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## Long-Term Effectiveness of Brief Multiple-Stimulus Without Replacement Preference Assessments on Individualized Education Plan Reading Progress of Students with Severe Disabilities

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LONG-TERM EFFECTIVENESS OF BRIEF MULTIPLE-STIMULUS WITHOUT  
REPLACEMENT PREFERENCE ASSESSMENTS ON INDIVIDUALIZED  
EDUCATION PLAN READING PROGRESS OF STUDENTS  
WITH SEVERE DISABILITIES

by

Heather C. Thornton

A thesis submitted in partial fulfillment  
of the requirements for the degree

of

MASTER OF SCIENCE

in

Special Education

Approved:

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UTAH STATE UNIVERSITY  
Logan, Utah

2008

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## ABSTRACT

Long-term Effectiveness of Brief Multiple-Stimulus Without  
Replacement Preference Assessments on Individualized  
Education Plan Reading Progress of Students  
with Severe Disabilities

by

Heather C. Thornton, Master of Science  
Utah State University, 2008

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Department: Special Education and Rehabilitation

To teach operant behaviors to individuals with severe disabilities, stimulus preference assessment (SPA) methods have been developed to accurately identify stimuli that may function as reinforcers. Previous researchers have used multiple-stimulus preference assessments without replacement (MSWO) effectively over a short time period to teach target behaviors to individuals with disabilities. The present study investigated the long-term effects of incorporating brief MSWO preference assessments into the instructional routine for students with severe disabilities on individualized education plan reading goal/objective progress. This was done by investigating the effectiveness of incorporating brief MSWO preference assessments by comparing reading goal progress when a random reinforcer is available, teacher- selected reinforcer is available, or a

student-selected reinforcer (via a brief MSWO preference assessment) is available over several weeks for students with severe disabilities in a secondary public school classroom setting.

(81 pages)

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## INTRODUCTION

Expectations for students to succeed and excel in public education are constantly changing and students with severe disabilities are no exception. In order for students with severe disabilities to demonstrate progress in their education, appropriate individualized education plan (IEP) goals and objectives should be developed for each student. Students then need to be taught the skills necessary to perform the behaviors identified in their IEP goals and objectives. Teaching students with severe disabilities can be difficult, which makes it extremely important that teachers use instructional techniques that have been documented to be effective (Logan & Gast, 2001).

One technique that is effective in the acquisition of operant behavior is reinforcement (Pace, Ivancic, Edwards, Iwata, & Page, 1985). Due to the difficulties in identifying reinforcers for individuals with severe disabilities by other means, systematic assessment procedures, called stimulus preference assessments (SPA) have been developed (Pace et al.). Graff and Ciccone (2002) stated that systematic preference assessments effectively identify functional reinforcers. Several SPA methods have been developed to accurately identify stimuli that may function as reinforcers for individuals with severe disabilities such as: single-stimulus preference assessment (Pace et al.), paired-stimulus preference assessment (Fisher et al., 1992), and multiple-stimulus without replacement assessments (DeLeon & Iwata, 1996).

During a single-stimulus preference assessment as developed by Pace et al. (1985) one stimulus is presented at a time from a predetermined pool of

stimuli. The practitioner measures whether or not the stimulus is approached. A stimulus is made available for 5 s; if it is approached (or touched) the student is allowed to interact with or consume the item. If it is not approached, the student will be prompted to interact with the item and the item will be presented again to give the student the opportunity to approach it. If the stimulus is still not approached (not touched) it will be removed and counted as no approach, and the next stimulus will then be presented. Each stimulus is presented several times. The measure of preference is determined by the percentage of times a stimulus was approached when it was available. The single-stimulus preference assessments place items into groups of preferred or non-preferred. While shown to be effective in placing stimuli into general categories of preferred or non-preferred, this method is time consuming, and does not allow for the different stimuli to be directly compared to each other.

Paired-stimulus preference assessments, also known as forced choice assessments, allow stimuli to be compared to each other (Fisher et al., 1992). Again a predetermined pool of stimuli is chosen and two items are presented at a time and the individual is allowed to choose between them. The first stimulus approached is counted as the selection. When both stimuli are approached simultaneously approaches are blocked. If there is no approach the individual is prompted to interact with both items, then both items are presented again. If both items are still not approached, both are removed and the next pair is presented. Each stimulus is presented with every other stimulus at least twice so that the stimuli can be presented on both sides (the right and left). While this

assessment method is more precise than the single stimulus presentation method, it is still time consuming and could be difficult to use on a long term basis.

The multiple-stimulus preference assessment without replacement (MSWO) method was developed by DeLeon and Iwata (1996). All items to be assessed are presented in an array. The individual is allowed to select one item from the array. Blocking of multiple selections is conducted in the same manner as in the paired-stimulus presentation. When an item is selected the individual is allowed to interact with or consume the item. Once an item is selected it is not available during the next presentation. This process of presenting items is repeated until all the items have been selected or until the student makes no selection. Items are ranked in order of preference by the percentage of times each stimulus was selected when it was available. The arrays are presented a total of five times for each individual. During MSWO preference assessments it can be difficult to handle multiple stimuli and the results are not as precise as the paired-stimulus assessment. A major advantage of the MSWO preference assessment, however, is that it takes about half the time of a paired-stimulus assessment.

Carr, Nicolson, and Higbee (2000) developed a similar procedure to the MSWO preference assessment however that required even less time to conduct: approximately 5 m. In the brief MSWO preference assessment the stimulus-presentation sessions were conducted with each participant three times rather than five times. The individual is instructed to select one item from the array, and

then is given 10 s of access after a selection. Blocking attempts to select more than one stimulus is also used when necessary. After a stimulus is selected the remaining stimuli are repositioned in a somewhat random order. This continues until all items are selected then the entire process is repeated two more times. The selection percentage is calculated in the same fashion as the MSWO preference assessment. This procedure can be used as an ongoing process because it requires such a short amount of time to complete. This is also an accurate SPA method to identify reinforcers for individuals with severe disabilities. The SPA methods that identify reinforcers to be used contingent upon academic responses could assist students in achieving their IEP goals and objectives more readily.

## RATIONALE FOR STUDY

Stimulus-preference assessments have been implemented and effective in a variety of populations: adults with severe mental retardation (Bojak & Carr, 1999); children with autism ages 2-7 (Carr et al., 2000); adults with profound developmental disabilities (DeLeon & Iwata, 1996); children with profound mental retardation ages 2-10 (Fisher et al., 1992); adolescent children with developmental disabilities (Graff & Ciccone, 2002); adolescents with developmental disabilities (Graff, Gibson, & Galiatsatos, 2006); children with mental retardation (Ortiz & Carr, 2000); adolescent boys with emotional-behavioral disorders (Paramore & Higbee, 2005); and profoundly retarded individuals ages 3-18 (Pace et al., 1985). Most of the studies have been conducted in clinical settings (Bojak & Carr; DeLeon and Iwata; Fisher et al.; Higbee, Carr, & Harrison, 2000; Pace et al.), and very few have been conducted in a classroom setting, exceptions include (Carr et al.; Paramore & Higbee). The previous studies have been all conducted for a short time period; however, the present study implemented the daily brief MSWO preference assessment over a period of several weeks to investigate the long term effects of MSWO preference assessment. The purpose of the current study was to determine if the long-term effects of incorporating daily brief MSWO preference assessment in the instruction routine for students with severe disabilities increased reading goal/objective progress. Implementing SPA into a classroom setting helped determine if the time and effort needed to conduct the preference assessment warranted a significant result. Special educators would welcome a quicker and

more effective way to reach IEP goals/objectives because of the benefit it would offer their students who already are behind their same age non-disabled peers. Brief MSWO preference assessment is a procedure that does not require a large amount of time can be used as a valuable reinforcer assessment tool to use throughout the school day thus motivating and enhancing student performance. This study investigated the practical use of brief MSWO preference assessment in a classroom setting of students with severe disabilities.

## LITERATURE REVIEW

The purpose of this literature review was to locate and describe previous studies that implemented a multiple stimulus-preference assessment without replacement with students with disabilities. The literature reviewed for the present study was located through the PsychINFO database via EBSCO Host and the *Journal of Applied Behavior Analysis* (JABA) online database. The search terms; stimulus preference assessment, multiple stimulus preference assessment, special education, disabilities, identifying reinforcers, academic achievement, work performance, severe handicaps, curricular revision and severe behavior problems were used in a variety of combinations to locate the studies. Articles were selected based on the following criteria: the use of MSWO preference assessment or brief MSWO preference assessment, and participants were diagnosed with disabilities. Seven studies using MSWO preference assessment were located. Five studies were reviewed and two were excluded. One was excluded because it focused only on the effect of MSWO preference assessment after meal times and the other was excluded because it used more than one SPA method and brief MSWO was not the main focus of the study.

DeLeon and Iwata (1996) wanted to study the advantages of a briefer assessment procedure to facilitate more frequent sampling and to allow for shifts in preferences. They combined what they called the best features of the paired-stimulus preference assessment with those of the multiple-stimulus preference assessment. This variation is known as the MSWO preference assessment.

The study compared MSWO preference assessment, multiple-stimulus with replacement, and the paired stimulus preference assessment.

Seven adults with profound developmental disabilities all of whom lived at a state residential facility participated in the study. The participants were ages 26, 25, 43, 43, 39, 45, and 32 years old. All of the participants had limited verbal to no verbal communication. They were selected for the study because they had a number of behavioral deficits and could benefit from the identification of extra reinforcers. The sessions were conducted in a therapy room on the grounds of the residential facility. Participants were not tested in the same rooms as each other but, each participant stayed in the same room throughout the study. Each room contained a table, two chairs and materials used for each participant during the study. Seven items per participant were selected for presentation during each assessment. Most of the items were selected by the experimenters who had no prior knowledge of the participant's preferences at the time. After some causal observations and caregiver input a few additional items were selected.

Prior to the first session participants were given a sample of each edible stimulus and 30 s of access to the each leisure stimulus. During SPA a selection was scored if the participant made physical contact with the stimulus. If contact was made with more than one item the first item contacted was recorded as the selection. If no item was selected within 30 s the trial ended. When an item was selected the participant was given 30 s of access to the item or was allowed to consume the item.



During MSWO preference assessment sessions all stimuli were placed in a straight line in front of the participant and the experimenter instructed the participant to select one item. After the selection was made the item was either removed if it was a leisure item or not replaced if it was an edible item. Before the next trial began the item on the left side would be moved to right side and the remaining items would be equally spaced on the table and centered in front of the participant. This procedure was implemented to allow for equal selection opportunities if participants had a tendency to always choose an item on a preferred side. This process continued until all items were selected, or the remaining items were not selected by the participant, and they were scored as “not selected.” The multiple-stimulus with replacement procedures were identical to the MSWO preference assessment except that the item selected was replaced in the array. Similar procedures were followed during the paired stimulus except that only two items were presented during each trial. The session continued until each item had been paired with all the other items for a total of 21 sessions. Failure to select an item did not end the session but the next pair would then be presented. All stimuli were positioned randomly and were presented in a predetermined order.

There were five consecutive sessions for each participant resulting in a total of 15 sessions. The order of stimuli presented varied between participants. A percentage score was calculated indicating the number of times an item was selected divided by the number of times the items was presented. Four of the seven participants identified the same highly preferred reinforcer during all three

assessment methods. The MSWO preference assessment procedure matched the top three ranked items of the paired stimulus assessment for four of the seven participants and two of the top three ranked items for the remaining participants. However there were some slight variations in the exact rankings. For all participants the multiple stimulus preference assessment produced the greatest number of unselected items. During both the paired stimulus presentation and the MSWO preference assessment at least 90% of the items were selected at least once for each participant.

The time required to conduct each procedure showed that the entire five-session assessment required a mean of 16.5 min for the multiple-stimulus preference assessment, 21.8 min for the MSWO preference assessment, and 53.3 min for the paired stimulus. Overall the three assessment formats produced very similar results in identifying the highest preferred stimuli. The MSWO preference assessment and paired stimulus assessment generally produced the most consistent ranking between procedures. The researchers noted that the MSWO preference assessment procedure required less time on average to administer than the PS preference assessment. Anecdotal data suggests that the highest preferred items were always available during the multiple stimulus presentation and were immediately selected. However, on the MSWO preference assessment the most preferred items were not always available and participants needed more time to scan the array. The time that it took participants to scan may have accounted for the increase in time.

The researchers implemented a second experiment to verify the prediction about the stimuli that were never selected. A schedule of contingent reinforcement was developed to examine reinforcing effects of four of the items to determine if they could support levels of responding above baseline. This experiment included four of the participants from the previous experiment. Sessions were conducted in the same room as before and each participant had a predetermined task selected to perform. After stable rates of baseline were observed each participant was exposed to a fixed ratio 1 schedule of the delivery of the item in question. The item used was different for each participant and was selected because it was selected during the MSWO preference assessment and the PS preference assessment but was not selected during the MS preference assessment. Reversal designs with slight variations were used for each participant.

Three of the four participants showed an increase from baseline of responses per min when using the reinforcers identified during the paired stimulus and MSWO preference assessment, but not the multiple stimulus assessment. For all seven participants, the MSWO preference assessment identified more reinforcers than similar procedures where stimuli were placed back into the selection array. The researchers noted the downfall of the multiple-stimulus procedure is the false negatives identified due to the continuous availability of the most preferred items. They also noted that the MSWO preference assessment and paired-stimulus procedure are the most beneficial

methods of identifying a variety of potential reinforcers for individuals who have few known reinforcers.

A practical setting for teachers to implement interventions is the actual classroom. This study took place in a number of different therapy rooms in a residential treatment facility. The participants were also much older than school age children. The target behavior was responses per minute in relation to specific tasks such as checker pieces being placed in a slot, ink stamper pressed on paper, cause and effect panel connected to a light, and wooden blocks placed in a bucket. These tasks are not academically relevant behaviors however the present study focused on academic responses. For three of the four participants when access to identified reinforcers was available responses per minute were higher than when access to reinforcers was not available. The study took 16, 24, or 42 sessions to complete for each participant. For some of the participants the total length of the study was a relatively short duration where as for others it was extended for a longer duration. For educational success it is necessary for long term gains to be made.

Carr et al. (2000) investigated the efficiency of the MSWO preference assessment reported by DeLeon and Iwata (1996) by decreasing the number of stimulus-presentation arrays from five to three by evaluating the effectiveness of using the highly preferred stimuli in a naturalistic context for children diagnosed with autism. Three children, males and female ages 2, 6, and 7 years old, participated in the study. All the participants were diagnosed with autism and attended a university based day program. Sessions were conducted in the

participant's daily therapy rooms which were approximately 4 meters by 4 meters. Each participant received 30 hours of one-on-one intensive behavior therapy per week.

Eight items consisting of edibles and leisure toys were selected for the study (one participant only had leisure toys presented due to medical conditions). Stimuli were selected based on parent survey and therapist suggestions. Therapists conducted brief MSWO preference assessment and reinforcer evaluation with each participant. Both assessments were conducted during one period of time. Procedures were similar to DeLeon and Iwata (1996), except that three stimulus presentations, rather than five were conducted with each participant.

Arrays of eight stimuli were presented to each participant and they were verbally instructed to select one. The stimuli were placed in a straight line in front of the participant. When the participant failed to respond, the instruction was repeated. If a participant attempted to select more than one stimulus they were blocked. After a stimulus was selected, the participant was given 10 s of access to the stimulus. Once a stimulus was selected, it was removed from the array. Following stimulus selection, the remaining stimuli were repositioned in a somewhat random order. This was repeated until all eight stimuli were selected and then the entire procedure was repeated two more times. Stimuli selection percentages were calculated by dividing the number of times a stimulus was chosen by the number of times which it was available and ranked from highest preference to lowest preference. The three stimuli that ranked as the highest

preference (first), medium preference (fourth or fifth), and lowest preference (eighth) were identified.

A low-frequency target behavior from the participant's ongoing acquisition curriculum was chosen based on recommendations from the clinic's assistant director. The target behavior for participant one, was to stomp his feet after receiving verbal instructions, participant two's target behavior was to say, "ma" after receiving verbal instructions, and participant three's target behavior was to imitate a therapist who placed two toy blocks together in specific ways. During baseline each participant was instructed to perform his/her target behavior for 15 consecutive trials. Next each participant was presented with each stimulus (high, medium and low) for two 15 trial sessions. The participant was provided stimuli on a fixed ratio 1 (FR 1) schedule for correctly performing the target behavior. Correct responses resulted in 10 s of access to the stimulus for that session. Following the reinforcer evaluation procedures eight additional MSWO preference assessments were conducted over 4 weeks. There were 2 to 5 days between each assessment. The main purposes of these additional assessments were to evaluate changes in preferences over time, and, to determine the correspondence between the results of the first MSWO preference assessment session and each additional session. This was calculated using the Spearman rank correlation between each item's ranking in the first session and its overall rank for subsequent sessions.

For participants two and three, the low preference failed to have any significant responding over baseline. The medium preference had a moderate

effect for participant one. However, for participant two it was only a modest effect and there was no effect for participant three. The high-preference for all three participants created the highest rate of responding. These results demonstrate the effectiveness of the brief three-session MSWO preference assessment. All three participants initial brief MSWO preference assessment and the reinforcer evaluation was completed in less than one hour. For two of the participants the preferences over time stayed stable during the eight ongoing MSWO preference assessments but participant one had variable data. Overall the Spearman rank showed high agreement for all participants during the first session and the following three sessions.

The researchers indicated the evaluation of a brief MSWO preference assessment could potentially be implemented regularly over time due to the small amount of time needed to assess reinforcers. They also implemented the reinforcer identification in the participants everyday setting during his/her regular scheduled training times. This research was conducted during over seven sessions and needs to be extended to a longer-term evaluation to support the results found.

As noted earlier this study took place in therapy rooms with one-on-one instruction rather than in classroom setting. The participants were of a preschool age school age and the target behavior was chosen from each participant's current curriculum therefore it was an educationally relevant behavior. For these participants during the onetime assessment it did show that the highly preferred items resulted in a greater number of correct responses but further research was

needed to identify to long term academic benefits. This is a relatively short time period to be able to identify if the intervention assists in the acquisition of academic behavior for that reason, a study that takes place over a longer duration was needed to identify if MSWO preference assessments make a difference in academic progress.

Higbee et al. (2000) tested the validation of stimuli identified as preferred through MSWO preference assessment preference assessments. Nine individuals with severe or profound disabilities participated in the study. Participants all resided in intermediate care facilities for persons with mental retardation. The participants were male and females, between the ages of 22 and 53 years old. All of the sessions were held in the participants' residences or day treatment programs. The same room was used for each participant throughout the study. The Reinforcer Assessment for Individuals with Severe Disabilities (RAISD) developed by Fisher et al. (1992) was used to select the stimuli. Individuals who worked closely with the participants were interviewed using the RAISD. Seven stimuli were selected for each participant during each assessment which were identified during the interview.

Participants were given 20 s to select stimuli and a response was recorded when physical contact was made with one stimulus in the array. If the participant made contact with more than one stimulus, the first item touched was scored as the selection. If a selection was not made within 20 s, the session ended and the remaining stimuli were scored as not selected.



Before each session, participants were given 20 s of access to each item following which they were given three assessment sessions with short breaks between sessions. All seven stimuli were presented at the beginning of each session. The stimuli were in a straight line and were evenly spaced on the table between the participant and the experimenter. The participant was instructed to make a selection. Following the selection access to the stimuli was given for 20 s and then the stimuli were removed from the array. The remaining stimuli were all shifted from left to right. This continued until all the stimuli were selected or no selection was made. A brief break was given and then the entire process was repeated two more times.

During the reinforcer validation phase, all participants received training on how to perform the target response of button pushing. When participant could perform the target response baseline began. Baseline lasted one min and participants were instructed to push the button as much as they wanted. No systematic consequences were delivered during baseline. Stimuli were ranked according to the percentage of times the stimulus was selected when it was made available then multiplying by 100%. Stimuli were then ranked from the highest to lowest percentage. Following baseline, one stimulus was then delivered contingent on the target response. The stimulus delivered was selected from the four or five stimuli identified as most preferred. Reinforcement was delivered on a fixed-ratio (FR) schedule of reinforcement. One stimulus was used for each session and the order of stimuli was random. Each session lasted one min however; the timer was stopped when a stimulus was consumed

because of the different amounts of time needed for consumption. At the end of each session experimenters recorded the total number of responses.

Sessions continued using an alternating treatment between the four stimuli until a clear separation of data could be seen.

An increase of responding over the median baseline when the highest ranked stimulus was used was seen for six of the nine participants. The stimulus ranked as a tie for second showed an increase of responding over baseline in a seventh participant and no stimulus consistently increased responding in the remaining two participants. The authors noted that preferences can and do change over time. A valuable advantage of this procedure is that it can be completed in a relative short amount of time therefore; making it easy to adapt to the changing needs of the individuals it serves. The authors also noted that the target response was relatively simple and reinforcing effects may not generalize to more complex responses and situations. The authors also suggested that stimuli identified as potential reinforcers in SPA should be applied in natural environments. This study showed another way for reinforcers to be identified in an efficient and accurate manor.

All participants in the above study were of adult age rather than of school age. They were living in a residential facility and the study either took place in the residence or in a day treatment program. MSWO preference assessments have been applied in several therapy or residential facilities yet few have focused on a classroom environment. All of the participants had the same target behavior, activation of a microswitch by pressing a button which is rather simple

task. The target behavior was not related to academic progress nor is the setting educationally relevant. Again access to the stimulus with the highest ranking did result in an increase of correct responses as compared to lower ranked items or no items when used for a brief duration. The setting was not naturalistic like students with disabilities would face like in a classroom environment. Sessions lasted for one min and multiple sessions were conducted in a day for a total of 3 hr. The study was extremely short in duration.

Graff and Ciccone (2002) conducted multiple-stimulus preference assessments to analyze extended MSWO (seven assessments and seven trials per assessment) to determine if the top ranked stimulus remained the top ranked stimuli if the number of sessions and trails per session were decreased. Fifteen residential school students between the ages of 7 and 21 years old participated in the study. Each participant was diagnosed with autism, developmental disabilities, or behavior disorders. Sessions were conducted in the participants' classrooms once a day three to four times each week. Sessions took approximately five min to complete and were conducted at various times during the school day.

Preference assessment procedures were similar to those developed by DeLeon and Iwata (1996). For each participant seven stimuli (edibles and toys) identified by the teaching staff were used. Edibles and toys were never used in the same assessment. The experimenter sat across the table from a participant and placed the items in a line in front of the participant who was then instructed to "choose one." Attempts to select more than one were blocked. After an item

was selected he/she was allowed to consume the item or play with it for 15-20 s. Remaining stimuli were rotated from right to left and repositioned so they were centered in front of the participant. Trials continued until the last item was approached or until no item was approached within 30 s. Seven sessions were conducted for each participant. Percentages of approaches were calculated by dividing the number of times a stimulus was approached by the number of trials the stimulus was available. Following the preference assessments a *post hoc* analysis was conducted to determine if the highest-ranked items would be identified if, (a) fewer sessions were conducted, (b) fewer trials per session were conducted, and (c) fewer sessions and fewer trials per session were conducted.

Four of the previous participants were selected to participate in the reinforcer assessments. A button press task was selected because the participants could complete the task without prompting. To determine whether highly preferred items served as reinforcers, an ABAB design was used. During baseline, all participants were instructed to “press the button” and no consequence was provided. A blue button on a blue background was used. During the intervention, participants could access the high preferred item for pressing the button. A red button on a red background was used. When the response requirement was met, the experimenter delivered the selected item.

The first post hoc analysis conducted was to determine whether the highest-ranked items would have been identified had fewer sessions been conducted. The second post hoc analysis was conducted to determine whether the highest ranked items would have been identified if fewer trials had been

conducted. The third post hoc analysis was conducted to determine whether the highest ranked items would have been identified if fewer sessions and fewer trials had been conducted. For five data sets, the brief MSWO preference assessment did not identify the same highest ranked stimulus compared to the extended MSWO preference assessment. However there were only minor differences in the percentage of approach responses on the extended MSWO preference assessment between the highest preferred items. Reinforcer assessments indicated that items identified as high preference on the brief MSWO preference assessment did function as reinforcers. This indicates that brief MSWO preference assessment can successfully identify highly preferred items. The researchers also demonstrated that the number of trials per session could also be decreased. The brief MSWO preference assessment did not yield the same highly-preferred items as the extended MSWO preference assessment; however the percentage approach differentiation was very minor. The researchers indicated that shorter assessments could be conducted more frequently to help identify reinforcer change over time than when longer assessments are used.

Like other studies reviewed, Graff and Ciccone (2002) did not apply MSWO preference assessment procedure in a public school classroom; rather they focused on a residential school setting. They did however have some participants of school age and others that were older. The target behavior was again a simple button pressing task which was not tied to any academic instruction or academic goals. The results showed access to the reinforcers did

increase the responses per minute yet there was no study on the long term effects of the intervention. The maximum number of sessions during the study was five but was also as low as three. This study implemented the intervention for a short duration to determine if the effects really make a difference.

Paramore and Higbee (2005) studied the effects of brief MSWO preference assessment with individuals with mild disabilities by measuring their on-task behavior. The purpose of this study was to examine the results of brief MSWO preference assessment with adolescents with emotional-behavioral disorders because it had not previously been conducted with this population. Three males ages 9, 10, and 11 years old with emotional-behavioral disorders in public school participated in the study. All three participants were receiving special education services. All three participants attended the same special education and general education classrooms.

The brief MSWO preference assessment took place in the special education teacher's private office. Within the office was a table, two chairs and the stimuli needed for the assessment. Reinforcer evaluation took place during group teacher directed math and reading in the participant's general education classroom. A classwide behavior management system was previously in place and it continued to be implemented. Through this system students earned points to receive privileges and access to preferred activities. There were a similar number of sessions conducted with each participant.

Brief MSWO preference assessment procedures were identical to those used by Carr et al. (2000) except only edible stimuli were used in the array, the

stimulus array consisted of five stimuli rather than eight and the participant could indicate their preference verbally or nonverbally. The researchers choose to use edible stimuli only because it was easy to deliver and it did not interfere with the on-going classroom behavior management system. Based on informal interviews with students, parents, and classroom staff stimuli to be used were selected. Observers recorded the order in which items were selected during each session. Once the brief MSWO preference assessment was completed the reinforcer evaluation began in the general education classroom.

The target behavior for all the participants was on-task behavior which was defined as feet on the floor, head up and back straight while sitting at the desk, working on the assigned task, speaking only after raising hand, being called on by the teacher and speaking about task-related question. Data was collected on the on-task behavior of the students using 20-s whole interval system. The interval was scored as on-task (yes) only if the participant maintained on-task behavior for the entire interval. Sessions were 10 min in length. The researcher conducted one to three sessions per day per student and there were about 33 sessions per students so the study was conducted in approximately 10 days.

During the reinforcer evaluation, participants could earn high-preference, medium-preference, or low-preference stimuli contingent on three consecutive observation intervals. Each time the response requirement was met during a session, the participant was immediately given one bite of the stimulus being evaluated during that session. One stimulus was available during each session

and the participants were informed which stimulus was available prior to each session. The order in which stimuli were presented was semi-random. Each participant had different high, medium and low-preference items such as: Funyuns, gummy worms, jerky, cheese, oranges, Pringles, fruit snacks, and grapes.

A multi-element design was used and once the stimuli were presented, initially there was not a large difference in on-task behavior upon the delivery of the reinforcers. However, the high-preference stimulus eventually produced the highest percentages of on-task behavior and this persisted over time. During baseline, all the participants were on-task less than 50% of the time. Once the edible items were delivered contingent on on-task behavior there was an increase of on-task behavior which may have been due to the fact that they were now receiving edibles where previously they were not. After repeated contact with the reinforcers (approximately 18 sessions) a differentiated pattern was seen based on access to the high, medium, or low preference items. These results showed the brief MSWO preference assessment were effective with adolescent boys with emotional-behavioral disorders in a public school setting. One limitation of the study was only food items were used and future researchers should study the effects of non-food items or activity oriented stimuli as well.

The participants were adolescent boys attending a public high school. The reinforcer identification took place in the general education classroom; yet, the preference assessments did not take place in the classroom but rather in the teacher's private office. The target behavior was on-task behavior as defined



previously. Although on-task behavior is educationally relevant it is not however an academically based behavior such as reading, math, writing or science. On task behavior however did increase when access to preferred reinforcers was available therefore in this setting it did make a difference for the target behavior. The study was longer term than other previous studies, for baseline and the intervention the study took over 30 days to complete. Long term studies can show academic progress over time however, Paramore and Higbee (2005) did not focus on the academic progress.

This literature relates to the present study in a several ways. First, the brief MSWO preference assessment is a much more manageable reinforcer identification tool for classroom teachers to use on a daily basis because of the relatively small amount of time that is required to administer it. Second, a longer term study needed to be implemented to determine the sustaining effects of MWSO preference assessment on academic progress over time. Third, sessions were conducted during the participant's daily schedule and this setting is easily accessible for classroom teachers. Fourth, responding increased in previous studies using the highly preferred stimuli and the present study extended this research to academic reading areas of current education programs of individuals with disabilities and evaluated the long term effectiveness of SPA using daily brief MSWO preference assessment. Fifth, because higher levels of stimuli resulted in higher rates of responding on tasks relevant to the participant, current education programming directly applied to the current IEP goals and objectives. Most of the previous studies have not measured an academic behavior however;

the present study measured academic responses (reading) as the dependant variable. It is essential to remember that the quality of reinforcers for individuals with severe disabilities is one variable that can influence learning however, it is not the only variable that influences learning and correct responding.

## PROBLEM STATEMENT AND RESEARCH QUESTION

With all of the known benefits of using reinforcement to teach operant behaviors to individuals with severe disabilities, little has been researched on the effects of using SPA in relation to academic progress. The benefits and ease of administering brief MSWO preference assessment for a classroom teacher make preference assessments a quick method to identify reinforcers for students. There is also no research, however on the long term effectiveness of brief MSWO preference assessment. That is, would incorporating daily brief preference assessment to select reinforcers to be used in instructional programs improve the long term academic performance of students with severe disabilities on the IEP goals and objectives? Thus, the purpose of this study was to extend the current studies of stimulus-preference assessments by applying brief MSWO preference assessment to the instructional routine of students with severe disabilities and measuring the impact on student progress of reading goals and objectives. This study investigated the long-term effectiveness of incorporating daily brief MSWO preference assessment by comparing reading progress when randomly selected, teacher-selected, and preference assessment-selected reinforcers were delivered contingent on correct responding.

## METHODS

### Participants and Setting

Four high school students, ranging in age from 14-18 years old, participated in the study. Participants were recruited from the classroom in which the researcher was the primary instructor. All were placed in a self-contained special education classroom and in grades 9 through 12. Each participant's age, gender, special education classification, and other medical diagnoses are listed in Table 1. All participants had a current IEP which allows them to receive specialized instruction in a self-contained special education classroom.

Prerequisite skills included: following verbal directions from a teacher/paraprofessional, attending to a task, demonstrating the ability to choose between tangible objects, and responding to questions correctly either verbally or with a communication device.

During the study there was a change of trimester so the number of people in the classroom and the specific individuals in the classroom for each hour changed. There were two different classroom hours (hour A and hour B) when the reading instruction took place. In the both hours there were three paraprofessionals, one student teacher, two to three peer tutors, three to four special education students and one classroom teacher. The adults and students in the classroom that were not running or participating in the study continued with the predetermined instruction with the specific student(s) with whom they were assigned to work; for example they were providing the students with language

Table 1

*Participant Information*

Participant	Gender	Age	Special education classification	Medical diagnosis'
Adam	Male	18	Multiple disabilities	global developmental delay chiari I malformation skull abnormalities
Kara	Female	15	Intellectual disability	ADHD esotropia developmental delay mild seizure disorder
Alice	Female	17	Autism	linear sebaceous nevus syndrome
Kendra	Female	16	Intellectual disability	down syndrome celiac sprue disorder

arts instruction. The number of peers and students would change because some of the students were in and out of the classroom based on their schedules.

During hour A there were different special education students, peer tutors and paraprofessionals present in the classroom than in hour B. All brief MSWO preference assessments and reading instruction took place in the self-contained special education classroom, at the student's assigned desk/table within the high school during the predetermined instructional routine planned based on the student's trimester schedule. The preference assessments took place at a small table in the back of the special education classroom facing a wall prior to reading

instruction. Each participant was seated at a desk/table separated from the other special education students. At each table was the participant, paraprofessional, inter-observer and peer tutor.

### Data Collection and Reliability

The independent variable in the present study was reinforcer selection. Numbers were randomly assigned to each stimulus by pulling strips of paper out of a bowl where the reinforcer names were printed. These numbers were used during the random selection phase. The reinforcers were then placed into four subsets each subset containing five stimuli. Appendix A lists the reinforcer rotation schedule of subsets used during all phases so that the participants had access to each subset the same number times throughout the study. At the time a subset was used for a trial it was crossed off the list so the researcher could easily keep track of which subset each participant was using for the day. During the random-selection baseline, reinforcers were selected for the student to receive during reading instruction. Each day prior to reading instruction a number was drawn out of a bowl from the sub-set of reinforcers assigned for the day. The number drawn was the reinforcer to be used during reading instruction. Next, during the teacher-selection phase, the teacher selected the reinforcer for the participant to receive. Finally, during the intervention the participants selected the reinforcer via a brief MSWO preference assessment as developed by Carr et al. (2000). The effects of incorporating daily brief MSWO preference assessments into the instruction routine was determined by measuring reading

IEP goal progress by comparing rates of site word acquisition using a randomly selected stimulus, teacher selected stimulus, and a stimulus identified through daily preference assessment as a contingent consequence for correct responding. The dependent variable in the experiment was the reading goal progress. The specific reading goals that were measured and the number of trials per day are listed in Table 2. The study was implemented daily for 16 weeks. Progress was tracked by calculating the average number of words mastered per day during each school week. For the purpose of this study a school week is defined as the number of days a student was present at school. (This was necessary in the event there was a short week of school or students were absent.) The total number of items mastered per week was tallied and divided by the number of days in the student school week. Mastery for each item was met after an item was performed correctly on three consecutive trials. Data was collected on each trial by a paraprofessional who was IRB certified through Utah State University's on-line certification modules to ensure all data collectors were trained and aware of the risks and ethical issues involved when implementing procedures with participants who are minors with disabilities. All data collectors passed the IRB certification process prior to collecting any data. Prior to the study the reading goals were determined by the IEP team (see Table 2).

Interobserver agreement (IOA) was taken during reading instruction for at least 30% of the sessions and was taken across all phases. IOA was calculated using the point by point method, therefore the total number of agreements was

Table 2

*Participant IEP Reading Goals*

Participant name	IEP goal	Trials per day
Adam	Adam will read 20 community words by matching pictures to words/signs with 80% accuracy for one month as measured by teacher checklist	10 words per day
Kara	Kara will read 50 new sight words with 90% accuracy for one month as measured by teacher checklist	10 words per day
Alice	Alice will read 50 community words with pictures with 90% accuracy for one month as measured by teacher checklist	20 words per day
Kendra	Kendra will add 100 sight words to her word bank as measured by teacher checklist	20 words per day

divided by the trials (agreements added to disagreements) and multiplying that score by 100% to yield a percentage score. To train the paraprofessionals on the reading instruction and data collection, video training of correct responses, incorrect responses, and prompted responses was provided to ensure accurate recording of data on the data sheets.

Video training was also provided to the paraprofessionals on the brief MSWO stimulus preference assessments providing examples of approaches, blocked responses and no approaches. The paraprofessionals collected data during both video training sessions and their scores were compared with the



researchers. All paraprofessionals had to have a 100% agreement with the researchers' data prior to the study beginning. IOA results during reading instruction for each participant were: Adam 90%-100% agreement with an average agreement of 96%, Kara 80%-100% agreement with an average agreement of 95%, Alice 100% and Kendra 90%-100% agreement with an average agreement of 98%. IOA results during MSWO preference assessments were: Adam 100%, Kara 100%, Alice 100%, and Kendra 93%-100% agreement with an average agreement of 99%. IOA data was collected by the classroom teacher across all participants and phases.

#### Treatment Integrity

An independent second observer recorded data on the correct reading instruction procedures and the proper implementation of brief MSWO preference assessment. During reading instruction training examples of correct responses, prompted responses and incorrect responses were given via video to ensure that paraprofessionals would correctly collect data on reading responses. During the SPA, training examples of blocked responses, prompted responses and correct responses were given to ensure that all individuals were trained on the different responses that may be given during the study. Treatment integrity was collected for at least 33% of sessions across all participants and phases. During baseline, the delivery of reinforcer during reading instruction was completed with 100% accuracy. During the random selection phase the selection of the reinforcer was completed with 100% accuracy and the delivery of the reinforcer during reading

instruction was completed with 100% accuracy. During the teacher selection phase the reinforcer selection was completed with 100% accuracy and the delivery of the reinforcer during reading instruction was completed with 100% accuracy. Finally, during the brief MSWO preference assessment phase the SPA was completed with 93%-100% accuracy with an average of 98% accuracy and the delivery of the reinforcer during reading instruction was completed with 89%-100% accuracy with an average of 99% accuracy.

## Procedures

### *Materials*

Items needed for reading goal instruction were determined based on each participant's reading goals. For all four of the participants, sight word flash cards, two timers, reading data collection sheets (see Appendix B), SPA data sheets (see Appendix C), and pencils were needed. For Adam and Alice, pictures of each sight word were also needed. The 20 tangible reinforcers were: large blue squish ball, magnets, Disney book, web ball, slinky, popcorn sensory box, play dough, classroom scrapbook, squishy lizard, sticky snake, Disney music, classical music player, bumble ball, stacked light up spinning balls, massage snake, push button massager, book about animals, pin art, rubber bouncy ball and fan . These stimuli were selected by the classroom teacher. They were items that were currently available in the classroom which the students had previously had access to. Each reading instruction session was timed and an average time to complete each session is reported in Table 3.

*Baseline*

During baseline, the four participants were instructed to read the identified group of sight words. There was no reinforcement given to the participants as a consequence of their responding. Each participant was required to read (either verbally or by matching a picture to a written word) the words. Adam and Alice were given three printed words on his/her desk, then a picture of one of the words was presented and the paraprofessional said; “This is (target word. Read (target word).” The participants would then take the picture and match it by placing it on top of the correct printed word on his/her desk. For Alice, after matching the word correctly, the paraprofessional would show both the printed word and the picture and ask, “What word?” Alice would then verbalize the word.

Table 3

*Reading Instruction Average Times for Each Phase*

Participant name	Baseline	Random selection	Teacher selection	MSWO preference assessment
Adam	9:41	10:10	13:31	14:07
Kara	2:53	4:00	4:07	4:37
Alice	6:17	8:58	8:57	9:18
Kendra	3:59	7:15	9:45	9:51

For Adam, when he was shown both the printed word and the picture, he was required to then point to the printed word. This whole process continued for the remaining trials but with three new printed words for each trial. Data was taken on correctly matching the picture with the printed word for Adam and Alice. Kendra and Kara were both presented with one printed word on a flashcard and the paraprofessional would ask, "What word?" The participants would then respond verbally by reading the word. This continued for all the remaining trials. Data was taken on the correct reading of the word. A response was scored as correct if the students read/matched the word correctly within 5 s of the instruction. An incorrect response was scored for Adam and Alice when they initially matched a word incorrectly but were given the verbal prompt of "try again" from the paraprofessional following which they matched the word correctly. For Kara and Kendra a response was scored as incorrect when a sound in the word was given, or when the participant was very close to reading the word correctly after their initial response. An incorrect response was also scored when the participants still gave an incorrect response following the prompts mentioned above.

Data were collected on each participant's response by paraprofessionals that provided the instruction during all phases. Baseline responding rates helped to determine the fixed ratio schedule for each participant. The criteria for the FR schedule and the results for each participant are found in Table 4. The percentages of correct responding were calculated by adding the three baseline

Table 4

*Fixed Ratio Schedule*


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Fixed ratio schedule	Percentage of correct responding criteria	Participant name	Participant baseline average
FR 1	0-49% and below	ADAM	47%
FR 2	50-69%	KARA	50%
FR 3	70-79%	ALICE	74%
		KENDRA	73%
FR 4	80-89%	none	
FR 5	90-100%	none	

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sessions together and averaging it by dividing by the total number of baseline sessions.

*Random Selection*

The 20 identified reinforcers were systematically placed into subsets with five items per subset (see Appendix D). The items were placed into subsets so that each trial the same five items were available together during each phase of the study. Each item then had a corresponding number assigned. The subsets remained the same through each phase of the study. First a random selection of baseline was implemented. During this phase, the numbers assigned to one subset were placed in a bowl and then the reinforcer was randomly selected by

pulling a number out of the bowl. The reinforcement rotation schedule was followed so all subsets were rotated on a daily basis and the same order was followed throughout each phase of the study. Next the tangible reinforcer that was randomly selected was placed on a table behind the teacher's desk on a card with the participant's name so the paraprofessionals knew which reinforcer was to be used for each participant each day. The reinforcer was shown to the student and they were reminded of how many words they had to read correctly in order to receive the reinforcer. The reinforcer was in view of the participant but out of reach. In order for the students to see their progress, a full page progress chart was created and placed on the desk near the student. The progress chart contained the same number of blocks as number of words that needed to be read correctly. For example if a participant was on a FR 2 schedule there were two blocks on the chart. As each correct response was given it was placed in the block on the chart as a visual reminder for the participants to see how close they were to receiving the reinforcer. Reading instruction began and data on each trial was collected. The randomly selected reinforcer was delivered based on the predetermined schedule. Each time the criterion was met, 45 s of access to the reinforcer was given to the participant. When the 45 s was over, the reinforcer was removed and instruction continued. At the conclusion of the reading instruction, the participant was again given 45 s of access to the reinforcer which was not contingent on correct responding; they received it regardless of their performance. One paraprofessional provided the reading instruction during hour A and a different paraprofessional provided the reading instruction during hour B.

In the event that a paraprofessional was absent from work, the teacher provided the reading instruction in place of the paraprofessional. This same process continued in all phases of the study.

### *Teacher Selection*

During the next phase of the study, the teacher selected one item from the assigned subset for the day following the reinforcement rotation schedule prior to reading instruction each school day. The items were selected based on what the teacher thought the participants would like or on what the participants had not had access to during the previous sessions. Again the tangible reinforcer was placed on the table behind the teacher's desk on the card with the participant's name for the paraprofessional to be informed of the reinforcer to be used that day. When reading instruction began, the paraprofessional showed the participant the available reinforcer and set it on the table in view but out of reach. The progress chart was also placed in view of the student. Reading instruction began and data on each trial was collected. The selected reinforcer was delivered on the same FR schedule as the previous phase. Each time the criterion was met the participant got 45 s of access to the reinforcer. As in the previous phase, access to the reinforcer was given at the conclusion of each reading instruction session. The subsets were also rotated daily using the same reinforcer rotation schedule.

### *Brief MSWO Preference Assessment*

This phase systematically replicated the brief MSWO preference assessment procedures as developed by Carr et al. (2000). Brief multiple stimulus-preference assessment without replacement were conducted at the beginning of each day by the teacher or a paraprofessional. The subsets or reinforcers were presented following the same reinforcer schedules as in the previous phases. Prior to the session the instructor placed five stimuli on the table in front of the participant. The participant was instructed to “choose one.” If the participant did not respond within 5 s, the instructions would have been repeated. If there was still no response, stimuli would have been placed in the students hand and the student prompted to interact with the stimuli. The items would have then been returned to the table and the instructions to “choose one” would have been repeated. A nonresponse did not occur during the study. When the participants attempted to select more than one stimulus responses were blocked and the instruction to “choose one” was repeated. After a stimulus was selected the participant was given 15 s of access with the selected stimulus. Following the selection and access time the selected item was removed from the array and the item on the left was moved to the right side and the remaining items were re-centered in front of the student. This process was repeated until no items remained. During the study a nonselection never occurred. The order in which items were selected was recorded on the brief MSWO preference assessment data sheet (Appendix B). The first item selected was scored as 1,



the second item selected was scored as 2, and so on. Any items not selected would have been scored as a 5; however, this did not occur during the study.

This process was then repeated two more times and data on the second trial was recorded in the second column and the third trial in the third column. The sum of columns one, two and three were calculated and the results indicated the highest ranked item. The item with the smallest sum was ranked number one and was used as the reinforcer during reading instruction. The reading instruction occurred in the same manner as baseline, random-selection and teacher selection phases except that the reinforcer delivered was the one that was identified as the most preferred through the brief MSWO preference assessment. Data of correct responses was recorded the same as in random baseline and teacher selection and reinforcement was delivered on the same FR schedule. When the criteria was met 45 s of access to the reinforcer was given.

Instruction for all three phases took place at the same desk with the same paraprofessional except in the rare event that a paraprofessional was absent from work, the teacher then provided the reading instruction. Each participant had a different FR schedule as shown in Table 4.

### Experimental Design

We utilized a multiple baseline across participants design to evaluate the long-term effectiveness of on-going daily SPA on the reading progress of students with severe disabilities. Paraprofessionals collected baseline data for all participants during baseline, random-selection phase, teacher-selection phase

and brief MSWO preference assessment. Adam received the intervention while the remaining participants continued in baseline. Next Kara received the intervention after the Adam showed a clear change in behavior with a stable data path. The same continued for Alice and the Kendra. Baseline and the intervention data was collected over a 16-week period. A multiple baseline design was necessary to use because a withdrawal design was not possible since the teacher would have known the participants' likely preferred items after running the preference assessments and could not make reinforcer selections without a bias.

## RESULTS

Results of the reading progress for all four participants are presented in Figure 1. All results are expressed as an average of words mastered per day within each week of the study.

Adam's average number of words mastered per day is presented in the top panel of Figure 1. During baseline, there was a decrease in the number of words mastered. He mastered an average of less than one word per day. During the random selection phase, there was no noticeable change after two sessions; again an average of less than one word per day was mastered. The next phase began and again there was no noticeable change and the data trend continued to decrease. After seven sessions in the brief MSWO preference assessment phase, there continued to be no noticeable change although there was a slight increase in trend during the last two sessions. Incorporating daily brief preference assessment and using the reinforcers in a reading program with Adam over several weeks did not appear to improve his academic performance. Adam mastered a total of 12 words (see Appendix E) over the course of the study.

Results for Kara are shown in the second panel of Figure 1. She had a decrease in the number of words mastered during baseline. Next, during the random selection phase, Kara initially showed a slight increasing trend in words mastered but then a decrease in trend occurred for the next two sessions. She was mastering less than 1.5 words per day but decreased to about .5 words per

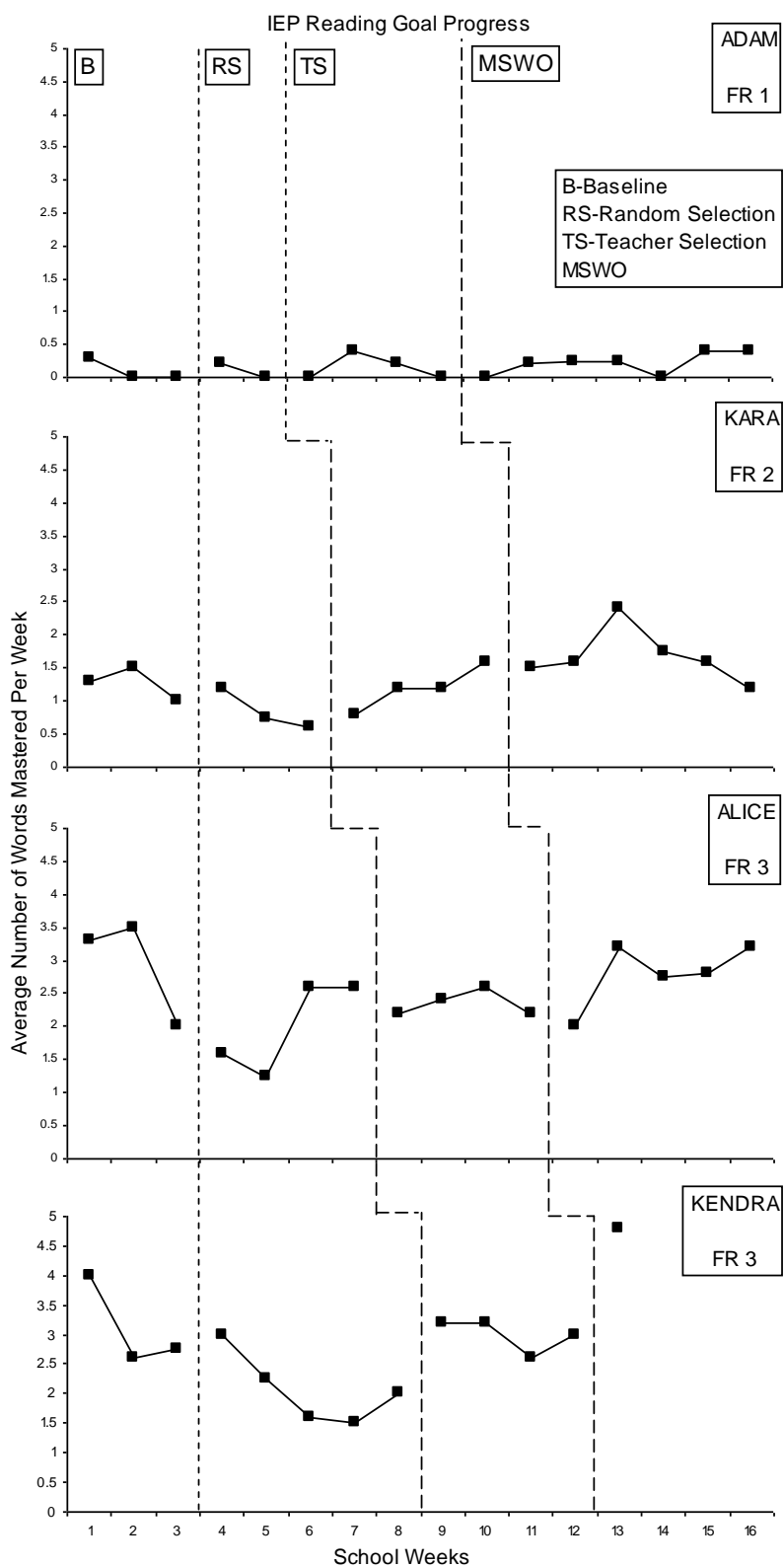


Figure 1. IEP reading goal progress for all participants.

day. When the decrease in trend was shown, Kara was moved into the teacher-selection phase. During this phase, an increasing trend of correct responding was seen throughout the entire phase. She was mastering just over 1.5 words per day. During the first two brief MSWO preferences assessment sessions Kara's correct responding continued to increase and she was mastering about 2.5 words per day but then a decrease in trend occurred for the remaining three sessions. Incorporating daily brief preference assessment and using the reinforcers during reading instruction over several weeks appears to have not improved Kara's academic performance. Kara mastered a total of 91 words (see Appendix F) during the study.

Results for Alice are shown in the third panel in Figure 1. Alice's correct responding during baseline varied between 3.5 words per day to 2 words per day. The number of words mastered per school week did decrease during the three baseline sessions. During the random selection phase, Alice's correct responding initially decreased in trend during the first two sessions to less than 1.5 words per day; however, the following session showed increase in trend to just over 2.5 words per day. This leveled off during the next session and she again average about 2.5 words per day. After the leveling of data was seen, Alice was moved into the teacher-selection phase and no noticeable change was seen; however, there was a slight decrease in trend in correct responding from just over 2.5 words per day to just under 2.5 words per day. Following the decrease in trend of correct responding, Alice was moved into the brief MSWO preference assessment phase. During this phase, essentially no noticeable

change of correct responding was seen and Alice was mastering just fewer than 3.5 words per day. It appears that incorporating daily brief preference assessment and using the reinforcers during reading instruction over several weeks slightly improved the academic performance of Alice. Alice mastered a total of 179 words (see Appendix G) during the study.

Results for Kendra are shown in the fourth panel in Figure 1. Correct responding during baseline varied between about 4 words per day to about 2.5 words per day. During the random selection phase, Kendra's data showed a slight increase during the first session but then decreased in trend during the following three sessions to just over 1.5 words per day. The fourth session showed a slight increase but the correct responding was still lower than during baseline so she was next moved into the teacher selection phase. Kendra had four sessions during the teacher selection phase and her correct responding increased in trend throughout that phase as compared to the random selection phase and was on average higher than during baseline. She was mastering over 2.5 words per day to just fewer than 3.5 words per day. Kendra was then moved into the final phase of the study, the brief MSWO preference assessment and only one session was able to be completed. She mastered almost 5 words per day however, she mastered all of the words on her current grade level and she ran out of words to learn. It appears that incorporating daily brief preference assessment and using the reinforcers during reading instruction over several weeks may have slightly improved the academic performance of Kendra but it is

difficult to determine since she ran out of words. Kendra mastered a total of 146 words (see Appendix H) during the study.

## DISCUSSION AND CONCLUSION

Overall, these four participants showed no significant change between phases in the rate of sight word acquisition because acquisition of sight words can be very slow for individuals with severe disabilities. Thus, the small gains we saw may still be meaningful. It should, however, be noted there are several possible reasons as to why the brief MSWO preference assessment did not have a significant effect on word acquisition. First, the pool of items we chose may not have contained enough stimuli with high reinforcing potency. It should be noted that that a higher magnitude of reinforcers may have had a different effect for these participants. Also, a denser schedule where the participants could have had opportunities to perform the academic tasks multiple times in a day could have altered the effects for these participants. It was observed that just having a short break from their academic work may have been sufficiently reinforcing versus receiving a tangible item. Each time the participants reached the criteria they were given the 45 s with the reinforcer which also allowed them to have a 45-s break from the high demand task. Performing the tasks correctly may have been more about receiving a break than receiving a reinforcer because functionally they received a break every time they received the reinforcer. It was necessary to give the participants the reinforcer every time they reached the criteria; otherwise the potency of the reinforcers could not have been measured. The quantity and quality of potential reinforcers included in the present study may not have been sufficient to produce increased rates of correct responding. In the



future, the quality of reinforcers could be altered by allowing the reinforcers to be a variety of items rather than just tangible objects such as edibles, activities and privileges which could be investigated by others. Also in the future researchers could analyze the effects of a break versus receiving a stimulus.

Second, the low rates of acquisition may have resulted from a response difficulty. All four of the participants had a severe skill deficit irrespective of reinforcers available; it simply takes them longer to acquire new skills regardless of their motivation to receive a reinforcer. Although levels of motivation were not measured during the study, behavioral data collected in the classroom based on the classroom behavior management plan and individual behavior plans showed that overall there was an increase of on-task behavior, and decrease of inappropriate behavior during the random selection, teacher selection and brief MSWO preference assessment phases as compared to baseline. Reading is a very high demand task for students with severe disabilities and it is possible that reading the sight words was merely a difficult and frustrating task. In the future researchers may study the effects of brief MSWO preference assessments with less difficult academic tasks.

Third, the school year came to an end. The study began the end of January and continued up to the second to last week of May when school ended. Had time not run out and Alice and Kendra had the opportunity to continue in the brief MSWO phase for several more weeks they could have had an opportunity to show an increase in trend in the number of words mastered per week but we were unable to run the phases out as long as we would have liked to. Adam and

Kara both had sufficient time in the brief MSWO preference assessment phase and it is not likely that results would have changed for them had the study continued for several more weeks. Kendra also ran out of words because she had mastered all of the words on her grade level. A phase change was made for Kara between the teacher selection phase and the MSWO phase when her responding was increasing. This phase change was made because the school year was drawing to an end and time was limited to complete the study; however, following the phase change her responding decreased.

There are some other limitations of this study that also need to be mentioned. One, the amount of time in the brief MSWO phase ended too soon because the school year came to an end. Two, only four participants were included in the study. There were a total of 15 students enrolled in the self contained special education classroom; but only four participated because of prerequisite skills, current IEP goals, time and staffing limitations. It is highly recommended that future studies include more students with various ages, disability classifications, variety of IEP goals in different academic areas, less demanding academic tasks, and various settings to further determine the effects of brief MSWO preference assessment on academic skill acquisition. Third, only tangible reinforcers were used and future studies may investigate the effects of tangible reinforcers versus a break from academic work, activities, edibles, privileges, etc. This study also only focused on reading sight words and future studies could apply the brief MSWO preference assessment with variety of academic skills at the same time. Further research on daily brief MSWO

preference assessments to select reinforcers to be used in instructional programs with students with severe disabilities to improve the long term academic performance on IEP goals and objectives is needed.

In conclusion, expectations for students to succeed and excel in public education are constantly changing and students with severe disabilities are no exception. In order for students with severe disabilities to demonstrate progress in their education, appropriate individualized education plan (IEP) goals and objectives should be developed for each student. For the students to reach the IEP goals and objectives it is essential that the students have motivation to try and correctly respond during academic tasks. It is often difficult for teachers to identify effective reinforcers for individuals with severe disabilities. Therefore, it is essential to know the proper reinforcing stimuli that will motivate the students to reach the goals and objectives. These results are meaningful for other teachers, in that the procedures are easy to implement and may results in increase correct responding for other students with severe disabilities. For these students there was no significant change in academic progress however other participants may have different results. If done again the future researchers could focus on less difficult tasks and different reinforcers. This is an important area of research and needs to be further studied in real contexts with real students to determine if the brief MSWO preference assessment has a positive effect on the academic performance of students with severe disabilities.

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APPENDICES

Appendix A  
Reinforcer Rotation Schedule





Appendix B  
IEP Sight Words Data Sheet



Appendix C

Brief MSWO Stimulus Preference Assessment Data Sheet

## Preference Assessment Data Sheet (Carr, Nicolson, &amp; Higbee; 2000)

Student: \_\_\_\_\_

Assessed By: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Stimulus Items	Rank by Trial			Sum of 1,2,& 3	Overall Rank (Smallest sum is #1)
	1	2	3		

Student: \_\_\_\_\_

Assessed By: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Stimulus Items	Rank by Trial			Sum of 1,2,& 3	Overall Rank (Smallest sum is #1)
	1	2	3		

Student: \_\_\_\_\_

Assessed By: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Stimulus Items	Rank by Trial			Sum of 1,2,& 3	Overall Rank (Smallest sum is #1)
	1	2	3		

Appendix D

Randomly Assigned Reinforcer Groups

1. Sticky Snake
2. Disney Book
3. Squishy Lizard
4. Bouncy Ball
5. Classical Music Player
  
6. Popcorn Sensory Box
7. Disney Music
8. Play Dough
9. Massage Snake
10. Push Button Massager
  
11. Book About Dogs
12. Fan
13. Slinky
14. Large Squish Ball
15. Light Up Spinning Stacked Balls
  
16. Classroom Scrapbook
17. Pin Art
18. Bumble Ball
19. Magnets
20. Web Ball

Appendix E  
Words Mastered for Adam

- 1 pay here
- 2 cold
- 3 name
- 4 wash hands
- 5 cafeteria
- 6 crosswalk
- 7 entrance
- 8 do not touch
- 9 men
- 10 stairway
- 11 use other door
- 12 walk



Appendix F  
Words Mastered for Kara

1	bag	41	lunch
2	chair	42	roast beef
3	fridge	43	corn
4	reading	44	submarine
5	lunch	45	shill dog
6	outside	46	vanilla
7	soap	47	oyster
8	dollars	48	nuggets
9	money	49	dinner
10	hands	50	french fries
11	door	51	coleslaw
12	calendar	52	cone
13	copies	53	strawberry
14	time	54	potato salad
15	computer	55	small
16	dance	56	hot fudge
17	garbage	57	Root Beer
18	name	58	cookies
19	freezer	59	dressing
20	office	60	mushrooms
21	multiply	61	meatballs
22	clean	62	turkey
23	pencil	63	Coke
24	binder	64	peas
25	divide	65	chocolate
26	chips	66	Sprite
27	coins	67	bun
28	coat	68	salad
29	shred	69	broccoli
30	ham	70	milkshake
31	work	71	burger
32	olives	72	meatballs
33	sandwich	73	onion rings
34	count	74	mashed potatoes
35	music	75	pie
36	table	76	pepperoni
37	pickles	77	dessert
38	soup	78	tuna
39	menu	79	garlic bread
40	desk	80	7-up

- 81 fish
- 82 green pepper
- 83 shrimp
- 84 dinner roll
- 85 Dr. Pepper
- 86 lasagna
- 87 baked potato
- 88 large
- 89 green beans
- 90 gravy
- 91 hamburger

Appendix G  
Words Mastered for Alice

1	exit	41	math
2	no food or drink	42	computer
3	entrance	43	candy
4	food	44	locker
5	open	45	stations
6	elevator	46	chips
7	fire extinguisher	47	store
8	stairway	48	school
9	don't walk	49	first aid
10	enter	50	free
11	danger	51	art
12	help wanted	52	book
13	phone	53	table
14	use other door	54	vacuum
15	water fountain	55	copies
16	closed	56	sink
17	name	57	paper
18	men	58	dance
19	stop	59	milk
20	women	60	door
21	do not touch	61	time
22	soap	62	shred
23	bus	63	office
24	recycle	64	pencil
25	divide	65	coat
26	men	66	lunch
27	bus stop	67	multiply
28	buckle up	68	outside
29	binder	69	calendar
30	fire station	70	apples
31	bag	71	bread
32	do not enter	72	count
33	magnets	73	freezer
34	clean	74	bag
35	pizza	75	brownie
36	coins	76	garbage
37	seminary	77	watermelon
38	money	78	Jell-O
39	dollars	79	bananas
40	music	80	toilet paper

81	tomato	123	spaghetti
82	peaches	124	pickles
83	onion	125	juice
84	yogurt	126	cookie
85	chair	127	jam
86	margarine	128	fridge
87	work	129	potato chips
88	vegetable oil	130	coffee
89	grapes	131	potato
90	oatmeal	132	candy
91	dust	133	pudding
92	mustard	134	soda pop
93	drink	135	restroom
94	cucumber	136	tuna
95	carrots	137	flour
96	desk	138	green pepper
97	crackers	139	mayonnaise
98	pie	140	lunch meat
99	popcorn	141	soup
100	salt	142	salad dressing
101	chicken	143	beans
102	cereal	144	tortilla chips
103	jelly	145	cake
104	hot chocolate	146	ketchup
105	milk	147	pet food
106	shaving cream	148	soap
107	hands	149	taco
108	butter	150	beans
109	oranges	151	paper towels
110	cheese	152	sugar
111	reading	153	salad bar
112	hamburger	154	hot dog
113	lettuce	155	green beans
114	pepper	156	broccoli
115	fish sticks	157	sausage
116	eggs	158	sandwich bags
117	ice cream	159	burger
118	macaroni and cheese	160	toothbrush
119	chicken	161	cookies
120	noodles	162	peas
121	bacon	163	mushrooms
122	syrup	164	pickles

- 165 toothpaste
- 166 celery
- 167 corn
- 168 olives
- 169 bun
- 170 cone
- 171 Root Beer
- 172 kleenex
- 173 nuggets
- 174 steak
- 175 lotion
- 176 rice
- 177 french fries
- 178 strawberry
- 179 soup

Appendix H

Words Mastered for Kendra



1	cause	41	plane
2	finally	42	leave
3	interest	43	object
4	length	44	important
5	measure	45	probably
6	material	46	system
7	million	47	written
8	paragraph	48	syllables
9	reached	49	energy
10	reason	50	inches
11	upon	51	scientist
12	war	52	contain
13	second	53	vowel
14	decided	54	perhaps
15	describe	55	curious
16	hours	56	noun
17	thing	57	difference
18	hundred	58	represent
19	several	59	numeral
20	ever	60	distance
21	mind	61	region
22	heard	62	Europe
23	problem	63	passenger
24	toward	64	government
25	rain	65	produce
26	were	66	worried
27	figure	67	route
28	certain	68	developed
29	know	69	precious
30	island	70	behavior
31	matter	71	general
32	usually	72	focuses
33	become	73	rough
34	direction	74	convince
35	products	75	guarded
36	center	76	businesses
37	cells	77	arrested
38	edge	78	pilot
39	travel	79	tongue
40	against	80	wool

81	machines	121	hear
82	divided	122	away
83	electric	123	sewed
84	wear	124	threatened
85	settlers	125	aluminum
86	chief	126	dribble
87	busy	127	wavelengths
88	fashioned	128	abolish
89	boundaries	129	ate
90	celebrate	130	adventurer
91	research	131	finance
92	crowded	132	follow
93	sailor	133	you're
94	laser	134	bake
95	continue	135	piece
96	since	136	love
97	entrance	137	homogenized
98	invented	138	connection
99	movement	139	tail
100	volunteers	140	wish
101	howled	141	felt
102	championships	142	abdomen
103	glowed	143	measure
104	controlled	144	hurry
105	escape	145	five
106	earthquake	146	build
107	Crop		
108	attend		
109	communicate		
110	pollution		
111	protest		
112	oceans		
113	shrinking		
114	fortune		
115	mounds		
116	pond		
117	creature		
118	memories		
119	allowed		
120	our		