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The Effects of Presession Conditions on Behavior During a Brief Functional Analysis

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by

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Abstract

Title: The Effects of Presession Conditions on Behavior During a Brief Functional Analysis

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Previous research has demonstrated that patterns of responding during a no-interaction condition of a functional analysis (FA) may predict FA outcomes. Thus, behavior analysts may use an initial no-interaction condition to identify problem behavior maintained by social reinforcement when time and resources are limited. However, in a clinic setting, most functional analyses are conducted in between or immediately after instructional sessions or structured play. Therefore, the proposed study was designed to examine the differential effects of presession conditions of naturally occurring activities (work versus play) at a clinic setting during a modified brief functional analysis. Results showed that presession conditions did not affect rates of responding for behaviors maintained by automatic reinforcement. Implications and future directions are discussed.

Keywords: autism, brief functional analysis, motivating operations, establishing operations, no-interaction condition, presession effects.

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Chapter 1: Introduction

Functional behavior assessment (FBA) is an assessment procedure designed to gather information about the function of problem behavior. The four types of FBA are indirect methods, descriptive assessment, structural analysis, and an experimental analysis, or functional analysis (FA). Indirect methods use structured interviews, checklists, rating scales, or questionnaires to obtain information from staff members and caregivers about the function of the behavior. A descriptive assessment includes direct observation of the target behavior in the natural setting. Antecedent, Behavior, and Consequence (ABC) continuous recording, ABC narrative recording, and scatterplots are all examples of descriptive assessment methods. In a structural analysis, antecedents are arranged so that their effects on problem behavior can be examined. In an experimental analysis, or FA, antecedents and consequences are systematically manipulated to identify the function(s) of the behavior. Overall, an FBA allows practitioners to develop a hypothesis about the function of the behavior. However, due to their manipulation of environmental conditions, FAs in particular most accurately identify the reinforcers maintaining problem behavior. Therefore, most published articles (71 of 91) on FBA reviewed by Hanley et al. (2003) opted for an FA.

An FA involves manipulating environmental conditions to identify which condition(s) evoke and maintain problem behavior. FAs have been considered the gold-standard method for assessment of behavioral excesses in applied behavior analysis (ABA) research and have been extended and replicated in over 2,000 studies since their introduction by Iwata et al. (1982/1994) (Beavers et al., 2013). Although the *Journal of Applied Behavior Analysis* has published the majority of FA studies, FA research has been included in numerous other journals (e.g., *Education and Treatment of Children, Behavioral Interventions, School Psychology Review*). Furthermore, the inclusion of FA research in other journals has increased by almost 20% since the 1980s, suggesting widespread use of FA throughout ABA and related fields (Beavers et al., 2013).

The purpose of FAs and FBAs more broadly is to identify the function of a problem behavior, such as self-injury, aggression, or property destruction (although they have also been used to assess the function of appropriate behavior; Lerman et al., 2005). Problem behaviors can serve four functions: social positive reinforcement, social negative

reinforcement, automatic positive reinforcement, and automatic negative reinforcement. Social positive reinforcement often takes the form of access to attention from others (e.g., shouting so others will turn around), or access to tangible items. Social negative reinforcement often involves the termination or postponement of an aversive event (e.g., running away to avoid demands from a teacher). Both types of reinforcement are socially mediated in that the consequences are delivered by another person. In contrast, behaviors maintained by automatic reinforcement occur independent of social consequences. Automatic positive reinforcement directly produces reinforcement (e.g., physical stimulation from mouthing body parts), whereas automatic negative reinforcement directly terminates an aversive stimulus (e.g., intense scratching to alleviate an itch).

Practitioners often use the results of an FA to successfully implement interventions in clinical and residential settings (Hanley et al., 2003). For instance, functional communication training (FCT) is an effective and widely used intervention for severe problem behaviors (Tiger et al., 2008). Vollmer and Vorndran (1998) provide an example of the successful implementation of FCT using functional reinforcers. These researchers examined self-injurious behavior (SIB) maintained by access to self-restraint materials. The results of their FA determined the individual's SIB was maintained by access to restraint materials (i.e., a leather jacket). The individual was then taught to appropriately mand (i.e., brushing motion with fingers down the chest area) for the leather jacket. The treatment evaluation showed that not only did SIB decrease, but the individual was also able to appropriately mand for more appropriate indoor attire (i.e., a cardigan).

Treatments based on FA results have also been implemented in schools and with different populations. School psychologists are often asked to assist with classroom-based interventions for disruptive behaviors with students diagnosed with ADHD (Vollmer & Northup, 1996). Unfortunately, classroom-based interventions such as providing reprimands, timeouts, and "planned ignoring" are often implemented without first accurately identifying the function of the behavior (Vollmer & Northup, 1996). As a result, such classroom-based interventions may inadvertently increase the occurrence of problem behavior through positive or negative reinforcement. The interventions may also be irrelevant to the function of behavior or fail to identify additional sources of reinforcement for more appropriate behavior (Vollmer & Northup, 1996).

Greer et al. (2013) conducted FAs with four typically developing children in a preschool classroom and evaluated treatments based on FA results. The children engaged in high levels of problem behaviors such as aggression and property destruction. Results of the FA demonstrated that problem behavior was maintained by attention for all children and was multiply controlled for one child (access to attention and tangible items). Treatment first consisted of presession statements of session contingencies describing the correct and incorrect responses to facilitate discrimination and to model the alternative response (mand). A differential reinforcement of alternative behavior (DRA) plus extinction procedure as well as a DRA plus time-out procedure were then implemented. Although results showed that DRA plus extinction was ineffective, DRA plus time-out was effective in reducing problem behavior and increasing appropriate alternative behavior. Overall, Greer et al. (2013) demonstrated the use of a successful intervention in typically developing school children based on the results of an FA.

FA Variations

Despite the important treatment implications of FAs, several limitations have led to the development of variations of FAs. One limitation is the risk posed by severe problem behaviors (Iwata & Dozier, 2008). For potentially dangerous behavior, a latency-based FA may be used as it measures the latency to the first response instead of repeated occurrences of behavior (Iwata & Dozier, 2008). Thomason-Sassi et al. (2011) compared the results of latency FAs to results of standard FAs in ten individuals diagnosed with developmental disabilities. Results demonstrated a correspondence between latency and standard analysis data in nine out of 10 comparisons. Therefore, Thomas-Sassi et al. (2011) demonstrated an alternative method of assessment for practitioners and researchers when the target behavior is too harmful to reoccur.

A second potential limitation of FAs is the difficulty involved in conducting assessments in a controlled environment (Iwata & Dozier, 2008). A trial-based FA, which can be conducted in the natural environment, may be used when there are concerns over the limited control of environmental conditions (Iwata & Dozier, 2008). Traditionally, trial-based FAs include a series of probes with trials consisting of a 1-minute test condition followed by a 1-minute control condition (Sigafoos & Saggers, 1995). Bloom et at. (2011) compared the results of trial-based FAs to those of standard FAs in 10 students at two schools for children with developmental disabilities. A series of assessment trials were

interspersed throughout classroom activities (i.e., tangible and attention trials during free time, demand trials during work periods). However, instead of 1-minute test and control conditions, Bloom et al. (2011) conducted three 2-minute trials consisting of a control condition followed by a test and control again. The authors then conducted standard FAs arranged in a multielement design. Results of the two FAs revealed correspondence in 6 out of the 10 assessments, suggesting that conducting a trial-based FA may be sufficient when a standard FA is not feasible.

A third potential limitation is time constraints. It is important to use a method of assessment that is efficient and accurate in clinical settings due to low service hours, limited resources, and the need to start treatment as soon as possible. Northup et al. (1991) provided a solution to this by conducting a brief functional analysis (BFA). The BFA consisted of 5-to-10-minute test and control conditions with a brief 1-to-2-minute break in between each session. Conditions in which problem behavior occurred were then repeated. Results of the study demonstrated a specific maintaining contingency for each participant. Furthermore, the researchers were able to conduct an entire assessment in 90 minutes or less. Although Northup et al. (1991) demonstrated the feasibility of conducting a BFA, Derby et al. (1992) found correspondence between the BFA and the standard FA in only 66% of cases. Furthermore, only 63% of BFAs evoked problem behavior. Therefore, although the BFA is a time-efficient assessment, the limited number and duration of sessions in a BFA may make it best suited for clients who exhibit high frequency problem behavior.

Vollmer et al. (1995) proposed a progressive model of FA that begins with a brief analysis followed by the addition of extended analyses as needed. The progressive model moves through four phases of assessment with the first phase being a BFA. If the BFA produces undifferentiated results, then the researchers suggested moving on to a full standard FA in phase 2. If the full FA yields undifferentiated results, the researchers proposed an extended no-interaction condition in phase 3 to rule out social consequences as the maintaining variable. In the final phase, if it has been determined that the behavior is not maintained by automatic reinforcement, a reversal design including the socially mediated reinforcers can be conducted. The authors evaluated this model with 20 children who exhibited problem behaviors including self-injury, aggression, stereotypy, and tantrums. Six participants completed the assessment in phase 1, four additional participants

completed the assessment in phase 2, five participants in phase 3, and two in phase 4. Thus, results of Vollmer et al. (1995) demonstrated a clear pattern of responses in 17 out of the 22 cases using this progressive model.

Roscoe et al. (2013) examined an alternative FA model for a specific behavior. The researchers hypothesized that the target behavior, hand-mouthing, was maintained by automatic reinforcement. Therefore, they arranged FA conditions in a 2:1 ratio of no-interaction or alone to demand and attention conditions in the first assessment phase. If results of the FA were undifferentiated, the researchers alternated the condition with highest levels of problem behavior with a play condition in a 1:1 ratio in the second assessment phase. Results of Roscoe et al. (2013) revealed that hand-mouthing was maintained by automatic reinforcement in 98.4% of the cases (all but one case). More specifically, only 72% of the FAs required the initial assessment phase of the no-interaction or alone condition, suggesting that a single exposure to an alone or no-interaction condition may be sufficient to identify automatically maintained problem behavior.

Querim et al. (2013) evaluated the use of brief alone or no-interaction conditions as a screening procedure for problem behavior maintained by automatic reinforcement. The researchers conducted an initial screening of alone or no-interaction conditions and then a subsequent full FA to determine if the initial screening assessment can predict FA results and if behavior maintained by automatic reinforcement produced a more consistent pattern of responding during the screening sessions compared to behaviors maintained by social reinforcement. The researchers were able to accurately predict that problem behavior was maintained by automatic reinforcement or socially mediated reinforcement in 28 out of 30 cases during screening. Furthermore, the researchers identified patterns of responding in the no-interaction screening assessment that indicated problem behavior may be more likely to be maintained by one type of social reinforcer versus another. For instance, two participants whose behavior was maintained by attention demonstrated low or decreasing rates of problem behavior during the screening. Participants whose behavior was maintained by escape did not engage in problem behavior during the screening, possibly due to the absence of an establishing operation for escape. Therefore, based on the results of Querim et al. (2013), the no-interaction or alone screening assessment may be sufficient

to predict problem behavior maintained by automatic reinforcement, thus, reducing the number of subsequent test conditions.

Henry et al. (2021) added to Vollmer et al.'s (1995) progressive model. Based on results of Querim et al. (2013), one update to the model included the use of a no-interaction or alone condition to screen for an automatic reinforcement function in phase 1. Additionally, since the publication of Vollmer et al. (1995), several other studies have provided recommendations on ways to refine brief FAs to better obtain differentiated results. Schlichenmeyer et al. (2013) provide a summary of idiosyncratic modifications that have been included in FAs. Henry et al. (2021) included several methodological refinements including fixed reinforcement times across all test conditions from Fisher et al. (1996), a discriminative stimulus for each test condition from Conners et al. (2000), and a fixed condition sequence from Hammond et al. (2013). Henry et al. (2021) obtained differentiated results in 100% of participants with their updated model. Specifically, 40% of participants persistently engaged in problem behavior during the no-interaction and alone screening conditions in phase 1. After those participants progressed to the following phases, automatic reinforcement was confirmed to be the maintaining variable. Therefore, results of Henry et al. (2021) were consistent with Querim et al. (2013), suggesting that for behaviors maintained by automatic reinforcement, conducting an initial no-interaction or alone condition prior to a conducting a BFA or standard FA may allow for treatment implementation more quickly.

Slanzi et al. (2022) extended Querim et al. (2013) and Henry et al. (2021) with 20 children diagnosed with ASD ranging from 3 to 7 years in age. The researchers began their assessments with a no-interaction condition, developed three hypotheses based on the patterns of responding in the no-interaction condition, and then followed with a modified BFA. Their hypotheses, which stemmed from the results and FA outcomes of Querim et al. (2013), guided their selection of test and control conditions in their modified BFA. First, the authors hypothesized that problem behavior was maintained by automatic reinforcement if it occurred at a constant level throughout the entire no-interaction condition. Therefore, if problem behavior occurred throughout the session, each condition (attention, tangible, escape) was included followed by a second 5-minute no-interaction condition. Second, the authors hypothesized that problem behavior was maintained by attention if the behavior initially occurred but then decreased (due to attention extinction).

If problem behavior occurred but decreased over the course of the session, an attention condition was included. An escape condition was also included to rule out escape as a function. Third, the authors hypothesized that if problem behavior did not occur at all, it was either maintained by escape due to the absence of an establishing operation for escape, or it was maintained by access to tangibles due to the absence of a discriminative stimulus for tangible items. Therefore, if no problem behavior occurred during the session, an escape condition was conducted. A tangible condition was also added if the target behavior did not occur during the escape condition or if there was a possible tangible function based on observations and staff reports. Additionally, as in Henry et al. (2021), the researchers included methodological refinements to their BFA to increase its efficacy. Such modifications included divided attention (Fahmie et al., 2013), individualized instructional demands based on observations (Roscoe et al., 2009), and ritualistic play and item arranging (Hausman et al., 2009; Rodriguez et al., 2012). Overall, Slanzi et al. (2022) obtained differentiated results in 95% of their assessments (21 out of 22) based on their hypotheses and modified BFA. More importantly, the average time for the completion of all assessments was 47 min, and all were completed within 70 min. Therefore, the BFA model proposed by Slanzi et al. (2022) may be useful for practitioners with limited time and resources.

Although the use of an initial no-interaction condition to guide further assessments is time-efficient and effective, Slanzi et al. (2022) mentioned several limitations with the no-interaction condition itself. First, placing a behavior on attention extinction or response blocking (for attention-maintained behavior) in a no-interaction condition may not be possible if the topography of the problem behavior is too harmful to the client or to others. If attention extinction or response blocking is not possible, the client may exhibit high rates of problem behavior throughout the no-interaction condition, resulting in response patterns more indicative of automatic reinforcement. Second, some problem behaviors may still occur in the absence of some discriminative stimuli based on the client's learning history or skill set. For instance, a client whose problem behavior is maintained by access to tangibles may still mand for items without the presence of the items or a client who has attention-maintained behavior may still engage in the problem behavior in the absence of an adult. Therefore, the researchers suggest future research examine the effects of

establishing operations (EOs) on patterns of responding in a no-interaction condition, as EOs have been shown to affect rates of problem behavior (O'Reilly et al., 2007).

Effects of Presession Conditions on FA Outcomes

Michael (1982) originally intended the term establishing operation (EO) to be short for "establishing or abolishing." However, by not differentiating between establishing or abolishing effects, the term EO failed to describe the two different effects of motivating operations (MOs). Laraway et al. (2003) further refined the concept of establishing operations by replacing it with the term MOs. More specifically, MOs were described as antecedent events that have either a value-altering effect or a behavior-altering effect. A value-altering occurs when the reinforcing or punishing value of a consequence is altered by an antecedent event. A behavior-altering effect occurs when the effectiveness of a reinforcer on a dimension of the behavior (i.e., frequency, response latency, magnitude) is changed by the same motivating operation that maintained the current dimension of the behavior. The term establishing operation (EO) refers to the stimulus or event which increases the value of the consequence (i.e., reinforcer-establishing effect), whereas an abolishing operation (AO) refers to a stimulus or event which decreases the value of the consequence (i.e., evocative effect). For example, a cookie is more valuable and is established as an effective reinforcer for a child after he/she has not had snacks all day (i.e., deprivation). In contrast, when the child has had snacks all day (i.e., satiation), the cookie is no longer valuable (i.e., its value abolished). An EO producing a behavior-altering effect increases the frequency of a behavior, whereas an AO decreases the frequency of the behavior. Taking the cookie example, the child is more likely to display behaviors that have been associated with receiving a cookie in the past (i.e., asking for a cookie) after not having snacks all day. However, the likelihood of the child displaying the behavior of asking for a cookie abates if he/she has had snacks all day.

Several studies have looked at the effects of MOs on the frequency of problem behavior in FAs. O'Reilly et al. (1999) examined the influence of presession attention versus no attention prior to an FA on rates of problem behavior in a 20-year-old male with severe intellectual disability. The first phase of the study consisted of an FA on yelling and head hitting. Results of the FA demonstrated that both behaviors were maintained by attention. The second phase of the study involved the delivery of high levels of attention on a fixed-time 30-s schedule for 1 hour and no attention for 1 hour prior to conducting an

analogue attention condition. Results of the second part of the study revealed that higher levels of head hitting occurred in the analogue attention condition when attention was withheld prior to the assessment compared to when the participant received high levels of presession attention. Therefore, an enriched environment may reduce the probability of severe problem behaviors.

O'Reilly et al. (2006) evaluated a three-phase methodology to isolate the evocative and abative effects of an EO on problem behavior maintained by attention. First, the authors conducted an FA with a 20-year-old male who engaged in bizarre speech and elopement. Second, results of an FA with presessions of continuous access to attention versus no attention were examined. Third, prior access to attention was again systematically controlled, however problem behavior was placed on extinction. Results revealed no prior access to attention appeared to function as an EO during the FA sessions and when the behavior was placed on extinction. Prior access to attention had an abative effect during extinction sessions.

Extending on the previous study, O'Reilly et al. (2007) examined the effects of presession levels of continuous attention versus no attention during alone and attention-extinction conditions with the same participant. The alone condition served to provide no reinforcement without a discriminative stimulus and the attention-extinction condition served to provide a discriminative stimulus while withholding reinforcement. Results showed that problem behavior occurred at lower levels during both conditions with prior exposure to continuous access to attention. Therefore, results of O'Reilly et al. (2007) demonstrated that MOs (i.e., prior exposure to attention versus no attention) can influence rates of responding when there are no discriminative stimuli or reinforcing consequences (a behavior-altering effect).

Roantree and Kennedy (2006) examined the effects of presession attention on the frequency of stereotypy in a child with severe disabilities. In an A-B-A reversal design, the researchers conducted an initial FA with no prior access to attention. A second FA was conducted with prior access to noncontingent attention for 20 minutes followed by a return to baseline. The initial FA and the return to baseline yielded undifferentiated results. However, high levels of problem behavior were observed after the presession condition of noncontingent attention. Therefore, unlike most studies in which results revealed that presession attention served as an AO, results of the study demonstrated presession

noncontingent attention served as an EO. Results of the study suggest that presession manipulations may be helpful to identify the function of the problem behavior when results of an initial FA yield undifferentiated data and presession attention may serve as an AO or an EO depending on the type of problem behavior.

Previous studies have shown an effect of presession attention on the occurrence of problem behavior in FAs. However, these studies have examined the effects of presession manipulations on behavior maintained by attention. McComas et al. (2003) examined the effects of presession attention on the occurrence of problem behavior maintained by attention and escape for 5 children with developmental and learning disorders. Before conducting an FA for behavior maintained by attention, the researchers provided the participants instructions to complete an independent work of their choice with no social interaction contingent on the occurrence of problem behavior or 10 minutes of continuous social interaction. The procedures for problem behavior maintained by escape were similar except the researchers instructed the participants to work on a specific academic task and 10 seconds of escape was provided contingent on the occurrence of problem behavior. Results revealed that presession attention served as an AO for attention-maintained problem behavior. However, presession attention did not affect the occurrence of escape-maintained problem behavior.

Previous studies have all included prior access versus no access to a specific variable maintaining the problem behavior (e.g., prior access to attention for attention-maintained behavior). However, no studies have examined the effects of prior exposure to naturally occurring activities on the occurrences of problem behavior. Results from Slanzi et al. (2022) have demonstrated that their BFA model may be sufficient for practitioners to use in a clinic setting with young children with ASD. However, in a clinical setting, FAs may often be conducted in between a client's session or immediately after. Therefore, it is beneficial to examine the effects of prior exposure to naturally occurring session activities on responses of problem behavior in an FA. Such naturally occurring activities may include a regular work session in which demands are placed (i.e., discrete trial teaching) or a play session. By examining the effects of such presession conditions, researchers may be able to recommend that practitioners schedule daily activities accordingly prior to exposing clients to an FA, which may provide more accurate results.

Therefore, the purpose of the study was to evaluate the effects of presession work periods versus play periods on patterns of responding during a modified BFA. The modified BFA assessment involved developing hypotheses based on the patterns of responding in the no-interaction screening condition and using the hypotheses to select test and control conditions. We chose to conduct this assessment as opposed to other time-efficient assessments because it presented an efficient methodology to screen for automatic reinforcement as well as socially mediated reinforcers. We ran the assessment after each presession condition (work versus play) twice to demonstrate experimental control. Instead of exposing participants to continuous access or no access to a specific variable maintaining the problem behavior, participants were exposed to structured naturally occurring activities (i.e., work and play) during presession conditions. Finally, we examined the data to identify differences in patterns of responding during the modified BFA based on presession variations.

Chapter 2: Method

Participants and Setting

Participants included two children, ages 3 and 5 years, diagnosed with autism spectrum disorder (ASD). Both attended a center providing early intensive behavioral intervention (EIBI) services and exhibited problem behavior that was harmful or interfered with skill acquisition. Children with a high intensity, low frequency of problem behavior were not included, as it is unlikely that their target behavior would occur in the BFA (Kahng et al., 2001). Although the arrangement of the session rooms varied by the specific condition being conducted, all assessments were conducted in a room designed for FAs at the center.

Materials

Academic tasks (or other materials for demands), moderately and highly preferred tangibles (based on free-operant preference assessments), data collection sheets, a timer, and a video camera were used for the study.

Experimental Design

The effects of pre-session exposure on FA outcomes were evaluated using a reversal design. Within-session data analysis, which has been shown to increase the efficacy of BFAs (Vollmer et al., 1995), was also conducted.

Dependent Variable

The dependent variables for this study were rates of problem behavior. James's behavior of speck picking was defined as picking up specks or small pieces of dirt, mulch, or similar speck-like material off the ground or surface (e.g., table). Henry's vocal stereotypy was defined as non-functional speech without negative affect such as frowning and/or tears. Only one topography of the problem behavior for each participant was targeted in each assessment. Data were collected using data collection sheets. Within-session data analysis was conducted, which included calculating and graphing rate of problem behavior per minute for each session.

Interobserver Agreement and Treatment Integrity

Interobserver agreement (IOA) data were collected by a second observer either in session or from a video recording. The type of IOA data collected was mean count-per-interval IOA, which was calculated by dividing the sessions into 10 second intervals and then dividing the lower score of problem behavior by the higher score in each interval and averaging the outcome across each session. IOA was assessed for 50% of sessions for James and 25% of sessions for Henry, which was 38% of overall sessions. For James, the mean IOA across sessions was 96% (range, 80% to 100%). For Henry, the mean IOA across sessions was 92% (range, 86% to 100%).

Treatment integrity for the work and play presession conditions was also measured. The details of the work and play conditions varied according to each participant; specific instructions for each condition were provided. In the work condition, the observer recorded whether or not the researcher delivered demands and positive reinforcement upon correct responding according to the instructions. For the play condition, the observer recorded whether or not the researcher provided minimal demands and the type of staff attention as indicated in the instructions. Treatment integrity was calculated by dividing the number of steps completed by the total number of opportunities. Treatment integrity was 100% across all sessions for both participants.

Procedure

Pre-Assessments

Prior to the assessment, participants were observed for 30 minutes and informal interviews with staff were conducted to select the target behavior, determine the operational definitions of the target behavior(s), and gather information for the presession conditions (i.e., duration, potential mands to deliver). A free-operant preference assessment was conducted with both participants to determine highly and moderately preferred items to include in the play and tangible conditions (Roane et al., 1998). The modified BFA assessment was then conducted after each presession condition, which included a no-interaction condition followed by test and control conditions based on our developed hypotheses (Slanzi et al., 2022).

Presession Conditions

Presession conditions of work and play were conducted prior to running each assessment. The duration of the presession conditions was 15 minutes, which was the average duration of work time from the 30-minute observations. The presession conditions were designed to mimic the participant's typical work and play session at the clinic. Each participant had the same therapist for all presession conditions. The presession conditions occurred in the same room as the no-interaction, test and control conditions to avoid any potential confounding variables during transitions. Each presession condition was conducted twice to demonstrate experimental control.

In the presession work condition, demands included a mix of both targets in acquisition and those already acquired with a fixed-ratio 1 schedule of reinforcement and reinforcement was provided for 10 seconds. If problem behavior occurred, the experimenter continued to follow the participant's behavior intervention plan. If the participant attempted to leave the work area, the experimenter verbally or physically, with the least amount of contact, prompted the participant to sit or stay (e.g., "we're still working"). Instructions remained the same unless the target in acquisition was mastered during the study. In such cases, the target was replaced with another target in acquisition that was in the same operant class (e.g., replaced tacting dog to tacting cat).

The presession play period involved the participant engaging in play. No demands were placed, and participants had free access to preferred items/activities. The experimenter provided attention at least every 20 seconds and responses to any appropriate social behavior initiated by the participant. However, the experimenter did not prompt the participant to play with any toys. There were no programmed consequences for the problem behavior unless the participant engaged in behavior that was harmful to himself or others (e.g., SIB). The experimenter then followed the specific behavior intervention plan in place for the participant. However, participants did not engage in harmful behaviors.

No-Interaction Condition

The no-interaction conditions were conducted for 15 minutes after each presession condition and prior to any test and control conditions. Breaks were provided between sessions if needed to allow time for room preparation. During the no-interaction condition, the participants were in a room with an experimenter. The participant did not have access to any items, unless the items were required to engage in the target behavior, such as

throwing. In this case, the items included were a colorful rug for James and a communication device for Henry, which was specific to the problem behavior (e.g., specks were not visible on the original carpet of the room). The room was also baited with sesame seeds for Henry. However, to mimic the natural environment, the room was not baited with sesame seeds during the presession conditions. No demands were placed, no attention was provided, and no consequences were provided contingent on problem behavior.

Test and Control Conditions

Tangible

A tangible function was not suspected for either participants based on staff reports or 30-minute observations. Therefore, a tangible condition was not included to avoid false positive outcomes (Rooker et al., 2011).

Escape

During the escape condition, an experimenter presented instructional demands that were tailored to each participant every 3 to 5 seconds. For both participants, the experimenter delivered demands in the form of discrete trial instructions (e.g., match to sample, gross motor imitation). If the participant did not respond to the initial instruction within 3 to 5 seconds, then a model prompt was provided. If the participant did not respond to the model prompt, the experimenter then physically guided the participant, with the least amount of contact necessary, to complete the instructed activity. Neutral feedback (e.g., "good") was provided contingent upon responding. Following the occurrence of problem behavior, the participant was told that he did not have to complete the activity and was provided a 30-second break. The experimenter turned away and all instructional materials were moved away from the participant.

Attention

Problem behavior occurred during the no-interaction conditions for both participants. Therefore, an attention condition was included in all assessments. Similar to the no-interaction condition, an experimenter was present in the room. Prior to the session, the experimenter provided 30-seconds of non-contingent attention. The session began with the experimenter removing all attention, including eye contact. Participants were provided the option of having a low-preferred item present, but both declined. All other materials

except for furniture were removed from the room with the exception of the rug for James. Following each occurrence of the problem behavior, the experimenter provided attention for 5 to 10 seconds (e.g., reprimands for James and social praise for Henry).

Control or Play

One session of the control condition was conducted for all assessments because the hypothesized function for both participants' behaviors was automatic reinforcement. During the control condition, participants had free access to highly preferred items or activities. The experimenter provided attention at least every 10-15 seconds (e.g., "I'm having a great time playing with you"). Participants were not prompted to engage with any items and no demands were placed. There were no programmed consequences for the occurrence of problem behavior.

Chapter 3: Results

Figure 1 depicts the results for James. After the first presession play condition, specks picking occurred throughout the no-interaction condition. The mean specks picked per minute was 3.7 (range, 0 to 11) during the no-interaction condition. Although the behavior showed a decreasing trend towards the last few minutes, we hypothesized that the behavior was maintained by automatic reinforcement based on staff interviews and observations. Subsequent test and control conditions confirmed our hypothesis. The mean of specks picking was 2 (range, 0 to 6) during the attention condition, 0 during the escape condition, 2.2 (range, 0 to 4) during the play condition, and 1.2 (range, 0 to 3) during the last 5-minute no-interaction condition. Results were similar for the second presession play condition. Mean specks picking per minute was 3.1 (range, 0 to 9) during the 15-minute no-interaction condition, 1.2 (range, 0 to 2) during the play condition, 0 during the escape condition, 2 (range, 0 to 4) in the attention condition, and 2.6 (range, 2 to 4) during the last 5-minute no-interaction condition. The behavior did not occur during the escape conditions because the presented tasks and its items may have competed with the participant's behavior of speck picking (Piazza et al., 2000). However, specks picking occurred during all other conditions, suggesting an automatic function.

Results were similar for the presession work conditions. For the first presession work condition, mean specks picking per minute was 5.2 (range, 0 to 11) during the 15-minute no-interaction condition, 0 during the play condition, 0.4 (range, 0 to 2) during the attention condition, 0 during the escape condition, and 3.8 (range, 2 to 10) during the last 5-minute no-interaction condition. For the second presession work condition, the mean was 1.8 (range, 0 to 7) during the 15-minute no-interaction condition, 1.4 (range, 0 to 3) during the attention condition, 0.4 (range, 0 to 2) during the play condition, 0 during the escape condition, and 3 (range, 1 to 5) during the extended 5-minute no-interaction condition. Although rates of responding were variable throughout the no-interaction conditions, specks picking did occur at similar or higher rates compared to other conditions, suggesting an automatic function. Overall, results did not vary based on presession conditions for James.

Figure 2 depicts the results for Henry. Vocal stereotypy occurred at a constant rate during the no-interaction condition following exposure to the first work condition, with a

mean of 7.3 (range, 0 to 19). Therefore, we hypothesized that Henry's vocal stereotypy was maintained by automatic reinforcement. The target behavior occurred in all test and control conditions, suggesting that the behavior was maintained by automatic reinforcement. Specifically, the mean was 5.4 (range, 3 to 11) during the play condition, 5.8 (range, 5 to 8) during the escape condition, 5.6 (range, 1 to 9) during the attention condition, and 4 (range, 1 to 7) during the extended 5-minute no-interaction condition. Results were similar after exposure to a second work condition. Mean stereotypy per minute was 5.9 (range, 2 to 11) during the 15-minute no-interaction condition, 8.2 (range, 6 to 10) during the attention condition, 1.8 (range, 0 to 4) during the escape condition, 7 (range, 5 to 9) during the play condition, and 15.2 (range, 9 to 24) during the extended 5-minute no-interaction condition. The only difference was that the rates of vocal stereotypy were much higher during the last 5-minute no-interaction conditions relative to other conditions, which further confirmed our hypothesis.

Results were similar for the presession play conditions. For the first presession play condition, Henry's mean rate of vocal stereotypy per minute was 5 (range, 2 to 9) during the 15-minute no-interaction condition, 2.6 (range, 0 to 5) during the attention condition, 1 (range, 0 to 3) during the escape condition, 6.2 (range, 4 to 9) during the play condition, and 2.2 (range, 0 to 8) during the no-interaction condition. For the second presession condition, mean stereotypy per minute was 5.2 (range, 0 to 11) during the 15-minute no-interaction condition, 9.4 (range, 6 to 14) during the play condition, 8.2 (range, 4 to 13) during the attention condition, 2.6 (range, 0 to 5) during the escape condition, and 8.8 (range, 6 to 15) during the extended 5-minute no-interaction condition. Overall, vocal stereotypy occurred at a constant rate throughout the 15-minute no-interaction conditions and continued to occur during all other conditions, confirming our hypothesis. Thus, results also did not vary based on presession conditions for Henry.

Figures 3 and 4 represent the results for James and Henry after each presession condition presented in a multielement design. Each session consisted of 5-minute bins corresponding to the appropriate test and control conditions. For both participants, the no-interaction condition either produced higher levels of responding compared to other conditions or at similar levels, indicating an automatic function. The only exception is the escape condition for both participants, in which the behavior either did not occur or occurred at low levels.

Chapter 4: Discussion

The purpose of the study is to examine the effects of presession conditions on rates of responding in a modified BFA. Presession conditions were conducted prior to each assessment and included a work or play period. Each assessment consisted of an extended no-interaction condition followed by test and control conditions. The test and control conditions were guided by hypotheses that were developed based on results of the extended no-interaction condition (Slanzi et al., 2022). For example, we hypothesized that the behavior was maintained by automatic reinforcement when the behavior occurred consistently throughout the 15-minute no-interaction condition. To confirm our hypothesis, we conducted test and control conditions of attention, escape, play, and an additional 5-minute no-interaction. Our results showed that both specks picking and vocal stereotypy was maintained by automatic reinforcement and that presession conditions did not affect rates of responding in the BFA.

Sclichenmeyer et al. (2013) identified more than 30 idiosyncratic variables that influenced responding during FAs. Therefore, previous researchers have included modifications to their FA conditions to better obtain differentiated results (Henry et al., 2021; Slanzi et al., 2022). Such modifications included fixed reinforcement times across all test conditions, a discriminative stimulus for each test condition, a test for ritualistic play, and more. Similar to the previous studies, we also included some methodological refinements to our FAs to include relevant antecedents and consequences in the test and control conditions. First, we included a discriminative stimulus for each test condition by having the experimenter wear a different color shirt for each condition. Second, we included specific high-preferred items that have been observed to increase behavior (e.g., yoga ball for James) (Mueller et al., 2001; Wilder et al., 2007). Third, we included a specific form of attention for both participants (e.g., verbal praise for James and reprimands for Henry; Kodak et al., 2007).

Overall, during the 15-minute no-interaction conditions, responding occurred, but rates were variable for James and consistent for Henry. It is unknown as to why there was variability in responding for James. However, we observed James periodically manipulating the specks in his mouth, which is an incompatible behavior and may have competed with specks picking. Despite the variability, the levels of the target behavior

during the 15-minute no-interaction conditions were either equal to or higher than all other test and control conditions and occurred again during the extended 5-minute no-interaction conditions, suggesting that the behavior was maintained by automatic reinforcement. For Henry, vocal stereotypy occurred consistently throughout all conditions, also suggesting an automatic function. However, for the first presession play condition, rates of vocal stereotypy decreased to zero in the last 5-minute no-interaction condition. This is because Henry started interacting with his communication device, which may have competed with vocal stereotypy.

Furthermore, results demonstrated that presession variables did not affect rates of responding during the BFA. One factor that may have contributed to these results is the stimuli present during the presession conditions. Previous research has found that providing access to preferred items that matched the sensory consequences produced by the behavior maintained by automatic reinforcement substantially decreased that behavior (Piazza et al., 2000). Further research has demonstrated an EO or AO effect of such behaviors following access to matched or unmatched stimulation (Rapp, 2007). More specifically, a persistent reduction in behavior maintained by automatic reinforcement following access to matched stimulation (AO effect) and an increase in behavior following access to unmatched stimulation (EO effect) has been shown (Rapp, 2007). Therefore, stimuli present during the presession conditions could have influenced rates of responding during the BFA. Although the items in the presession work conditions differed from the presession play conditions, we did not examine whether they were matched or unmatched stimuli. A competing items assessment would need to be conducted to examine this.

Although presession variables did not affect rates of responding during the BFA, we were still able to obtain differentiated results. Therefore, our results provide further support for the use of a no-interaction condition as a screening analysis for behavior maintained by automatic reinforcement (Querim et al., 2013). Furthermore, in their new guidelines for assessing the function of behaviors, Henry et al. (2021) suggest that it may be safe to conclude that the behavior is maintained by automatic reinforcement if it persists throughout the no-interaction condition. Therefore, if the behavior occurs consistently throughout a no-interaction condition, treatment decisions may be made earlier without a need for additional assessment. This will not only save time, resources, and effort for

practitioners, but it will also result in earlier treatment for clients with more harmful behaviors.

Additionally, following the BFA model demonstrated by Slanzi et al. (2022), we were able to conduct each assessment, including the presession conditions, in under an hour. Although we had to conduct interviews, direct observations, and preference assessments prior to the assessment for each participant, the total duration of these tasks was typically only 30 minutes. Therefore, our results provide further support for the use of the modified BFA. Specifically, behavior analysts with limited time and resources may use the modified BFA to determine the function of the behavior, especially if it is suspected to be maintained by automatic reinforcement. More importantly, presession variable manipulations would not add an extensive amount of time, if any, to the assessment.

We also conducted within-session data analysis, which allowed us to include more data points within a session for a more detailed analysis. Although both models consisted of 5-minute test and control conditions, the modified BFA is advantageous compared to the BFA demonstrated by Northup et al. (1991). The Northup et al. BFA only consisted of one to three data points in each condition, making it hard to evaluate the stability of the data. It is also difficult to determine whether the data resulted from carryover effects from the previous condition or from within the condition itself. The modified BFA also has an advantage over the interview-informed synthesized contingency analysis (IISCA; Hanley et al., 2014). Although the IISCA can produce differentiated results, it only tests for synthesized contingencies (e.g., combining consequences for access to tangibles and escape). The IISCA cannot be used to isolate functions. The IISCA also did not test for automatic reinforcement, whereas the modified BFA tested for both automatic and socially mediated reinforcement.

In addition to providing support for the previous studies (Henry et al., 2021; Slanzi et al., 2022; Querim et al., 2013), the current study also extended their findings by examining the effects of presession variables on rates of responding during the BFA. Although our results did not demonstrate an effect on responding during the BFA, this may make for a more efficient assessment process. Practitioners may not have to systematically control for presession variables when using an initial no-interaction condition as a screening assessment for behaviors maintained by automatic reinforcement.

The presession conditions we used were different than those used in previous studies. We did not attempt to manipulate specific variables maintaining the problem behavior. For example, in O'Reilly et al. (2007), results of an FA demonstrated that the target behavior was maintained by attention. The participant was then exposed to 5-minute attention-extinction and alone sessions. Prior to each session, an experimenter provided either noncontingent attention or no attention. In Rispoli et al. (2011), problem behavior for two participants was determined to be maintained by access to tangibles. Presession conditions included access to items and no access to items for a mean duration of 45 minutes. As presession conditions can range from 5 minutes to 45 minutes, practitioners are required to take time out of a client's day to accommodate presession manipulations. Instead, our presession conditions consisted of structured, naturally occurring activities that mimicked the participant's typical session at the clinic. An advantage of this is that practitioners may not have to take time out of a client's session to include antecedent manipulations prior to conducting FAs. Instead, if needed, they just have to rearrange the client's work and play schedule accordingly.

Despite the advantages of the study, there are still several limitations that are worth noting. First, this study only obtained data from participants whose target behaviors were maintained by automatic reinforcement. Previous research has indicated an EO or AO effect on attention and escaped maintained behaviors (McComas et al., 2003; O'Reilly et al., 2007; Roantree & Kennedy, 2006). More specifically, if the behavior was maintained by attention, the presession work or play condition could have an EO or AO effect on rates of responding depending on the type of attention that typically evokes the problem behavior. The presession conditions could also have an effect on behaviors maintained by escape and access to tangibles, depending on the instructions provided and items included. Therefore, results of research on BFAs may vary based on the function of the behavior.

Second, varying specific aspects of the presession conditions (e.g., therapist, duration, setting) may produce different results. For example, our presession conditions were 15 minutes in duration, which was the average time our participants spent in work and play sessions during our observations. Previous research has also indicated that a 15-minute presession condition had an EO or AO effect on behaviors maintained by automatic reinforcement (Chung & Cannella-Malone, 2010). However, it is unknown whether

presession conditions of shorter durations have an effect on responses and if the function of the behavior contributes to such differences.

Additionally, the participants were at an ABA clinic with the appropriate resources and trained experimenters to conduct the FAs. However, schools and outpatient units may have time constraints, limited resources, and practical challenges as reasons to not conduct an FA (Gardner et al., 2012). For instance, typically developing children in schools may require some kind of experimental manipulations to determine the function of their behavior but schools may not be able to divert special education resources to children without a disability (Gardner et al., 2012). However, given the efficiency of the modified BFA, it may be useful in settings with such limitations. Finally, we did not evaluate treatment effects based on our results. This is a significant limitation as evaluating a treatment is the way to determine whether results of our assessments were accurate.

To address the above limitations, future research should include participants whose behaviors are maintained by a function other than automatic reinforcement. For example, if the target behavior occurred but then decreased throughout the no-interaction condition after a presession play condition, researchers may hypothesize that the behavior was maintained by attention. As a result, the researchers would conduct subsequent test and control conditions of attention and play to confirm their hypothesis.

Additionally, future researchers could examine different variations of the presession conditions and their effects on rates of responding during the BFA. For instance, instead of conducting a 15-minute presession condition, researchers could examine whether a 5-minute presession condition would also affect results. Future researchers could also explore differences in reinforcement schedules, magnitude, and setting. For instance, we only conducted the presession conditions in neutral rooms where the FAs were held to control for extraneous variables. However, future research could explore the possibility of conducting presession conditions in the participant's typical classroom or treatment room.

Finally, future research could examine treatment effects following this type of assessment. For example, results of this study demonstrated an automatic function for both participant's behaviors. A treatment option would be to provide participants with noncontingent stimuli that presumably substitutes for the sensory stimulation produced by those behaviors (Piazza et al., 2000). For example, if the putative sensory consequence for

vocal stereotypy was auditory stimulation then access to a sound-producing toy or music could be provided to decrease vocal stereotypy.

Differential reinforcement of other behavior (DRO), which involves delivering a reinforcer following the absence of a target behavior for a predetermined interval, have been used to effectively treat behaviors maintained by automatic reinforcement (Capriotti et al., 2012). For example, Capriotti et al. (2012) provided tokens to participants at the end of each 5-second period if they did not engage in the behavior. Their results demonstrated a substantial decrease in motor tics. Additionally, differential reinforcement of alternative behavior, which involves delivering a reinforcer following the occurrence of a specific alternative behavior have been shown to decrease stereotypy (Potter et al., 2013). More specifically, the experimenters demonstrated that stereotypy could be used as a reinforcer for a more desirable alternative behavior (Potter et al., 2013).

Extinction-based treatments, which involve withholding stimulation that has functioned as the maintaining reinforcer in the past contingent upon the occurrence of the target behavior, have also been used to decrease behaviors maintained by automatic reinforcement. For example, headphones with white noise have been provided to mask the auditory stimulation produced by vocal stereotypy (Aiken & Salzberg, 1984). Previous research has also examined the suppressive effects of protective equipment on SIB due to sensory extinction (Moore et al., 2004). However, such extinction-based treatments must be implemented with caution as they may result in extinction bursts or increases in aggression (Lerman et al., 1999).

Despite the many different treatment options for behaviors maintained by automatic reinforcement, it is important to take into consideration underlying reasons as to why the behavior may be persistently occurring. For example, if a client engages in ear covering and ear covering has been determined to be maintained by automatic reinforcement, then practitioners may need to examine the possibility of an ear infection. By taking important health problems into consideration, practitioners can avoid ineffective treatment and coordinate medical care as soon as possible for clients who need it. This is particularly true for target behaviors maintained by automatic negative reinforcement.

Overall, results of this study suggest that it may not be necessary for practitioners to systematically control for presession variables when using an initial no-interaction condition as a screening assessment if the behavior is suspected to be maintained by

automatic reinforcement. Conducting antecedent manipulations as well as the assessment itself may be too complex and time consuming. Furthermore, cost of services is high; therefore, session time is valuable, and practitioners may not want to take time out of a client's session to conduct an assessment that is time consuming. As a result, practitioners may use less reliable and accurate assessment procedures (e.g., descriptive analyses, structured interviews). Therefore, considering our results and the efficiency of the modified BFA, practitioners may be more inclined to conduct FAs in their clinics as well as in various other settings (e.g., homes, residential facilities, schools). By doing so, the function of problem behaviors can be more accurately assessed which will lead to more effective treatments for clients. Most importantly, FAs help clients maintain dignity by taking into consideration their unique learning histories before developing treatment (Hanley, 2012).

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Figure 1

Results of the brief functional analysis for James. The upper panels depicts results after presession play conditions. The lower panels depicts results after presession work conditions.

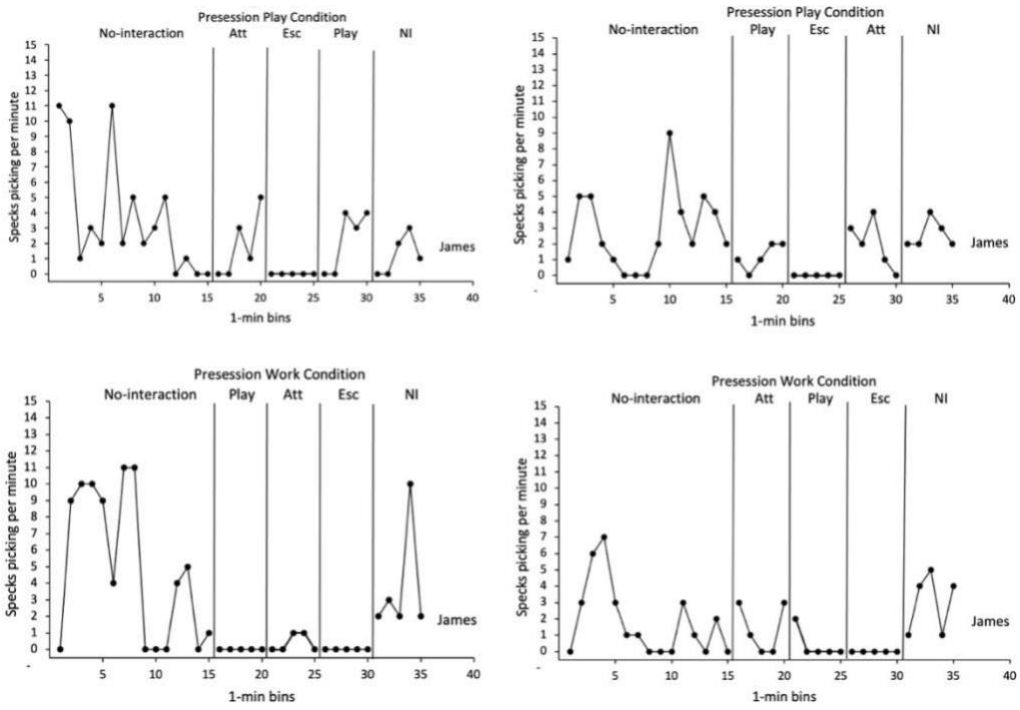


Figure 2

Results of the brief functional analysis for Henry.. The upper panels depicts results after presession play conditions. The lower panels depicts results after presession work conditions.

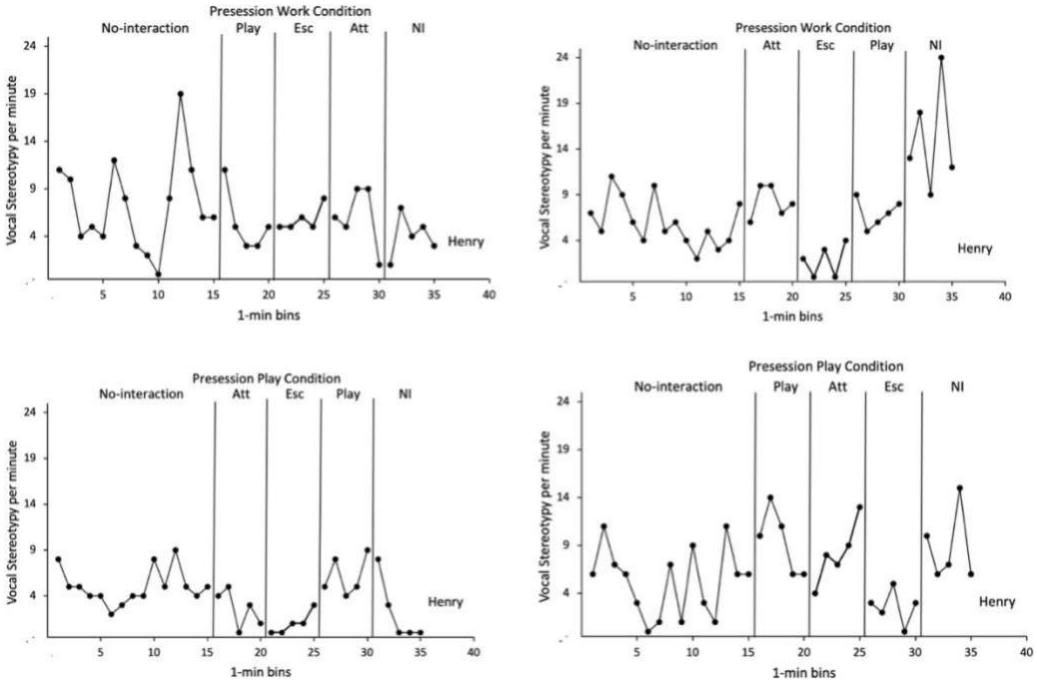
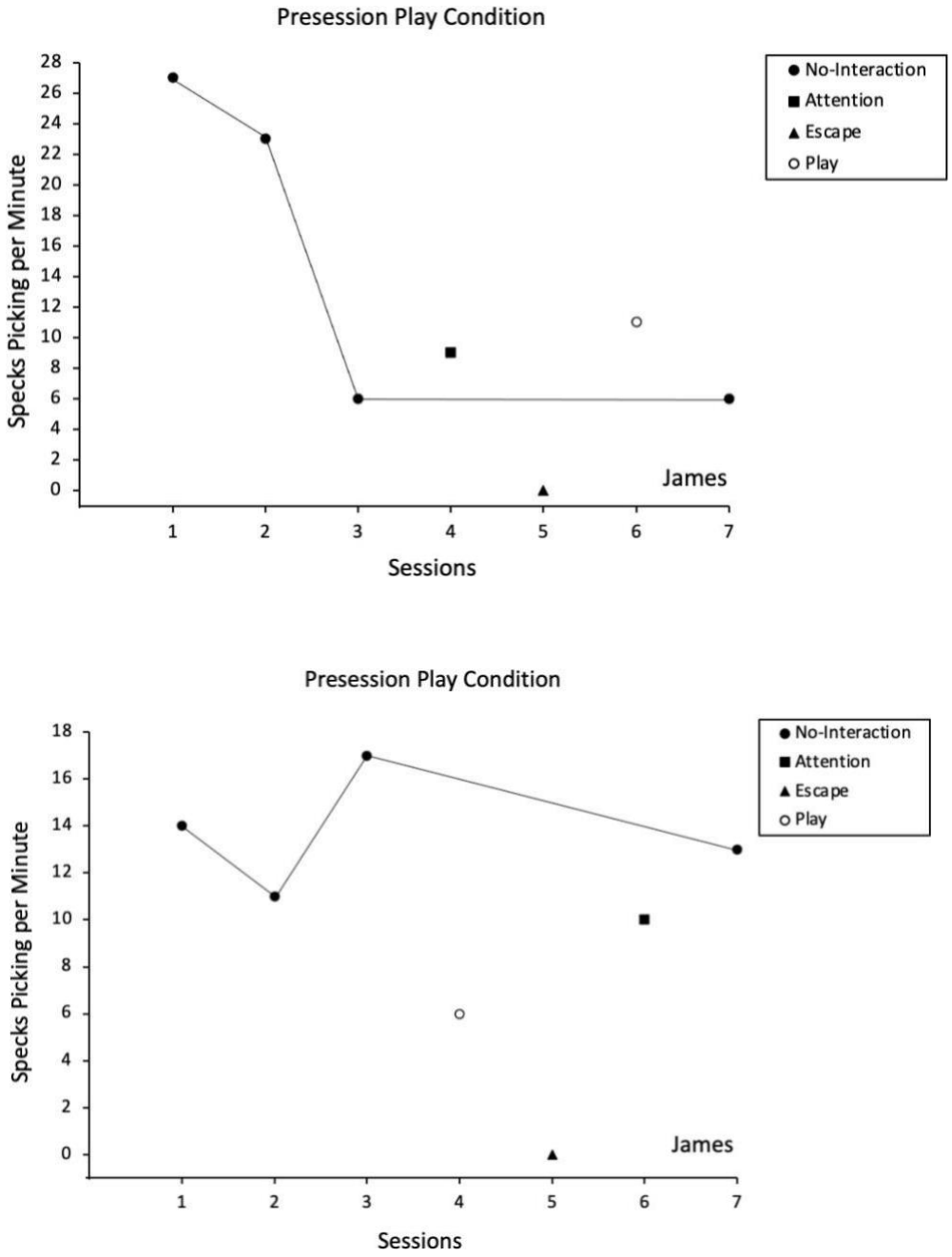
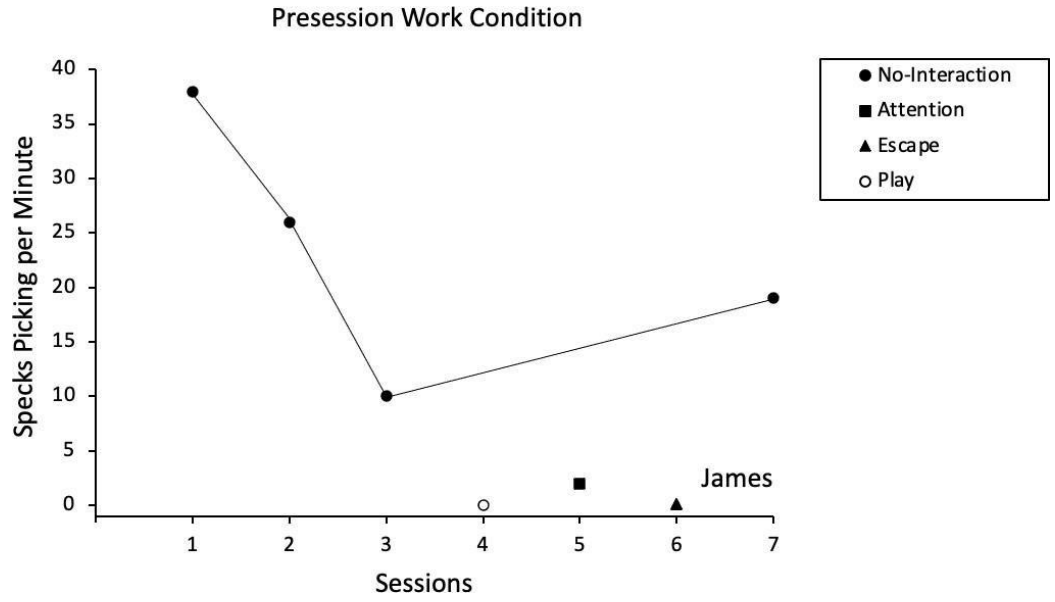


Figure 3

Results of the brief functional analysis for James in a multielement design. The first two graphs depict results after presession play conditions. The last two graphs depict results after presession work conditions.




Presession Work Condition
Specks Picking per Minute
40
35
30
25
20
15
10
5
0
1
2
3
4
5
6
7
Sessions
James
No-Interaction
Attention
Escape
Play

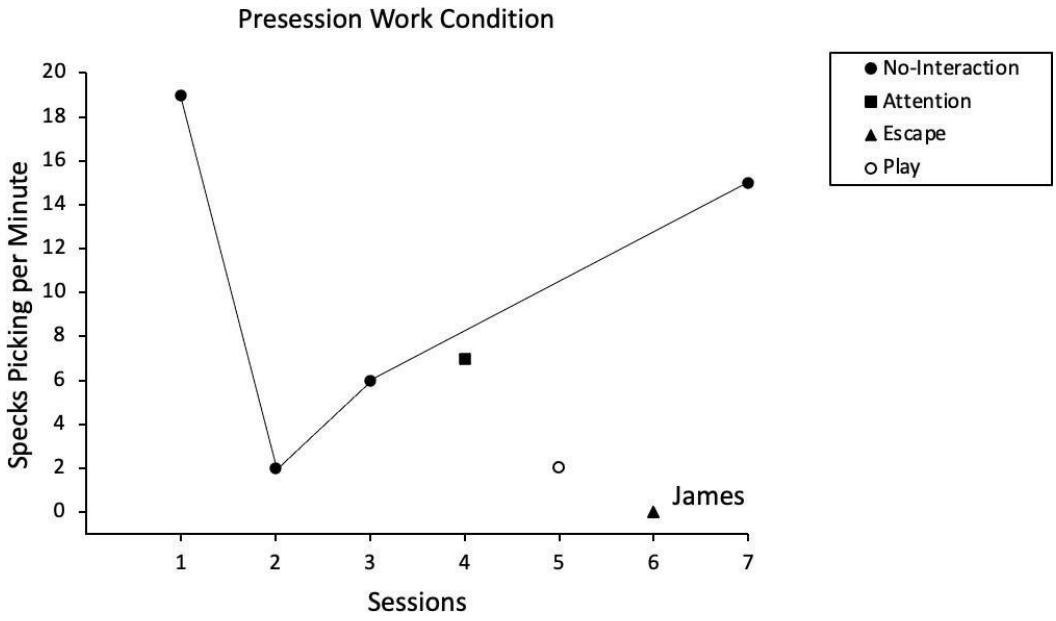
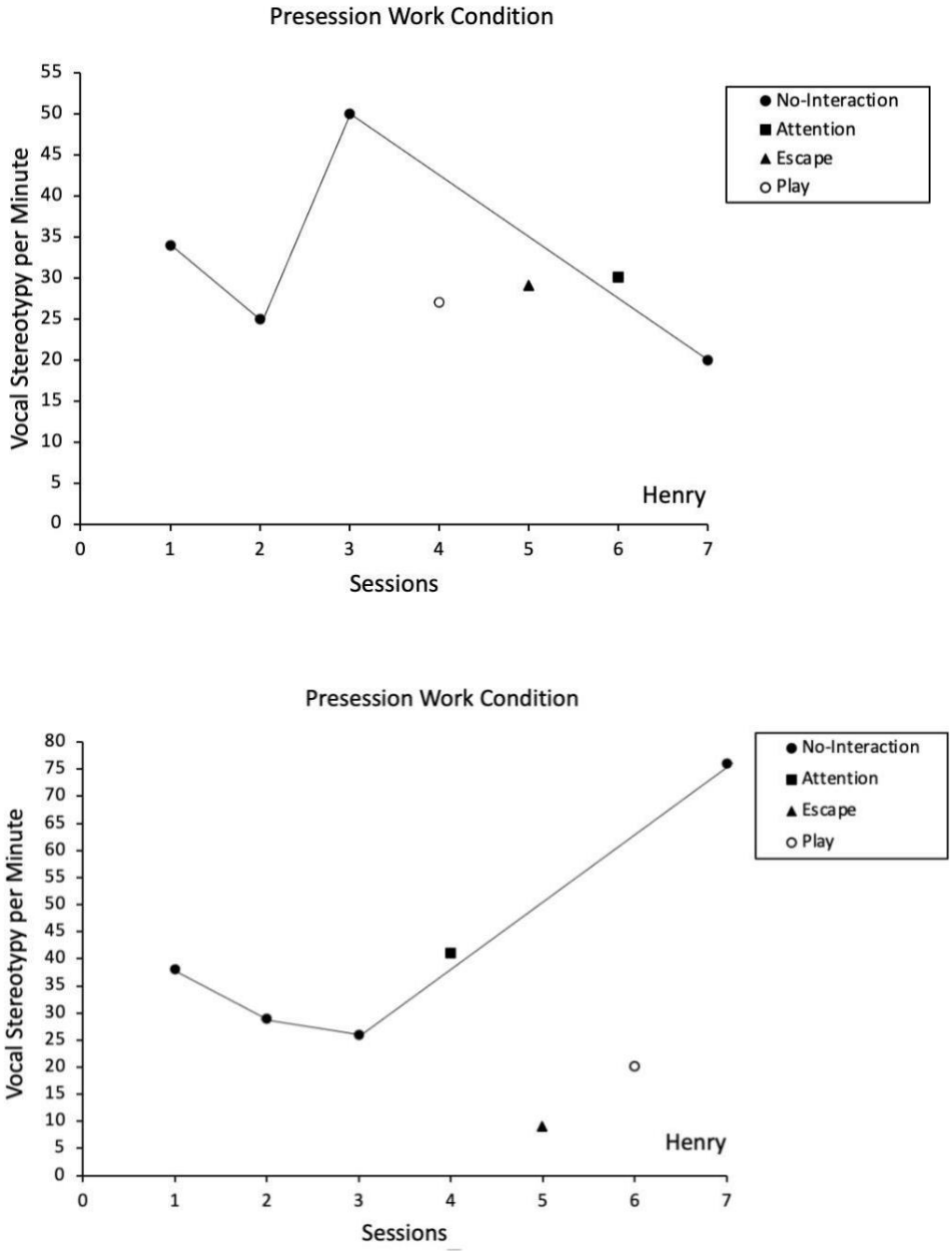
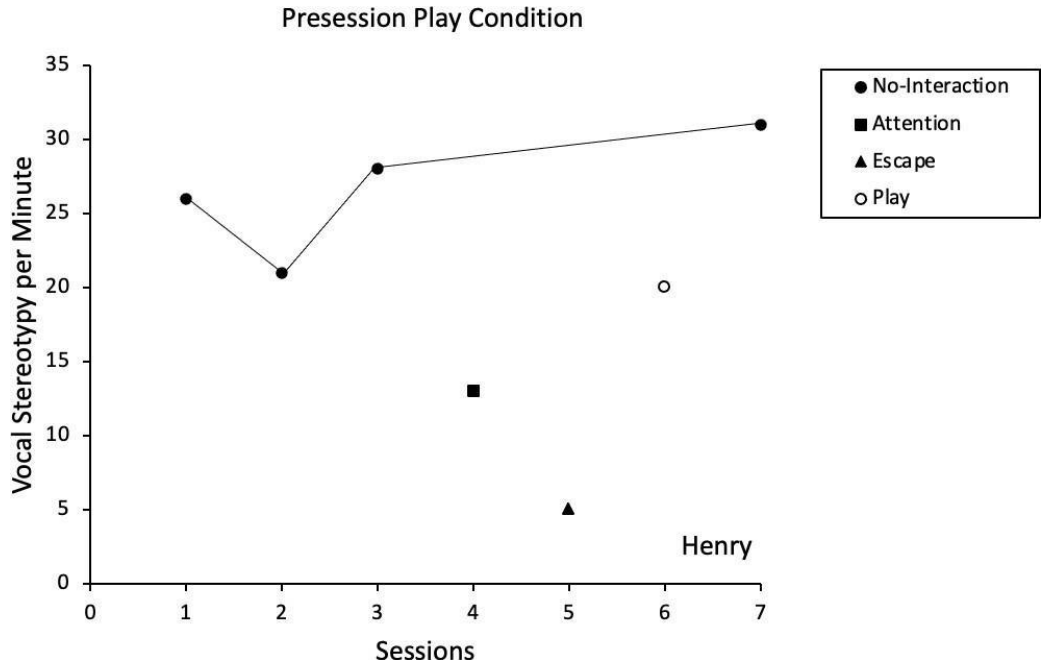
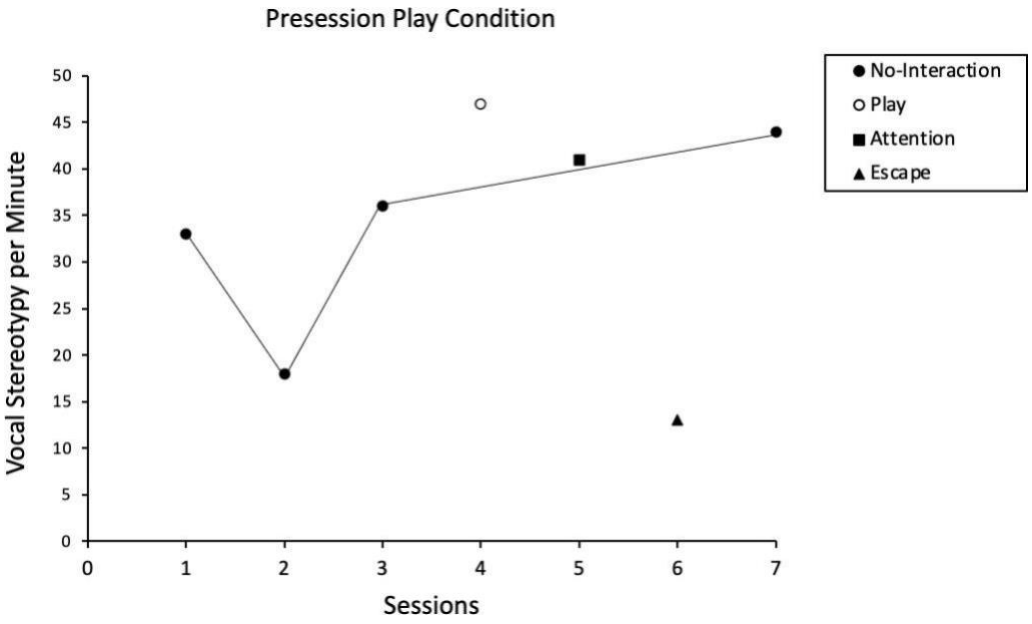

Presession Work Condition
Specks Picking per Minute
20
18
16
14
12
10
8
6
4
2
0
1
2
3
4
5
6
7
Sessions
James
No-Interaction
Attention
Escape
Play

Figure 4

Results of the brief functional analysis for Henry in a multielement design. The first two graphs depict results after presession work conditions. The last two graphs depict results after presession play conditions.




Presession Play Condition
Vocal Stereotypy per Minute
Sessions
Henry
No-Interaction
Attention
Escape
Play
0
5
10
15
20
25
30
35
0
1
2
3
4
5
6
7


Presession Play Condition
Vocal Stereotypy per Minute
Sessions
No-Interaction
Play
Attention
Escape
0
5
10
15
20
25
30
35
40
45
50
0
1
2
3
4
5
6
7