulates environmental events to verify the functional relationship between specific environmental events and consequences with the problem behavior (Arndorfer & Miltenberger, 1993). In other words, the purpose of a FA is to experimentally confirm that the hypothesized relationship between environmental events (e.g., demand of completing an academic task), target behaviors (e.g., tantrums), and consequences provided in response to the target behaviors (e.g., escape) are causal and not correlational (Steege et al., 2019).

Since the seminal report of Iwata and his colleagues (Iwata et al., 1982), the use of analog probe procedures to analyze challenging behavior has often been considered the “gold standard” approach to assessing the function of problem behavior (Arndorfer & Miltenberger, 1993; Fox & Davis, 2005; Steege et al., 2019). Analog probe procedures consist of sessions in which the suspected environmental event is presented in a highly controlled setting, often a research clinic or inpatient hospital. The trials are called analog procedures because events are meant to simulate, or be analogous to, events occurring in the home or school setting. Multiple trials are conducted under different conditions repeatedly over short periods of time and observation data

are collected on the occurrence of challenging behavior (Quinn et al., 2001). Traditionally, there are four analog probe conditions: tangible, alone, escape (also called the demand condition), and attention. Trials are brief (e.g., 10 minutes) and are repeated in a random order until data indicate a stable pattern of responding.

The purpose of the tangible condition is to test whether the target behavior functions to access preferred tangible items or activities. In the tangible condition, the child has access to preferred toys or materials and then those materials are removed. If the child engages in the target behavior, the materials are returned for a short period of time (e.g., 30 seconds) and then removed again. The purpose of the alone condition is to determine if the target behavior occurs for sensory seeking purposes. The alone condition involves the child being left alone without toys or activities nor any adults present. The purpose of the escape or demand condition is to test whether the target behavior functions to avoid or remove unwanted demands. The escape or demand condition involves the child being given many tasks (e.g., academic or functional) to complete, one after another. If the target behavior occurs, the task is removed for a short period of time (e.g., 30 seconds). The purpose of the attention condition is to test whether the target behavior functions to access social mediated attention. In the attention condition, appropriate behaviors are ignored but target behaviors result in attention (e.g., “Don’t do that”) from the adult in the room. High rates of target behaviors in this condition suggest attention is the function of the target behavior. It is possible to include a fifth play condition, the purpose of which is to provide a control condition. The control or play condition involves an adult paying attention to the child as the child plays with their preferred toy with no demands or task present. Target behaviors are ignored in order to avoid reinforcing any of the previously socially mediated functions (i.e., tangible, escape, attention).

Asmus and colleagues (2002) provide an example of the use of FA analog probes with Nate, a student with defined problem behaviors of aggression (e.g., hitting, pinching, and biting) and destruction (e.g., throwing items across the room) over the course of two weeks for two hours per day. A series of five-minute trials were conducted, and the conditions were repeated until a stable pattern of behavior emerged. Sessions that tested the possibility of escape being the function of the target behaviors included a task of asking Nate to place pegs into a container. When Nate engaged in aggressive or destructive behavior, the task was removed for 15 seconds and Nate was told “OK, break time” by the implementer (Asmus et al., 2002). In this manner, the situation is analogous to other situations at home or school where Nate’s target behaviors might result in him escaping the requested activity. In the attention condition, the therapist provided Nate with attention in the form of social disapproval only when he engaged in the target behaviors. In the tangible condition, a preferred toy was visible to Nate and given to him for 15 seconds every time he engaged in the target behavior. In the alone condition, all toys and people were removed, and Nate had nothing to do. Nate’s rates of target behavior in the escape sessions were much higher than in the other conditions, leading to the conclusion that escape is reinforcing the target behaviors.

The results from hundreds of FAs have been published (Hanley et al., 2003). Clinic-based FAs and reviews of studies using FAs demonstrate the effectiveness of the procedures (Iwata et al., 1994; Kurtz et al., 2003). As an example, Kurtz et al. (2003) examined FAs conducted in a hospital setting with 30 children with self-injurious behavior and reported that the FAs were successful in 87.5% of the cases. However, the use of analog procedures is demanding and is not normally conducted in a naturalistic environment (e.g., a classroom) due to the control needed over the conditions of the setting (Hanley, 2012). Potential demands placed upon staff and

therapists when using analog procedures include availability of resources such as clinic rooms and highly trained staff, the time needed for running dozens of sessions, and accurate data collection. Due to the complexity of standard analog FA procedures, researchers have developed brief versions of the analog approach that can be conducted in approximately 90 minutes, thus reducing the lengthy FA process (Quinn et al., 2001).

Brief experimental functional analysis. Brief functional analyses (BFA) are assessment procedures that still manipulate the consequences which may influence target behavior in the same manner as traditional analog procedures, just in an abbreviated manner (Gardner et al., 2012; Wacker et al., 2004). In contrast to the traditional experimental functional analysis methods, a brief version is better suited for outpatient clinical settings and naturalistic environments (e.g., a school-based setting). This variation of the traditional experimental model is considered brief because it has shorter session durations, a fewer number of sessions, and/or fewer conditions tested (Steege et al., 2019; Vollmer & Northrup, 1996). This version of FA offers advantages such as efficiency and flexibility, which is needed when conducting an assessment within a less controlled environment (e.g., a classroom or outpatient setting). BFAs are not only successful when used with students with severe problem behavior or intellectual disabilities, but with those typically developing students who show unwanted behavior in the school-setting (Gardner et al., 2012; Wilder et al., 2006). Results of Gardner et al.'s (2012) study, for example, suggest that BFAs meet the standards for an empirically supported assessment methodology for typically developing children, especially when the therapist is the parent or teacher of the student. A limitation of BFAs, however, is that conditions are not repeated over time which allows for a replication of findings (Gardner et al., 2012).

Trial-based functional analysis. A trial-based functional analysis consists of many of the same logistics as a traditional experimental FA, but it is more applicable to applied settings such as schools (Bloom et al., 2011). Unlike traditional and brief FAs, which involve resource-heavy observation recording procedures, trial-based FAs simply require evaluators to document the occurrence or nonoccurrence of a problem behavior within the context of predetermined assessment trials (Steege et al., 2019). All the traditional conditions (attention, escape, tangible, alone, and control conditions) are included for trial-based FAs. Each trial can end for one of two reasons: the target behavior occurs and encounters reinforcement, or a prespecified duration of time elapses (typically 2 to 5 minutes) without the occurrence of the target behavior (Steege et al., 2019). For example, in an escape trial, the therapist would present the student with an academic task and would provide frequent prompts to the student to begin/continue working on the task (e.g., every 10 seconds). If problem behavior arises then the therapist would stop giving prompts and say, “Let’s take a break.” The assignment would be removed, and the trial would end. However, if the student had no problem behavior during that trial, the trial would end at the designated time. In the control condition, no demands are given, but the child has access to non-contingent attention and tangible items. Each condition is repeated multiple times, typically trials for each condition, often over multiple days (Lambert et al., 2012). Once all the trial-based FA conditions are completed, the data would be organized into a bar graph to indicate the percentage of trials the problem behavior occurred under each condition (i.e., attention, escape, tangible, alone, and control). The condition or conditions with a higher percentage would be considered the function(s) of the target behavior.

Latency-based functional analysis. A less researched area of FAs involves a more distinct type of trial-based FA, called latency-based functional analysis (LBFA). LBFAs measure

the time from the presentation of a specific environmental event to the first occurrence of the target behavior (Bloom et al., 2011). Caregivers may be less likely to reject the idea of a traditional or brief FA when presented with the idea of a LBFA due to this method resulting in fewer problem behaviors during assessment sessions (Caruthers et al., 2015; Thomason-Sassi et al., 2011).

Latency-based functional analysis relies on traditional FA conditions but uses latency as the dependent variable. Specifically, the amount of time between the delivery of the discriminative stimulus and the start of the target behavior is measured, rather than frequency or presence of target behavior, to indicate the strength of target behavior in each condition (Lydon et al., 2012). This type of FA can be used in naturalistic settings and may be appropriate when stakeholders (e.g., administration, teachers, parents) are concerned with the safety or feasibility of the traditional FA process (Lambert et al., 2017). When compared to the traditional FA procedures, latency-based is more feasible in school-based settings for three reasons. First, trial sessions end after the first instance of problem behavior, rather than potentially reinforcing the behavior for 5 to 10 minutes as in a traditional FA (Caruthers et al., 2015). In school, there is a low tolerance for problem behavior (Hansen et al., 2019; Solnick & Ardoin, 2010). Second, in a school-based setting where time is constrained, the LBFA may decrease the amount of time required to conduct a full FA because latency-based sessions end following the first target response (Hansen et al., 2019; Roscoe et al., 2015). Third, difficulties with controlling motivating operations and reinforcing variables in school-settings (e.g., peer attention, adult attention, academic task transitions) for the 5 to 10 minutes per trial necessary for standard analog FA may be difficult (Hansen et al., 2019). Overall, due to the procedures of LBFA, there

is a decreased amount of problem behavior observed in the trials as compared to traditional FAs (Kamlowsky et al., 2021; Lambert et al., 2017; Thomason-Sassi et al., 2011).

FBA in Schools

Functional behavior assessment has become a commonly used practice within the school setting (Anderson et al., 2015). Evaluations of current public-school practices, however, suggest that indirect and descriptive FBA assessment methods are more commonly used, not functional analyses (Blood & Neal 2007; Lloyd et al. 2016; Oliver et al., 2015; Roscoe et al., 2015; Van Acker et al., 2005). FAs conducted in a school setting have the potential to improve the reliability and validity of FBAs in comparison to a clinical setting, particularly as it pertains to ecological validity, which is the measurement of how generalizable experimental findings are to real-world settings (Hanley et al., 2003; Lloyd et al., 2016). For example, within a clinical setting, a student may react differently to a demand or task delivered to them by an unfamiliar person than to a demand or task delivered by a teacher in a classroom setting with whom the student has regular contact. Therefore, those FAs conducted outside of the school setting may lack essential ecological validity and could potentially cause cases of false-negative or false-positive FA results (Lloyd et al., 2016). A school-based FA presents the typical conditions in which the behavior would occur naturally, therefore the outcome of the assessment may produce more valid results than an indirect or descriptive FBA which would ultimately lead to effective interventions (Lloyd et al., 2016).

FAs are rarely implemented in schools by school personnel due to barriers with implementation such as limited time, resources, personnel, and safety risks to the student and staff (Lloyd et al., 2016). Standard FAs can involve complex procedures and several hours of assessment time. Due to this procedural complexity, FAs have historically been implemented by

clinicians or researchers with extensive knowledge and training in FA methods (Lloyd et al., 2016; Lydon et al., 2012; Mueller et al., 2011; Tincani et al., 1999). When FAs are implemented by those with specialized expertise, they can be highly effective. For example, Mueller et al. (2011) discussed 90 FAs conducted in schools but as part of their private business and reported that 90% were successful in identifying the maintaining variables of the target behaviors that ranged from noncompliance and classroom disruption to aggression and self-injurious behavior.

Anderson and colleagues (2015) reviewed 233 articles and aimed to discern best practice guidelines and directions for educators, however, the authors caution that the actual practice of FBAs in schools is substantively different than what is reported in the literature. For example, all the articles utilizing FAs were conducted by researchers in the school setting. The researchers focused on (a) type of FBA used, (b) participants characteristics, (c) settings in which FBAs are commonly conducted, and (d) trends in the use of various methods of FBA over time (Anderson et al., 2015). The findings suggested that non-experimental methods of FBA were valued, often to operationally define the problem behavior or identify the variables included in more rigorous methods of FBA (Anderson et al., 2015). The review indicated that 80% of descriptive methods were preceded by an indirect FBA, while “40.1% of publications reporting functional analysis also reported the results of an indirect FBA and 25.9% reported results of descriptive FBA” (Anderson et al., 2015, p. 364). Thus, while FAs may be considered a gold standard method of determining the function of a behavior, many FAs use additional methods besides experimental procedures.

The rigor of the FBA related to the setting in which the FBA was conducted and the people who worked with the student during the FBA (Anderson et al., 2015). The settings in which the FBAs were conducted was broken up into three classroom settings: isolated, special

education, and combined. The settings were varied by the type of FBA that was being conducted, for example, descriptive FBAs were more likely to be conducted within the classroom setting by teachers and other educators (e.g., general education, special education, or combined), than were the experimental methods (Anderson et al., 2015). Further research is still needed to evaluate the training of those working with the student, controlling conditions within the school setting, and time constraints (Anderson et al., 2015).

Purpose of Current Study

While Anderson et al. (2015) reported that 63.1% of published FBAs conducted in schools included an experimental analysis, they also noted that this percentage is not reflective of actual practice in schools. They note that educators rely primarily on interviews and rating scales to conduct FBAs. The current study contributes to the literature by providing additional evidence for the feasibility of conducting an FA in the classroom setting and the value of including teachers and other school staff in the functional analysis. Specifically, the purpose of this study was to examine the feasibility of conducting an FA within the school setting to determine the function(s) of severe problem behavior.

1. Can a multielement FA be used to infer the function of a student's problem behavior in a public high school setting?
2. Does a multielement FA with standard experimental procedures produce interpretable results when conducted with a severe behavior problem (i.e., aggression and self-injury)?

Method

Participant

The participant was a 15-year-old, Caucasian female with diagnoses of autism spectrum disorder and intellectual disability. For this study we used the pseudonym Rebecca to identify the participant. Rebecca was referred due to concerns of significant problematic behaviors in the school setting. She exhibited problem behaviors pertaining to aggression (i.e., hitting, slapping, kicking, head-butting, throwing objects) and self-injurious behaviors (i.e., biting knuckles, biting arms, head-banging, hitting self). These behaviors were causing concerns in the classroom and for the safety of the students and staff involved. Informed consent from participating parties was obtained after approval from Western Kentucky University's Institutional Review Board (IRB reference number: IRB 21-037).

Materials and Setting

This study was conducted in an empty classroom in a rural public high school in south central Kentucky. This empty room was already being used to de-escalate Rebecca's behaviors since they were often directed towards other students, and it was unsafe for Rebecca to stay in the room with them. The empty classroom was the size of a typical classroom. It was equipped with a computer, speakers, and overhead projector. There were cabinets for storage, a table for a single student to work at, and sensory items such as bean bags, a swing, and mats. There were multiple bins of toys and manipulatives as well. During the FA, there was a therapist, school psychologist, school psychology practicum student, low-incidence consultant, instructional assistant, and special education teacher present. In the empty classroom there was a teacher's desk with a computer that was linked to the overhead projector and an office chair. Behind the desk, there was a large filing cabinet. There was a window next to the teacher's desk with a view

of the staff parking lot. Two student desks with chairs were placed near the entrance of the room facing the wall which had a bulletin board that displayed visuals in the form of picture cards that the participant was learning. In the left corner of the room, there was a large crescent shaped table and three chairs. A black plastic rocking chair, child-sized pop-up tent, and various buckets and baskets of sensory toys were in the room as well.

For the free operant preference assessment, a paper form was used to collect data, along with a clipboard, timer and pencils. Rebecca had access to a large bouncing ball, an Easter bucket, and various blocks and small toys within a toy bin.

For the FA, a computer was used to videorecord the assessment. The assessment was recorded via Zoom with an additional therapist online to assist in the data collection and provide support to the in-person therapist and school team. The therapist used a timer to dictate the number of minutes that had elapsed during the trials. A data collection sheet was provided to the school psychologist as well as the virtual therapist to collect the frequency of problem behaviors Rebecca was exhibiting throughout the different conditions for clinical decision-making. The assessment results were then uploaded to OneDrive, a Microsoft data sharing platform.

Experimental Sequence and Design

Functional Analysis

A multielement functional analysis design was conducted and compared Rebecca's behavior during each of the following conditions: play (control), tangible (food), escape, and attention. A fixed condition sequence facilitates differential responding during multielement FAs by capitalizing on or limiting sequence effects (Hammond et al., 2013; Iwata et al., 1994). Experimental conditions during the fixed sequence were conducted in the following order: play (control), tangible (food), escape, and attention.

Data Collection

Data Collection System. Data collectors used Countee to collect data (Peic-Gavran, 2020). This app is a data collection application for direct observation data. It allows for the collection of timed-event recording data. Data collectors were trained using training videos prior to coding the current study data. Once the collector coded the training videos with at least 80% reliability to the master code file across dependent variables for three sessions, they moved onto coding the session videos. Interobserver agreement (IOA) was not collected.

Dependent Variables

The dependent variables were aggression and self-injury behaviors. *Aggression* is defined as the forceful contact between the participant's body and another person or object from a distance of 6 inches or more or harming others (i.e., hitting, slapping, kicking, head-butting). *Self-injury* is defined as forceful contact with participant's body from a distance of three inches or greater; harming self (i.e., biting knuckles, biting arms, head-banging, hitting self). Data were recorded on aggression and self-injury separately but combined for assessing the function of the behaviors.

Procedures

Free Operant Preference Assessment (FOPA). The purpose of the FOPA was to inform the research team on items to be used in the FA and potentially during the intervention. This information is then compared to the amount of time in which the student engaged with other items or in other activities. Before the beginning of the first session, a FOPA was conducted and lasted 5 minutes. Items that the student had regular and preferred engagement with were listed 1 through 10. Data were recorded using 10-second momentary time sampling procedures. The data collector circled the number of the item that the student engaged with at the moment the timer

sounded every 10 seconds. The data collector would circle “none” if the student did not engage with any items when the timer sounded. The number of intervals where engagement with each item was then added and reported. The results of the FOPA indicated that the blocks were Rebecca’s preferred items.

Teacher Interview. An open-ended functional assessment interview was adapted from Hanley (2012) and used to interview Rebecca’s special education teacher before conducting the functional analysis. Appendix A shows the adapted interview form. The purpose of this interview was to gain insight from the staff member that engaged with Rebecca on a daily basis and determine the events that occurred before, during, and after the problem behavior. By conducting this interview, the therapist was able to make predictions as to which conditions would need to be assessed and in what capacity for the functional analysis. Background information was collected as it pertained to chronological age, gender, language abilities, play skills/preferred activities, and preferred leisure items. As it pertained to language abilities, Rebecca used cards as a form of communication, but rarely used them independently. When prompted, Rebecca would touch the card that represented “oatmeal” or during the use of discrete trial training she would touch one of the two cards presented. Rebecca’s teacher reports that blocks are her preferred toy, she enjoys taking walks down the hall and likes to lay on the ground while playing with toys. Specifically, Rebeca enjoyed holding toys up in the air, letting them drop, and listening to the sound they made by pressing her ear against the floor. Rebecca’s teacher indicated that sometimes Rebecca becomes upset on her walks and can become aggressive. The second part of the interview asks questions intended to inform hypotheses about the function of the target behaviors. Rebecca’s teacher identified Rebecca’s problem behaviors as aggression and self-injurious behaviors. Rebecca’s teacher reported that the school staff

typically reacted or responded to problem behavior by using time-out and reminding Rebecca to use “nice hands.” Rebecca’s teacher reported that her educational goals pertained to identifying numbers, shapes, and matching tasks.

Functional Analysis

The purpose of the functional analysis was to determine the function(s) of the student’s behaviors (e.g., escape, attention, tangible). Each FA session lasted 5 minutes. During a play condition designed to serve as a control condition, the goal was to create a situation in which problem behavior should not occur. That is, Rebecca had continuous access to highly preferred items and highly preferred attention without presenting demands. The consequence for problem behavior in the play condition was that the therapist ignored the problem behavior.

The tangible condition assessed whether the student would engage in problem behavior to access preferred food. The student was given food (i.e., applesauce and oatmeal cream pies) in small bites contingent on the problem behavior. The therapist responded to any bids for attention and provided attention at least once every 30 seconds.

The escape condition assessed whether the student engages in problem behavior to escape academic tasks (using teacher provided academic materials). During the escape condition, if Rebecca did not comply with the demand the therapist would continue to prompt. A new prompt was given when Rebecca complied. The therapist would model the task when Rebecca did not comply. This sequence was repeated until Rebecca engaged in target behavior. If Rebecca engaged in problem behavior, the therapist would say “okay, you can take a break,” or “okay, you don’t have to,” and walk away.

In the attention condition, Rebecca had access to neutral items in the room (e.g., toys, sensory items, activity folders). When Rebecca would bring the items to an adult in the room or

attempt to get that adult's attention the adult would reply, "I need to do some work." and would continue to ignore Rebecca. The target behavior would be reinforced with 30 seconds of therapist attention contingent on the occurrence of problem behavior, such as walking around the room holding her hand, saying, "nice hands," or interacting with her with her preferred items.

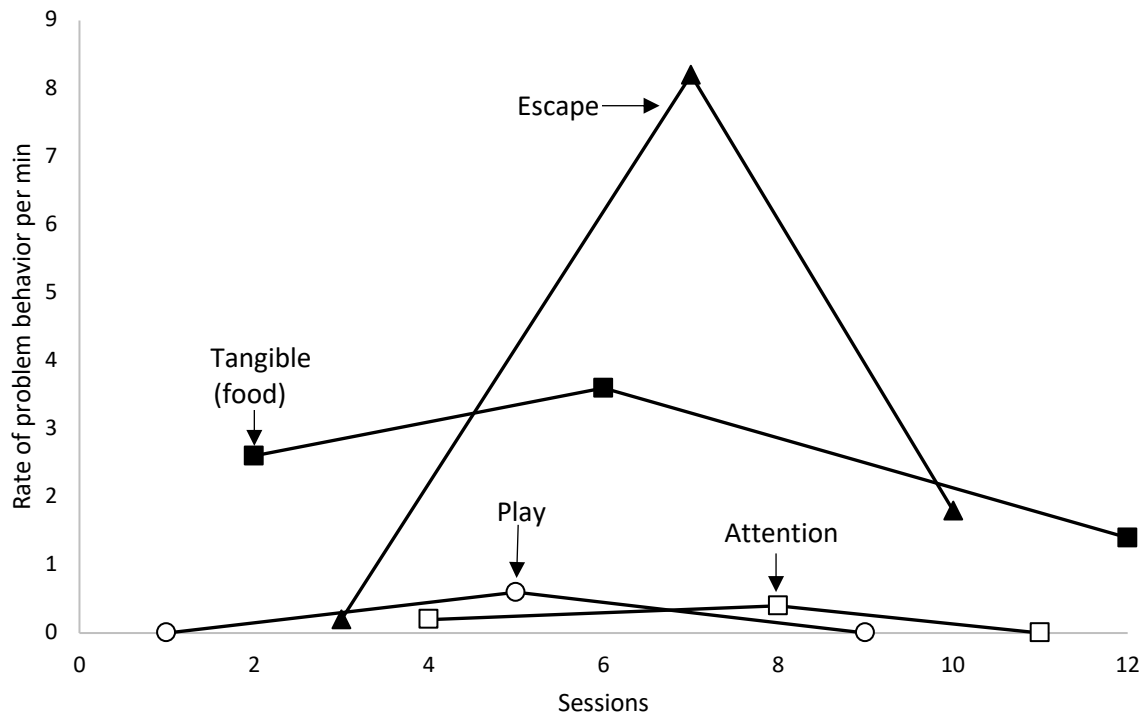
The function analysis was terminated when a minimum of three series of FA conditions occurred along with one of the following criteria: (a) three consecutive test sessions with higher rates of target behavior than the play condition, (b) three of four test sessions with higher rates of target behavior than the play condition, or (c) an increasing trend in target behavior across three consecutive test sessions. Outside of the context of the study, the research team developed a function-based intervention based on the results.

Results

Criteria for discontinuing the FA were met after conducting three sessions of each condition (i.e., escape, tangible, attention, control). Higher rates of the target behavior occurred in two conditions relative to the control condition. Specifically, the results of the functional analysis showed the level of the target behavior was high in the escape from academic demands and access to food items (tangible) conditions relative to the control condition, suggesting the functions were both escape and tangible (see Figure 1). In the attention condition, the level of target behavior was low and at a similar level as the control condition.

Figure 1

Functional Analysis of All Problem Behavior



Discussion

This study sought to answer the following research questions: (1) Can a multielement FA be used to infer the function of a student's problem behavior in a public high school setting and (2) Does a multielement FA with standard experimental procedures produce interpretable results when conducted with a severe behavior problem (i.e., aggression and self-injury)? Related to the first research question, the function of the student's behavior was inferred as escape from academic demands and access to food (tangible). Target behaviors in the escape condition were at a high level in comparison to the play (control) condition indicating that the function of the target behaviors was maintained by escape from demands. Rebecca also engaged in a high level of target behavior in the tangible condition compared to the control condition. Thus, a second function of her target behaviors was to gain access to preferred food items.

Related to the second research question, researchers found that due to the school having access to a research team to conduct the FA, standard procedures were followed and recreated within the school environment and with staff the student regularly engaged. The empty classroom used for the FA, however, did not include additional students and staff as Rebecca typically experiences on a day-to-day. Still, it was a natural environment with which the student was familiar. Conducting the FA at her school may have contributed to more accurate results than a clinical setting due to the familiarity of the setting for the student. Even though the student exhibited severe problem behaviors, the controlled conditions created by the research team were able to produce interpretable results.

For the current study, a research team was available to come into the school setting and conduct this FA. In a public-school setting, the persons responsible for conducting a functional analysis are typically classroom teachers and behavior specialists (Lloyd et al., 2022). A

potential concern for the school team implementing the FA without the research team's assistance could be carry-over effects. Carry-over effect happens when a behavior is "carried over" from one experimental condition to the next. For example, if a student engages in the target behavior in the tangible condition and does not have enough time to de-escalate before beginning the attention session, teachers could interpret that the function of the behavior is both tangible and attention. Due to observing the target behavior within both conditions. Another concern is time constraints, as it may not be feasible for a classroom teacher to take a minimum of 90 minutes out of their day to complete a functional analysis. The teachers and behavioral specialist may be overwhelmed with the requirements of doing an FA or have additional school-responsibilities that would compete with completing an FA.

It is likely that if the research team had not implemented the FA for Rebecca, a descriptive or indirect FBA may have occurred with the help of the school psychologist and classroom teacher. A descriptive or indirect FBA might result in a hypothesis about the function of her behavior but would lack the experimental control to demonstrate it was the actual function. For example, if ABC data was used to collect information on Rebecca's behaviors the hypothesized function may have been identified as accessing attention. Due to Rebecca's behaviors being de-escalated by attention and attention being incorporated within other functions. Lastly, ensuring the safety of all parties involved. Due to the severity of Rebecca's behaviors, the FA was conducted within an empty classroom to ensure the other students in Rebecca's class were kept safe from the aggressive behaviors solicited by the FA. Rebecca was aggressive to staff in the room, and they were instructed to hold their arms up to block their faces at those times. Overall, the addition of the research team resulted in interpretable functions of Rebecca's problem behaviors due to the structure and controlled conditions of the FA.

Limitations

Two potential threats to internal validity should be noted. One, the researchers did not collect treatment fidelity data. The collection of treatment fidelity data can be crucial to interpretation and in this case outcomes of the proposed intervention (Capin et al., 2018). Not having data to support that the FA was conducted with fidelity can cause uncertainty pertaining to the interpretation of the results. It is possible that the results were found based on the set-up of the procedures or other environmental factors. Second, the researchers did not collect IOA, and this could affect the way the functional relationship is interpreted. For example, if a researcher had a bias that there would not be any instances of problem behavior in the attention condition, they may not code the instances correctly or at all. Therefore, having additional raters to collect IOA would have been ideal.

Future Directions

The results of the current study suggest the following potential avenues for future research: (a) further training of educators as it pertains to FA procedures and how to apply them within the school setting and (b) which school-based staff is best fit for implementation. Lloyd et al.'s 2016 study found that only 14 of the 39 studies in their review (35.9%) included procedures for the school-based implementers to follow. Additionally, only eight of the 39 studies reported whether implementers had previously conducted a functional assessment, while six reported to have no previous experience (Lloyd et al., 2016).

Creating a framework for school personnel to follow and evaluating that framework could be highly beneficial to the literature and practice of FA procedures within the school setting. Lloyd and colleagues (2022) piloted a decision tool pertaining to the individualization of

hypothesis testing for students with more challenging behaviors and encourage more collaborative planning. Educators may find themselves overwhelmed when choosing a best-fit strategy for their particular student and although hypothesis testing has been shown to be promising, there is no existing framework to guide them in this process (Lloyd et al., 2022). Through their research, Lloyd et al. (2022) found that this decision tool was successful in prioritizing safety and efficiency, confirming one or more hypothesis on the first or second attempt, and was socially valid. Piloting this decision tool on a larger scale may assist in the further implementation of standard FA procedures within a school setting.

Overall, it was determined that a multielement FA was useful to determine the function of a student's severe problem behavior. This study occurred within a natural setting which may have contributed to obtaining valid results. However, the availability of a highly trained research team is not something every school has available. Thus, additional research is needed on assisting school personnel to conduct FAs themselves.

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Appendix A

Teacher Interview Protocol

| | | |
|-----------------|-------|-------------|
| Participant ID: | Date: | Respondent: |
|-----------------|-------|-------------|

Participant Demographics

| | |
|------------------|-------------------------|
| Age: | DOB: |
| Male/Female | SPED classification(s): |
| Other diagnoses: | |

Background Information

1. Describe their language abilities.
2. Describe their play skills and preferred toys or leisure activities.
3. What else do they prefer?

Functional Assessment Interview

1. What are the problem behaviors? What do they look like?
2. How often does it happen and how long does it typically last?
3. Do the different types of problem behavior tend to occur in bursts or clusters and/or does any type of problem behavior typically precede another type of problem behavior (e.g., yells preceding hits)? (or: Are there any warning behaviors that precede it?)
4. Under what conditions or situations are the problem behaviors most likely to occur? Or, do the problem behaviors reliably occur during any particular activities? Or, what seems to trigger the problem behavior?
5. Does problem behavior occur when you break routines or interrupt activities? If so, describe.
6. Does the problem behavior occur when it appears that he/she won't get his/her way? If so, describe the things that the child often attempts to control.
7. How do adults and peers react or respond to the problem behavior?
8. What do you and others do to calm him/her down once he/she engaged in the problem behavior?

9. What do you and others do to distract him/her from engaging in the problem behavior?
10. What do you think he/she is trying to communicate with his/her problem behavior, if anything?
11. If I could give you a million dollars to make the problem behavior start right now, what would you do? What are the things you avoid saying and doing because you know it will lead to problem behavior?
12. If I could pay you a million dollars to make the problem behavior stop right now, what would you do?
13. What strategies have already been attempted? Were they effective? Why or why not?

Academic Background Information

1. What is the student's current level of academic functioning?
2. What are some current educational goals?
3. In what areas of instruction does the student most need additional behavioral support?

Note. Teacher Interview Protocol adapted from Hanley (2012).

Appendix B

WKU Institutional Review Board Approval



*INSTITUTIONAL REVIEW BOARD
OFFICE OF RESEARCH INTEGRITY*

DATE: October 1, 2020

TO: Jessica Torelli, Ph.D.
FROM: Western Kentucky University (WKU) IRB

PROJECT TITLE: [1646829-2] Classroom-based Behavioral Assessments and Interventions to Support Students and Teachers

REFERENCE #: IRB 21-037

SUBMISSION TYPE: New Project

ACTION: APPROVED

APPROVAL DATE: October 1, 2020

EXPIRATION DATE: September 30, 2021

REVIEW TYPE: Full Committee Review

Thank you for your submission of Revision materials for this project. The Western Kentucky University (WKU) IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a project design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Full Committee Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding followed by a *signed/implied* consent form. Informed consent must continue throughout the project via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All UNANTICIPATED PROBLEMS involving risks to subjects or others and SERIOUS and UNEXPECTED adverse events must be reported promptly to this office. Please use the appropriate reporting forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

All NON-COMPLIANCE issues or COMPLAINTS regarding this project must be reported promptly to this office.

This project has been determined to be a MINIMAL RISK project. Based on the risks, this project requires continuing review by this committee on an annual basis. Please use the appropriate forms for this procedure. Your documentation for continuing review must be received with sufficient time for review and continued approval before the expiration date of September 30, 2021.

Please note that all research records must be retained for a minimum of three years after the completion of the project.

If you have any questions, please contact Robin Pyles at (270) 745-3360 or irb@wku.edu. Please include your project title and reference number in all correspondence with this committee.

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Type of document: ['Specialist Project']

Title: Applying a Functional Analysis in a School Setting

Keywords (3-5 keywords not included in the title that uniquely describe content): functional behavior assessment, challenging behavior, trial based

Committee Chair: Carl Myers, Ph.D.

Additional Committee Members: Jessica Torelli, Ph.D., BCBA-D Christina Noel, Ph.D., BCBA-D

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