

THE EFFECTS OF WITHIN-ACTIVITY CHOICE INTERVENTIONS ON PROBLEM BEHAVIOR
AND TASK ENGAGEMENT OF CHILDREN WITH AUTISM SPECTRUM DISORDER

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Abstract

Historically, individuals with developmental disabilities have been given few opportunities to make choices in their daily lives across various contexts. It was often thought that this population was either not capable of making choices or that individuals with autism would make bad choices when given the opportunity. However, research has shown that not only are individuals with Autism Spectrum Disorder (ASD) capable of making choices, but that choice-making interventions can be effective in reducing problem behavior and increasing appropriate behavior. To date, studies have evaluated the effects of across-activity choices on problem behavior and task engagement. The current study assessed the effects of providing within-activity choice during non-preferred activities. Results showed idiosyncratic effects of the within-activity choice across two participants in terms of rates of problem behavior, task engagement, and preference for the choice-making intervention.

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The Effects of Within-Activity Choice Interventions on Problem Behavior and Task Engagement of Children with Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is a developmental disorder with an early-childhood onset. ASD is characterized by significant impairment in social interaction and communicative ability. Children with ASD also display repetitive and stereotyped patterns of behavior (American Psychiatric Association, 2013). Further, challenging behavior, such as aggressive or self-injurious behavior, is more common among children with ASD than among typically developing children or children with other developmental disabilities (Matson, Wilkins, & Macken, 2009).

As a result of these deficits and difficulties, people often question the abilities of children with ASD, including their capacity to make choices. Brigham (1979) defined choice as “the opportunity to make an uncoerced selection from two or more alternative events, consequences, or responses. By uncoerced [he means] that there are no programmed implicit or explicit consequences for selecting one alternative over the others except for the characteristics of the alternatives themselves” (p. 132). Many service providers exercise a great deal of control over children with ASD, failing to give individuals’ input in decisions about treatment goals or procedures, work tasks, or leisure activities. It is often assumed that individuals with ASD either cannot make choices or that when given the opportunity, they would make bad choices (Bannerman et al., 1990).

However, research has shown that not only are individuals with severe to profound developmental disabilities capable of making choices (e.g., Lancioni, O’Reilly, & Emerson, 1996) and that service providers can learn to appropriately provide choices across contexts (e.g., Browder, Cooper, & Lim, 1998), but that providing choices to individuals with ASD results in

positive effects, including reducing problem behavior (e.g., Lohrmann-O'Rourke & Yurman, 2001) and increasing task engagement (e.g., Cole & Levinson, 2002). Providing more choices to children with disabilities enhances their control over their environment, as well encourages individuals to express their desires and preferences, thus potentially making the use of problem behavior unnecessary (Shogren, Fagella-Luby, Bae, & Wehmeyer, 2004).

Preference of Choice

Research has been conducted to evaluate individuals' preference of choice, regardless of how much the options are liked, by isolating choice as an independent variable. Schmidt, Hanley, and Layer (2009) evaluated typically developing, pre-school children's preferences for the opportunity to choose using a concurrent-chains arrangement in which identical consequences were available in choice and no choice conditions. Participants were asked to choose one of three worksheets with identical content to complete. Upon completion, the choice worksheet resulted in verbal praise and then the opportunity to choose one of five identical edibles. The no choice worksheet resulted in verbal praise and then the instructor picked one of the same five identical edibles to give to the child. Lastly, the control worksheet resulted in only verbal praise once the child finished. Results showed that all participants selected the choice condition most frequently, indicating that choice-making itself might function as a reinforcer.

A second assessment was conducted in which less preferred items, stickers, were used instead of highly preferred edibles. Data indicated that participants continued to pick the choice condition most often, demonstrating that preference for the opportunity to choose is not limited to conditions in which highly preferred items are involved. This has important implications for providing individuals opportunities to make choices during work tasks, which presumably are

less preferred than edibles or stickers. However, since typically developing students were the participants of this study, further assessment is needed to investigate if results would generalize to individuals with ASD.

Effects of Choice on Problem Behavior

Shogren et al. (2004) conducted a meta-analysis to assess the efficacy of choice interventions in reducing problem behavior. The meta-analysis consisted of 13 articles from six journals, including 30 participants mostly between the ages of five and 21. All articles included participants with an identified disability, the implementation of a choice intervention, and problem behavior as the dependent variable. Two categories of choice interventions were identified: 1) task order: interventions which allowed participants to choose the order in which they completed tasks and 2) either/or: interventions in which participants chose between two activities. The studies involved either academic, daily living, or vocational activities.

Results of this meta-analysis revealed that choice interventions may help to reduce problem behavior in individuals with disabilities. Data showed that choice interventions resulted in substantially lower levels of problem behavior compared to baseline conditions, as well as the elimination of problem behavior in slightly less than half of the cases. It appears that these results may be clinically significant, referring to the practical value or importance of the effect of the interventions (Kazdin, 1999). The reduction in problem behavior, and elimination in some cases, likely made a noticeable and genuine difference in the lives of the participants of these studies, as well as for others with whom these individuals interact.

There were also some treatment outcomes that varied as a result of participant characteristics. For example, participants with aggressive behavior showed a trend toward greater reduction and elimination of problem behavior, as compared to individuals who exhibited

non-aggressive behavior. Moreover, studies which identified escape from demands as the cause of behavior, showed greater treatment effects with choice-making interventions, as compared to studies which assessed behaviors maintained by other contingencies. Perhaps by providing work related choices, individuals would experience work as less aversive and, therefore, not engage in problem behavior as a method to escape demands. This supports the importance of assessing the function of problem behavior to determine appropriate intervention strategies. Lastly, no differences were found between the two categories of choice design, task order and either/or, suggesting that different types of choice interventions may have comparable efficacy in reducing problem behavior (Shogren et al., 2004).

Other studies have also found that choice-making is effective in reducing and even eliminating severe and pervasive problem behavior. Dyer, Dunlap, and Winterling (1990) investigated the effects of choice-making on serious problem behaviors of three school-aged children with severe disabilities. A choice-making package was implemented in which the participants were allowed to make selections of tasks and rewards. The primary dependent variable was the percentage of intervals with serious problem behavior. The secondary outcome measure was task performance based on correct responses during each session.

A reversal design was implemented to evaluate the effects of the choice-making package. During the choice condition, the child was given opportunities to choose from available tasks and identified reinforcers. During the no choice condition, the same tasks and reinforcers were provided, but based on teacher initiation and an independent schedule. Results indicated that problem behavior was consistently lower or eliminated in the choice condition, as compared to the no choice condition across all three participants. All of the participants selected all of the tasks and reinforcers in the choice condition which were presented in the no choice condition,

indicating that it was likely the choice, rather than preference, that was responsible for the positive behavior change. However, a preference assessment was not conducted before the intervention was put in place, thus this cannot be concluded with certainty. Furthermore, there were no consistent differences in task performance among the choice and no choice conditions. The authors suggest that these results may be because mastered tasks were used in this study (Dyer et al., 1990).

Other studies have found more mixed results about the effects of choice interventions on the occurrence of problem behavior. Vaughn and Horner (1997) assessed rates of challenging behavior when teachers selected the instructional tasks, as compared to rates when students chose the instructional tasks, for both non-preferred and preferred activities. Task preference was first identified through interviews with teachers and parents and then validated by conducting sessions during which the student was presented with a choice between one higher preference task and one lower preference task.

Results indicated that the rates of challenging behavior were relatively lower for three of the four students when higher preference tasks were presented, regardless of whether the student or teacher selected the task. Additionally, the rates of problem behavior were somewhat lower for two of the students when choice between lower preference tasks was provided. These results suggest that the choice itself, and not merely the students' preference for the options, was likely responsible for the reduction in challenging behavior. However, for the other two participants, the rates of problem behavior during both student and teacher selected, lower preference tasks were equivalent. Therefore, it cannot be argued that providing choice was effective in reducing problem behavior for these two individuals.

Additionally, Cole and Levinson (2002) used a reversal design to investigate the effects of using verbal directives (e.g., “Line up at the door.”) versus choice questions (e.g., “Do you want to line up in front of me or behind me?”) in instructional routines on the problem behavior of two children. Although the results indicated that the rate of challenging behavior decreased when choice questions were used, there were less pronounced effects on the rate of task completion as compared to baseline.

Effects of Choice on On-Task Behavior

In addition to reduction in problem behavior, choice-making interventions have been shown to increase task engagement. Watanabe and Sturmey (2003) studied the effect of choice-making opportunities during activity schedules on task engagement of three adults with autism. During baseline conditions, the experimenter wrote the morning schedule on the board and gave the task papers to the participants. The choice condition was comparable to the baseline condition except that at the beginning of the session the participants were told to make today’s schedule and were given a list of nine activities in which they were able to pick three. During both the baseline and choice conditions, the experimenter provided verbal praise while smiling and providing eye contact when the participant finished the task during the scheduled period. During the maintenance phase, the sessions were identical to the choice condition except that the experimenter did not provide verbal prompts. A multiple baseline across subjects design was utilized to demonstrate experimental control. Overall, participants were on-task significantly more during choice and maintenance conditions, compared to baseline conditions. This demonstrates that the choice-making intervention increased the time on-task for all participants, even once the verbal prompts were removed, thus reducing client dependence on staff prompts without reducing time on-task. Additional positive effects were observed during the

intervention, although formal data were not collected. For example, as participants' on-task behavior improved, their inappropriate behavior decreased and productivity increased.

Preference assessments were not conducted prior to the intervention. Therefore, increases in on-task behavior may have been the result of the opportunity for individuals to engage in more preferred tasks since they only had to complete three of the nine available choices, as opposed to the effects of the choice itself.

Canella et al. (2005) conducted a meta-analysis to further investigate the effects of choice-making interventions and preference assessments. The authors reviewed 30 studies which related to building choice opportunities into daily contexts, assessing the effects of choice-making on various parameters of behavior, assessing preferences, and assessing the effectiveness of various preference assessment formats. Nine studies specifically assessed the effects of choice-making on task engagement, affect, and problem behavior of individuals with varying levels of disabilities. Overall, positive results were found; however, some studies provided mixed results, thus showing the need for additional research. For example, Graff et al. (1998) and Moes (1998) found decreasing trends in problem behavior and increasing trends in appropriate behavior during choice conditions, yet also discovered a fair amount of overlap between the baseline and intervention data. Therefore, additional research is needed to further explore which choice-making interventions are most effective and for whom these strategies are most likely to impact.

Effects of Different Types of Choice-Making Interventions

Most research on choice-making interventions has focused on choices between activities and fewer studies have evaluated choice within activities (Rispoli et al., 2013). Additionally, no studies to date have assessed the effects of within-activity choice interventions without the

inclusion of across-activity choice interventions in the study as well. Across-activity choices involve allowing individuals to choose between different tasks or activities. Within-activity choices involve holding the instructional activity constant and having the instructor choose the activity, yet allowing the individual to choose between instructional materials, such as using a pen or pencil, or environmental arrangements, such as sitting at a desk or the group table. Ulke-Kurkcuoglu and Kircaali-Iftar (2010) measured on-task behavior during within-activity choice and across-activity choice conditions for four boys with ASD. They found that the levels of on-task behavior were comparable for both conditions.

Additionally, Dibley and Lim (1999) evaluated the effects of within- and across-activity choice on the frequency of protests exhibited by students with severe intellectual disabilities. They used an ABABC single-subject design in which “B” represented within-activity choice and “C” represented both within-activity and across-activity choices. The authors found that the within-activity choice condition reduced protests, yet protests were further reduced when across-activity choices were also implemented. Although this study provides interesting results, there were several limitations that warrant further investigation. First, a true comparison of within- and across-activity choice was not evaluated since the two types of choices were combined in condition “C” of the study. Additionally, task preference was not assessed or controlled for in this study. Without assessment of task preference, it is not known if the participants’ preference for certain tasks may have contributed to the reduction in challenging behavior during conditions that included across-activity choices. Lastly, the ABABC design did not control for potential sequence effects; therefore, it is not known if the order of conditions influenced the dependent variable.

Rispoli et al. (2013) addressed some of the above limitations. The authors evaluated the effect of choice on challenging behavior for four participants within an ABAB design in order to control for sequence effects while also demonstrating experimental control. The “A” represented a no choice, baseline condition. An alternating treatment design was embedded within the “B” phases to compare the effects of a within-activity choice condition and an across-activity choice condition.

The authors included two pre-assessment measures: the Questions About Behavioral Function (QABF: Vollmer and Matson, 1995) rating scale and a Multiple Stimulus Without Replacement (MSWO) preference assessment, in order to determine the function of the participants’ challenging behavior, as well as their preference for educational activities. Although it is beneficial that the authors gathered information about the function of the challenging behavior, they utilized an indirect measure which does not demonstrate experimental control. Therefore, it would be more beneficial to conduct a functional analysis which allows for a thorough evaluation of the factors that contribute to problem behavior. Additionally, although the authors noted that the preference assessment revealed that all of the educational activities were equally non-preferred, no information was provided about which activities the participants chose and if they were able to avoid certain activities. It is possible that the participants repeatedly picked the same activities, and that this repeated engagement made the activities easier and less aversive. Further, individuals’ preferences may have changed throughout the study, which was not assessed since a preference assessment was only conducted at the beginning of the study. Lastly, the study did not evaluate increases in positive behaviors, such as the amount of work completed, on-task behavior, or the accuracy of responses during instruction, which are also socially significant dependent variables.

In spite of these limitations, Rispoli et al. (2013) found both statistically and clinically significant results. All participants displayed higher levels of challenging behavior during no choice, baseline conditions than during choice conditions. The rates of behavior in the across- and within-activity choice conditions were low for all participants; however, the across-activity choice condition was associated with the lowest rates of challenging behavior for three of the four participants. The fourth participant showed no clear differentiation in rate of challenging behavior across the choice conditions. Although across-activity choices may result in slightly greater reductions in challenging behavior than within-activity choices, it appears that either choice format has the potential to produce positive results. Therefore, it is likely beneficial to use either intervention if one type of choice intervention is more feasible to implement than the other in certain settings. However, it is important to note that the results could have been influenced by carry-over effects as a result of the alternating treatment design. Isolating within-activity choice conditions may produce clearer results.

The Present Study

In recent years, there has been a shift in the education and interventions for children with ASD to focus on positive behavior support, relying more on reinforcement based consequences and antecedent strategies than on reactive and punishment based procedures (Dunlap et al., 1994). These approaches aim to prevent rather than suppress problem behavior and increase appropriate behavior in this population. Providing individuals with more choices throughout their day represents one such antecedent manipulation that has shown to have a positive impact on the lives of these individuals. In addition to the general effectiveness of choice-making interventions in reducing problem behavior, including aggression, self-injurious behavior, and property destruction, and increasing positive behavior, such as task engagement, there are also

practical advantages to using choice-making strategies. Choice-making interventions are not contingent on a behavior, rather they occur before behaviors, and, therefore, are easier to implement. Additionally, these interventions likely have a high level of social validity because of their easy implementation, positive outcomes, and ability to help individuals with disabilities maintain more control and autonomy in their lives.

There are many educational tasks that individuals cannot avoid and that evoke problem behavior. Additionally, it is not always possible to provide across-activity choices because at some point students have to engage in non-preferred activities, which they would likely not choose if given the opportunity. Therefore, it is important to determine ways to make these non-preferred activities more desirable in order to lead to more productive work sessions, consisting of fewer challenging behaviors and more on-task behavior. Although there has been a lot of research on choice-making interventions, no studies have been conducted assessing within-activity choice using task preference assessments to identify non-preferred tasks. Therefore, when evaluating previous research, it cannot be concluded with certainty that changes in participants' behavior were because the participants were given the opportunity to make choices. Rather, it may have been because the participants were simply given the opportunity to engage in more highly preferred activities. The purpose of the present study was to isolate non-preferred activities and offer choices within the tasks. Based on previous research on choice-making interventions, this intervention is predicted to decrease negative behaviors and increase positive behaviors during the identified non-preferred activities.

The present study extended the available research in several ways. First, a functional analysis was conducted prior to implementation of any choice intervention to systematically determine the function of the individual's behavior. This enabled the researchers to assess if

there was a correlation between the function of problem behavior and intervention effectiveness. Additionally, a task preference assessment was conducted to identify non-preferred tasks. This allowed for the evaluation of choice interventions in the context of least preferred tasks and provided a greater understanding of the relation between the preference of tasks, the preference of choice, and decreases in problem behavior. Additionally, the dependent variables included both negative and positive behaviors, to fully assess the effects of choice-making interventions. Problem behavior was operationally defined for each participant, and included aggression, self-injurious behavior, and property destruction. Furthermore, although not included in most previous studies, problem behavior also included vocal stereotypy for one participant. Stereotypy can interfere with academic instruction and slow the rate of skill acquisition. Additionally, stereotypy can be disruptive to others in the environment and impede social interactions, as well as be socially stigmatizing. Other dependent measures included percent of on-task behavior. Lastly, treatment integrity was measured, data which were often lacking in previous research, to ensure that the choice-making interventions were implemented as planned, as well as consistently across staff members (Tullis et al., 2011).

Methods

Participants and Setting

Instructors referred one boy and one girl who met criteria to participate in this study. Participants were students at a center-based school program for individuals with autism spectrum disorder (ASD). Each participant had to be able to reliably indicate preference for tasks, which was assessed before the start of the study.

Frank was a 7-year-old male diagnosed with ASD. He works in a classroom with two other children, receives one-on-one instruction, and engages in group activities with five other

children. Frank also receives multiple sessions of speech therapy throughout the week. He communicates using full sentences, although exhibits poor articulation. Staff report that Frank exhibits challenging behavior when he is asked to complete non-preferred tasks or when told it is time to stop engaging in preferred activities.

Alison is a 7-year-old female diagnosed with ASD. She works in a classroom with two other children and typically receives one-on-one instruction, although sometimes works in dyads with one instructor and two students. Alison also engages in group activities with five other children and receives multiple sessions of speech therapy throughout the week. She communicates using mostly two to three-word phrases, although is prompted to use full sentences, particularly when requesting preferred items or activities (e.g., “I want gummies.”). Alison also uses a Picture Exchange Communication System (PECS). Staff report that she exhibits challenging behavior when she is asked to complete non-preferred tasks or when told it is time to stop engaging in preferred activities.

All sessions were carried out in an assessment room adjacent to the students’ classroom. For Frank, the effects of within-activity choice-making were also evaluated within his classroom. Sessions were conducted by familiar instructors and research staff members.

Materials

Materials included those needed for seven educational tasks for each student. For example, for matching tasks, sets of identical objects or pictures were used depending on the student’s behavioral repertoire. Additionally, reinforcers from students’ typical reinforcement system were used for each student (e.g., candy, chips, toys, iPad).

Dependent Measures

Data were collected via a computer-based continuous data collection program, as well as video recorded, for all experimental conditions based on the following dependent measures:

Problem Behavior. Problem behavior was operationally defined for each participant. Data were collected on the percent of each session or responses per minute that the individual engaged in each type of problem behavior.

Frank's problem behavior consisted of aggression (i.e., any instance of the following directed towards another person: biting, scratching, hitting, kicking, grabbing, pushing, poking, pulling hair, or throwing objects or any attempts to do any of the above.), property destruction (i.e., any action that resulted in damaging property including hitting, kicking, throwing, pushing, ripping, defacing, or biting an object, and dumping items out of containers.), and screaming (i.e., any vocalizations above speaking level.). Combined problem behavior for Frank included instances of aggression, property destruction, and screaming. Frank also exhibited tantrums (i.e., continuous aggression and disruption lasting more than 30s) within his daily classroom activities; however, he did not engage in any tantrums during the present study.

Alison's problem behavior consisted of self-injurious behavior (i.e., any instance in which Alison hit herself with her hand from six inches or greater and any instance in which she pinched/grabbed herself.), aggression (i.e., any instance of hitting, kicking, scratching, or punching others, including attempts to do any of the above.), and screaming (i.e., any utterance above speaking level). Alison's challenging behaviors also included vocal stereotypy, which was defined as any instance of non-contextual speech or sounds. Combined problem behavior for Alison consisted of any instances of self-injurious behavior, aggression, and screaming. Vocal stereotypy is reported separately because it was found to be maintained by a different

function than the other types of problem behavior and is measured by duration rather than frequency.

On-Task Behavior. On-task behavior was defined as 1) looking at the instructor (i.e., the participant's eyes are oriented towards the instructor for at least 3s), 2) answering a question asked by the instructor or saying something related to the activity, or 3) demonstrating appropriate behavior needed to complete the task (e.g., after the instructor says, "Match," the participant moves one picture on top of another picture). Data were collected on the percent of each session that the individual exhibited on-task behavior.

Procedure

The procedure for this study was based on the procedures developed and carried out by Rispoli et al. (2013). However, some differences were implemented, such as the inclusion of functional analyses of problem behavior and repeated task preference assessments.

Functional Analysis. Prior to experimental conditions, a functional analysis using methods similar to Iwata, Dorsey, Slifer, Bauman, & Richman (1982/1994) was conducted to determine the function of participants' problem behavior. For Frank's functional analysis of combined problem behavior, three test conditions (attention, tangible, and escape) and one control condition were conducted. For Alison's functional analysis of combined problem behavior, four test conditions (attention, tangible, escape, no consequence) and one control condition were conducted. For Alison's functional analysis of vocal stereotypy, three test conditions (attention, escape, no consequence) and one control condition were conducted. The following is a description of each of the conditions used in the functional analyses. During the attention condition, the participant was provided with preferred attention (e.g., praise, high-fives, tickles, engaging him in preferred conversation topics) for 20s. Attention was then withheld as

the antecedent. When the participant engaged in any of the target behaviors, the teacher provided him/her with attention for 20s. During the tangible condition, the participant was given access to preferred items (e.g., toys) for 20s. Tangibles were then removed. The preferred items were withheld as the antecedent. When the participant engaged in any of the target behaviors, the teacher gave the participant access to the preferred items for 20s. During the escape condition, the participant was presented with work tasks (e.g., worksheets, receptive id of pictures) as an antecedent. When the participant engaged in any of the target behaviors, the teacher removed the task for 20s. During the no consequence condition, the participant had no access to attention or tangibles and there were no task demands. No consequences were provided if the participant engaged in the target behaviors. During the control/toy play condition, the participant was given access to attention and toys and there were no task demands. There were no programmed consequences in place for target behaviors (i.e., the teacher did not change her behavior). Sessions were five minutes in length and presented in a randomized order until clear patterns emerged. For Frank, a functional analysis was first conducted in a small assessment room adjacent to his typical classroom. However, staff reported qualitative differences in his behavior across settings. More specifically, they reported that problem behavior was more severe and occurred in more contexts in the classroom setting, as compared to in the assessment room. Therefore, a functional analysis was also conducted in his classroom. For Alison, the functional analyses were conducted in the assessment room.

Task Preference Assessments. In order to control for the effects of choice versus preference, instructors conducted a task preference assessment at the beginning and end of the experiment, as well as when the assessment location changed (as was the case for Frank). Instructors performed a Multiple Stimulus without Replacement (MSWO) task preference

assessment (DeLeon & Iwata, 1996). Instructors and researchers identified seven non-preferred, mastered educational tasks from each student's current or past programming, which had been associated with challenging behavior, to be used during the MSWO. Sessions for the MSWO were conducted in the participant's classroom. During the MSWO, all tasks were presented simultaneously on the classroom group table. The participant was instructed to "pick one." Once a task was selected, the participant was instructed to complete the task for one minute and then the task was removed from the array. The remaining tasks were presented until all tasks had been selected and a rank order of preference was determined. The MSWO was conducted at least three times until consistent selections were observed. The mode ranking was used to determine the three least preferred activities and these activities were included in the choice evaluation. For Alison, additional evaluations were conducted using her three most preferred activities.

Choice Evaluation. A single case, reversal design was utilized in this study to evaluate the effects of within-activity choices on problem behavior and on-task behavior. All sessions in each experimental condition included three least preferred tasks from the MSWO and were five minutes in length. Once the session began, the instructor used least-to-most prompting as necessary to ensure that the participant was properly engaging with the materials. In all experimental conditions, contingent on the occurrence of escape-maintained problem behavior, the student was provided a 20s break. Students received verbal praise for correct responding during instructional tasks. Once the session was over, access to preferred items or edibles was provided.

No Choice/Baseline Conditions. During the no choice condition, the instructor presented tasks from the three least preferred activities identified during the task preference assessment and

systematically selected environmental arrangements, order of activities, and instructional materials during each session. The instructor first said, “It’s time for work,” and then presented the activity, relevant materials, and an instruction relevant to the activity. The participant continued to work on the educational tasks until five minutes passed. Teachers were instructed to maintain an equal balance of materials and locations within the sessions, as well as vary the order in which activities were presented. If a participant expressed choice during this condition (e.g., asked to switch activities, materials, or location), the instructor stated, “We need to do this work now,” “We need to use these materials now, or “We need to stay here right now.”

Within-Activity Choice Conditions. In the within-activity choice condition, instructors provided the same three least preferred tasks identified in the MSWO as the baseline condition. The participant was then given the opportunity to make several choices about how to work on the activities as part of a choice package. Based on choices that were feasible and acceptable for the given setting, the instructor gave the student the opportunity to choose the location that he or she completed the activity and which materials to use. However, the order of activities was determined by the instructor. The instructor first asked the student to choose between two different locations. For example, the instructor said, “Do you want to do writing at this table or at the other table?” After the student made a selection and the student and instructor moved to the selected location, the teacher provided a second choice of which materials to use. The teacher placed or held up two sets of materials related to the activity in front of the student and asked the participant to “pick one.” For example, if the educational task was writing the participant was allowed to select between writing with a pencil or marker. The student had the opportunity to pick which location and set of materials to use for each activity. If no choice was made, the instructor presented the choice three times before selecting the location or set of

materials that would be used for that activity. If the student spontaneously and appropriately requested to change locations or materials during the session, he or she would be given the opportunity to do so. The participant continued to work on the educational tasks until five minutes passed.

Procedural Variations. Following the initial choice evaluation in the assessment room, the effects of procedural variations were assessed for each participant. Frank's staff members reported that his behavior in the assessment room differed from typical behavior in the classroom. Therefore, an additional evaluation took place in the classroom. Sessions in the classroom were first conducted without contingent breaks and later conducted with contingent breaks. In the previous evaluation in the assessment room with contingent breaks, Frank often screamed "no break" and engaged in property destruction during breaks. Therefore, the researchers wanted to assess if differences existed in the rate of problem behavior when breaks were offered contingent upon problem behavior, as compared to when no breaks were provided.

For Alison, choice was also evaluated using her three most preferred choices. The tasks were again kept consistent across baseline and choice evaluations. Further, additional choice sessions were conducted (choice-materials only) in which Alison was only given the choice between two sets of materials for each activity, rather than also being given a choice of which location to complete each activity. This variation was included to further assess if various types of choice differentially affected Alison's behavior.

Treatment Preference Assessment. A concurrent chains arrangement was used to assess which condition, either baseline or choice, each participant preferred. Training sessions were first conducted in which a visual stimulus cue was associated with each condition. The cues were 8 x 11 pieces of construction paper, with orange signaling the baseline condition and green

signaling the choice condition. Prior to beginning this evaluation, staff reported that neither participant exhibited any color preferences. The choice condition included the full choice package for Frank, yet included only choices of materials for Alison. The instructor stated the rule “When the orange paper is out I pick where we sit and what materials we use for work,” or “When the green paper is out you pick where we sit and the materials we use for work,” depending on which condition was being trained. Frank was exposed to each contingency two times. He was then asked to explain each contingency to ensure that he understood them, at which point trials were conducted. Alison did not have the verbal ability to explain the contingencies on her own. However, as being exposed to the contingencies during the training phase, she repeated what the instructor said (e.g., “green,” “my,” “orange” and “your”). She was exposed to each contingency 10 times, since she had minimal previous exposure to colored stimulus cues and was not able to verbally indicate that she understood the contingencies. Trials were then conducted. Each trial started with the instructor holding up both pieces of paper and asking the student to “pick one.” The positioning of the two pieces of paper was counterbalanced across sessions. Once a colored paper was selected, it was left out on the student’s desk and he/she was required to complete one minute of work, consisting of the same educational activities used at the end of the study, according to the procedures of the condition chosen (i.e., either receiving choices or not). Each session consisted of five trials, after which the student received reinforcement and a break.

Interobserver Agreement (IOA) and Treatment Integrity (TI). IOA and TI data were collected throughout the study. IOA was assessed for 33.33% of all sessions, across conditions and participants, by graduate research assistants who had been previously trained in the data collection system. Each session was divided into 10-s bins, and the number of observed

responses or seconds of an event was scored for each bin. For each bin, the smaller number of observed responses/ seconds of event was divided by the larger number of observed responses/ seconds of event. The results were then averaged across the entire session. Interobserver agreement averaged 87.65% for Frank's on-task behavior (range 72.77%-97.38%), 97.29% for Frank's combined problem behavior (range 81.67%-100%), 88.30% for Alison's on-task behavior (range 75.65%-97.33%), 83.31% for Alison's vocal stereotypy (range 70.37%-97.36%), and 93.94% for Alison's combined problem behavior (range 70.87%-100%).

Moreover, independent recorders also collected TI data for 33.33% of all sessions. A procedural task analysis was prepared for each study phase with the instructor's behaviors operationally defined. Appendix A includes the treatment integrity data sheet for baseline conditions and appendix B includes the treatment integrity data sheet for choice conditions. TI was calculated by dividing the number of procedural steps completed correctly by the total number of procedural steps for that condition, and then multiplying by 100%. The combined mean TI across all conditions of the study for both participants was 96.49% (range 80%-100%).

Results

Frank

Functional Analysis. Figure 1 depicts Frank's rate of combined problem behavior during the functional analyses in the assessment room (top panel) and classroom (bottom panel). Results showed high levels of combined problem behavior in the escape condition conducted in the assessment room ($M=.95$). Only the last tangible condition resulted in increased rates of problem behavior. The rates of combined problem behavior during the classroom functional analysis were elevated during the tangible ($M=2.73$) and escape ($M=3.4$) conditions. Rates of problem behavior were low during the attention ($M=.067$) and control ($M=.067$) conditions.

Therefore, results suggest that Frank's target behaviors are maintained by escape from demands and restricted access to preferred items.

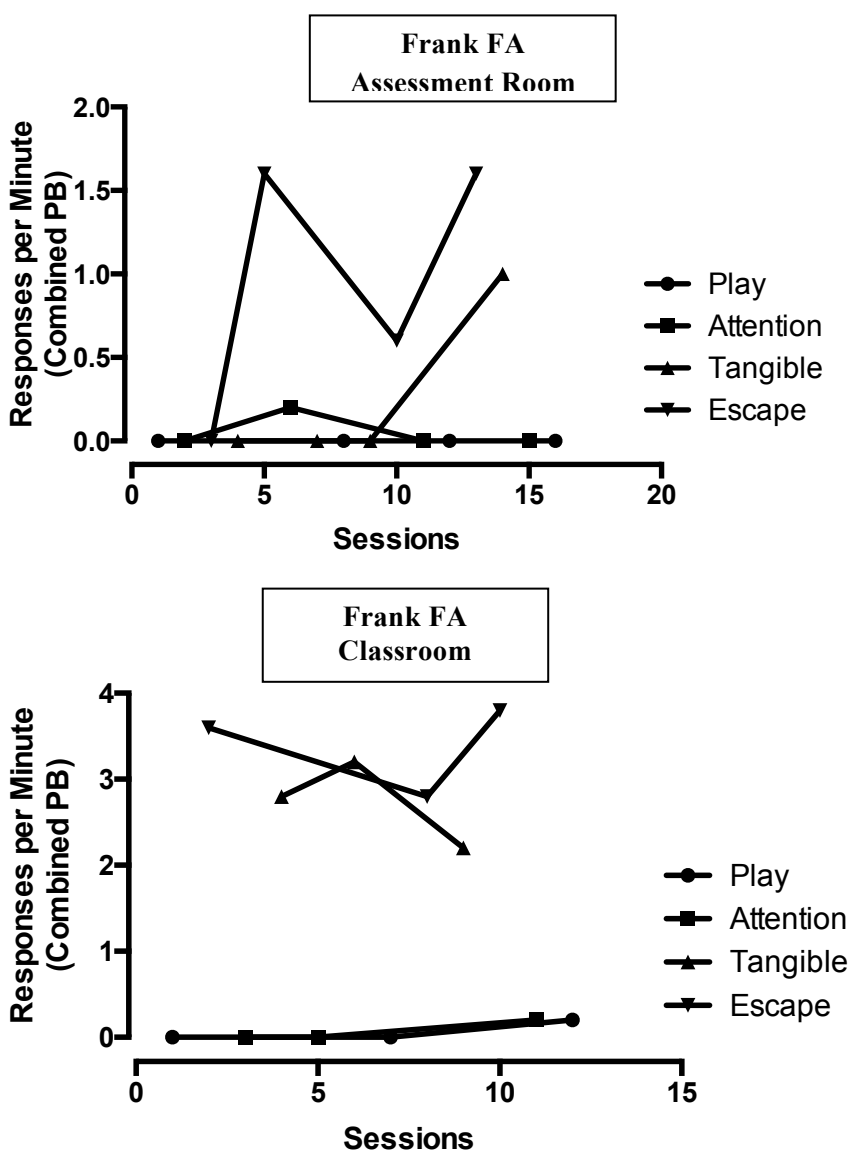


Figure 1: Frank's rate of combined problem behavior during the functional analysis run in the assessment room (top panel) and the functional analysis run in his classroom (bottom panel)

Task Preference Assessment. The seven identified educational tasks for Frank included coloring in a coloring book, writing his name, worksheets (e.g., matching, tracing, writing words), word searches, reading from a book, typing, and lacing boards. Table 1 depicts Frank's

preference of activities at various time points during the study. Based on his preferences prior to starting the study, lacing boards, worksheets, and writing his name were the three educational activities used in the first phase of the study in the assessment room. Based on Frank's preference of activities after completing the first phase of the study in the assessment room, worksheets, reading from a book, and lacing boards were the three educational activities used during the second phase of the study in the classroom.

Table 1: Frank's preference of activities at various time points during the study

Activity	Rank Order at the Beginning of the Study	Rank Order After Phase 1 of the Study	Rank Order at the End of the Study
Coloring in a coloring book	2	1	3
Writing his name	7	3	7
Worksheets	6	5	6
Word searches	4	4	5
Reading from a book	3	6	2
Typing	1	2	1
Lacing boards	5	7	4

Choice Assessment (Assessment Room). Sessions for Frank were initially conducted in an assessment room adjacent to his classroom. Figure 2 depicts Frank's rate of combined problem behavior during baseline and choice conditions (top panel) and his percent of on-task behavior (bottom panel) for sessions conducted in the assessment room. There was little differentiation between Frank's rate of problem behavior and on-task behavior during baseline phases and choice phases. The rate of problem behavior was relatively low, with several sessions at 0 instances, and occurred equally across the baseline ($M = .199$; range 0-2.4) and choice ($M = .144$; range 0-2.4) conditions. Frank's on-task behavior was slightly higher during choice conditions ($M = 94.04\%$; range 55.99%-100%), as compared to when choices were not

provided ($M = 89.96\%$; range 64.2%-99.3%), however this difference may not be clinically significant.

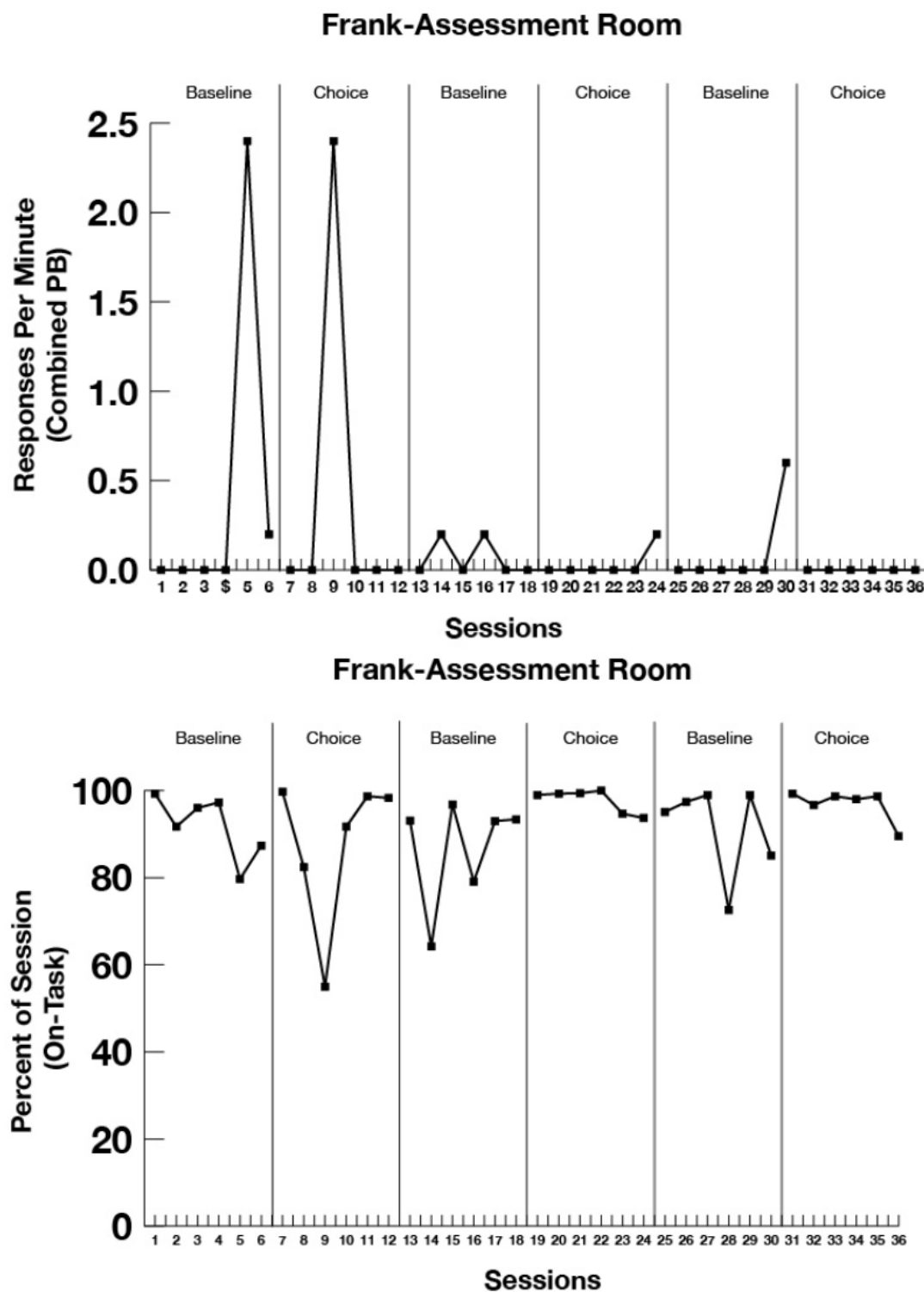
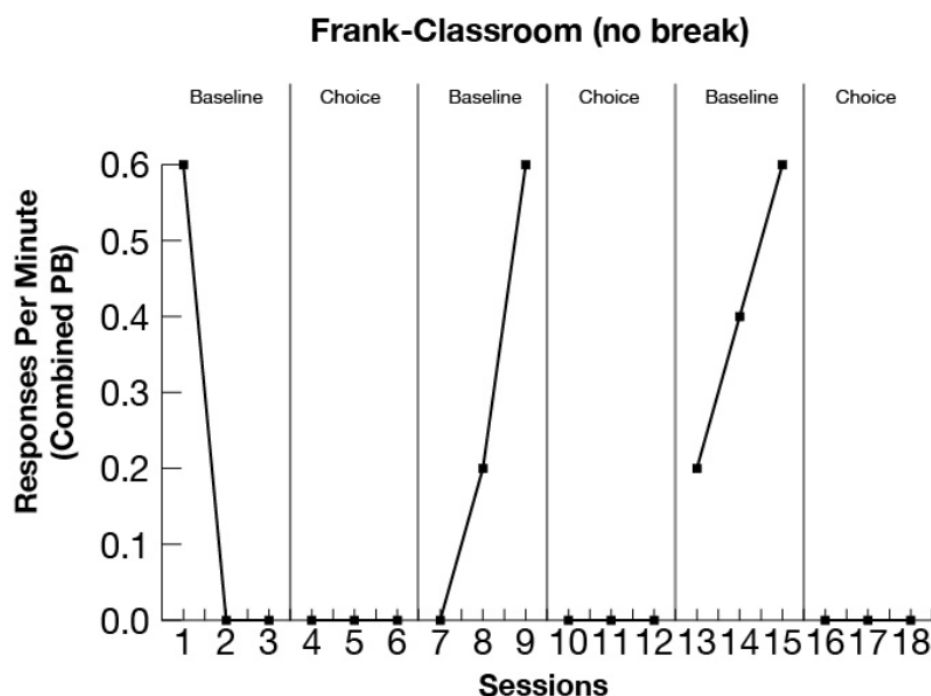


Figure 2: Frank's rate of combined problem behavior (top panel) and percentage of on-task behavior (bottom panel) during baseline and choice sessions run in the assessment room

Choice Assessment (Classroom). Figure 3 depicts Frank's rate of combined problem behavior (top panel) and percentage of on-task behavior (bottom panel) during baseline and choice conditions run in his classroom when no break was provided contingent on instances of problem behavior.

Frank's overall mean rate of problem behavior during baseline conditions in the classroom when no breaks were provided contingent on problem behavior was .29 (range 0-.6). Frank did not exhibit any instances of problem behavior during choice conditions in the classroom when no breaks were provided for problem behavior (although there were no opportunities for Frank to be offered a break during these sessions since he did not engage in any challenging behavior). Additionally, on average, Frank remained on-task for a greater percentage of the session during choice conditions ($M=95.45\%$; range 86.3%-100%), as compared to baseline conditions ($M=75.43\%$; range 23%-96.5%).



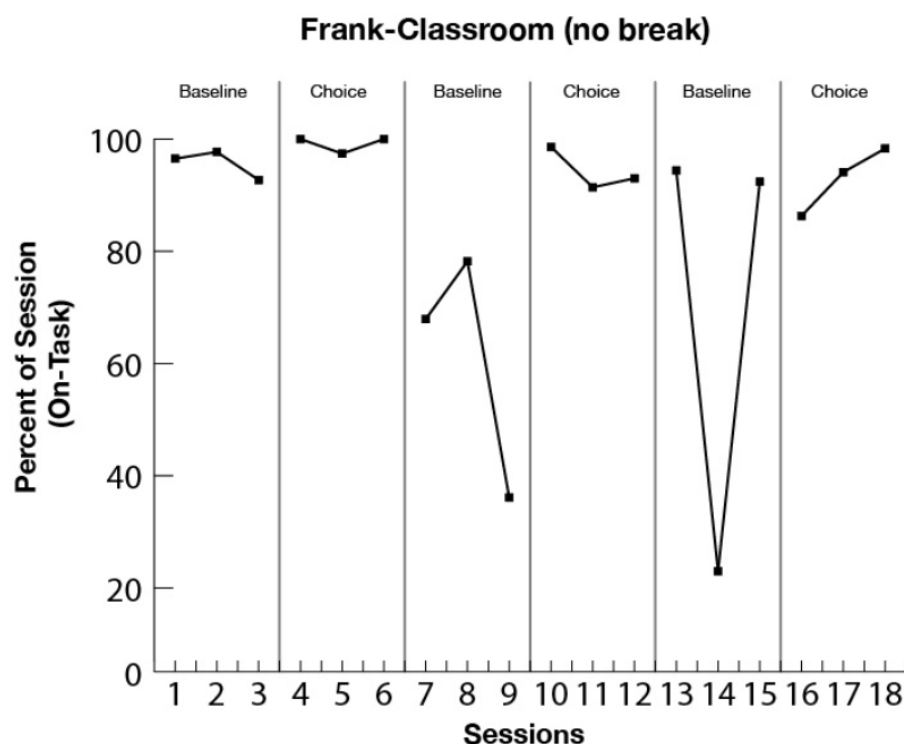
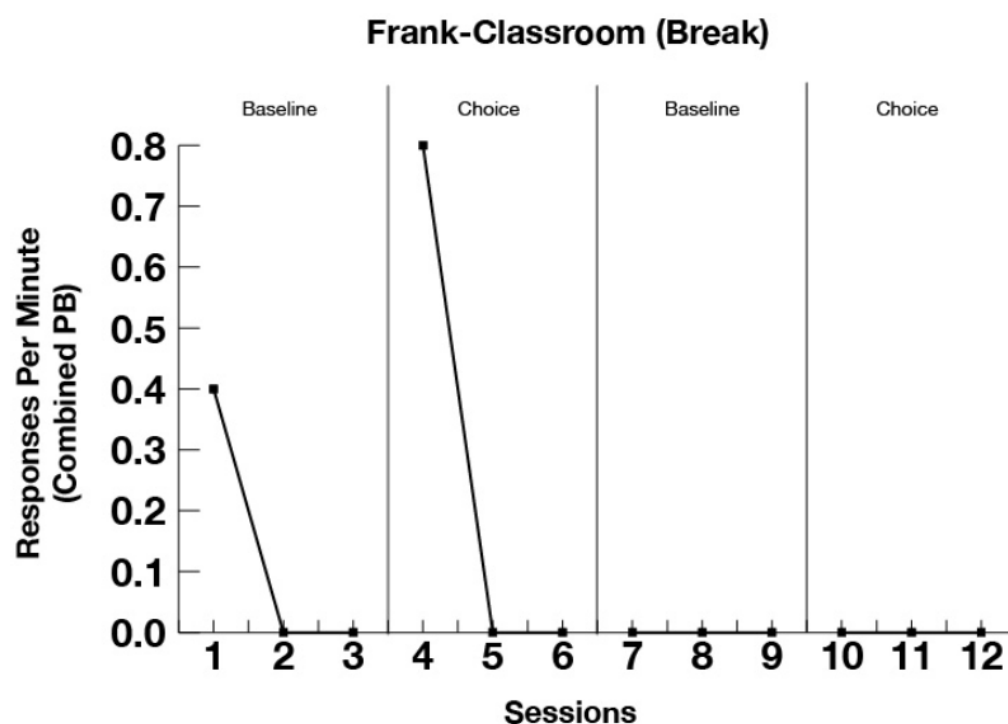


Figure 3: Frank's rate of combined problem behavior (top panel) and percentage of on-task behavior (bottom panel) during baseline and choice sessions run in his classroom when no break was provided contingent on instances of problem behavior

Lastly, sessions were run in the classroom again, yet with breaks provided after instances of problem behavior. Figure 4 depicts Frank's rate of combined problem behavior (top panel) and percentage of on-task behavior (bottom panel) during baseline and choice conditions run in his classroom when a break was provided contingent on instances of problem behavior. During this initial baseline phase, Frank's mean rate of problem behavior was .13 (range 0-.4). It is interesting to note that during the first baseline condition, Frank became upset because he wanted to choose a different lacing board than the one he was told to complete. During this session, he was only on task for 38.6% of the session because he spent most of the time trying to hide the lacing board and retrieve a different one. During the first choice phase, Frank's mean rate of challenging behavior was .27 (range 0-.8). It is important to note that during the first choice condition, Frank picked a worksheet that mistakenly contained different material which was

substantially harder than the worksheets in all of the other conditions. Frank exhibited problem behavior during this worksheet but did not request to change to a new worksheet. When breaks were provided after the occurrence of problem behavior, Frank said he did not need a break and tried to get the worksheet from the instructor's hands. During the final baseline and choice phases, Frank did not exhibit any instances of problem behavior. During the baseline conditions he often asked if he could pick the materials for a given task, yet remained "calm" (i.e., did not engage in instances of aggression, property destruction or screaming) when told that he had to use the materials he was given. Additionally, on average, Frank remained on-task for a greater percentage of the session during choice conditions ($M=87.22\%$; range 73.7%-98.7%), as compared to baseline conditions ($M=79.69\%$; range 38.6%-95.3%).



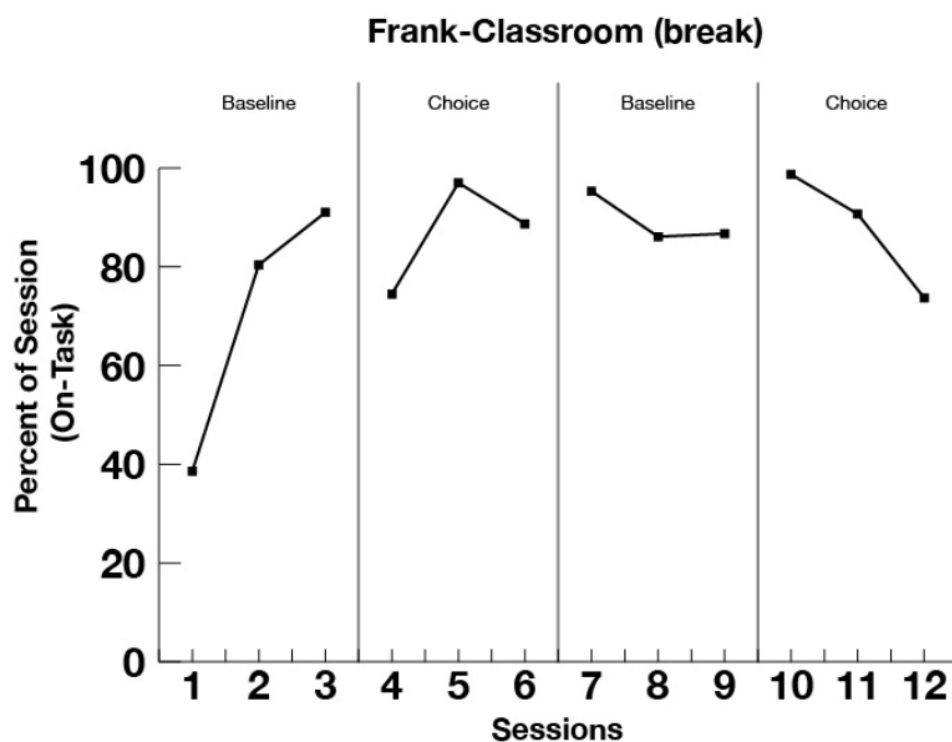


Figure 4: Frank's rate of combined problem behavior (top panel) and percentage of on-task behavior (bottom panel) during baseline and choice sessions run in his classroom when a break was provided contingent on instances of problem behavior

Treatment Preference Assessment. When given the opportunity to choose between baseline and choice conditions, Frank choose the choice condition 100% of the time. Figure 5 depicts Frank's percentage of selection of each condition across sessions.

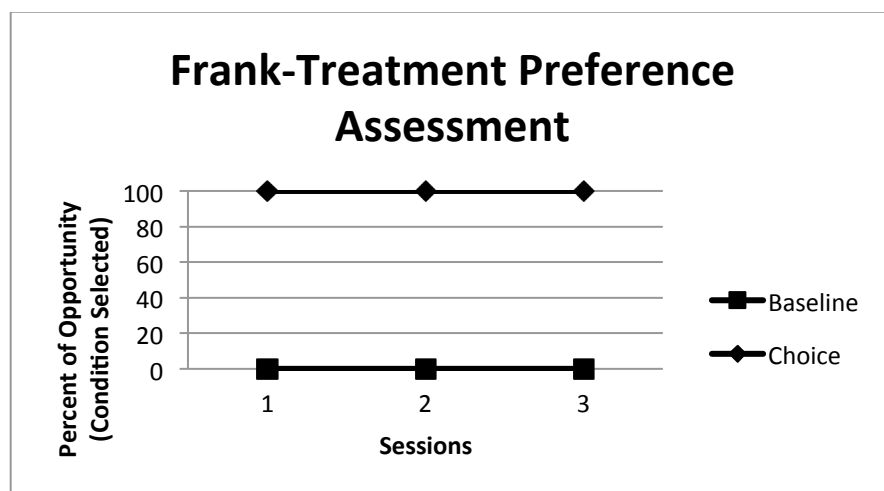


Figure 5: Frank's percentage of selection of each condition across sessions

Alison

Functional Analysis. Figure 6 depicts the results from Alison's functional analysis of problem behavior. The escape and tangible conditions resulted in increased rates of problem behavior ($M=.6$ and $.3$, respectively). Rates of problem behavior were low during all other conditions (Play/Control: $M=0$, Attention: $M=0$, and No Consequence: $M=.05$). Therefore, results suggest that Alison's target behaviors are maintained by escape from demands and restricted access to preferred items. Figure 7 shows the results from Alison's functional analysis of vocal stereotypy. Alison's average percentage of vocal stereotypy was high across all conditions (Play/Control: 49.25%, Attention: 57.15%, Escape: 65.3%, No Consequence: 59.65%), suggesting that her vocal stereotypy is maintained by automatic reinforcement.

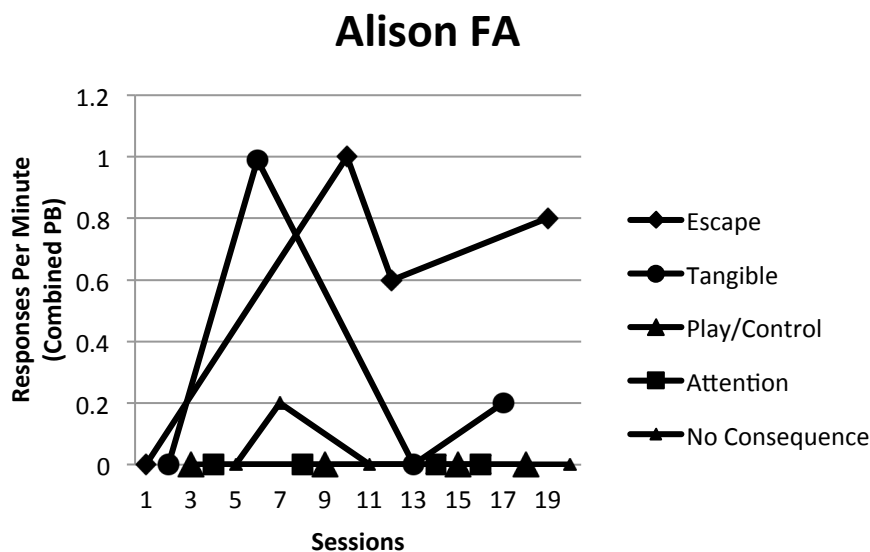


Figure 6: Alison's rate of combined problem behavior during the functional analysis

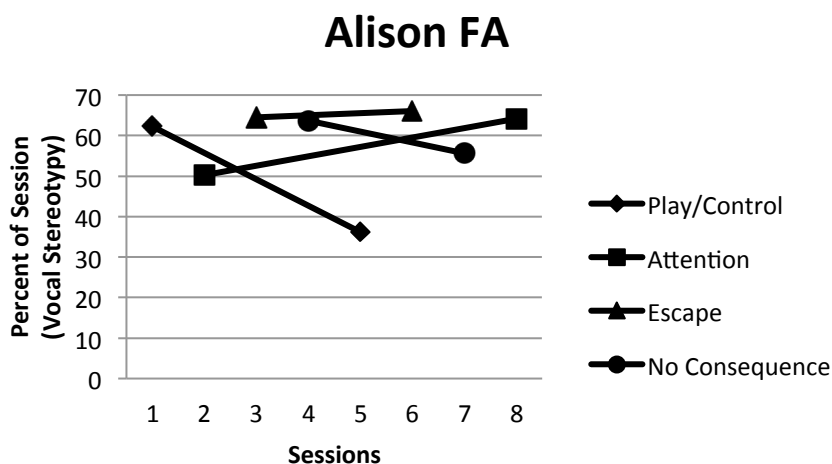


Figure 7: Alison's percentage of vocal stereotypy during the functional analysis

Task Preference Assessment. The seven identified educational tasks for Alison included singing a song, counting coins, puzzles, speech program-labeling with PECS, math worksheets (addition), telling time, and completing the pattern. Table 2 shows Alison's preference of activities prior to starting the study and at the end of the study. Based on her preferences at the beginning of the study, singing a song, counting coins, and speech program-labeling with PECS were the three educational tasks used during the study. Some sessions were also conducted using Alison's three most preferred tasks of the seven educational activities, which included math worksheets, puzzles, and completing the pattern.

Table 2: Alison's preference of activities at the beginning and end of the study

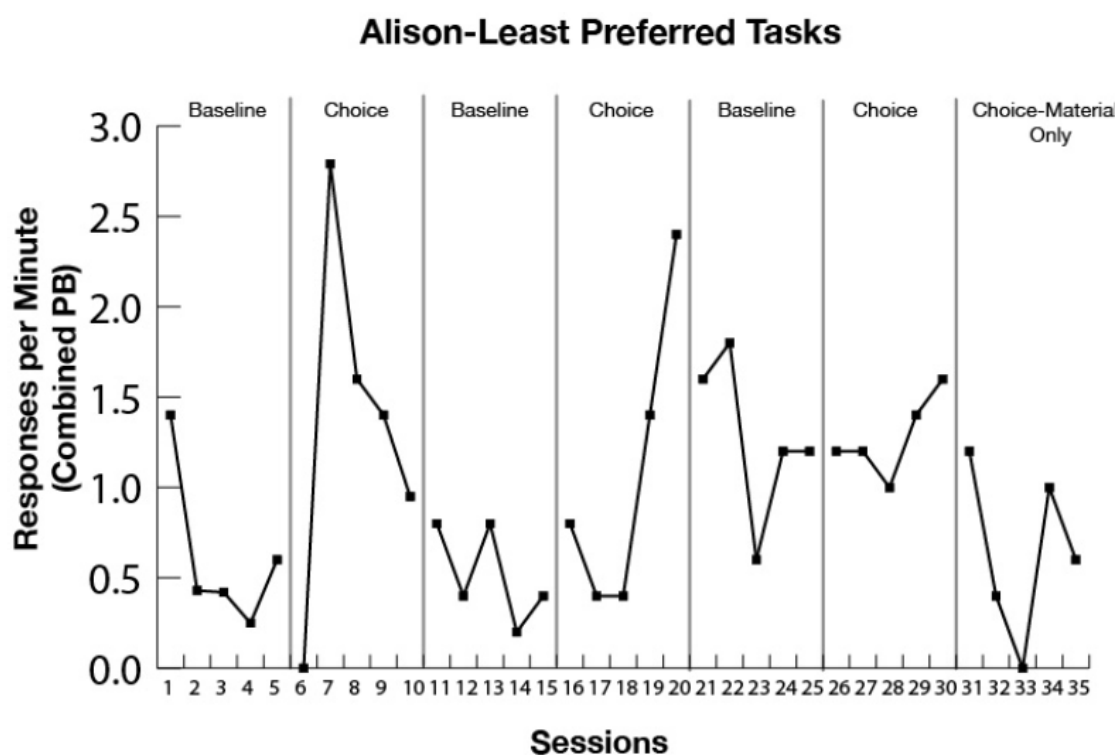
Activity	Rank Order at the Beginning of the Study	Rank Order at the End of the Study
Singing a song	5	4
Counting coins	6	5
Puzzles	2	1
Speech program	7	6
Math worksheets	1	2
Telling time	4	3
Completing the pattern	3	7

Choice Assessment. All sessions for Alison were run in the assessment room adjacent to her classroom. First, conditions were conducted using her three least preferred activities identified during the work preference assessment. Figure 8 illustrates Alison's rate of combined problem behavior (top panel), percentage of vocal stereotypy (middle panel), and percentage of on-task behavior (bottom panel) during baseline, choice, and choice-materials only sessions involving her three least preferred activities.

Alison's overall mean rate of problem behavior during baseline conditions involving her three least preferred activities was .807 (range .2-1.8). Her overall mean rate of problem behavior during choice conditions was significantly higher ($M=1.343$; range 0-2.79). Although initially there appeared to be clear differentiation between Alison's rate of problem behavior during baseline and choice phases, such that her mean rate of problem behavior was higher during choice phases, this pattern did not persist. During the initial baseline phase, Alison's mean rate of challenging behavior was .62 (range .25-1.4). When choice was then provided Alison's mean rate of problem behavior increased to 1.35 (range 0-2.79). Alison's mean rate of challenging behavior decreased to .52 (range .2-.8) when the reversal baseline condition was implemented and then increased to a mean rate of 1.4 (range .4-2.4) during the intervention reversal. When Alison went back to baseline for the third time, her mean rate of problem behavior slightly decreased to 1.28 (range .6-1.8). During the final intervention reversal when Alison was provided choice again her mean rate of problem behavior remained at 1.28 (range 1-1.6). A choice-materials only phase was also included to further assess if various types of choice differentially affected Alison's behavior. The choice of location was removed during this variation because it was observed during the full choice phases that Alison often engaged in

problem behavior when given a choice of where to complete the work task. During the choice-materials only phase, Alison's mean rate of challenging behavior was .64 (range 0-1.2), which was similar to the mean rate during the first two baseline phases.

Alison's mean percentage of vocal stereotypy was slightly higher during choice conditions ($M = 40.79\%$; range 27.1%-67.4%), as compared to when choices were not provided ($M = 35.89\%$; range 20.6%-53.8%). Her vocal stereotypy was highest, on average, when she was only offered a choice of materials to use ($M = 50.52\%$; range 27.7%-61%). However, there appears to be an overall increasing trend in vocal stereotypy across the last four conditions. Alison's on-task behavior was lower during choice conditions ($M = 65.89\%$; range 42.5%-90.4%), as compared to during baseline conditions ($M = 73.47\%$; range 46.7%-91.3%). However, overall her on-task behavior was highest during choice-materials only conditions ($M = 76.6\%$; range 63.5%-88.7%).



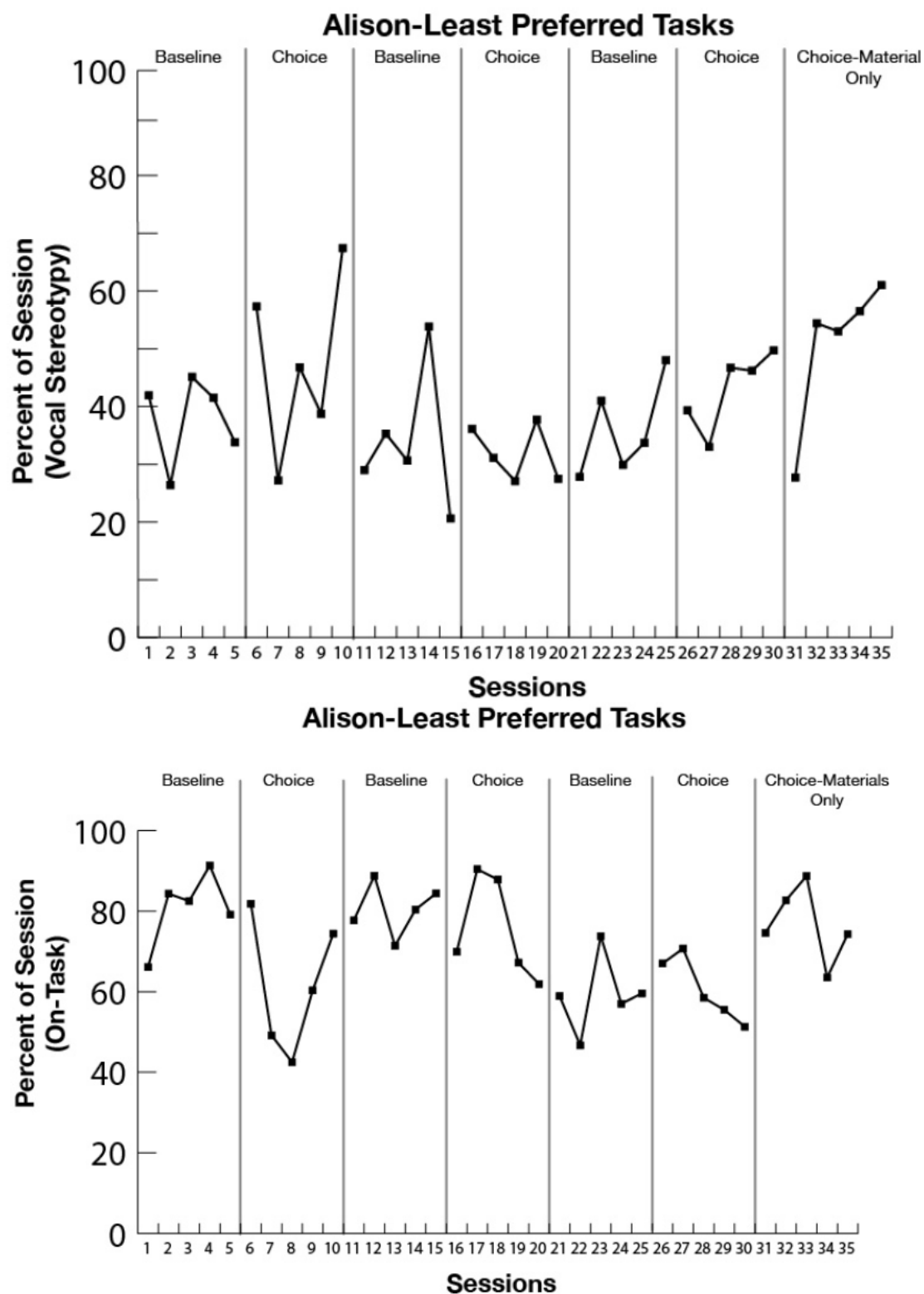


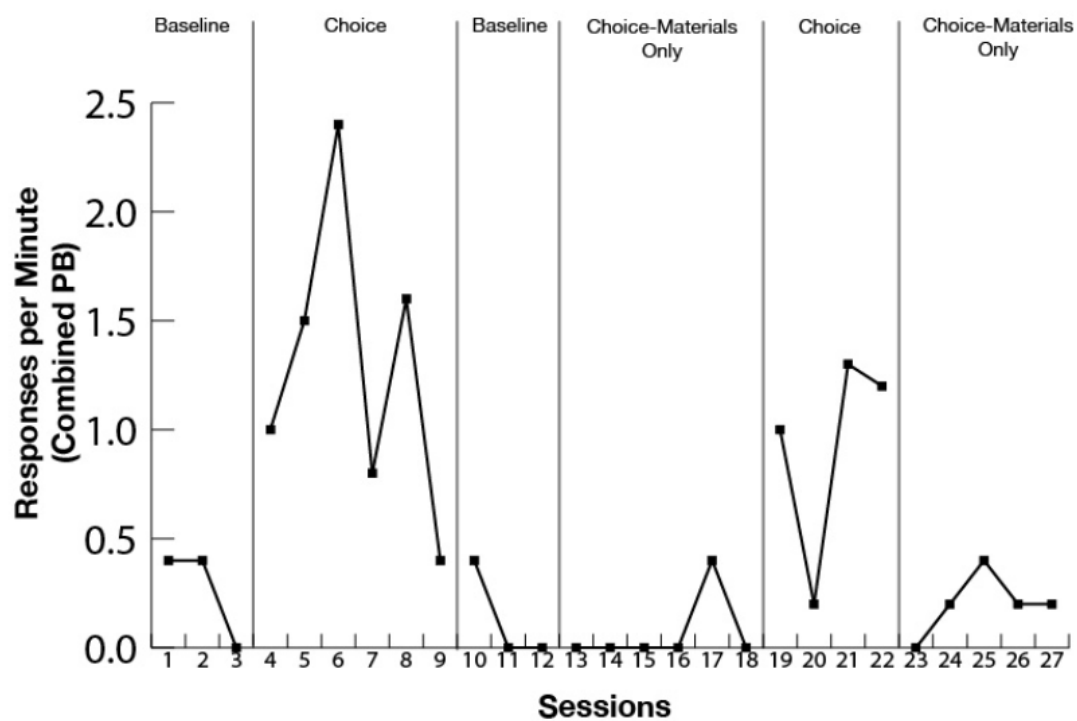
Figure 8: Alison's rate of combined problem behavior (top panel), percentage of vocal stereotypy (middle panel), and percentage of on-task behavior (bottom panel) during baseline, choice, and choice-materials only sessions involving her three least preferred activities

Following the choice assessment with the three least preferred tasks, another evaluation was conducted using Alison's three most preferred tasks from the work preference assessment to further assess why providing choice was not effective in decreasing challenging behavior and increasing on-task behavior. It is possible that choice was not effective in that context because choice functioned as another demand or, instead, related to what Alison was choosing between (i.e., materials for tasks that were least preferred). Figure 9 depicts Alison's rate of combined problem behavior (top panel), percentage of vocal stereotypy (middle panel), and percentage of on-task behavior (bottom panel) during baseline, choice, and choice-materials only sessions involving her three most preferred activities.

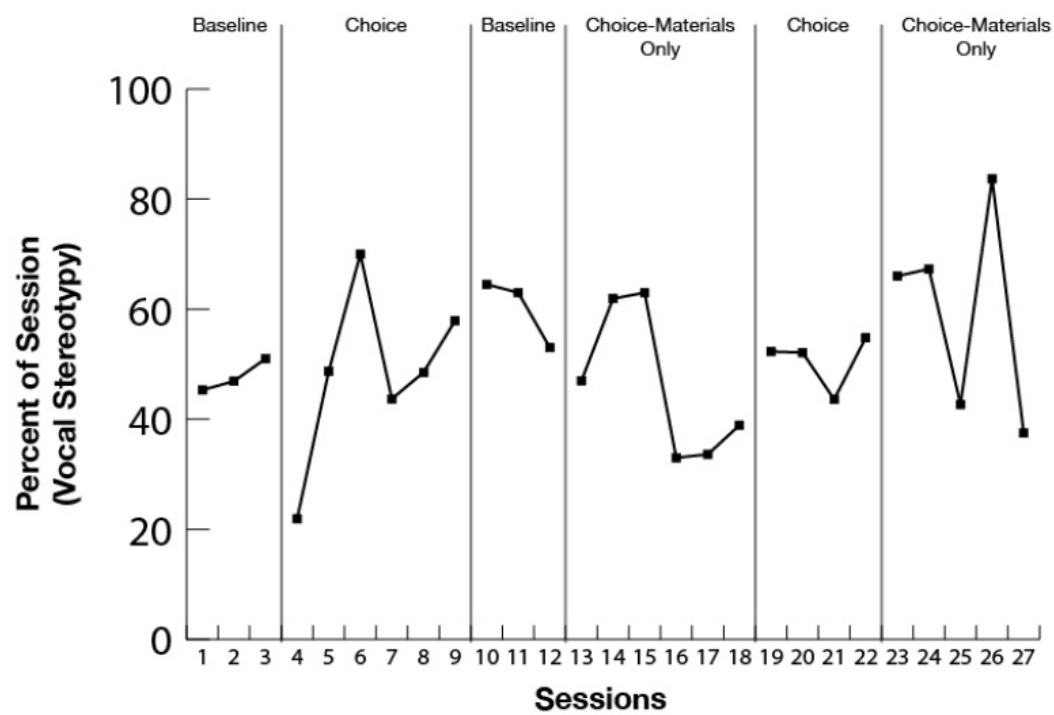
When Alison's more preferred work activities were used, her challenging behavior was highest, on average, during choice conditions ($M=1.103$; range .4-2.4). There was little differentiation between her average rate of challenging behavior during baseline phases ($M=.2$; range 0-.4), as compared to choice-materials only phases ($M=.135$, range 0-.4). These results are similar to those obtained when Alison's three least preferred activities were used and, therefore, it was likely not the level of preference of the activities being used that affected Alison's level of problem behavior.

Alison's mean percentage of vocal stereotypy was variable across sessions, yet not clinically different across any of the phases: Baseline: $M= 53.95\%$ (range 45.3%-64.5%); Choice: $M= 49.58\%$ (range 21.9%-70%); Choice-Materials Only: $M=52.84\%$ (range 33%-83.7%). Alison's on-task behavior was highest during baseline phases ($M= 89.4\%$; range 86%-94.6%) and choice-materials only phases ($M= 88.77\%$; range 81.3%-98.2%). Overall, her on-task behavior was lower during choice phases ($M= 71.74\%$; range 58.3%-89.9%).

Alison-Most Preferred Tasks



Alison-Most Preferred Tasks



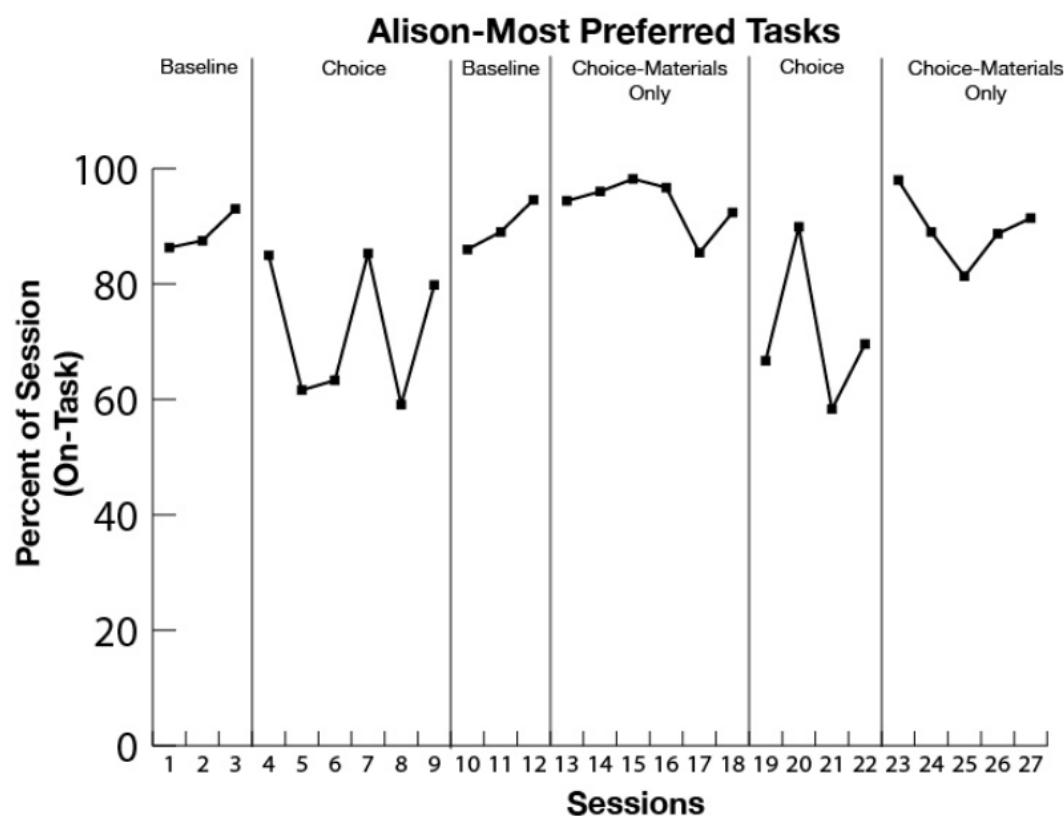


Figure 9: Alison's combined rate of problem behavior (top panel), percentage of vocal stereotypy (middle panel), and percentage of on-task behavior (bottom panel) during baseline, choice, and choice-materials only sessions involving her three most preferred activities

Treatment Preference Assessment. When given the opportunity to choose between baseline and choice-materials only conditions, Alison choose the choice-materials only condition 72% of the time. However, her preference for choice decreased over time, remaining consistently at 60% across the last three sessions. Figure 10 depicts Alison's percentage of selection of each condition across sessions.

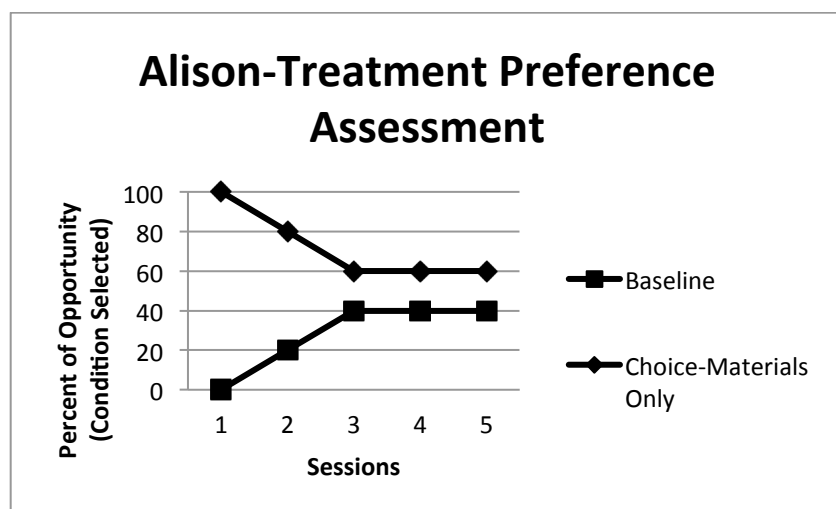


Figure 10: Alison's percentage of selection of each condition across sessions

Discussion

The present study aimed to evaluate whether providing choice during, rather than between, non-preferred activities would impact problem behavior and task engagement of two school-aged participants with ASD. Frank, a 7 year-old male and Alison, a 7 year-old female, were required to complete non-preferred activities, yet were provided the opportunity to choose which materials to use and the location to complete the tasks.

Overall, Frank exhibited low rates of problem behavior throughout the study. However, results showed that, on average, Frank exhibited a higher rate of problem behavior during baseline conditions, as compared to choice conditions. When sessions were conducted in the assessment room, after the initial baseline and choice phases, Frank's rate of combined problem behavior remained low across both conditions. When sessions were conducted in the classroom with no contingent breaks after the occurrence of problem behavior, Frank did not exhibit any instances of problem behavior during the choice conditions, yet exhibited low levels of problem behavior during the majority of baseline sessions. When breaks were provided contingent upon problem behavior, Frank's rate of problem behavior remained at 0 across most sessions of both

baseline and choice conditions. During baseline, Frank's only engagement in problem behavior was due to restricted access to choice. Frank wanted to choose which lacing board he completed and when not permitted to do so, he spent the remainder of the session screaming, kicking the table, and trying to hide the lacing board he was given, as he tried to take a new lacing board from the bag. Frank only exhibited instances of problem behavior during one choice session, during which he was mistakenly given a worksheet containing novel, rather than mastered, material. Although problem behavior was similar across choice and baseline conditions, Frank's on-task behavior was consistently higher during choice conditions, compared to baseline conditions, across all variations (i.e., sessions run in the assessment room and the classroom, as well as sessions involving contingent breaks and those with no breaks).

Frank's results demonstrate the potential effectiveness of this choice-making intervention in decreasing problem behavior and increasing task engagement. Frank appeared to like making choices. During many baseline sessions he asked to pick a different material and when told to sit at a particular table sometimes said he did not want to. When choice was restricted, Frank was sometimes able to remain "calm," yet other times repeatedly asked to switch materials and exhibited difficulty completing the designated task. It appeared that Frank enjoyed having some control over the session during choice conditions since he was able to pick the materials and location. Additionally, when systematically assessed, Frank always picked to complete work with the opportunity to choose which materials to use and where to sit, as opposed to having to complete work with the instructors making these decisions. Therefore, this type of intervention could be a useful strategy, and one that is easy to implement during Frank's typical day.

Providing Frank the opportunity to make choices during work sessions will increase his control

in the situation and hopefully help to increase his task engagement and prevent instances of problem behavior.

Results from Frank's functional analyses demonstrated that his problem behavior is maintained by escape from demands and restricted access to preferred items or activities. Surprisingly, Frank did not seem to like being given a break contingent on instances of problem behavior during the study sessions. He often screamed that he did not need a break and tried to get the work materials back, to either continue working on the task in some instances, yet other times to destroy the materials (e.g., ripping worksheets). As mentioned above, once Frank had experience with being given choices of materials and location, he often asked to make choices during work tasks and sometimes became upset if his request was denied. In contrast, the provision of choice-making opportunities appeared to allow Frank to get his required work done with a higher percentage of on-task behavior.

It is also important to note that Frank's task preferences remained quite consistent throughout the study. A task preference assessment was conducted with Frank at three time points: before beginning the study, between phase 1 of the study in the assessment room and phase 2 of the study in his classroom, and at the end of the study. At each time point, Frank had two of the three same least preferred work activities. Therefore, Frank's low rates of problem behavior were likely not due to a change in preference for the activities being used during the study.

Overall, the choice package did not have beneficial effects for Alison. On average, Alison exhibited the highest rates of problem behavior and the lowest percentage of on-task behavior during choice conditions, regardless if her least preferred or most preferred work tasks were used. She engaged in considerably lower rates of problem behavior and a higher

percentage of on-task behavior during baseline and choice-materials only conditions. Overall, her challenging and on-task behaviors were not clinically different during baseline conditions, as compared to during choice-materials only conditions. When Alison's three least preferred activities were used, she exhibited, on average, the highest percentage of vocal stereotypy during choice-materials only conditions. However, this may be due to an overall increasing trend across conditions. Therefore, it is possible that if another condition following the choice-materials only condition was implemented, vocal stereotypy would have remained high or increased. When Alison's three most preferred activities were used, there was little differentiation, on average, between her percentage of vocal stereotypy during baseline, choice, or choice-materials only conditions. Further, there were high levels of treatment integrity across participants and conditions, demonstrating that differentiation in rates of problem behavior and percentages of on-task behavior were not the result of the choice-making intervention being implemented inaccurately or inconsistently.

Alison received breaks contingent on any instance of problem behavior across all of the conditions. Therefore, some of Alison's instances of challenging behavior may have been the result of her motivation to escape demands. However, because the contingent break was in place across both baseline and choice conditions, it appears that the choice opportunity evoked the problem behavior. At times during the choice conditions, Alison did not make a choice right away, resulting in the instructor having to repeat the options up to three times before making the selection for Alison as to what materials she would use or where she would sit. More specifically, Alison did not always select an option when given a location choice or a choice of which song to sing (one of her work tasks). The instructor did not make the choice for Alison until she had three choice-making opportunities without responding, which often, yet not always,

coincided with problem behavior. This may have served as a way for Alison to delay the presentation of demands. Further, the choice may have functioned as another demand, which led to higher rates of escape-maintained problem behavior. Although Schmidt et al. (2009) found promising results regarding the preference of choice-making using edibles and less preferred reinforcers, stickers, choice did not seem to be preferred for Alison in the context of work tasks. It is important to note that all of the seven educational tasks used in the MSWO were initially chosen because they were reported to be non-preferred and associated with challenging behavior. Therefore, Alison's three "most preferred" activities were more highly preferred compared to her three lowest preferred activities, yet likely not preferred in general. It is possible that choices for reinforcers have a different effect than choices for work tasks.

As was the case for Frank, Alison's task preferences remained quite consistent from the beginning of the study until its completion. A task preference assessment was conducted with Alison before beginning the study and at the end of the study. Most of Alison's initial three least preferred activities were similarly ranked at the beginning of the study and at the end of the study. However, one of her three most preferred activities initially, became one of her three least preferred activities at the end of the study. It is also important to note that the same activities, whether least or most preferred, were used across conditions, and, therefore, the difference between Alison's rate of problem behavior and percentage of on-task behavior and vocal stereotypy across conditions was not the result of her preference for the activities being used. Even when Alison's three most preferred activities were used, similar patterns in her behavior were seen as compared to when her three least preferred activities were used. Again, it is important to remember that Alison's three most preferred activities represent a relative

preference compared to her three least preferred activities, yet do not represent preferred activities.

Further, Alison's preference of choice during work tasks was systematically assessed following the completion of the study. During this assessment, Alison's preference for baseline conditions as compared to choice-materials only conditions was evaluated. The full choice package was not assessed since Alison exhibited the highest rate of problem behavior during these conditions. Alison initially exhibited preference for choice-materials only conditions during the assessment. However, she generally alternated between choosing baseline and choice-material only conditions during the last three sessions of the treatment preference assessment. Therefore, there is not strong evidence at this time that adding within-task choices to Alison's regular programming would be beneficial.

Certain limitations require readers to interpret the results of this study with some caution. This study only involved two individuals and results varied across the two participants. Therefore, the study should be repeated with additional participants to further understand why within-activity choices might be effective in reducing problem behavior and increasing on-task behavior for some individuals, whereas this intervention may have the reverse effects for other individuals. Additionally, only mastered tasks were used in this study. It is possible that the results would have varied, including resulting in greater differentiation across conditions, if target skills were used instead. Future research should assess the effects of within-activity choice with the use of target tasks, instead of mastered tasks as was used in the present study, to determine if there might be a greater differentiation between levels of problem behavior and on-task behavior during baseline and choice conditions.

This study aimed to extend previous research on choice-making interventions by isolating non-preferred activities through a task preference assessment and offering choices within the non-preferred activities. In addition, a functional analysis was conducted for each participant prior to implementation of any choice intervention to systematically determine the function of the individual's behavior. Both participants' challenging behavior was determined to be maintained by escape from demands and restricted access to tangibles. However, the intervention did not prove to be effective for both participants. Therefore, other factors may play a role in determining for whom within-activity choice interventions are beneficial in reducing challenging behavior and increasing on-task behavior. For some individuals the opportunity to make choices during work tasks may function as an abolishing operation for escape from demands (i.e., escape is less likely to function as a reinforcer for problem behavior). The opportunity to make choices may make the demand less aversive, and thus, the individual is less motivated to escape the demand. However, for other individuals, choice may function as another demand, and thus, evoke problem behavior that is maintained by escape from demands.

References

- American Psychiatric Association (2013) *Diagnostic and statistical manual of mental disorders-5*. Washington, DC.
- Bannerman, D., Sheldon, J. B., Sherman, J. A. & Harchik, A. E. (1990). Balancing the right to habilitation with the right to personal liberties: The rights of people with developmental disabilities to eat too many doughnuts and take a nap. *Journal of Applied Behavior Analysis*, 23, 79-89.
- Brigham, T. A. (1979). Some effects of choice on academic performance. In L. C. Perlmutter & R. A. Monty (Eds.), *Choice and perceived control* (pp. 131-142). Hillsdale, NJ: Erlbaum.
- Browder, D. M., Cooper, K. J., & Lim, L. (1998). Teaching adults with severe disabilities to express their choice of settings for leisure activities. *Education and Training in Mental Retardation and Developmental Disabilities*, 33, 228–238.
- Canella, H. I., O'Reilly, M. F., & Lancioni, G. E. (2005). Choice and preference assessment research with people with severe to profound developmental disabilities: A review of the literature. *Research in Developmental Disabilities*, 26, 1-15.
- Carlson, N. R. (2010). *Physiology of behavior (Tenth Edition)*. New York, NY: Allyn & Bacon.
- Cole, C. L., & Levinson, T. R. (2002). Effects of within-activity choices on the challenging behavior of children with severe developmental disabilities. *Journal of Positive Behavior Interventions*, 4, 29–37.
- DeLeon, I. G. & Iwata, B. A. (1996). Evaluation of a multiple-stimulus format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis*, 29(4), 519-533.
- Dibley, S., & Lim, L. (1999). Providing choice-making opportunities with and between daily school routines. *Journal of Behavioral Education*, 9, 117-132.

- Dunlap, G., DePerczel, M., Clarke, S., Wilson, D., Wright, S., White, R., & Gomez, A. (1994). Choice-making to promote adaptive behavior for students with emotional and behavioral challenges. *Journal of Applied Behavior Analysis*, 27, 505-518.
- Dyer, K., Dunlap, G., & Winterling, V. (1990). Effects of choice-making on the serious problem behaviors of students with severe handicaps. *Journal of Applied Behavior Analysis*, 23, 515-524.
- Graff, R. B., Libby, M. E., & Green, G. (1998). The effects of reinforcer choice on rates of challenging behavior and free operant responding in individuals with severe disabilities. *Behavioral Interventions*, 13, 249–268.
- Iwata B. A., Dorsey M. F., Slifer K. J., Bauman K. E., Richman G. S. (1982/1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis*, 27(2), 197–209.
- Kazdin, A. E. (1999). The meanings and measurement of clinical significance. *Journal of Consulting and Clinical Psychology*, 67, 332–229.
- Lancioni, G. E., O'Reilly, M. F., & Emerson, E. (1996). A review of choice research with people with severe and profound developmental disabilities. *Research in Developmental Disabilities*, 17, 391–411.
- Lohrmann-O'Rourke, S., & Yurman, B. (2001). Naturalistic assessment of and intervention for mouthing behaviors influenced by establishing operations. *Journal of Positive Behavior Interventions*, 3, 19–27.
- Matson, J. L., Wilkins, J., & Macken, J. (2009). The relationship of challenging behaviors to severity and symptoms of autism spectrum disorders. *Journal of Mental Health Research in Intellectual Disabilities*, 2, 29–44.
- Moes, D. R. (1998). Integrating choice-making opportunities within teacher-assigned academic

- tasks to facilitate the performance of children with autism. *Journal of the Association for Persons with Severe Handicaps*, 23, 319–328.
- Rispoli, M., Lang, R., Neely, L., Camargo, S., Hutchins, N., Davenport, K., & Goodwyn, F. (2013). A comparison of within- and across-activity choices for reducing challenging behavior in children with autism spectrum disorders. *Journal of Behavioral Education*, 22, 66-83.
- Schmidt, A. C., Hanley, G. P., & Layer, S. A. (2009). A further analysis of the value of choice: Controlling for illusory discriminative stimuli and evaluating the effects of less preferred items. *Journal of Applied Behavior Analysis*, 42, 711-716.
- Scotti, J. R., Evans, I. M., Meyer, L. H., & Walker, P. (1991). A meta-analysis of intervention research with problem behavior: Treatment validity and standards of practice. *American Journal on Mental Retardation*, 96, 233–256.
- Shogren, K. A., Fagella-Luby, M. N., Bae, S. J., & Wehmeyer, M. L. (2004). The effect of choice-making as an intervention for problem behavior: A meta-analysis. *Journal of Positive Behavior Interventions*, 6, 228-237.
- Tullis, C.A., Cannella-Malone, H.I., Basbigill, A.R, Yeager, A., Fleming, C.V., Payne, D., & Wu, P. (2011). Review of the choice and preference assessment literature for individuals with severe to profound disabilities. *Education and Training in Autism and Developmental Disabilities*, 46, 576-595.
- Ulke-Kurkcuoglu, B., & Kircaali-Iftar, G. (2010). A comparison of the effects of providing activity and material choice to children with autism spectrum disorders. *Journal of Applied Behavior Analysis*, 43, 717-721.
- Vaughn, B. J., & Horner, R. H. (1997). Identifying instructional tasks that occasion problem

behaviors and assessing the effects of student versus teacher choice among these tasks.

Journal of Applied Behavior Analysis, 30, 299-312.

Watanabe, M. & Sturmey, P. (2003). The effect of choice-making opportunities during activity schedules on task engagement of adults with autism. *Journal of Autism and Developmental Disorders, 33, 535-538.*