ANALYSIS OF THE EFFECTS OF CHOICE MAKING ON TOY PLAY

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ABSTRACT

Significant gains in adaptive behavior have been attributed to incorporating choice opportunities into daily activities for individuals with developmental disabilities. The opportunity to choose from amongst available options has frequently been shown to increase task engagement in social contexts. However, literature on the effects of choice on activity engagement during social interactions is minimal, and has often been conducted in situations outside of typical classroom routines. Therefore, the purpose of the current investigation is to a) extend literature on choice by integrating choice making opportunities into the existing play routines of children with moderate disabilities and b) provide empirical evidence of a treatment package targeted to increase functional play that could feasibly be implemented by educators.
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CHAPTER 1

INTRODUCTION

Operant behavior is generally conceptualized as a product of its consequences. That is, learning occurs as an individual discriminates the context in which a given behavior is likely to be followed by a consequence, and responds in accordance. This relationship, expressed as the three-term contingency, provides a temporal framework for the analysis of events that occur before a behavior, and the ensuing consequence. The antecedent is defined as any condition or environmental change that precedes a behavior, and a consequence as the event that follows that response (Cooper, Heron & Heward, 2007).

Applied behavior analysis has historically focused on the manipulation of consequent events to increase or decrease future occurrences of behavior. The role of the antecedent, although fundamental in this contingency, is often regarded as secondary. In his discussions on operant theory and the contingencies that shape the discriminative operant, Skinner (1953) included conditions, or drives, (e.g., deprivation, satiation,
emotion, aversion, avoidance, and anxiety) that could alter the frequency of behavior without temporally direct contact with the consequence. These conceptualizations of antecedent conditions did not clarify how those conditions functioned to change behavior; however, they did provide a descriptive foundation for empirical expansion on the topic of motivation.

In the subsequent years, the role of the antecedent was suggested as a timely and necessary area of empirical development, specifically with regard to technological refinement for studying such conditions (e.g., Wahler & Fox, 1981). In an expansion of operant theory’s three-term contingency, Michael (1982) addressed the concept of motivation and its effects on behavior, identifying a lack of terminology to distinguish the differentiated conditions that effect responding. Previous discussions on the topic of motivation used the blanket term discriminative stimulus in reference to any change in condition that altered the frequency of behavior as a result of a) the discriminated relationship between a stimulus change and increased availability of the putative reinforcer, and b) the individual’s history of response reinforcement associated with that behavior. According to this definition, the discriminative stimulus necessarily indicates availability of reinforcement, which in turn evokes responses that have previously led to that reinforcement. Missing in this explanation was mention of conditions that alter responding in the absence of some signaling stimulus.

Deficits in terminology prevented differentiation of the functional properties of various environmental conditions, and hindered analysis of the different types of stimulus control, thus resulting in the erroneous inclusion of all conditions as discriminative
stimuli. In response, Michael (1982) suggested a refinement on the existing term *establishing operation* (EO) to refer to “any change in the environment which alters the effectiveness of some object or event as reinforcement and simultaneously alters the momentary frequency of behavior that has been followed by that reinforcement” (p.150-151).

To address this lack of consensus, as well as the increasing attention paid to the topic of motivation, Laraway, Sncerski, Michael and Poling (2003) suggested a refinement of terminology to elucidate the specific effects of the EO, to promote more accurate dialogue about the EO, and use of procedures that are conceptually aligned with specific effects of the EO. As Michael (1982) pointed out, use of the term EO to indicate any altering effect (e.g., increase or decrease) poses some risk of confusion. In order to clarify the different effects, Laraway and colleagues suggested using the term *abolishing operation* (AO) to refer to conditions decrease the reinforcing value of a consequence, and EO only when referring to those that increase the reinforcing value of a consequence.. Additionally, they suggested use of the term *motivating operations* (MO) to indicate any condition (EO or AO) with value- and behavior- altering effects.

Michael (1982, 1993) renewed interest in the role of the antecedent, and improved existing technology by allowing classification of variables based on their function by providing a conceptually systematic approach for analysis of those conditions. Laraway and colleagues (2003) proposed refinements to the terminology in an attempt to promote better understanding of the different effects of an MO, and provide behavior analysts with a more systematic technology to study the effects of antecedent variables on behavior.
From the years 1990 – 1999, the number of articles in the *Journal of Applied Behavior Analysis* citing the term EO increased 200%, and citations of Michael’s 1982 and 1993 articles have grown every year since their publication (Iwata, Smith, & Michael, 2000).

Although usually combined with consequence in experimental manipulations, antecedent procedures alone have been used to assess and treat problem behavior. Descriptive analyses have provided accurate hypotheses on the maintaining variables of problem behavior later verified through analogue conditions (Mace & Lalli, 1991), while others have arranged environments and assessed relative frequency of problem behavior, confirming hypothesized functions by then decreasing problem behavior with treatments that incorporated the putative reinforcers (Carr & Durand, 1992).

One type of antecedent approach, noncontingent reinforcement (NCR), involves the presentation of the functional reinforcer for problem behavior on a response independent schedule (e.g., fixed time, FT, variable time, VT). Access to that reinforcement may alter the reinforcing value of that reinforcer as well as behavior that has previously resulted in that consequence. This may serve to decrease responding, (e.g., problem behavior). However, NCR in the absence of extinction has been shown to be effective in decreasing maladaptive behavior (Fischer, Iwata, & Mazaleski, 1997) and increasing adaptive behavior (Horner, 1980).

The manipulation of antecedent variables has also been shown to alter the reinforcing value of events, evoking increased engagement attributed to deprivation (Klatt, Sherman, & Sheldon, 2000) as well as decreased preference for tangible items, attributed to satiation (McAdam et al., 2005). Exposure to peer selection of items has
evidenced an evocative effect for items previously identified as low preferred (Bruzek & Thompson, 2007).

The topic of choice making has received increased consideration in the literature. Significant gains in adaptive behavior have resulted from antecedent interventions based on the provision of choice. Such increases in adaptive behavior have been attributed to the reinforcing effects of contacting preferred stimuli which results from the opportunity to choose (Lerman et al., 1997), while others have suggested that there is some reinforcing value inherent in the opportunity to choose from amongst available options (Fisher, Thompson, Piazza, Crosland & Gotjen, 1997; Vaughn & Horner, 1997). Empirical evidence provides support for both of these hypotheses (Vaughn & Horner, 1997; Kern et al., 2001).

Variables including choice, and relative preference for a task, have been also been used to decrease problem behavior during academic instruction (Vaughn & Horner, 1997). The opportunity to choose aspects of a required task, such as sequence of demands, has shown to increase adaptive behavior (Kern et al., 2001), especially when an individual is able to select the activity as well as the embedded tasks (Dibley & Lim, 1999). In situations where required tasks are considered low-preferred (LP) for an individual, the opportunity choose amongst those LP options has shown to decrease maladaptive behaviors occasioned by those demands (Dunlap, dePerczel, Clarke, Wilson & Wright, et al., 1994).

The opportunity to choose one option, regardless of relative preference, has been shown to increase task engagement (Bambara, Ager, & Koger, 1994), while for others the
preference for a task may function to increase engagement (Parsons, Reid, Reynolds, & Baumgartner, 1990). Control over the sequence of a required task has also evidenced increased engagement (Tasky, Rudrud, Schulze, & Rapp, 2008). Increased engagement has been noted as well when individuals with disabilities make choices between independent or cooperative tasks, often choosing the cooperative situation (Lancioni, O’Reilly & Oliva, 2002). These findings have implications for promoting choice making during tasks and increasing access to preferred social engagement situations.

Kennedy and Haring (1993) taught four students with profound multiple disabilities to make choices during social interactions, and assessed the effects of choice making on activity engagement in a three part study. In the first study, a preference assessment was conducted to identify relative preference for stimuli that were then used during the remainder of the investigation. Students were then taught the use of a microswitch communication device in the second phase. The final phase extended use of the communication device to choice making in social situations with non-disabled peers, using an alternating treatments design to compare communicative response and activity engagement across student choice, peer choice, and no choice conditions. One daily session, approximately 25 minutes in length, occurred in the classroom at times when few other individuals were present (e.g., breaks between classes). Two dependent variables, microswitch presses and duration of engagement, were measured using video recording software. Engagement, defined as touching or facing stimuli, was measured continuously and expressed as a percentage of available time per session.
During baseline, the microswitch was available and students were able to control stimulus presentation. This type of baseline was used to assess generalization of microswitch use from instructor (phase 2) to peer (phase 3). Upon implementation of treatment, students were exposed to a single experimental condition each session. In the student choice condition, students were able to request any stimuli from the array determined by the preference assessment at any time during the choice condition by activating the microswitch. Stimuli requested were then presented by the peer, contingent upon communication. The microswitch was not present during the peer choice or no choice conditions. No additional contingencies (e.g., prompting, social reinforcement) were in place for the target responses. Results for two participants indicated that engagement was highest during choice conditions, suggesting that the opportunity to choose increased the reinforcing value of the stimuli. Such data suggests support for the theory that the opportunity to choose may provide reinforcing value in addition to, or independent of, relative preference for those selections.
LITERATURE REVIEW

Choice Interventions in Applied Research

Choice and Problem Behavior

As treatment for problem behavior, choice making has empirically evidenced reductions in problem behavior. Dyer, Dunlap and Winterling (1990) evaluated the effects of choice on problem behavior for three students by providing the opportunity to select instructional tasks, as well as reinforcement received for task completion. Participants were selected that engaged in high frequencies of a varying range of problem behavior (e.g., aggression, property destruction, elopement), which served as the main dependent variable in the study. The secondary measure, task performance, was measured as rate of correct responding. Each participant had three to four pre-vocational or pre-academic tasks assigned based on prior demonstration of ability to complete those tasks. Three to five stimuli were selected to serve as reinforcers based upon teacher report of serving as effective reinforcement. Reinforcement was delivered on a variable interval schedule, also determined by the teacher. Classroom teachers received instruction on implementation of procedures, and delivered instruction across all conditions of the study.

Prior to implementation of the choice intervention, participants were first instructed on choice making skills. A reversal design was used to demonstrate effects of
choice, counterbalanced across participants. In the choice condition, students were presented with available selections and indicated a choice either verbally or gesturally. Upon completion of the task, and in accordance to the reinforcement schedule, the student selected a reinforcer from the menu of choices. No choice conditions presented the same task and reinforcement, but were assigned by the classroom teacher. Choice conditions demonstrated decreases in problem behavior across all participants. Two participants reportedly engaged in higher frequencies of problem behavior that was of specific concern to classroom staff, in the form of aggression towards others. Additional analysis of aggressive behavior indicated that one participant demonstrated decreased levels, while the second engaged in near zero levels of aggressive behavior during choice conditions. Results of this study present significant implications, in both reductions in problem behaviors with choice making embedded in classroom instruction, and the delivery of treatment by classroom staff.

While the previous treatment package included choice of both task and reinforcement, Dunlap et al. (1994) demonstrated similar effects with a treatment package that manipulated only antecedent variables. Participants in the study were two elementary students with emotional and behavioral challenges who engaged in high levels of disruptive behavior. Effects of opportunity to choose academic task on engagement and disruptive behavior were compared in a reversal design. A no choice condition consisted of daily assignments determined by the teacher, while the choice condition contained a menu of academic tasks selected to approximate the tasks in no-choice condition. No additional contingencies were in place for the target behaviors,
however existing classroom reinforcement contingencies were maintained across all conditions. High levels of task engagement and decreased levels of disruptive behavior were observed for one participant during the choice condition. In sessions where the participants did not contact the opportunity to choose, frequency of problem behavior increased. Results for the second student evidenced variability in levels of engagement that remained higher than responding in the no choice condition.

Variables of both choice and relative preference for tasks have been attributed to decreased problem behavior during academic instruction (Vaughn & Horner, 1997). Teacher reports of tasks that typically occasioned problem behavior were used in a preference assessment. Six tasks, three HP and three LP, were assigned to each student according to results. Choice options containing one HP and one LP were presented to the students, and frequency of problem behavior was measured. Problem behavior for all participants remained low when HP tasks were selected. For one participant, LP items were chosen more frequently, and associated problem behavior increased during completion of these LP tasks. Occurrences of problem behavior were then compared across choice between two LP tasks and a teacher-choice condition in which the same task was assigned. Replication occurred with two HP tasks as well. Two of the four participants evidenced lower rates of problem behavior when they selected the LP task as opposed to teacher choice of the same task. However, HP tasks occasioned lower rates of problem behavior for three participants, regardless of choice condition.

Embedding choice of task within existing schedules has evidenced increased compliance to demands and decreases in problem behavior (Dibley & Lim, 1999). In an
ABABC design, daily activities in the classroom routine (e.g., meal time, leisure activity) were selected for the study. Choice within the routine (e.g., completion now or in 10 minutes, meal items) was alternated with a no choice condition, in which elements of the tasks were assigned by staff. During a third condition, choice of activity and steps therein activity were presented to the participant. Results indicated highest compliance to demands and lowest levels of protesting during condition C in which the student was able to select both activity and the embedded tasks, with similar levels in choice conditions.

The opportunity to choose requires at least two available options. Consequently, selection of one results in the neglect, at least temporarily, of the remaining options. When choice is provided in education settings, some may believe this allows escape and avoidance of non-preferred tasks. Alternately, choice may be provided along other dimensions (e.g., sequence), allowing control of stimulus presentation determined by another (e.g., teacher). Such choice making options have evidenced increases in adaptive responding, while reducing disruptive behavior (Dibley & Lim, 1999; Kern et al., 2001).

Choice of activity sequence during assigned tasks was compared to a no choice sequence by Kern and colleagues (2001). Three tasks with which students had demonstrated proficiency were selected for each of the participants, and student-determined sequence served as the dependent variable. Selection of dependent variables was determined by problem behaviors in which the student engaged, which for one participant was problem behavior and task engagement, engagement for another, and problem behavior for the third. When participants determined task presentation, all three displayed increases in adaptive behavior, with corresponding decreases in problem
behavior. When students were assigned those same tasks in the no-choice condition, such improvements were not observed. These findings are consistent with previous research, indicating a preference for choice (e.g., Fisher et al., 1997).

Preference and Choice

An area that has received considerable research is the study of choice making and preference in students with developmental disabilities. While the specific processes implicit in the efficacy of choice are not fully understood, research has indicated that for some individuals, the availability of choice allows one to contact the reinforcing properties of a preferred stimulus (Lerman et al., 1997) while for others, the act of choosing itself may serve as the functional reinforcer (Fisher et al., 1997, Vaughn & Horner, 1997). Further, empirical evidence suggests a value in choice making, in addition to the reinforcing properties of those selections (Vaughn & Horner, 1997 et al., 1997, Kern et al., 2001).

One proposed explanation to benefit of choice opportunity suggests that individuals may have a preference for choice, and that the act of choice making itself may provide reinforcement independent of, or in addition to, the stimulus selected (Fisher et al., 1997). Participant responding on concurrent schedules assessed the value of choice by using key presses that resulted in either one experimenter determined reinforcer, or two options from which to choose. In the first experiment, items chosen were yoked in a no-choice control condition. Although previously chosen stimuli were assigned, all participants responded most frequently to the choice option. During the second experiment, two LP items were placed on the choice key, while no-choice key resulted in
equal delivery of LP and HP reinforcement. For two of the participants, responding was allocated to choice keys initially, but then began to shift to the no-choice key which contained higher quality stimuli. One of the participants, however, continued to respond to the choice key regardless of the option of relatively higher quality.

Empirical evidence has also indicated that the reinforcing value of differential consequences are associated with stimuli are functionally related to responding (Lerman et al., 1997). Prior to exposure to choice and no-choice conditions, a preference assessment was conducted to identify five relatively HP stimuli to serve as reinforcement. During choice conditions, students were given the opportunity to choose one of two reinforcement options contingent upon accurate responding to a selected target behavior. In a yoked control condition, responding was reinforced with the previously selected stimuli. Accuracy of responding across conditions was undifferentiated for all participants, supporting the hypothesis that choice making opportunities result in access to highly preferred options, and that the reinforcing properties of the selected stimulus functions to change behavior.

Procedures used to determine if choice making itself holds reinforcing have compared the relative rates of problem behavior during LP and HP academic tasks (Vaughn & Horner, 1997), with results that indicate a reinforcing value inherent choice, as well as the relative reinforcing value of chosen stimuli. Teacher report of tasks that typically occasioned problem behavior determined stimuli used in a preference assessment. Six tasks, three HP and three LP, were assigned to each student according to results. Choice options containing one HP and one LP were presented to the students, and
rates of problem behavior were measured. Students almost exclusively selected HP tasks, during which frequency of problem behavior remained low. For one participant, LP items were chose more frequently, and associated problem behavior increased during completion of these LP tasks. Similar findings of increased problem behavior during yoked controls indicate the reinforcing value of choice (Dunlap et al., 1994).

Participants most frequently chose HP tasks, which prevented analysis of effects of choice across preference category. Thus, a third condition was implemented to compare choice between two LP tasks to a teacher-choice condition, in which the same task was assigned. These procedures were repeated with two HP tasks. Two of the four participants evidenced lower rates of problem behavior when they selected the LP task as opposed to teacher assignment of the same task. However, HP tasks occasioned overall lower frequency of problem behavior for three participants, regardless of choice condition. Implication of these results point to both the value of relative preference, in addition to the act of choice making.

Preference assessment technology has been refined in order to increase ease of use and applicability in applied educational contexts. For instance, use of a choice menu presentation format to present available options has effectively been used to express choice selections (Hanley, Iwata, & Lindberg, 1999). Further assessment of reinforcer effectiveness confirmed increased responding allocated to those items when item selected via picture cue. Modifications to the structure of assessment sessions have shown that adaptations to existing formats can provide increased flexibility in applied settings. Carr, Nicolson and Higbee (2000) assessed the utility of a brief, free operant assessment to
indicate relative preference. Data suggested that the brief assessment format provided accurate measures of reinforcer effectiveness. Such preference assessment is more sensitive to transitory preference patterns, and can function to effectively identify a momentary preference to increase adaptive responding.

One benefit of a brief assessment format is the efficiency of the procedures to indicate relative preference, which should conceptually lead to increased adoption of such practices. DeLeon et al. (2001) compared the reinforcing value of items determined by daily brief preference assessments to that of more lengthy paired choice (PC) assessments. Each day a multiple stimulus without replacement (MSWO) was conducted by presenting the same set of choices, with the first item selected considered the most preferred item of the day. Daily results were compared to relative preference for those items as determined by PC, and when results differed, the reinforcing value of each was assessed by allocation of task responding. For four out of five participants, the results of the MSWO most effectively determined reinforcer effectiveness. Implications of these findings speak to the dynamic nature of preference, and the importance of effective assessment strategies to increase adaptive behavior.

Choice and Task Engagement

Preference for stimuli has shown to be effective to increase on-task behavior for some individuals (Parsons et al., 1990). In an evaluation of the effects of assigned vs. self-selected tasks, Parsons and colleagues measured the engagement in low-and high-preferred work tasks of four adults with developmental disabilities. Preference for tasks (e.g., sanding and staining plaques) was assessed to determine relative preference of tasks,
with results determining assignment of tasks to either LP or HP. Three treatment conditions were alternated across daily sessions to expose participants to assigned HP, assigned LP, and choice of task. No additional contingencies were in place outside of typical procedures used in the work setting. Data from this investigation show that on-task behavior during choice conditions occurred during 91% of sessions, almost twice that when assigned LP, at 46%. However, responding to assigned HP tasks was 90%. Selection of HP task during choice opportunities occurred almost exclusively for three participants, while the fourth chose the high-preferred task on 60% of opportunities. Aggregate data was presented for all participants, thus responding relative responding in LP and HP during choice conditions was unclear for the fourth participant. Overall, the results of this study suggest relative preference for task may function to increase adaptive behavior.

In a two-part analysis comparing choice making to assignment of preferred task, Bambara et al. (1994) assessed the on-task behavior of adults with severe disabilities. During the first study, one LP and one HP item was determined for each of the participants, and these items were made available during a choice condition. A no choice condition was counterbalanced across sessions, alternating between assignment of LP or HP task. Procedures were replicated in a second phase, with modifications made on task preference to include one LP and one task of moderate preference. Results of the first study replicated those of Parsons et al. (1990), demonstrating highest engagement during the choice condition or assignment of high-preferred task. HP tasks were most frequently selected during the choice condition. During the second phase, the responding of three
participants evidenced sensitivity to the relative preference of the items, selecting one item on over 70% of opportunities in choice conditions. The third participant demonstrated higher responding during choice conditions irrespective of relative preference of selected tasks.

Lancioni et al. (2002) assessed relative the preference for individual and cooperative task situations of four adults with multiple disabilities in a workshop setting. After training the participants to follow individual and cooperative work schedules, Experimenters introduced the choice making component by providing the option to choose between engagement situations. Responding was measured across both accuracy of task completion and selected engagement situation (e.g., alone or cooperative). Results of the study demonstrated increased accuracy of responding with work schedules for all participants, and three participants selected cooperative task situations on 87% of the opportunities to select the engagement situation.

Embedding opportunities to choose into daily routines can function to increase engagement in those work tasks. Tasky et al. (2008) provided a list of nine household tasks (e.g., vacuuming, dusting) from which participants could select three activities, placing in whatever sequence they desired. The sequence was then placed on a schedule of tasks to be completed during the day. Data indicated that all participants engaged in higher levels of on-task behavior when provided the opportunity to select the activity, as opposed to assignment of sequence of those same activities. Delivery of intermittent verbal praise for on-task behavior, although held constant across conditions, makes the effects of choice alone unclear.
Increased task engagement was observed by Watanabe and Sturmey (2003) in an evaluation of the opportunity to determine three tasks to be placed in the context of an existing daily schedule. Adults in a vocational program selected from a menu of self-care or academic tasks in a multiple-baseline across participants design. Verbal prompts and social praise were used during all conditions. Despite potential limitations to both design and consequent procedures, these results reflect increased participant engagement during the choice conditions, relative to baseline levels of responding.

In an analysis of the effects of choice making on engagement during social interactions, Kennedy and Haring (1993) taught four students with profound multiple disabilities choice making in a three part study. In the first study, a preference assessment was conducted to identify relative preference for stimuli that were then used during the remainder of the investigation. During the second phase students were then taught the use of a microswitch communication device to express choice selections.

The final phase extended the use of the communication device to choice making in social situations with non-disabled peers, comparing communicative response and activity engagement across student choice, peer choice, and no-choice conditions. Two dependent variables, microswitch presses and duration of engagement, were measured with video recording software. In the student choice condition, participants were able to request any stimuli from the array determined by the preference assessment at any time during the choice condition by activating the microswitch. Contingent upon communication, stimuli were presented by the peer. The microswitch was not present during the peer choice or no choice conditions. No additional contingencies (e.g.,
prompting, social reinforcement) were in place for the target responses. Patterns of responding for two participants indicated highest engagement during choice conditions, suggesting that the opportunity to choose increased the reinforcing value of the stimuli. One participant engaged in higher levels of responding when stimuli were determined by peer or experimenter.

Summary of literature review

The topic of choice making and preference has received increased consideration in the literature. Evidenced gains in adaptive behavior have been attributed to the effects of contacting reinforcement contingencies as a result of choice making (Lerman et al., 1997), as well as the functional reinforcement inherent in the opportunity to choose among available options (Fisher et al., 1997; Vaughn & Horner, 1997). Empirical evidence also suggests an inherent value in choice making, in addition to the reinforcing properties of those selections (Vaughn & Horner, 1997 et al., 1997; Kern et al., 2001).

Variables of both choice and relative preference for tasks have been attributed to decreased problem behavior during academic instruction (Vaughn & Horner, 1997). The opportunity to choose aspects of a required task, such as sequence (Kern et al., 2001) or specific demands embedded within an activity, especially when an individual is able to select both activity and the embedded tasks (Dibley & Lim, 1999) have shown to increase adaptive behavior. In situations where required tasks are considered LP for an individual, the opportunity choose amongst those LP options has shown to decrease maladaptive behaviors occasioned by those demands (Dunlap et al., 1994).
The opportunity to choose one option, regardless of relative preference, has demonstrated increased task engagement (Bambara et al., 1994), while for others the preference for task may be as important as choice in promoting engagement (Parsons, Reid, Reynolds, & Baumgartner, 1990). Control over sequence of a required task has also evidenced increased engagement (Tasky et al., 2008). Such increased engagement has been noted as well when individuals with disabilities make choices between independent or cooperative tasks, often choosing the cooperative situation (Lancioni et al., 2002).

Findings of these studies highlight the value of choice making to promote increased adaptive behavior in individuals with developmental disabilities. Much of the literature demonstrates such advances in vocational program settings (Lancioni et al., 2002; Parsons et al., 1990), residential settings (Tasky et al., 2008; Watanabe & Sturmey, 2003) or segregated classrooms (Kennedy & Haring, 1993; Kern et al., 2001). Additionally, existing literature on effects of choice in engagement during social situations is minimal, and often has been conducted with students with severe disabilities in training situations outside typical social routines (Kennedy & Haring, 1993; Lancioni et al., 2002).
Purpose of the study

In response, the purpose of the current investigation is to a) extend literature on choice by integrating choice making opportunities into the existing play routines of children with moderate disabilities and b) provide empirical evidence of a treatment package targeted to increase functional play that could feasibly be implemented by educators.

Research Question

Does the opportunity to choose increase the duration of appropriate toy play?
CHAPTER 2

METHOD

Participants and setting

Participants were recruited from an integrated preschool classroom serving both students with and without disabilities in a suburban public elementary school. Both participants were receiving special education services. Both students were recruited based upon teacher report of inconsistent or low levels of play engagement and infrequent social interaction with peers. Four students without developmental disabilities, selected based on teacher recommendation and demonstration of functional play skills, served as controls in the play dyads.

Participant 1

HH was a 4-year-old female with developmental delays and received special education services in an integrated classroom setting. HH also received speech/language and occupational therapy services once a week. The classroom teacher reported that HH engaged in minimal social contact with peers, and often sought adult attention in play settings. HH’s verbal repertoire consisted of 2-3 word phrases, which were generally evoked by teacher questions. Spontaneous use of language was infrequent.
Participant 2

MH was a 4-year-old male diagnosed with autism. He had been receiving special education services 4 months in an integrated classroom setting, MH also received speech/language and occupational therapy services once a week. The classroom teacher reported that MH displayed deficits in functional toy play, and often engaged in non-functional object manipulation (e.g., repetitive movements, lining up objects, visual perseveration on toy items, repetitive labeling of HP items). MH’s verbal repertoire consists mainly of echoic speech, repetitive phrases irrelevant to context, and infrequent greeting of peers.

Setting

All sessions were conducted in the integrated preschool classroom. A total of eleven children, aged 3-5, received educational services 2 ½ hours per day in the classroom. Seven of the students were identified as pre-school students with a disability. One lead teacher provided classroom instruction, supported by two instructional aides.

Classroom instruction followed a consistent daily schedule: large group circle, small group activities, special activities, snack, and large group circle. All classroom students participated in small group activities, which consisted of alternating between free play and art activities, with intervention sessions occurring at play stations during free play. No adjustments were made to the existing classroom schedule to accommodate the study. Classroom staff members were advised to continue their typical interactions with the children, but to withhold specific play instructions. In the event that the students
physically left the play area, the experimenter, teacher or classroom aide verbally redirected the student back to the designated area (e.g., “go to cars”).

The study occurred in three play stations: *Housekeeping*, *Table toys* and *cars*. Multiple sets of the same stimuli were available at each station, such that both students had access to identical stimuli. *Housekeeping* occupied a partially enclosed 3ft x 9ft area, and contained dolls, blankets, crib, kitchenware, and play food. The *table toys* station consisted of rectangular table with six chairs, which served as the designated play area. A large shelf located beside the table housed the available play items, including Mr. Potato Head®, string beads, blocks. The *cars* station contained a variety of toys, including trains, animals, cars, blocks, Legos®, and occupied a partially enclosed 5ft x 5ft area.

**Dependent Variables**

Two dependent variables were measured in this study: frequency of item contact and duration of toy play. Frequency of item contact was the dependent variable during the identification of stimuli. Contact was defined as participant placement of a hand to any available toy resulting in physical movement of that item (i.e., pushing a car, picking up block, carrying a doll). Each unique contact was recorded as one occurrence. For instance, if the participant ceased to contact the toy item, and then picked up the item at a later time, a second occurrence was recorded. A cumulative frequency of contact to each item was recorded, and the stimuli contacted by each participant during this procedure were yoked across all treatment conditions.
The duration of toy play was the main dependent variable in the choice investigation and was defined as manipulating a toy object in a way that was appropriate to its function (Libby, Powell, Messer, & Jordan, 1998). The experimenter used data collection software to record the duration of toy play. A toy play response began 3 seconds after the child touched the toy and ended when the child put the toy down or began using the toy inappropriately. For example, occurrence of functional object engagement with a car includes pushing, crashing or ramping the toy over other objects. Functional object engagement with a doll includes actions such as dressing, feeding, or rocking the doll. Engagement was not scored as functional when the participant manipulated the item in a manner inconsistent with the intended use. For example, banging a doll on the table, or throwing a block, was not scored as functional play.

Response Measurement and Interobserver Agreement

Materials used included a laptop computer, pen and paper, and picture icons. Two laptop computers were used to collect data during experimental conditions; the first was used by the primary experimenter, and a second was used by an additional data collector for the purpose of collecting data on inter-rater reliability. Pen and paper recording was used during the identification of stimuli and daily session log maintenance. Picture icons were used in the daily classroom activities prior to the study, with five picture icons corresponding to choice item availability presented to the student during choice making.

Data on the frequency of contact with each stimulus during the direct observation of preference was collected by the primary experimenter. Duration of the functional object play for target and control students were collected using data collection software
on a Windows based laptop computer. A three second delay between participant contact and scoring occurred. This delay was used to allow observed behavior to be defined as functional. For instance, if the participant picked up the item, but did not manipulate the item otherwise, no occurrence of functional play was measured. If the item was picked up, and the participant began to manipulate the item appropriately (e.g., push the car), occurrence of functional play was measured. After this delay, and determining the occurrence of functional play, the duration measure was initiated by selecting the assigned computer key. Measurement of the target behavior was terminated when the participant discontinued their engagement with the object (e.g., set item down) or began to engage with the item in a manner inconsistent with the intended use (e.g., throwing a block). The duration of each instance of the target behavior was added together and this number was divided by the total session duration to derive the percentage of each session with function object play.

A second observer assessed reliability during 22% of sessions in the study using the measures described. Duration-per-occurrence agreement was calculated for each response by dividing the shorter duration of each occurrence by the longer duration of each occurrence and multiplying by 100%. Mean duration-per-occurrence was then calculated by adding the agreement scores for each occurrence and dividing by the total number of occurrences. Results are presented in Table 3.
Table 3: Interobserver agreement for each participant.

<table>
<thead>
<tr>
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<th>Baseline</th>
<th>Treatment</th>
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</thead>
<tbody>
<tr>
<td>HH</td>
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<td>85%</td>
</tr>
<tr>
<td>MH</td>
<td>72%</td>
<td>81%</td>
</tr>
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</table>

Identification of Stimuli

An assessment to identify preferred items for the analysis was initiated for each participant. Direct observation occurred for a total of three, 5-minute sessions over the course of 3 days. Participants had noncontingent access to all of stimuli in each play area, and the observer recorded the frequency of contact with each toy item. The 5 stimuli that were contacted most frequently were then used during all subsequent sessions as described below.

Experimental Design

An alternating treatments design was used to compare functional object engagement across three conditions: student-choice, peer-choice, and baseline. All experimental sessions were 5 minutes in length. Following baseline, the three treatment conditions were rapidly alternated to compare effects of choice on functional object engagement.
Procedures

No-choice baseline

Baseline measures of functional object engagement were collected prior to implementation of treatment. During baseline, items were selected by the experimenter from array of stimuli identified in the direct observation of preference above, with the provision that each stimulus was selected at least once. At the beginning of each 5-minute session, the selected stimuli were placed in the center of the play area by the experimenter (e.g., car, dolls, trains). There were no programmed consequences for appropriate or inappropriate behavior.

Choice condition

At the beginning of every choice session, a multiple stimulus with replacement preference assessment similar to that of DeLeon et al. (2001) was conducted. A visual menu of the five available items was presented to the student, and the verbal instruction “pick one” was given. The student expressed a choice by touching the picture or saying the name of the item. The stimuli selected were presented to both students for the entire session. There were no contingencies in place for target behaviors. If the students left the play area, they were redirected back to the area with a verbal prompt.

Peer choice condition

Peer choice sessions were conducted following the same procedures used in during student-choice. Upon selection from the menu of choices, both were presented
with the peer-selected stimuli for the entire session. There were no contingencies in place for target behaviors. If the students left the play area, they were redirected back to the area with a verbal prompt.
CHAPTER 3

RESULTS

This chapter reports the results for the assessment procedures, including the identification of stimuli, choice intervention, and the brief preference assessment. Also reported are the results for measures of interobserver agreement.

Identification of Stimuli

Participant 1. The direct observation results of preference for HH are displayed in the first section of Table 1. HH contacted the plastic play kitchen most frequently across observations, \( M = 2; \) range, 1 to 3) and dolls \( M = 1.33; \) range, 1 to 2) at a higher frequency, relative to Mr. Potatoe Head \( M = .66; \) range, 0 to 1), beads \( M = .33; \) range, 0 to 1), and blocks \( M = .33; \) range, 0 to 1).

Participant 2. Results of the identification of stimuli for MH are displayed in the second section of Table 1. Cumulative frequency of contact made with each stimuli during observation show that MH contacted animal stimuli at a higher frequency per session \( M = 2.6; \) range 2 to 3), relative to train \( M = .66; \) range 0 to 2), car \( M = .66; \) range 0 to 1), block \( M = .66; \) range 0 to 1), and Legos® \( M = .33; \) range 0-1).
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<td>legos</td>
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</table>

Table 1: The cumulative frequency of contact with each stimulus during direct observation of preference for each participant.

**Choice Intervention**

**Participant 1.** Figure 1 shows the percent duration of functional toy play for HH across treatment conditions. During initial baseline sessions, HH displayed low but variable rates of functional play. As the baseline condition continued, low levels of functional play stabilized (M = 19.6%; range, 1.0% to 43.7%). Following initiation of the choice intervention, an increasing trend in functional play was observed during the participant choice condition (M= 56.5%; range, 40.6% to 78.3%), which was elevated
relative to the baseline (M=19.7%; range 14.3% to 28.3%) and the peer choice condition (M = 29.5%; range 5.7%-46.0%). The peer choice condition produced low, variable functional play and the baseline condition also produced low functional play.

![Figure 1: Functional toy play during choice intervention for HH.](image)

Participant 2. Figure 2 shows the percent duration of functional toy play for MH across treatment conditions. Low, stable rates of functional play were observed during the baseline condition for MH (M = 2.0%; range 0% to 4.3%). When the choice intervention was introduced, MH displayed slightly higher rates of functional play across all conditions. Percentages of functional play in the choice condition were elevated relative to the peer choice condition, which remained low (M = 12.0%; range, 0% to
25.7%). Functional play in the baseline condition remained low for the majority of treatment conditions; however, a rapid increase in functional play was noted during the final sessions of treatment ($M= 14.7\%$; range, 0% to 56.3%)

![Graph showing functional play during choice intervention for MH.](image)

**Figure 2.** Functional play during choice intervention for MH.

**Brief preference assessment**

*Participant 1.* Data on the daily multiple stimulus with replacement (MSW) sessions were analyzed together to empirically determine relative preference for stimuli and are presented in Table 2. Choice condition was implemented for a total of five sessions, in which HH allocated equal responding towards beads and kitchen. Data during the peer choice and baseline conditions were then analyzed to determine if the
item selected impacted the level of functional play. Results are presented in Figure 3, but functional play between the LP ($M = 25.1\%$; range, 1.3$\%$ to 46.0$\%$) and HP items ($M = 27.9\%$; range, 1.0$\%$ to 78.3$\%$) were highly variable and undifferentiated.

Participant 2. Results of the daily MSW preference assessments for MH are shown in Table 2. The animals, train, and car were each selected during at least one choice condition. Each of these stimuli was considered HP. Blocks and Legos were considered low preferred, as they were never selected during the MSW preference assessments. Functional play during all conditions was then analyzed to determine if play varied as a function of item selection. The results are displayed in Figure 4. Low levels of responding were observed when low preferred stimuli were selected by peers or the experimenter during peer choice and baseline session ($M = 5.3\%$; range, 0$\%$ to 15.7$\%$). Higher, but variable percentages of functional play were observed when HP stimuli were selected across all conditions ($M = 20.4\%$; range, 0$\%$ to 67.7$\%$).
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Table 2: The cumulative frequency of stimuli selection during daily brief MSW preference assessment for each participant.
Figure 3: Functional play by preference for HH.
Figure 4: Functional play by preference for MH.
CHAPTER 4

DISCUSSION

This chapter addresses the findings of the study in answering the research question: does the opportunity to choose increase the duration of appropriate toy play? Results are also discussed in relation to the purpose of the study, in a) extending literature on choice by embedding choice making opportunities into the existing play routines of children with moderate disabilities and b) providing empirical evidence of a treatment package targeted to increase functional play that could feasibly be implemented by educators.

Participant 1

Upon analysis of functional play across conditions, data suggest a preference for the opportunity to choose the activity during peer play sessions. When the option to choose was not available, HH engaged in lower levels of functional play. In the event that her peer selected one of her high preference activities, increased levels of play were observed relative to baseline conditions, when the provision of choice was never made available to either child. Additional measures of preference were conducted to further determine the function of preference during play, by way of brief daily preference assessment procedures. These procedures allowed for analysis of trends in play to be
compared to the relative preference of selected items. Although HH allocated responding
towards beads and kitchen, levels of functional play during these HP activities were
highly undifferentiated relative to engagement with LP toys. Together, these results
suggest that the opportunity to choose may serve to reinforce responding, resulting in
increased gains in adaptive behavior. These findings are consistent with previous research
evidencing an inherent value in the act of choice making (Fisher et al., 1997), and
resulting increases in adaptive behavior when engaged in choice activities (Bambara et al.,

However, it is important to note that HH was exposed to the opportunity to
choose during only 5 sessions. Additionally, HH experienced a number of situational
factors that may have effected responding, namely in her attendance due to illness.
Throughout the study her attendance was variable, between absences and visits to the
school nurse. Such variables may have influenced behavior across many domains,
including her participation in this investigation.

Participant 2

Prior to implementation of choice making opportunities, MH engaged in
consistently low frequencies of functional play. After the choice intervention was
introduced, he began to display increased levels of play during all conditions of the study.
This could be attributed to increased familiarity with contingencies as the study continued.
Opportunities to choose the activity did evidence gains in play levels relative to peer
choice play situations. Overall, responding during baseline conditions did remain low for
most of the treatment sessions. Further comparison of play during all conditions was
assessed to determine if the relative preference of the toy selected effected engagement levels. It was observed that when LP items were determined by the experimenter or peer choice, low levels of responding occurred. Selection of HP items generally resulted in higher levels of responding across all conditions, however lower engagement levels with HP items occurred when these items were presented during no choice baseline and peer choice conditions. During a final no-choice baseline condition, the assigned toy was a HP item. Data from this session demonstrated increased levels of engagement. When considering the patterns of responding observed for MH, it would appear that although choice was a factor in increasing functional play, the relative preference for those items may have increased responding.

Limitations and Future Research

Some limitations to the study should be noted, and suggestions made for improvement upon those factors. Foremost, variables in the environment may have affected the level of experimental control across the study. As mentioned earlier, two potential peers were assigned to each participant. Although each treatment session included only one of those peers, the individual varied across sessions. This type of peer assignment was selected to ensure availability of pre-selected peers during all treatment sessions, in consideration of attendance and other scheduling conflicts that often occurred during the initial observations in the classroom (e.g., OT/SLP schedules that fluctuated weekly, absence due to illness). Additionally, the frequent illness and consequent absence of one participant, HH, resulted in gaps in treatment as well as variability in overall responding in the classroom setting. Peer attendance fluctuated as well throughout the
study, presenting additional potential confounds. Future research should involve assignment of a single peer with consistent attendance established prior to assignment of student groups.

This investigation occurred during the last three calendar months of the school year, which resulted in frequent conflicts (e.g., special classroom activities, field trips) that limited the total number of opportunities for implementation of the choice intervention. Events such as these should be considered more carefully in the future to increase consistency and frequency of treatment.

Response measurement was assessed using continuous duration measures, which decreased the number of treatment sessions that could occur in a given day. Use of an alternative measurement system would have allowed for increased exposure to treatment conditions for both participants, as these sessions could have occurred simultaneously at different play stations. Future investigations could benefit from the use of a partial-interval recording system, as computer software would not be required to accurately assess responding. Occurrence of simultaneous treatment sessions would allow for increased contact with contingencies.

A significant limitation lies in the procedures used for the initial preference assessment. The observation techniques used present challenges in accurate assessment of relative preference. Approach frequency as an indicator of preference limits the use of items to those that may not have actually been preferred items. This is illustrated by the fact that some stimuli contacted during the initial observation were never selected during choice conditions. Use of duration measurement or a more systematic presentation format
would have provided valuable, and potentially more accurate, indicators of preference. Initial selection of more sensitive procedures may have resulted in a pool of available choice options more reflective of relative preference for each participant. Thus, future research would contribute more conclusive evidence on the role of preference in activity engagement should more systematic preference assessment occur prior to a choice investigation.

Implications for practice

Despite the identified limitations, procedures used in this study hold implications for the integrated classroom setting. Findings speak to the value of choice in increasing engagement during classroom activities, suggesting that educators may promote success by systematically arranging environments to embed choice making opportunities into the existing classroom schedule. Providing choice of a required activity increases student autonomy while maintaining progress towards educational goals. Findings of the study also emphasize the value of preference in promoting increased engagement. In situations where choice of task may not be feasible, educators can assign tasks of relative preference as a means of increasing adaptive behavior.

Engagement levels during play for HH also illustrate the value of the EO in a classroom setting. The provision of choice may have altered the value of the play activity, and simultaneously increased the momentary frequency of play behavior. These findings demonstrate to educators the potential benefits of embedding choice making opportunities into scheduled activities, and increasing student motivation to engage in classroom activities.
Results also demonstrate a practical, effective means of increasing engagement during peer play activities. The intervention is manageable to implement on a class-wide scale, in that daily routines of each student can be integrated into that of their peers. Individual students in an integrated classroom often have varied education goals, resulting in multiple schedules that a teacher must balance. Incorporating these procedures would allow a teacher to systematically embed opportunities for choice making in the context of social interactions with peers, potentially increasing the benefits for both students with and without disabilities.
REFERENCES


Appendix 1

Consent Forms
CONSENT FOR PARTICIPATION IN RESEARCH

I consent to my child's participation in research entitled: Effects of peer modeled toy play on play skills of children with ASD.

Dr. Joe Wheaton, Principal Investigator, or his authorized representative, Courtney Fleming, has explained the purpose of the study, the procedures to be followed, and the expected duration of my child’s participation. Use of video tape for the sole purpose of data collection has been explained. Possible benefits of the study have been described, as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Furthermore, I understand that I am free to withdraw my child at any time and to discontinue participation in the study without prejudice to me or my child.

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: ________________________________

Signed: _______________________________  Signed: _______________________________

(Principal Investigator or his authorized representative)  (Person authorized to consent for participant)

HS-027E Consent for Participation in Exempt Research
Appendix 2

Session Log
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51
Appendix 3

Interobserver Agreement
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<th>Treatment</th>
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<tbody>
<tr>
<td>HH</td>
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<td>MH</td>
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<td>81%</td>
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</tbody>
</table>
Appendix 4

IRB Exemption Approval
TITLE PAGE - APPLICATION FOR EXEMPTION
FROM REVIEW BY THE INSTITUTIONAL REVIEW BOARD
The Ohio State University, Columbus OH 43210

Principal Investigator:

Name: Joe E. Whalen
Department: College Education & Human Ecology
Office: 222 E. 11th
Campus Address (room, building, street address): 1000 E. 11th Ave
Signature: 12/09/02

Co-Investigator:

Name: Courtney Fleming
Office: 614-292-4101
Campus Address (room, building, street address) or Mailing Address: 1000 E. 11th Ave.
Signature: 12/09/07

Co-Investigator:

Name:
Office:
Campus Address (room, building, street address) or Mailing Address:
Signature

Protocol Title: Effects of peer modeled toy play on play skills of children with ASD

Source of Funding: NIH

Research has been determined to be exempt under these guidelines.
Research may be subject to the requirements listed below.
The proposed research does not fall into any of the categories of exemption. Submit an application to the appropriate institutional review board for review.

Date of determination: 12/09/08
Signature: Tami Prestage
Office of Responsible Research Practice