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# Effects of Choice of Type of Classroom Assignment on On-Task Behavior in Students with Developmental Disabilities

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**Effects of Choice of Type of Classroom Assignment on On-Task Behavior in Students with  
Developmental Disabilities**

by

Nicholas Potts

A Thesis

Submitted to the Graduate Faculty of

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## **Abstract**

The effects of choosing the type of classroom assignment on on-task behavior of three high school students with developmental disabilities was investigated. Secondary measures of problems completed and accuracy of responses were analyzed. All sessions were conducted in a self-contained classroom for students who qualified for special education services. Using a reversal design, students were exposed to choice and no-choice conditions involving the presentation of a paper and pencil or electronic version of a math assignment. Electronic assignments were identical to those given in paper and pencil format, with the exception that they were converted and completed using an iPad2®. Results indicated an increase in on-task behavior for two out of three participants, but did not have a significant effect on the quantity or accuracy of academic skills.

## Table of Contents

Chapter 1: Introduction .....	4
Chapter 2: Method .....	10
Participants.....	10
Materials .....	11
Setting .....	12
Dependent Variable, Measurement, and Interobserver Agreement.....	12
Procedures.....	13
Experimental Design.....	15
Chapter 3: Findings of the Study .....	16
Results.....	16
Discussion.....	18
References.....	24
Appendix A.....	26
Appendix B.....	27
Appendix C.....	28
Appendix D.....	29

## Chapter 1: Introduction

There is currently a growing body of research on the area of choice as behavioral intervention for people with and without disabilities (Brigham & Sherman, 1973; Dunlap et al, 1994; Geckeler, Libby, Graff, & Ahearn, 2000; Romaniuk et al. 2002; Ulke-Jurkcuoglu & Kircaali-Ifter, 2010; Vaughn & Horner, 1997). Choice involves the presentation of two or more options concurrently, such that the participant is allowed to independently select the more desired option (Fisher & Mazur, 1997).

Preference assessments have been proven effective in determining stimuli that can serve as reinforcers (e.g., Fisher et al., 1992; DeLeon & Iwata, 1996; Roane, Volmer, Ringdahl, & Marcus, 1998). A preference assessment is a procedure used to determine stimuli that may have reinforcing effects, and increases the probability of future rates of responding for desired behaviors (Cooper, Heron, Heward, 2007). Using a preference assessment prior to or within a work session can greatly increase the probability that the stimulus will have reinforcing value. Stimulus preference assessments have also been used to evaluate task completion based on preference for tasks and/or materials (Tasky, Rudrud, Schulze, & Rapp, 2008).

The effect of choice as an antecedent intervention has been a topic of growing interest in research. Researchers have evaluated choice reinforcers and/or tasks with the purpose of decreasing problem behavior and/or increasing on-task behavior with great success (e.g., Dunlap et al, 1994; Dyer, Dunlap, & Winterling, 1990; Powell & Nelson, 1997; Tasky et al., 2008). Dyer et al. (1990) evaluated the effects of choice of tasks and reinforcers on problem behaviors of 3 school-aged children diagnosed with severe autism/mental retardation. Two conditions (choice and no-choice) were implemented. During the choice condition, each subject was allowed to choose both the task to complete and the reinforcer that would be earned. During the

no-choice condition, the same tasks and reinforcers were provided, but a predetermined schedule dictated the order in which both were presented. Results of the study were a decrease in problem behaviors for all three of the subjects during the choice condition as compared to the no-choice condition. However, it is difficult to tell whether it was the choice of task, or the choice of reinforcer, that resulted in this decrease.

There has also been a considerable amount of research showing the benefits of providing a choice of tasks on desirable and undesirable behavior. Tasky et al. (2008) evaluated the effects of choice of tasks on on-task behavior for three individuals with traumatic brain injury (TBI). In the tasks-assigned condition (no-choice condition), each participant was given a list of three tasks, the order of which was pre-determined, and instructions to complete each task in the order in which they appeared. During the choice condition, each participant was presented with a list of nine tasks from which they were able to choose three to complete. They were also able to choose the order in which they would complete these tasks. The results were that on-task behavior increased during the choice condition as compared to the no-choice condition for each participant. This is a compelling demonstration of the effectiveness of task choice on on-task behavior.

Powell and Nelson (1997) also investigated the effect of choice of task; however, they evaluated the effect on undesirable behaviors of a 7-year-old boy with Attention Deficit Hyperactive Disorder (ADHD). The study was conducted within a typical elementary classroom. Again, there were two phases, a choice and no-choice. During the no-choice phase, the participant was presented with one Language Arts task and was required to complete it. During the choice phase, the participant was presented with three different Language Arts assignments and he was able to choose which assignment to complete. Results of the study

included a decrease in undesirable behavior in the choice phases as compared to the no-choice phases. It is significant to note that this research was done within a regular classroom, and the only variable that was changed between phases was having choice over which assignment to complete.

Ulke-Kurkuoglu & Kircaali-Iftar (2010) also compared the effects of providing choices of activities, and extended this by also evaluating the choice of activity-related materials on on-task behavior of children with autism. During baseline, the teacher would present materials for six pre-determined activities individually, and prompted the student to complete the task. The teacher used an errorless teaching procedure (fading from physical prompts, to gestural prompts, to independent completion), if needed, for a task. Reinforcement was implemented for independent, correct responses on a VR 4 schedule. During the activity-choice phase the participant was presented with two overall activities. There were two sets of materials for each activity for a total of four sets of materials. The teacher instructed the student to choose an activity. The teacher would then choose the set of materials to complete the activity. During the materials-choice condition, the participant was presented with an activity selected by the teacher, but was asked to choose the set of materials to complete the activity. Results of research were higher rates of on-task behavior during both the activity-choice and material-choice conditions as compared to the no-choice conditions. This indicated that providing choices of materials produced similar results to allowing choice of activity. Further research could be conducted to determine whether or not different forms of materials, such as paper and pencil, manipulatives, or electronic formats could also increase responding.

In an attempt to further the body of knowledge in the area of choice as an effective procedure for behavior change, research has been conducted to attempt to separate whether

changes in responding are directly related to the act of choosing, or simply that there is a more desired outcome. Bambara, Ager, & Koger (1994) attempted to separate these two variables and isolate choice by evaluating the effects of choice and task preference on the work performance of adults with severe disabilities. The authors conducted two separate experiments. In Experiment 1, three adults diagnosed with severe or profound mental retardation participated. A multi-element design was used to evaluate the effects of three conditions (assigned high-preference task, assigned low-preference task, and choice of task) on on-task behavior. During the assigned high-preference task and assigned low-preference task conditions, a high- or low-preferred task was presented to the participant to complete. During the choice of task condition, the participant was presented with the high- and low-preferred tasks and allowed to choose which to complete. Results were that on-task behavior was higher during the assigned high-preference task and choice of task conditions as compared to the assigned low-preference condition. In Experiment 2, two tasks that were considered low-to-moderately preferred were selected for each participant. A multi-element design was used to evaluate choice and no-choice conditions. During the no-choice condition, one of the tasks was presented to the participant to complete. During the choice condition, both tasks were presented and the participant was able to choose which activity to complete. Results of Experiment 2 were that on-task behavior was relatively equal for choice and no-choice conditions. The results of both experiments highlighted the possibility that task preference can have an impact on whether or not choice is an effective antecedent intervention. It is possible that if the choice is between two low-preferred tasks, such as difficult classroom assignments, providing choice may not be enough to make a significant difference on behavior.

Romaniuk et al. (2002) extended the research on why choice is often a successful intervention by first performing a functional analysis. The purpose of the study was to determine



whether the function of behavior played a role in the effectiveness of choice as an intervention. Seven students, ages 5-10, participated in the study. Prior to any conditions, an analogue functional analysis was performed in order to determine the function of problem behavior for each student. The analogue functional analysis included three conditions: escape, attention, and control. The results indicated that problem behavior was maintained by escape from task demands for three participants, access to attention for three participants, and both escape and attention for one participant. Following the functional analysis, each student participated in choice and no-choice phases. During the choice phase, the student could choose the task they wanted to complete, and during the no-choice condition, the therapist chose the task to complete. The results were that three participants whose problem behavior was maintained by escape from task demands, and one participant with multiple-controlled problem behavior, had significant decreases in problem behavior during the choice condition; however, the three students whose problem behavior was maintained by attention showed little to no decrease in the choice condition as compared to the no-choice condition. These results highlight the importance of understanding what maintains problem behavior. Providing choice was successful in decreasing problem behavior for those students whose behavior was maintained by escape, either because they could choose the activity that was more preferred, or because choice makes the overall demand context less aversive.

Therefore, choice is still a relevant antecedent-based procedure to consider when designing an Individualized Educational Plan (IEP). It has been demonstrated in multiple environments, including public schools, that providing choices has been successful in decreasing problem behavior and increasing on-task behavior (Dunlap et al., 1994; Dyer et al., 1990; Powell & Nelson, 1997; Tasky et al., 2008; Ulke-Kurkuoglu, & Kircaali-Iftar, 2010). Additionally,

providing choices of tasks can be useful in increasing on-task behavior because students are given multiple options for stimuli rather than receiving a directive regarding one specific stimulus (Tasky et al.). Choice can be observed throughout any given day within a classroom, workplace, or living environment. These choices may occur in situations such as choosing activities to complete, materials to use, where to sit, and type of reinforcement desired. When presented with two or more options, a student can choose that which is more desirable at that moment. For example, a teacher may allow different options for a culminating project. Some students may prefer to write a paper, while others prefer to make a presentation. Choice is a flexible procedure in that it can be implemented in many different situations with many different materials. It can also be presented in many different ways (i.e., vocal questions, visual choice boards, presentation of stimuli, etc.).

The purpose of the current study is to replicate and extend current research on choice as an antecedent intervention by evaluating the choice of the type of classroom assignment in which tasks are presented. As our society becomes more technologically advanced, it is logical that research be broadened to accommodate innovation. As electronic devices such as iPads become more available and user-friendly, it becomes an opportunity to allow for skills to be taught in multiple mediums. Therefore, an evaluation of the effects of choice of type of classroom assignment (paper vs. iPad) on on-task behavior in high school students with developmental disabilities is warranted.

## Chapter 2: Method

### Participants

Three high school aged students participated in the study. All participants were identified for special education services. Their Individual Education Plan (IEP) dictated their academic programming. All three participants' math skills were multiple grade levels below those of their peers. The selection of participants was based on their low levels of on-task behavior while working on academic tasks. All subjects were referred for participation by their classroom teachers.

Ruth was a 15-year-old girl with a diagnosis of Specific Learning Disability. She has an overall IQ of 56, which puts her in the Extremely Low range. She attends all academic classes in a self-contained environment. She currently works at an approximate second grade level in math.

Neal was a 16-year-old boy diagnosed with both Intellectual Disability and Speech or Language Impairment. In addition, he had a medical history that included being diagnosed with a condition that required him to undergo radiation, chemotherapy, and a bone marrow transplant in 2006. He has a full scale IQ of 54, which puts him in the Extremely Low Range. He currently works at a first grade level in math.

Mark was an 18-year-old boy diagnosed with Williams Syndrome. He had an additional diagnosis of Intellectual Disability. He has an overall IQ 42, which puts him in the Extremely Low range. He attends all academic classes in the self-contained environment. He currently works at a first grade level in math.

## Materials

Tasks for one academic subject (math) were used throughout the study for each participant. Daily assignments included material that was currently being taught. In particular, students performed simple computation problems consisting of addition, subtraction, multiplication, or division of whole numbers. Materials for each participant were modified in order to reflect their current levels of performance in this area. In order to control for length and difficulty of assignments, each session included the identical number of problems with the same number of digits throughout the study. For each assignment, two versions were created. One set was in the form of traditional paper and pencil worksheets. This version required each participant to write the answers by hand and bring the materials to the teacher when finished. The second version of the materials contained the same information/problems as the other, with the exception that the student completed each worksheet electronically using an iPad2®. All paper and pencil worksheets could be converted exactly to reflect identical length and difficulty. In order to convert paper and pencil worksheets into an electronic version that was accessible for participants, an application called Showbie® was used. The application was acquired and installed on each individual device that was dedicated to each participant. Documents were first scanned and sent to a computer in a portable document format (PDF) by the teacher. They were then uploaded to Showbie® where all participants had access to their own blank copy of the task. In order to access materials, each participant was assigned to a class. Once assigned, they independently used the application on their personal iPad2® to gain access and complete the assignment. Once completed, these materials were submitted electronically to the teacher through the provided technology. The selected technology allowed for an exact digital copy of the paper and pencil task. Additionally, this procedure can be used for any academic subject.

## Setting

The study took place in a classroom designated for the self-contained program within the high school. Each session was conducted during a block of time designated for math instruction. This block occurred during the regularly scheduled school day (8:00 am- 2:10 pm).

## Dependent Variable, Measurement, and Interobserver Agreement

The primary dependent variable for all participants was on-task behavior. *On-task behavior* was defined as being oriented toward work materials and making physical contact with one or more of the task materials, asking questions pertaining to the current task, or acquiring additional materials needed. *Off-task behavior* was defined as engaging in any behaviors not necessary for completing the current task. Examples of off-task behavior included looking away from the materials, leaving the work area, removing hands from all task materials, conversing with the teacher, or engaging in problem behavior such as self-injury. Occurrences of on-task and off-task behavior were recorded using momentary time sampling (MTS). Sessions lasted for 10 minutes, and each session was broken into 60, 10-s intervals. In the event that a participant finished the assigned task before the end of the 10-minute session, a code was included on the data sheet to record the time of completion. Observers recorded data for each participant at the end of the 10-s intervals. If a participant was engaged in any behavior other than those specified as on-task, off-task behavior was recorded. If off-task behavior was not documented, it was assumed that the participant was on-task for that specific interval. Each observer used paper and pencil to code data for each session. Intervals within sessions were signaled to the observers using an ear bud attached to a voice recorder that had been previously prepared to signal at the assigned rate. Data for each session was graphed as percent of intervals of on-task behavior. This was calculated by dividing the number of intervals in which on-task behavior was scored by

the total number of intervals and multiplying by 100%.

In order to track academic progress, a secondary measure to record accuracy of work completed was recorded. After the experimental session had ended, the primary observer recorded the total number of problems completed, as well as the total number of correct answers. A percent of correct answers was calculated by dividing the number of correct answers by the total number of problems and multiplying by 100%. A second, independent observer collected data for 35% of sessions to assess inter-observer agreement (IOA) for each phase. Prior to experimental sessions, training was provided to the second observer. Training consisted of meeting with the primary investigator to learn and demonstrate mastery of the dependent variable. Secondly, both observers scored video clips of contrived academic sessions. The participant in the video was represented by a staff member. The data for each session was broken down interval-by-interval and observers' records and was compared to each other. An agreement was defined as both observers scoring on- or off-task behavior during an interval. IOA for each session was calculated using the interval method, by dividing the number of agreement intervals by the total number of intervals, and multiplied by 100%. Overall agreement was 90% (range, 80% to 94%).

## **Procedures**

Prior to each session the participant was allowed to take his or her seat in the designated classroom. He or she was instructed to take out a pencil, their iPad2, or both depending on the condition being conducted. Once sitting at a workstation, only the materials required for completing the academic task were present. Following task instructions, the session began and the teacher did not prompt the participant to engage in the homework activity again during the session. While the participant was working, the teacher remained in the classroom, but was

engaged in another activity (i.e., reading, grading, etc.). If the participant asked a question concerning the assignment, the teacher answered the question; however if the participant asked a question that did not pertain to the assignment or attempted to talk to the teacher, the teacher responded with minimal attention (e.g., “I can’t talk about that right now.”), and then returned to his/her activity. This was consistent with the current regular classroom procedures. No additional programmed consequences were implemented.

**No Choice.** Prior to no-choice sessions, the participant sat down and the experimenter explained the assignment instructions. Next, the participant was told which medium (paper or iPad2) he or she would use (e.g., “Today you will use the iPad to complete your assignment.”). The participant was presented with the task materials, the instructions were read again to him or her, he or she were prompted to ask questions at this time if there were any, and then he or she were allowed to complete the assignment. During these sessions, the teacher only responded to questions directly related to the assignment. No additional programmed consequences were implemented based on on- or off-task behavior, number of correct or incorrect responses, or if the assignment was completed.

**Choice Phase.** Prior to choice sessions, the participant sat down and the experimenter explained the assignment instructions. Next, the participant was presented with a paper worksheet and an iPad2 and prompted to select the medium that they wanted to use to complete their assignment. After they selected a medium, the teacher read the directions again, and participants were prompted to ask questions any time if they had any, and then they would be allowed to complete the assignment. During these sessions, the teacher only responded to questions directly related to the assignment. No programmed consequences were implemented

based on on- or off-task behavior, number of correct or incorrect responses, or if the assignment was completed.

### **Experimental Design**

A reversal design was used to evaluate the effects of choice of type of assignment on on-task behavior in a classroom setting across subjects with developmental disabilities. For the designated class subject, an ABAB design was used. Five sessions for each phase were implemented, with the exception of a sixth session during the first no-choice phase for Mark. During both the first and second no-choice (or baseline) phases (A), the two mediums (paper and iPad2) were alternated. During the choice phase (B), the student determined which type of assignment he or she wished to complete. If it was determined that the choice condition evoked the highest level of on-task behavior, it would be implemented in the classroom following the study. It was initially determined that follow-up data would be collected at 2, 4, 6, and 8 weeks with the purpose of evaluating long term effects of choice as an intervention for on-task behavior. Due to the extended amount of time that it took to attain data due to student availability and absences, follow-up data was not able to be collected for any of the participants due to a change in their school schedules.



### Chapter 3: Findings of Study

#### Results

Table 1 displaying the percent and range of intervals with on-task behavior during choice and no choice of materials conditions is found in Appendix A. Figure 2 displays the percent of intervals each participant was on task. During the first no choice phase, Ruth presented with low levels of on-task behavior, averaging 34% (range, 12% to 53%). Following a change to the first choice phase, there was an increase in overall on-task behavior to 49% (range, 0% to 88%). The overall level of on-task behavior maintained to an almost identical average of 48% (range, 3% to 82%) during a second no-choice phase. The final choice phase, which consisted of only two sessions due to lack of attendance, averaged 32% (range, 30% to 38%).

For Mark, the average percent of on-task behavior during the first no-choice phase was 36% (range, 27% - 65%). During this phase, a sixth session was performed with Mark because of a significant increase in on-task behavior during session five (65%). This score was inconsistent with the percent of on-task behavior during the first four sessions that ranged from 27% to 47%. Session six saw on task behavior decrease to an average of 35%, which falls within the range of results from the initial four sessions. During the first choice phase, Mark's on-task behavior increased to an average of 60% (range, 38% to 77%). A reversal to the second no-choice phase saw a decrease to an average of 31% (range, 7% to 58%). A return to a final choice phase saw Mark's on-task behavior increase to an overall level of 53% (range, 43% to 70%).

Neal's average percent of on-task behavior was 18% (range, 7% to 44%) during the initial no-choice phase. A change to the first choice phase saw an increase in overall on-task behavior to 53% (range, 17% to 78%). Following a reversal to the second no-choice phase,

Neal's on-task behavior decreased to 33% (range, 0% to 67%). A second choice phase was introduced, and on-task behavior increased to 48% (range, 15% to 88%).

Although percent of on-task behavior was the primary dependent variable, data was also collected on the number of problems that were completed, as well as the percent of problems that were correct. The number of problems completed during choice and no-choice conditions is displayed in Appendix C. Appendix D displays the percent problems completed correctly. Ruth completed an average of 8 problems during the first no-choice phase (range, 1 to 16), while completing 89% of them correctly (range, 75% to 100%). During the first choice phase, this number increased to an average of 15 problems completed (range, 0 to 32). The percent completed correctly dropped to 67% (range, 56% to 81%). During the second no-choice phase, the number stayed higher at an average of 16 problems completed (range, 0 to 35), and the percent correct increased to 80% (range, 50% to 100%). During the abbreviated second choice phase, the number of problems completed fell to an average of 7 (range, 4 to 9). The average number of problems completed correctly dropped slightly to 71% (range, 66% to 75%).

Mark averaged 4 problems completed during the first no-choice phase (range, 0 to 5). The percent completed correctly was 88% (range, 60% to 100%). During the first choice phase, the average problems completed stayed consistent with the no-choice phase, averaging 3 problems per session (range, 2 to 4), but the average number of correct problems completed decreased to 65% (range, 33% to 100%). A change to the second no-choice phase saw no change in the average number of problems, staying at 3 (range, 1 to 8). The percent of correct problems also stayed consistent with the first choice phase at 68% (range, 25% to 100%). During the second choice phase, Mark increased the number of problems completed to an

average of 5 (range, 1 to 10), but saw a significant decrease in correct problems to 39% (range, 10% to 100%).

Neal completed an average of 6 problems during the first no-choice phase (range, 0 to 20). He was correct in answering an average of 95% of the problems (range, 85% to 100%). In the first choice condition, he averaged 8 completed problems (range, 4 to 15) with an average accuracy of 62% (range, 25% to 100%). A return to no-choice conditions saw an increase in problems completed to an average of 13 (range, 0 to 25) and correctly answered an average of 72% (range, 0% to 100%). The number of completed problems further increased to an average of 19 during the second choice phase (range, 3 to 35). The accuracy stayed at almost identical levels as the prior phase at 73% (range, 44% to 86%).

## **Discussion**

The results of the current study indicate that choice of type of classroom assignment was effective in increasing on-task behavior for two out of three participants. Mark and Neal showed increases in on-task behavior during the two choice conditions over the no-choice conditions. For Ruth, there was an increase from the first no-choice condition to the first choice condition. However, the average levels of on-task behavior stayed almost identical in the second no-choice condition. Although the final choice condition was abbreviated, levels of on-task behavior dropped to near baseline levels.

Despite the initial analysis showing increases in on-task behavior for two out of three participants, these results should be viewed with caution. One limitation of the current study is the inability to quantify the effects of each individual's preference for a specific medium, and how they may have played a role in the change in levels of behavior. All three participants showed a strong preference for one particular medium over the other. Of the seven sessions

conducted during the choice phase, Ruth chose to complete the paper and pencil version of the assignment in all of them. Mark chose to complete the electronic version in 9 of 10 sessions, while Neal chose the paper and pencil materials for all 10 choice sessions. In order to attempt to determine whether or not preference was a significant factor in the levels of on task behavior, the data from choice and no choice sessions of the preferred medium was further analyzed. Ruth showed an obvious preference for the paper and pencil format. Overall, she was on task for an average of 46% of sessions (phase 1= 38%, phase 2= 54%) using paper and pencil. During choice sessions, Ruth was on task in 41% of sessions (phase 1= 49%, phase 2= 32%). For Mark, who showed a strong preference for the electronic assignments, an overall percent of on-task behavior during no-choice iPad sessions was 39% (phase 1= 34%, phase 2=44%). During choice sessions in which he chose the iPad, his overall on-task behavior was 55% (phase 1= 56%, phase 2= 53%). Neal's preference was for the paper and pencil medium. His overall rate of on-task behavior during the no-choice paper and pencil sessions was 22% (phase 1= 11%, phase 1= 33%). In all 10 choice sessions he chose this medium, and his overall on-task behavior was 51% (phase 1= 53%, phase 2= 48%). Following this analysis, it appears that preference may have been a confounding variable for Ruth, being that rates of on-task behavior during both choice and no-choice phases were similar when given her preferred medium. For Mark and Neal, the results showed that rates of on-task behavior were significantly higher during the two choice phases than no-choice phases when given their preferred materials. Their results indicate that the primary variable for behavior change was choice, although the degree to which preference played a role cannot be completely isolated within this research design.

Additional data was collected on the number and accuracy of answers given during sessions of all three participants. The purpose for gathering this data was to determine whether

choice would have an effect on the number of problems completed, as well as the number that were done correctly. For Ruth, there was an increase of an average of 7 problems per session from the first no-choice phase to the first choice phase. The number maintained in the second no-choice session, but dropped by over 50% in the final abbreviated choice phase. Ruth's accuracy dropped in both choice phases, but overall stayed in a range from 67% to 89% in all phases. For Mark, the number of completed problems stayed consistent between 3 and 5 in all four phases. The accuracy of the completed problems decreased from the first no-choice phase to the first choice phase, stayed consistent into the second no-choice phase, and dropped significantly in the final choice phase. Neal's number of completed problems gradually increased through all four consecutive phases (range, 6-19). There was also an increasing trend in the percent correct throughout the length of the study. The results of the data collection on number and accuracy of problems completed is inconclusive in terms of whether or not choice directly influenced responding. There is one consideration when looking at Ruth's data. During all sessions, she was asked to complete both addition and subtraction problems. During the first no-choice phase, she completed 0% of the subtraction problems. During the first choice phase, completion of subtraction problems increased dramatically to 66%. A return to the second no-choice phase saw a decrease to 39% of completed subtraction problems. The final abbreviated choice phase saw an increase to 70%. Although Ruth's willingness to complete subtraction problems is positive in helping to improve in this area, it had an effect on her accuracy scores, being that it was clear that overall she was more accurate answering addition problems (addition= 93%, subtraction= 57%).

Another limitation of the current study is the lack of a complete data for the final choice phase for Ruth. Instead of having 5 sessions, only 2 were completed due to a lack of attendance.

The primary investigator extended the amount of time allotted for research, but it still proved insufficient. Because of this, results gathered for Ruth must be looked at as incomplete.

A final limitation of the current study is a lack of follow-up data. Upon completion of the initial experimental sessions, the format of the class changed. The environment changed in that there were additional students added, as well as having a change in teaching staff. There were other concepts that were targeted for instruction. This change was in alignment with each student's IEP. Therefore, any data regarding the maintained effects of presenting choice on on-task behavior could not be collected for fear of decreased validity.

When looking at the results of the current study, one question that should be addressed is whether or not the implementation of choice is socially valid. The purpose of the current study was to investigate the effects of choice of type of classroom assignment on on-task behavior. On-task behavior is a measure of how much time each subject was engaged in the learning activity. Task engagement is a major factor in promoting skill acquisition and generalization. Results of the current research indicated that there was an increase in on-task behavior for 2 of 3 subjects. Further analysis indicated that this increase did not translate to an increase in correct responding. These results require the investigator to ask the question of whether or not this intervention is socially valid. Social validity "refers to the extent to which target behaviors are appropriate, intervention procedures are acceptable, and important and significant changes in target and collateral behaviors are produced" (Cooper et al., 2007). The choice of the dependent variable allowed for analysis of an important factor in each of the subjects' availability for learning, as well as the overall effectiveness of increasing skill level. Educators in the school setting are continuously looking for ways to increase the amount of time that students are

attending to their work. Although choice did not result in an increase in correct responding, on-task behavior allowed for the evaluation of primary research questions.

Another component of social validity is acceptability of a procedure. All of the procedures introduced in this study had been used previously in the subjects' academic setting, although it had not been done as systematically. These sessions were conducted in 10-minute intervals. Each of the subjects had been exposed to both types of assignments. Each of them showed a preference for one medium over the other (paper and pencil vs. iPad). Despite the informal observations that were derived, no specific data was collected regarding the acceptability of the procedures used. Further research in this area should also include a post research questionnaire regarding the acceptability of the procedures used.

The greatest question regarding social validity of the choice procedure used is due to the fact that there were no notable increases in number of problems completed or number of problems completed correctly. Because of the lack of positive results, was choice a valid procedure to use? The answer to this question may be found by looking at a couple of factors. First, each of the subjects that participated in the study were several grade levels below typically developing peers in the area of mathematics. In order to acquire and generalize skills, they require additional support and practice. It is possible that using 10-minute sessions did not allow sufficient opportunities to practice the math skills that were targeted. Second, it is possible that the students were focused only on completing the task. There were no programmed consequences provided for completing problems correctly vs. incorrectly. Further research in this area may benefit from providing direct feedback for correct and incorrect answers.

Based on research conducted previously in this area, it has been shown that choice can be an effective agent of behavior change. Although the current study did not result in increased

rates of correct responding, it was effective in increasing on-task behavior in 2 of 3 subjects.

These results justify the continuation of research in this area. Further research may benefit by extending its focus to not only on-task behavior, but correct responding as well.

The findings of the current study add to the body of research regarding the effects of choice on behavior. Choice of type of classroom assignments was effective in increasing on-task behavior in 2 out of 3 participants, but did not have a significant effect on the quantity or accuracy of academic skills. Possible future areas for research would include isolation of the effects of choice vs. personal preference. Additionally, further analysis focusing on task completion and accuracy could be pursued.



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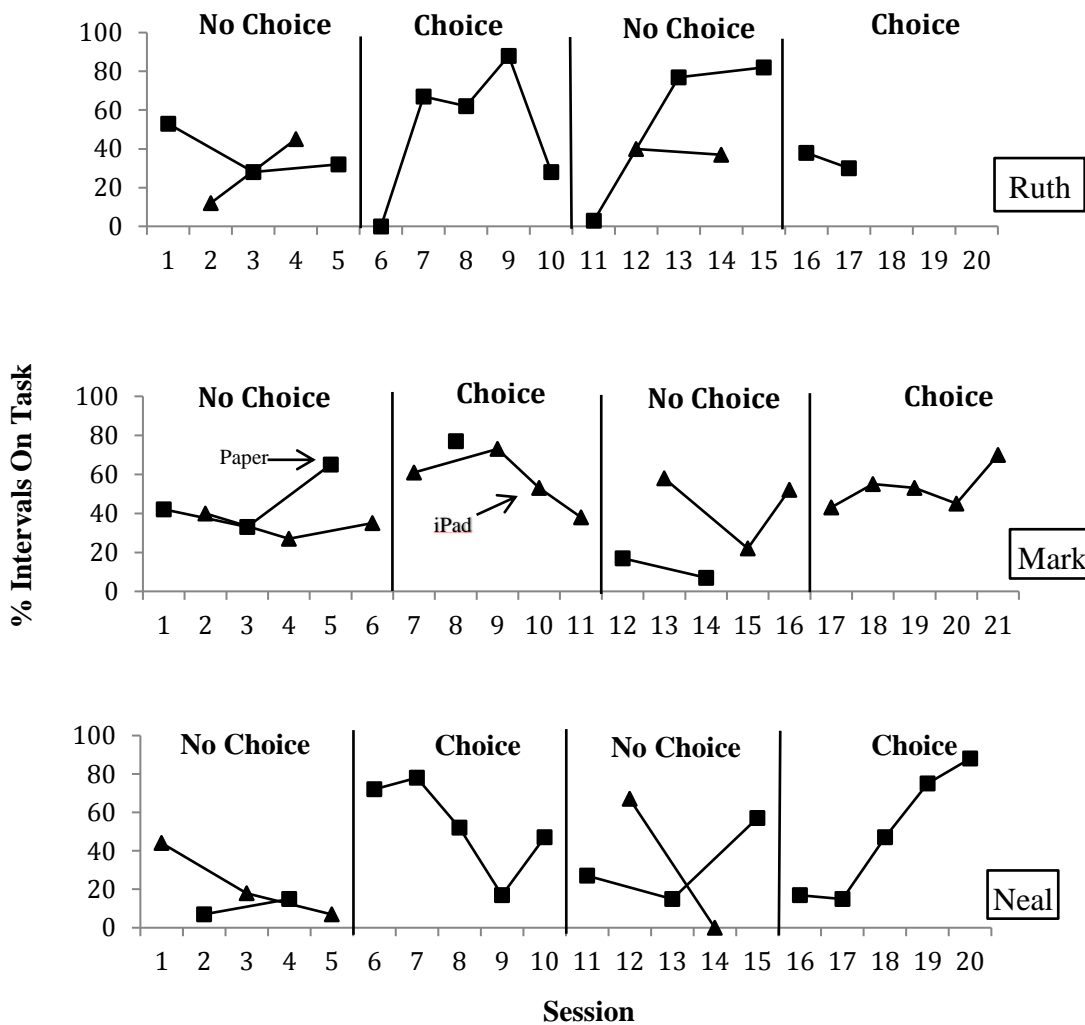
### Appendix A

Table 1. Mean percent and range of intervals with on-task behavior during choice and no choice of materials conditions.

	No Choice Phase #1		Choice Phase #1		No Choice Phase #2		Choice Phase #2		Overall Mean (No Choice)	Overall Mean (Choice)
	Mean %	Range	Mean %	Range	Mean %	Range	Mean %	Range		
<b>Ruth</b>	<b>34%</b>	<b>(12% - 53%)</b>	<b>49%</b>	<b>(0% - 88%)</b>	<b>48%</b>	<b>(3% - 82%)</b>	<b>32%</b>	<b>(30% - 38%)</b>	<b>41%</b>	<b>41%</b>
<b>Mark</b>	<b>36%</b>	<b>(27% - 65%)</b>	<b>60%</b>	<b>(38% - 77%)</b>	<b>31%</b>	<b>(7% - 58%)</b>	<b>53%</b>	<b>(43% - 70%)</b>	<b>34%</b>	<b>57%</b>
<b>Neal</b>	<b>18%</b>	<b>(7% - 44%)</b>	<b>53%</b>	<b>(17% - 78%)</b>	<b>33%</b>	<b>(0% - 67%)</b>	<b>48%</b>	<b>(15% - 88%)</b>	<b>36%</b>	<b>51%</b>

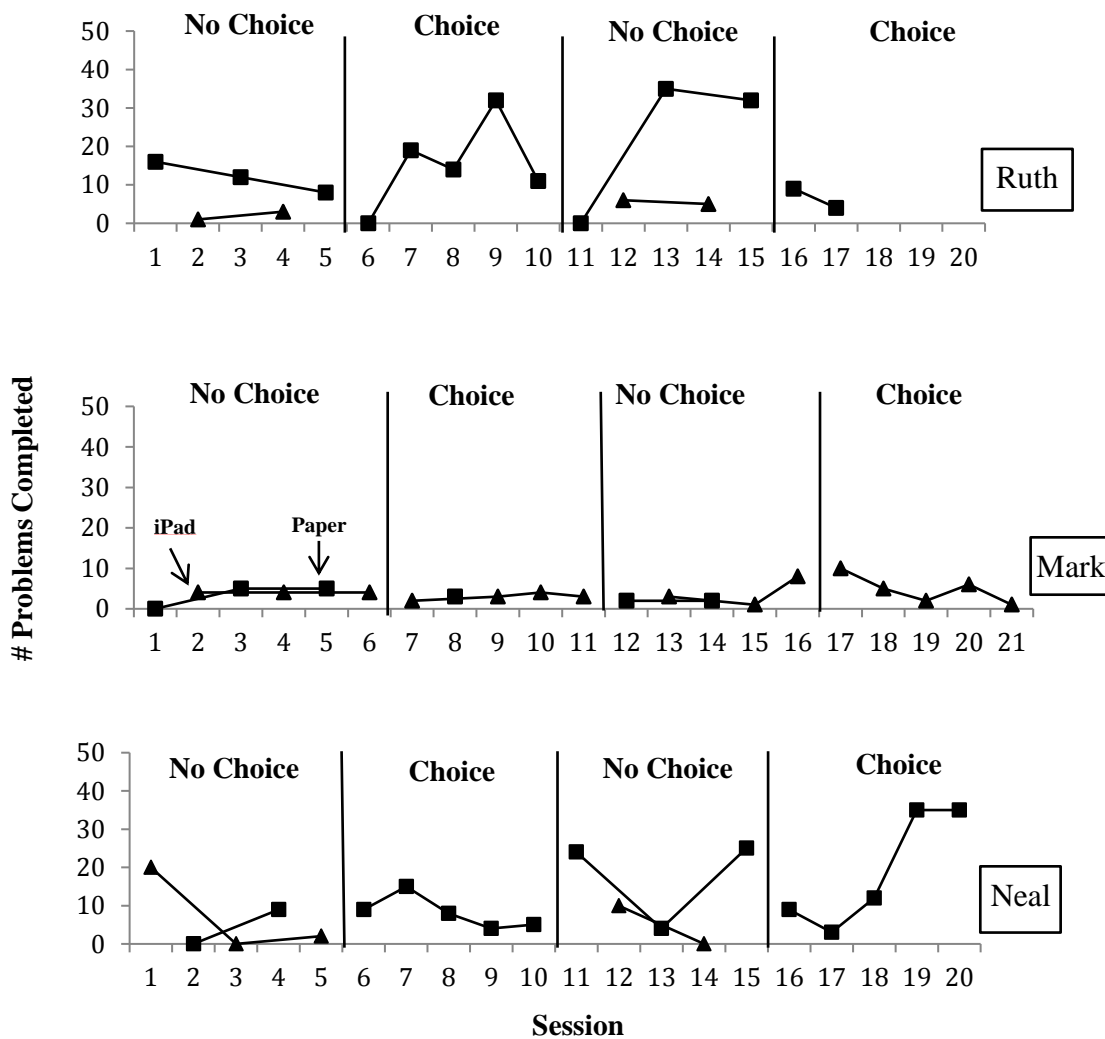
Appendix B

Figure 2. The percent of intervals with on-task behavior during choice and no choice of materials conditions.



## Appendix C

Figure 3. The number of problems completed during choice and no choice conditions



### Appendix D

Figure 4. The percent of problems completed correctly in choice and no choice conditions.

