Evaluating the Effects of Reinforcer Quality on Academic Skill Acquisition with Students With Significant Disabilities

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the Graduate School of The Ohio State University

By

Hollie A. Byrum

Graduate Program in Educational Studies

The Ohio State University

2014

Master’s Examination Committee:

Dr. Helen Malone, Advisor

Dr. Ralph Gardner
Abstract

This study utilized an alternating treatments design to evaluate the effects of high preference (HP) and low preference (LP) items on color discrimination via eye gaze during a reinforcer assessment with three students with severe to profound disabilities. Paired-stimulus preference assessments were conducted prior to the reinforcer assessment condition to identify HP and LP items. Results showed that although all three students demonstrated hierarchical preferences for the six stimuli in the preference assessment, there was undifferentiated responding between the HP and LP conditions in the reinforcer assessment with little change in behavior from baseline.
Acknowledgments

I would like to begin by thanking my advisor, Dr. Helen Malone, for providing me inspiration, guidance, timely feedback, and support throughout the duration of this project as well as the opportunity to participate and work for BBAS. Her passion and dedication to her students and this field is truly admirable and respected. I would also like to thank my undergraduate professor, Lynn Woolsey, for her guidance and love. Without her faith and several lengthy conversations, I would have never made it this far. A large thank you is given to Eli Jimenez for his time spent editing my work and providing me with feedback and answers to my never-ending questions. Special thanks to Justin Page and John Schaefer for keeping me on track by providing me with a plan and deadlines. Thank you to Lindsey Penrod and Megan Miller for collecting IOA and procedural integrity data when needed during such a busy semester. Finally, I would like to thank my parents, Bob and Tracie Conley, and boyfriend, Ryan, for being supportive, patient, loving, and understanding throughout these past few years.
Vita

May 2007 .......................................................... Franklin High School

2011 ............................................................... University of the Cumberlands

2012 to present .............................................. Graduate Research Associate, Department of Educational Studies, The Ohio State University

Fields of Study

Major Field: Educational Studies

Area of Emphasis: Special Education
# Table of Contents

Abstract ................................................................................................................................. ii

Acknowledgments .................................................................................................................. iii

Vita .......................................................................................................................................... iv

Fields of Study ....................................................................................................................... iv

Table of Contents ................................................................................................................... v

List of Tables ........................................................................................................................... vii

List of Figures .......................................................................................................................... viii

Chapter 1: Introduction .......................................................................................................... 1

Chapter 2: Methods ................................................................................................................. 7

Chapter 3: Results ................................................................................................................... 20

Chapter 4: Discussion .............................................................................................................. 34

References ............................................................................................................................... 43

Appendix A: Reinforcer Assessment of Individuals With Severe Disabilities (RAISD). 46

Appendix B: Preference Assessment Data Sheet .................................................................. 50

Appendix C: Baseline Reinforcer Assessment Data Sheet ..................................................... 52
Appendix D: Reinforcer Assessment Data Sheet .......................................................... 54
Appendix E: Preference Assessment Procedural Integrity Data Sheet .................. 56
Appendix F: Baseline Reinforcer Assessment Procedural Integrity Data Sheet ...... 58
Appendix G: Reinforcer Assessment Procedural Integrity Data Sheet ................. 60
Appendix H: Parental Permission Consent Form .................................................... 62
List of Tables

Table 1. Participant Demographics........................................................................................................... 8
Table 2. Stimuli Used In Preference Assessments....................................................................................... 9
List of Figures

Figure 1. Nathan’s first preference assessment................................................................. 21
Figure 2. Nathan’s second preference assessment............................................................. 21
Figure 3. Nathan’s pre-test probe...................................................................................... 23
Figure 4. Nathan’s post-test probe.................................................................................... 24
Figure 5. Morgan’s first preference assessment................................................................. 25
Figure 6. Morgan’s second preference assessment............................................................. 26
Figure 7. Morgan’s third preference assessment............................................................... 27
Figure 8. Morgan’s pre-test probe..................................................................................... 28
Figure 9. Morgan’s post-test probe................................................................................... 29
Figure 10. Sarah’s preference assessment........................................................................ 30
Figure 11. Sarah’s pre-test probe...................................................................................... 31
Figure 12. Sarah’s post-test probe.................................................................................... 33
Chapter 1: Introduction

Block (1992) outlined four major criteria that characterize students with profound disabilities including: a) limited levels of awareness in cognitive functioning, b) limited response repertoire, c) lack of a system of communication, and d) medical complications. Each area requires an emphasis of instruction to assist with skill acquisition because individuals with significant disabilities learn at a slower pace when compared to their same age peers (Block, 1992; Snell & Brown, 2010). Contrary to the research, individuals with significant disabilities are often portrayed as being unable to learn. By possessing a positive perception and utilizing the proper tools, individuals with significant disabilities are in fact able to acquire knowledge and various skills.

One criteria characterizing students with profound disabilities is a lack of a communication system. Several research studies exist supporting that individuals with profound disabilities can learn to communicate and use their communication responses to make choices. Several students may not have a formal system of communication others may be able to understand and may exhibit communication that is nonsymbolic (i.e., pointing, crying, grunting). Augmentative and alternative communication (AAC) is a strategy that uses aids or techniques to supplement or replace an individual’s voice or verbal communication skills (Mustonen, Locke, Reichle, Solbrack, & Lindgren, 1991). Studies have demonstrated that individuals with significant disabilities and limited
communication have benefited from using AAC (Johnston, McDonnell, Nelson, & Magnavito, 2003; Mirenda & Erickson, 2000). It has also been shown that individuals with severe to profound disabilities can use their selection method to indicate preference within a preference assessment (e.g., Fisher et al., 1992; Fisher, Piazza, Bowman, and Amari, 1996; Pace, Ivanič, Edwards, Iwata, & Page, 1985). For example, Fisher et al. (1992) utilized a forced choice preference assessment and identified stimuli that functioned as reinforcers for four individuals with severe to profound disabilities.

Allowing individuals the opportunity to learn how to communicate effectively and then use that communication method to indicate preferences is vital for self-autonomy and has major educational implications (Fleming, 2010). If opportunities for choice making are never provided to individuals, it would be difficult to interpret what types of stimuli could be used to reinforce behaviors during skill acquisition. It is often assumed that if an individual likes something, then it will automatically serve as a reinforcer (Fisher et al. 1996) when in fact it may not.

In order to better identify possible reinforcers through in a preference assessment, Fisher et al. (1996) created the Reinforcer Assessment for Individuals With Severe Disabilities (RAISD). This survey is provided to caregivers to assist in generating a list of potential items a person prefers and rank them in the order the caregiver perceives is least to most preferred. By using the RAISD, caregiver predictions of preferred stimuli for 6 participants with profound developmental disabilities in the study by Fisher et al. (1996) were slightly better than the standard set of stimuli when a choice assessment was
performed, indicating that caregiver opinion could contribute to reinforcer identification when combined with choice assessment.

Another characteristic defining individuals with severe to profound disabilities is their limited response repertoires (Block, 1992). One selection method that has been evaluated in working with individuals with minimal response repertoires (i.e., non-vocal, non-ambulatory) is the use of eye gaze (Cannella-Malone et al., under review; Fleming et al., 2010). Fleming et al. (2010) assessed whether eye gaze duration could be used with individuals with severe physical and developmental disabilities to identify reinforcing stimuli. Results were consistent with previous research, indicating individuals with severe multiple disabilities could identify reinforcing stimuli and found that the stimuli identified as highly preferred functioned as reinforcers and the stimuli identified as low preference were much weaker and did not serve as reinforcers.

Cannella-Malone, Sabelny, and Tullis (under review) replicated Fleming et al. (2010) by identifying reinforcing stimuli via eye gaze for three individuals with severe multiple disabilities. Stimuli identified in the paired-choice preference assessment as preferred were tested in a subsequent reinforcer assessment. Results replicated Fleming et al. (2010) indicating that eye gaze is an effective selection method that can be used to identify reinforcing stimuli for students with severe multiple disabilities. One limitation in both of these studies was the skill utilized in the reinforcer assessment. The authors reported the skill was already in the student’s repertoires, indicating some level of familiarity with the skill. Neither study investigated a skill that was not currently in the student’s repertoires.
In order to test the validity of the preference assessment results, researchers conducted a reinforcer assessment to determine whether or not an item identified as highly preferred (HP) affects responding (i.e., increase in responding if presented contingent on the target response). Similarly, the same procedures are used with the low preferred (LP) item in order to compare responding across conditions (i.e., HP vs. LP). If a HP item does not have reinforcing qualities, responding within that condition should remain low. Conversely, if the HP item does have reinforcing qualities, researchers should see an increase in responding in that condition, suggesting that the item has reinforcing properties. Research has effectively identified stimuli through preference assessments that can act as reinforcers (Pace et al., 1985; Paclawskyj et al., 1995; Piazza et al., 1996, Fleming et al., 2010; Cannella-Malone et al., in progress).

For example, Pace et al. (1985) conducted a single stimulus assessment to identify preferences and assess reinforcers by evaluating a formal two-step method. The study was successful in identifying reinforcing stimuli for six individuals with severe developmental disabilities via a preference assessment; they subsequently tested the reinforcing value of the identified preferred and non-preferred items on adaptive behaviors (i.e., reaching, raising hand, looking) currently exhibited at low rates in the participant’s repertoire. Paclawskyj & Vollmer (1995) found that a forced-choice procedure (e.g., paired stimulus preference assessment) showed greater differentiation of stimuli and was effective in identifying stimuli that functioned as reinforcers for skills within the student’s repertoire that were inconsistently performed. Piazza, Fisher, Hagopian, Bowman, and Toole (1996) compared the reinforcing effectiveness of high,
middle, and low preference items based on the results of a preference assessment. The effectiveness of identified preferences as potential reinforcers for in-chair and in-square behavior were evaluated. The high preference stimuli functioned as reinforcers for all 4 participants in comparison with the middle and low stimuli and the low preference stimuli did not function as reinforcers for any of the 4 participants when compared to the high or low stimuli.

Although research has shown that an inconsistent behavior (i.e., sitting in seat, looking, stacking blocks) in an individual with significant disabilities’ repertoire can increase when utilizing an identified reinforcer, there is limited information regarding behaviors not within the student’s repertoire. Fleming et al. (2010) and Cannella-Malone et al. (under review) suggested that future research focus on testing acquisition skills (i.e., a new skill) in the reinforcer assessment following a preference assessment.

Purpose of Study/Research Questions

Although previous research has provided evidence supporting the use of preference assessments in identifying preferred items for individuals with severe to profound disabilities, there is minimal research investigating the acquisition of a novel skill in a reinforcer assessment (Cannella-Malone et al., under review). The purpose of this study was to answer the following research questions: (a) Can eye gaze serve as a reliable selection behavior to identify preferences for individuals with severe to profound disabilities? (b) Can individuals with severe to profound disabilities acquire a new skill utilizing an HP item via eye gaze?, and (c) Does the delivery of a high preference (HP)
item or low preference (LP) item affect the acquisition of a new skill in a reinforcer assessment?
Chapter 2: Method

This chapter describes the participants involved in this study, setting, materials, dependent and independent variables, data collection procedures, experimental procedures and design, interobserver agreement, and procedural integrity.

Participants

Three students (2 females and 1 male) with multiple disabilities participated in this study. Students were identified for this study through informal observations and interviews with school staff. Students were considered good candidates if they (a) did not use a clear form of communication, (b) had unknown or unclear preferences, (c) had limited motor movement, and (d) had reliable eye gaze. Information on each participant is presented in Table 1.

Setting

All three students attended county-funded, fully-segregated schools for students between the ages of 5 and 22 with moderate to profound intellectual, physical, and developmental disabilities. All sessions were conducted in a university-based research classroom located within each school. The classroom was contained one desk, a group table, several chairs, a window, and miscellaneous items from school faculty. All sessions were conducted in a back portion of the room on carpet near the group table.
<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Sex</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nathan</td>
<td>20</td>
<td>M</td>
<td>Profound Intellectual Disability, Spastic Quadriplegic Cerebral Palsy, Seizure Disorder</td>
</tr>
<tr>
<td>Sarah</td>
<td>15</td>
<td>F</td>
<td>Spastic Quadriplegic Cerebral Palsy, Intellectual Disability, Seizure Disorder, Scoliosis</td>
</tr>
<tr>
<td>Morgan</td>
<td>16</td>
<td>F</td>
<td>Spastic Quadriplegic Cerebral Palsy, Intellectual Disability</td>
</tr>
</tbody>
</table>

Table 1. Participant Demographics

Materials

The Reinforcer Assessment of Individuals With Severe Disabilities (RAISD; Fisher, Piazza, Bowman, & Amari, 1996; see Appendix A) was completed by caregivers and teachers for each student in order to identify six stimuli to include in the preference assessment. Stimuli used in each preference assessment are listed in Table 2. Six laminated 4 in. by 4 in. colored cards (i.e., blue, orange, red, green, yellow, and purple) were used during the color identification trials. Data sheets and a pencil were used to record data. A stopwatch was used to record session duration and countdown the time students could access the HP or LP item during the reinforcer assessment. A digital timer
was used to time 2 min teaching sessions. A video camera was used to record sessions to code for interobserver agreement and procedural integrity.

<table>
<thead>
<tr>
<th>Nathan</th>
<th>Sarah</th>
<th>Morgan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spiderman Web</td>
<td>Magazine</td>
<td>Bop It</td>
</tr>
<tr>
<td>YouTube Videos (i.e., iPhone)</td>
<td>Music (i.e., portable CD player)</td>
<td>Music (i.e., portable CD player)</td>
</tr>
<tr>
<td>Magazine</td>
<td>Tambourine</td>
<td>Tambourine</td>
</tr>
<tr>
<td>Music (i.e., portable CD player)</td>
<td>Guitar</td>
<td>Snores (i.e., picture icon)</td>
</tr>
<tr>
<td>Bouncy Balloon</td>
<td>Maraca</td>
<td>Guitar</td>
</tr>
<tr>
<td>Bop It</td>
<td>YouTube Videos (i.e., iPhone)</td>
<td>Magazine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mirror</td>
</tr>
</tbody>
</table>

Table 2. Stimuli Used In Preference Assessments
Dependent Measures and Data Collection

Data were collected on selection, which was defined as looking in the direction of one of two stimuli for a duration individualized for each student in the preference assessment (see Appendix B) and reinforcer assessment (see Appendixes C and D). After observing each participant, a 2 s duration was selected for Nathan and Morgan, and a 3 s duration for Sarah.

In the reinforcer assessment, the dependent variable was looking at the target color for the predetermined length of time. This was defined as the student selecting the correct color from a pair of colors when asked to look at a specific color (e.g., “Look at blue.”). Data were also recorded on ‘no choices’ from each participant. A no choice was defined as the participant not looking at either item or holding the gaze for the required duration. Session duration was recorded by starting a stopwatch upon presentation of the first pair of stimuli and stopping it after the completion of the last stimulus pairing. Although not included with the experimental data, correct color identification was tracked during the teaching sessions to monitor student progress. An average of two sessions (range: 2–4) were conducted per condition for each student per week. Each session lasted an average of 9 min and 32 s (range: 3 min and 5 s–22 min).

Experimental Design

This study used an alternating treatment design (Barlow & Hayes, 1979) because it was the most appropriate design to evaluate the effects of two independent variables (i.e., HP vs. LP) on a single dependent variable (i.e., correct color identification). The
three conditions were baseline (BL), high preference (HP), and low preference (LP). The order of the HP and LP conditions was alternated across sessions.

Interobserver Agreement (IOA) and Procedural Integrity

Graduate students who were trained on the procedures collected IOA and procedural integrity data on both preference assessment (see Appendix E) and pre and post-test reinforcer assessment probe sessions (see Appendixes F and G). These observers were trained by providing them a data sheet, showing them how to collect data using the data sheet, and explaining what represented a selection for each student. Observers were also provided with practice identifying each participant’s specific gaze by holding mock trials (i.e., holding two items and asking participant to select one). IOA and procedural integrity data were collected and scored through live sessions with the second observer in the room or by recording the session using a video camera and having a second observer view and code the video. IOA was calculated by using the following formula:

\[(\text{Agreements} / (\text{Agreements} + \text{Disagreements})) \times 100.\]

Procedural integrity was calculated by dividing the number of steps completed correctly by the total number of procedural steps and multiplying by 100.

Preference Assessment.

Across all three participants, average IOA was 98% (range: 92–100%) for preference assessment sessions. Average procedural integrity was calculated to be 99% (range: 99–100%) for preference assessment sessions.

Nathan
IOA and procedural integrity data were collected for 50% of the first preference assessment sessions and 67% of the second preference assessment sessions. IOA was calculated to be 100% for both preference assessments. Procedural integrity was calculated to be 99% (range: 97–100%) for the first preference assessment and 100% for the second preference assessment.

Sarah

IOA was calculated to be 92% (range: 83–100%) for Sarah and was collected for 33% of sessions. Procedural integrity was calculated to be 99% (range: 99–100%) for the preference assessment and was collected for 33% of preference assessment sessions.

Morgan

IOA was calculated to be 100% across both preference assessments for Morgan and was collected for 50% of the first preference assessment sessions and 33% of the third preference assessment sessions. Procedural integrity was calculated to be 100% across both preference assessments and was collected for 33% of sessions for both preference assessments.

Across all three participants, the average IOA was 98% for preference assessment sessions (range: 92–100%). The average procedural integrity was calculated to be 99% for preference assessment sessions (range: 99–100%).

Reinforcer Assessment

For all three participants, average IOA was calculated to be 98% (range: 92–100%) for reinforcer assessment sessions. Average procedural integrity was calculated to be 99% (range: 97–100%) for reinforcer assessment sessions.
Nathan

IOA data were collected for 41% of LP and HP pre-test reinforcer assessment probe sessions and 34% of LP and HP post-test reinforcer assessment probe sessions. IOA was calculated to be 93% (range: 83–100%) across LP pre-test probe sessions and 92% (range: 67–100%) across LP post-test probe sessions. IOA was calculated to be 98% (range: 67–100%) across HP pre-test probe sessions and 99% (range: 83–100%) across HP post-test probe sessions.

Procedural integrity data were collected for 41% of LP and HP pre-test probe sessions and 34% of LP and HP post-test probe sessions. Procedural integrity was calculated to be 99% (range: 94–100%) for LP and HP pre-test probe reinforcer assessment sessions, 97% (range: 89–100%) for LP post-test probe reinforcer assessment sessions, and 100% for HP post-test probe reinforcer assessment sessions.

Sarah

IOA data were collected for 33% of HP pre-test probe sessions and 25% of HP post-test probe sessions. IOA data were also collected for 29% of LP pre-test probe sessions and 21% of LP post-test probe sessions. IOA was calculated to be 100% across LP pre and post-test probe sessions and 98% (range: 83–100%) across HP pre-test probe sessions and 97% (range: 83–100%) across HP post-test probe sessions.

Procedural integrity data were collected for 29% of LP and HP pre-test probe sessions and 21% of LP and HP post-test probe sessions. Procedural integrity was 99% (range: 92–100%) for LP and HP pre-test probe sessions and 100% for LP and HP post-test probe sessions.
Morgan

IOA data were collected for Morgan for 39% of LP pre-test and post-test probe sessions and 44% of HP pre-test and post-test probe sessions. IOA was calculated to be 95% (range: 83–100%) across LP pre-test probe sessions, 98% (range: 83–100%) across LP post-test probe sessions, and 100% across HP pre-test and post-test probe sessions.

Procedural integrity data were collected for 39% of LP pre and post-test probe sessions and 44% HP pre and post-test probe sessions for Morgan. Procedural integrity was calculated to be 99% (range: 95–100%) for LP pre and post-test probe and 100% for HP pre and post-test probe sessions.

Procedures

Pre-Assessment

Eye gaze duration was determined for each student by assessing specific criteria, including the student’s natural resting position, visual tracking ability, and ability to sustain eye contact with an object. After observing each participant, a 2 s duration was selected for Nathan and Morgan, and a 3 s duration for Sarah. Sarah’s eye gaze duration required a slightly longer time lapse, because she would frequently scan the stimuli and rest on a stimulus for 2 s. Increasing eye gaze duration encouraged accurate rather than coincidental selections.

A neutral gaze was specified for each participant by identifying a position that was relatively natural and involved minimal response effort for the participant to select via eye gaze. Neutral gaze was defined as the gaze where the student’s eyes rested naturally. Neutral gaze was determined by assessing how the student’s body naturally
rested in their chair, their head positioning, their eye dominance, whether they exhibited a weaker field of vision, and any eye abnormalities. For example, Sarah’s natural resting position was to her right side with her head slanted back facing toward the ceiling. The experimenter sat on a table slightly above her in her field of vision. Her left eye was determined dominant based upon observations (i.e., difficulty tracking and focusing on stimulus with her right eye), and I relied on the responses she made with her left eye throughout the assessments. Without a neutral gaze, it would be unclear if the student were making a selection.

**Preference Assessment**

A paired-choice preference assessment (Fisher et al., 1992) was used to assess preference for the six stimuli identified through the RAISD. Each item was paired with every other item and presented on both the left and right sides resulting in 30 pairings.

Each session began me positioning myself in front of the student according to their resting position (e.g., sitting or standing directly in their line of sight). Each stimulus was presented and manipulated individually for 5 s to reveal its reinforcing properties (e.g., vibration, flashing lights). When a neutral gaze was obtained, I held up two stimuli at the student’s eye level, one in the left hand and one in the right hand. If a neutral gaze was not obtained, the items were removed from the student’s view and the experimenter waited until a neutral gaze was observed. After the initial 2 s presentation, I removed the items and placed them out of the participant’s view (i.e., behind my back, low to the floor). The left stimulus was presented while I named and manipulated it for 5 s. The item
was then removed and the process was repeated for the right stimulus. Once a neutral gaze was obtained, both items were represented as I instructed the student to “pick one.” The student was given 5 s to initiate a directional gaze towards an item (10 s for Sarah). If the student looked at an item and held their gaze for 2 s (3 s for Sarah) the student was allowed to access the item for 30 s. If the student did not make a selection, both stimuli were removed for 5 s. The items were then represented with the direction “pick one” to give the student an additional opportunity to make a selection. If the student did not select an item, the trial was terminated, and a 10 s break began.

This process was repeated until six trials were complete, which made up one session. A total of five sessions were conducted for a total of 30 trials. At the end of 30 trials, a preference hierarchy was created by counting the number of times each item was chosen and ranking the items from the highest to the lowest total. If an item was selected the same amount of times as another item resulting in a tie, the pairing (e.g., music and Bop It) was examined, and the item selected within that pairing was positioned higher on the preference hierarchy.

Reinforcer Assessment

The effect of the HP and LP stimuli as reinforcers in teaching color identification was assessed. Blue, orange, red, and green were selected for instruction and yellow and purple were used as distractors. Complimentary colors were paired for instruction (i.e., red and green). These colors are direct opposites on the color wheel, resulting in the greatest difference between the two colors, therefore promoting easier discrimination. The colors were counterbalanced in both HP and LP conditions. Blue and orange were
selected as the HP condition target colors for Nathan and Sarah and LP condition for Morgan. Red and green were selected for the HP condition target colors for Morgan and LP condition for Nathan and Sarah. This was done to counteract any potential confounds ensuring acquisition of color identification was not the result of some unknown characteristic of the specific colors being taught (e.g., blue and orange being easier to discriminate and learn than red and green).

Six pairings per session were presented in both the HP and LP conditions. During each session, students sat in their wheelchair and the researcher sat according to the student’s natural resting position (e.g., in their line of sight). One of two target colors was present in each pair (e.g., blue or orange) and was paired with a distractor (i.e., yellow or purple) or the other target (i.e., blue vs. orange). All 6 trials were randomized for each session and each color was randomly presented on different sides and determined by a coin flip.

Overview

Baseline sessions were conducted until stable responding was achieved. Once intervention was introduced, each session was comprised of three components (i.e., test probe 1, teaching session, and test probe 2) for both HP and LP conditions. If both HP and LP conditions were conducted on the same day, the student was given a brief break (i.e., 5 min) between the two conditions. Conditions were alternated (e.g., if HP first on Monday, LP was first on Tuesday). Teaching sessions were conducted between the two test probes. The following sections describe each of these conditions.

Baseline
During each trial, two colors were presented at the student’s eye level and the student was instructed to, “Look at [color]” following a neutral gaze. Regardless of student performance, no consequences were provided. Baseline sessions consisted of five trials and were run until stable responding was observed. Five s elapsed between each trial.

Test Probe 1

After I saw stable responding in baseline, instruction in color identification began. Before beginning each test probe session, the student was brought to the classroom and I sat according to the student’s natural resting position. The item associated with the condition (i.e., HP or LP stimulus) was sampled and manipulated for the student for 5 s. This was followed by the presentation of two colors at the student’s eye level and asking the student to look at the target color (e.g., “Look at blue.”). If the student looked at the correct color within 5 s, they were provided access to the target item for 30 s. If the student did not respond within 5 s or selected the incorrect color, the trial was terminated and marked as a no choice. New trials began 5 s following the previous trial. Each test probe 1 session consisted of 5 trials.

Teaching Sessions

A 2 min teaching session was conducted following completion of test probe 1. I positioned myself directly in front of the student with four color cards (i.e., two targets and two distractors). Yellow and purple were the distractor colors in both the HP and LP conditions for all students. A teaching session began when I started the 2-min timer and asked the student to select a color (e.g., “Where’s blue?”) from an array of onej.
the student selected the correct color three times consecutively, a second color (i.e., distractor color) was added which increased the field to two colors. Prompting techniques including gestures (e.g., pointing, tapping) and proximity were used to increase the student’s correct responding. After the student selected the target color three times consecutively from an array of two, the process was repeated for the second target color. Verbal praise was provided each time the student looked at the correct color. For Morgan, stimuli identified as the second highest and second lowest preferred in the preference assessment were embedded into the teaching sessions beginning at session 15 in order for Morgan to contact the contingency (e.g., if she looks at the correct color, she receives access to an item). In addition, session duration was increased to 3 min to allow more time for instruction and access to reinforcers.

Test Probe 2

Upon completion of each teaching session, a second test probe session began. Test probe 2 procedures were identical to those used in test probe 1. Following the end of test probe 2, the student was given a 5 min break before starting a second session (i.e., test probe 1, teaching session, test probe 2) and returned to his or her classroom.
Chapter 3: Results

Nathan

Preference Assessment

The results for Nathan’s preference assessments are presented in Figures 1 and 2. Two preference assessments were conducted throughout the study to continue to identify preferred items. In the first preference assessment, Nathan selected music and Bop-It most frequently with seven out of ten opportunities. After examining the music and Bop-It pairing, music was identified as the HP item because it was selected over the Bop-It. The item selected least frequently (i.e., LP) was the bouncy balloon with two selections. Nathan had two no choice trials in this preference assessment.

Data revealed that neither item acted as a reinforcer with trends of responding therefore, a second preference assessment was conducted following session 23 of the reinforcer assessment to see if Nathan had different preferences, using the same items used in the first preference assessment. For this assessment, YouTube videos ranked as the highest preferred item with 10 selections. The bouncy balloon remained the least frequently selected item with zero selections. Nathan made no choice in three trials during the second preference assessment.
Figure 1. Nathan’s first preference assessment.

Figure 2. Nathan’s second preference assessment.
Reinforcer Assessment

Pre-Test Probe

Data are presented in Figure 3 for Nathan’s pre-test probe sessions. In baseline, Nathan selected the target color an average of 1.33 times (range: 1–2) per session for the LP condition and an average of .67 times (range: 0–2) per session for the HP condition. When intervention was implemented, Nathan selected the target color an average of 1.15 times (range: 0–4) per session in the LP condition. In the HP condition, Nathan selected the target color an average of 1.1 times (range: 0–3) per session. No clear separation was apparent between the two conditions.

During the second baseline condition, Nathan selected the target color an average of .67 times (range: 0–1) per session for both the LP and HP conditions, showing a decrease in responding compared to the first baseline. When intervention was reintroduced using the newly identified HP and LP items, Nathan selected the target color an average of .67 times (range: 0–2) in each condition.

Post-Test Probe

Nathan’s data for the post-test probes are presented in Figure 4. In baseline, Nathan selected the target color an average of 1.33 times (range: 1–2) for the LP condition and an average of .67 times (range: 0–2) per session for the HP condition. When intervention began, Nathan selected the target color an average of 1.7 times (range: 0–3) per session for the LP condition and an average of 1.42 times (range: 0–3) for the HP condition.
These data indicate a decrease from the first baseline. When intervention was reintroduced using the newly identified HP and LP items, correct target selection for the HP condition increased to an average of 1.67 selections (range: 0–3) per session. In the LP condition, Nathan selected the target color an average of 1 time (range: 0–2) per session. Responding in the HP condition was slightly higher than the LP condition in 4 of the 6 sessions. Overall, Nathan selected the target color as frequently in the LP condition, if not more, as the HP condition, in both the pre-test and post-test probes. No clear, consistent discrepancy was observed for either test probe condition. Nathan had more
correct selections in the HP condition than the LP condition in the post-test probe with the exception of two sessions after intervention was reintroduced following the second baseline condition.

Morgan

Preference Assessment

The results of Morgan’s preference assessments are presented in Figures 5, 6, and 7. Three separate preference assessments were conducted with Morgan over the course of this study. In the first preference assessment, the magazine was identified as the HP item due to it being selected most frequently (6/10 trials). The guitar and tambourine were
selected the least amount of times (1/10 trials). After examining the trial containing both items, the tambourine was identified as the LP item. Morgan made no choice in 15 trials during this preference assessment.

A second preference assessment was immediately conducted upon conclusion of the first preference assessment due to the high number of trials in which she didn’t make a selection. During this assessment, the magazine was identified as the HP item with the highest number of selections (6/10 trials). Neither the Bop It nor tambourine were selected during this assessment. Using a randomized coin toss, the tambourine was identified as the LP item. She made no choice 14 times in the second preference assessment.
Figure 6. Morgan’s second preference assessment.

After several sessions in the reinforcer assessment with no improvement and frequent escape behavior (e.g., looking away when the demand was presented), a third preference assessment was conducted after session 14. The magazine was selected seven times and the tambourine was never selected. Morgan continued exhibiting no choice behavior during this assessment for 13 trials. Across all three preference assessments, the magazine remained the HP item and the tambourine remained the LP item.
Figure 7. Morgan’s third preference assessment.

Reinforcer Assessment

Pre-Test Probe

Morgan’s pre-test probe data are presented in Figure 8. In baseline, Morgan selected the target color an average of .33 times (range: 0–1) in the LP condition and .66 times (range: 0–2) in the HP condition. When intervention was implemented, Morgan selected the target color an average of .20 times (range: 0–1) per session for the LP condition and an average of .33 times (range: 0–2) per session for the HP condition. A slight separation in responding was observed between the HP and LP conditions beginning in session 8 through session 10 (i.e., 3 consecutive sessions), but declining to zero selections with overlapping data for the remaining sessions.
Figure 8. Morgan’s pre-test probe.

Post-Test Probe

Morgan’s post-test probe data are presented in Figure 9. During baseline, Morgan selected the target color an average of .33 times (range: 0–1) for the LP condition and .66 times (range: 0–2) for the HP condition. During intervention, Morgan selected the target color an average of .21 times (range: 0–1) per session for the LP condition. In the HP condition, Morgan selected the target color an average of .55 times (range: 0–1) per session.
Overall, the pre-test probe condition contained a slightly higher discrepancy in responding between the HP and LP condition when compared to the post-test probe condition. Post-test probe data contained a more consistent discrepancy between responding in the HP and LP condition with an average of .55 selections for the HP condition and an average of .21 selections for the LP condition. Baseline had decreasing trends for both the HP and LP conditions and no increasing trends are present in the post-test probe.
Sarah

Preference Assessment

Results for Sarah’s preference assessment are presented in figure 10. The guitar was identified as the HP item with the highest number of selections (8/10 trials), and the maraca was identified as the LP item with the lowest number of selections (2/10 trials). Sarah made no choice during one trial.

Reinforcer Assessment

Pre-Test Probe

Sarah’s data for the pre-test probe are presented in Figure 11. In baseline, Sarah selected the target color an average of 1.6 times (range: 0–3) per session for the LP
condition and an average of 1.8 times for the HP condition (range: 1–2). When intervention was implemented, she selected the target color an average of 1.16 times (range: 0–3) per session for the LP condition and an average of 1.89 times (range: 0–4) per session for the HP condition.

A slight separation was observed in responding between the HP condition and LP condition with the exception to a few sessions. In the last session (session 24), a distinct and larger separation was observed in responding between the HP condition and LP condition with 4 selections and 0 selections, respectively.

Figure 11. Sarah’s pre-test probe.
Post-Test Probe

Data are presented in Figure 12 for Sarah’s post-test probe. In baseline, Sarah selected the target color an average of 1.6 times (range: 0–3) per session for the LP condition and an average of 1.8 times for the HP condition (range: 1–2). When intervention was implemented, a slight increase was observed for the HP condition and a slight decrease in the LP condition. For the LP condition, Sarah selected the target color an average of 1.37 times (range: 0–3) per session for the LP condition. In the HP condition, Sarah selected the target color an average of 2.26 times (range: 0–4) per session.

Overall, a separation was observed with Sarah responding slightly more in the HP condition than the LP condition for majority of the sessions. Baseline stabilized around 2 correct selections per session for both HP and LP condition. In the pre-test probe, there was a discrepancy between the HP and LP condition where Taylor’s responding in the HP condition was higher than her responding in the LP condition with a clear separation in the last three sessions. This discrepancy was more apparent and consistent with minimal overlapping data in the post-test condition.
Figure 12. Sarah’s post-test probe.
Chapter 4: Discussion

This chapter will discuss the results of this study for each participant in relation to the research questions, potential limitations, and areas for future research. Results of the current study extend the body of literature by evaluating the effects of the use of a high preference item and a low preference item in a reinforcer assessment on the acquisition of a new skill with individuals with significant disabilities. Previously, researchers assessed the effect of reinforcers identified in a preference assessment with target behaviors already exhibited in the participant’s repertoire (Fleming, 2010, Cannella-Malone et al., under review). For this study, the selection behavior was utilized in the acquisition of a skill (i.e., color identification) not in the participant’s repertoire. All three students demonstrated hierarchical preferences (i.e., a range from the highest to the least preferred items) for the six stimuli presented in a paired-stimulus preference assessment. Overall, although Sarah began to show differentiated levels of responding toward the end of the study (indicating possible color discrimination), stimuli identified as highly preferred were ineffective in teaching color identification for all three participants.

Nathan

Overall, Nathan’s data revealed no clear pattern of responding for the HP or LP condition in either test probe. Often, responding in the LP condition was higher when compared to responding in the HP condition. This may have indicated a possible shift of
preference, or an inability to contact the contingency available (i.e., if he looks at the target color, he receives access to an item). Following the second preference assessment, responding in the post-test probe revealed higher levels of responding in the HP condition than the LP condition, suggesting the newly identified HP item (i.e., YouTube videos) may have functioned as a more effective reinforcer. Due to the low number of sessions following the second preference assessment (i.e., six), it is possible this study could have yielded differentiated results for Nathan utilizing the new HP item.

Nathan had a clear gaze that was observable by all individuals working with him. After several observations and sessions, a right side bias in responding was identified. At the beginning of the study, Nathan almost always selected the item to his right regardless of the items presented. Halfway through the study, the teacher reported Nathan historically had difficulty in identifying items towards his left side and utilizing his peripheral vision. I retested all vicinities of his field of vision and determined that Nathan could pinpoint and track any item presented directly in front of him to his left or right. However, if an item was presented on his left (rather than starting at midline and moving to the left), Nathan didn’t locate it. This revealed the response effort to select items on his left was higher, potentially confounding any previous data. With this information, I shifted myself towards Nathan’s left side, equalizing the levels of response effort involved to select either stimuli.

It is important to note that Nathan’s physical reactions to the newly identified HP item (i.e., YouTube videos). When Nathan was given access to the YouTube videos, he smiled frequently and laughed, which are all signs associated with pleasure and
enjoyment. When Nathan was given access to the LP item, his face was blank (e.g., disengaged, noninterested) with his mouth slightly dropping open, which are signs associated with boredom. Nathan’s physical reaction to these items provides anecdotal evidence that the items identified in the preference assessment as HP and LP was accurate.

Nathan exhibited a strong left side bias in responding for majority of the study. To help identify and prevent issues like this before beginning intervention, future researchers should conduct a more systematic pre-assessment (i.e., systematic data collection involving neutral gaze and eye contact duration, tracking days and times experimenter works with student).

Sarah

Sarah exhibited higher levels of responding when compared to Nathan and Morgan. For the majority of the pre-test and post-test probe sessions, responding in the HP condition was higher than responding in the LP condition. There were several sessions in which responding was equal for both conditions. It is important to note that the highest number of accurate responses Sarah emitted (i.e., 4) occurred in the HP condition on six separate occasions. Sarah was the only participant to respond with four accurate responses, with the exception to Nathan on his first session in the pre-test probe for the LP condition. Sarah never emitted more than three accurate responses in the LP condition.

In the last three pre-test and post-test probe sessions, a clear separation between the HP and LP conditions was observed. If this trend had continued, it is possible that
responding in the HP condition would have continued to increase while responding in the LP condition remained at low levels.

Even though Sarah’s responding approached the mastery criterion near the end of the study, her attendance (e.g., missing multiple weeks) may have impacted acquiring color discrimination. In addition, Sarah displayed expressions associated with happiness (e.g., smiling, laughing) during sessions when attention was given to her by the experimenter or when a second observer was present implying attention or myself may have acted as a reinforcer.

Morgan

Morgan exhibited low levels of responding in both HP and LP conditions during the pre- and post-test probes. Differentiation in responding occurred for three consecutive sessions, with a higher number of responses in the HP pre-test probe condition versus lower levels of responses in the LP condition. Unfortunately, this increasing trend did not continue and responding dropped to zero for both conditions. Reinforcers were embedded into the teaching sessions after 14 sessions with no improvement in responding with the aim of achieving higher levels of responding. The duration of the teaching session was also increased from 2 min to 3 min to allow more time for instruction and access to items. The second most highly preferred item from the preference assessment (i.e., music) was used in the HP teaching sessions and the second least preferred item (i.e., Bop It) was used in the LP teaching sessions. A question to consider when embedding reinforcers into teaching sessions when instructing is whether to utilize the items identified as the actual HP and LP within the preference assessment, or the items identified as the next most
preferred and next least preferred items within the preference assessment. The phase utilizing embedded reinforcers may have been more effective in Morgan’s level of responding if the actual HP and LP items had been utilized within the teaching session.

Morgan was unique in that she was the only participant who identified the escape contingency available within the study. When presented with the S\textsuperscript{d}, “Look at ‘color’”, Morgan would look away from the color cards, often down to her lap. As soon as the experimenter removed the stimuli and began to record data, Morgan would lift her head and focus on the experimenter’s behaviors. After reviewing the data, it was apparent that I unintentionally reinforced Morgan’s escape behavior, which made it difficult to make progress even when reinforcers were embedded.

Limitations and Future Research

There are several factors that may have been limitations in this study. One limitation noted in this study is the difficulty of the task chosen for (e.g., color discrimination). It’s also possible that color discrimination began too soon. All three participants in this study were unable to acquire the skill of color discrimination by the end of this study indicating a level of difficulty. Future research should consider choosing a skill that is less complex and simpler in nature but also not within the participant’s repertoire. It is possible that color discrimination was too complex and required that the skill be broken down into more manageable steps in order to achieve mastery. Future researchers could investigate teaching one skill instead of an array of skills. For example, researchers could begin with one color (e.g., blue) and teach until mastery. Once the color blue is mastered, a different color could be introduced and taught until mastery and so on.
This study sought to instruct 6 different colors at the same time, which is a very complex skill of discrimination. The participants may have performed better if the skill was broken down to learn one color at a time then introduce discrimination later. A future study could use a multiple baseline across tasks design to instruct one color as a time and introduce a new color in the following tiers.

Teaching sessions pose another limitation in this study. No data was collected during teaching sessions and systematic data collection on target color selection was not recorded. Target colors were selected daily to instruct in the teaching sessions. The experimenter aimed to alternate which color was targeted per teaching session (e.g., if blue was focused on a particular HP session, then orange was focused on during the next HP session). It is possible the experimenter targeted the same color for each condition multiple sessions in a row due to the lack of systematic data collection. Over the course of the study, my teaching style tended to shift for each participant within the teaching sessions. For example, when working with Sarah I found myself becoming more exciting and fun when she made accurate selections however when working with Morgan, I found myself with low motivation due to her infrequent accurate selections. Future researchers should collect data throughout each teaching session and observe to see if participants are responding differently in the teaching session in comparison with the test probe session. The reinforcer could also be utilized to provide more access to the contingency.

Another limitation to this study is the escape contingency available within each session. Morgan learned that when I presented two color cards in the test-probe sessions, if she looked away she could avoid the task entirely. Ultimately, this was an easier
behavior for her to engage in than making a selection (i.e., competing contingencies). The majority of sessions that Morgan participated in involved escape behavior for each trial. The escape contingency that Morgan learned made it difficult to instruct. The consequence for looking away was the trial being terminated. It’s possible the reinforcers may have not been potent enough to overcome the reinforcing values of escaping a demand. Future research should aim to have the experimenter act as a reinforcer for each of their participants. To do this, experimenters should interact and have frequent encounters with their participants on a daily basis. Interactions should be exciting, fun, and occur in various settings. The dependent measure being assessed should also occur in various settings to prevent the participant from associating a specific location with the concept of ‘work’.

One last limitation of this study was the inability to work with the students on a consistent basis. Two of the three participants were absent frequently throughout this study. If the participants were present in school, there were specified times the experimenter was allowed to work with them. Due to the severity of the disabilities of the participants included in this study, the participants would often be asleep or extremely fatigued and unable to work during the specified times, preventing the experimenter from working with them. It is possible the participants in this study did not acquire color discrimination due to frequent absences.

In this study, the accuracy for overall student selections was not recorded, and future researchers should evaluate not only accurate selections, but selections overall to
see if the number of selections per participant in a given session increase over the time frame of the study.

Implications

Instructing individuals with disabilities can be very difficult with all of the complexities involved for each individual student. As Block (1992) noted, individuals with profound disabilities often have limited response repertoires and lack a system of effective communication, often placing heavy stressors on individuals working with the students (i.e., teachers). Eye gaze should be assessed and utilized for individuals that lack the physical capabilities to select an item. Teaching this population of students to select via eye gaze offers them an opportunity to communicate. It is also beneficial to conduct preference assessments via eye gaze to identify items that are motivating for each student. These items can be used as reinforcers for everyday activities performed by the student (i.e., daily living skills, behavior, new skill acquisition) within the classroom and in other settings. When using the items identified as motivating from the preference assessment, it is important to collect data and assess if the items are acting as reinforcers. If a new skill is being instructed utilizing the reinforcer, it is important to address the complexity of the skill and break it down into manageable tasks if required. Otherwise, the reinforcer may be ineffective in fostering a behavior not in the student’s repertoire.

Conclusion

Researchers should continue to examine the effects of the use of a high preference item and low preference item on the acquisition of a new skill (i.e., a skill not in the participant’s repertoire). Findings in this study support that individuals with significant
disabilities are capable of indicating preferences and make selections. Previous research has shown that items identified in a preference assessment as highly preferred can function as reinforcers with behaviors already in the participant’s repertoire. In this study, items identified as highly preferred were not reinforcing enough to function as reinforcers to foster a behavior not in the participant’s repertoire.
References


Appendix A: Reinforcer Assessment of Individuals With Severe Disabilities (RAISD)
Reinforcement Assessment for Individuals with Severe Disabilities (RAISD)

Student’s Name: ____________________________________________
Date: ________________________________________________________
Recorder: ____________________________________________________

The purpose of this structured interview is to get as much specific information as possible from the informants (e.g., teacher, parent, caregiver) as to what they believe would be useful reinforcers for the student. Therefore, this survey asks about categories of stimuli (e.g., visual, auditory, etc.). After the informant has generated a list of preferred stimuli, ask additional probe questions to get more specific information on the student’s preferences and the stimulus conditions under which the object or activity is most preferred (e.g., What specific TV shows are his favorite? What does she do when she plays with a mirror? Does she prefer to do this alone or with another person?)

We would like to get some information on ________’s preferences for different items and activities.

1. Some children really enjoy looking at things such as a mirror, bright lights, shiny objects, spinning objects, TV, etc. What are the things you think ________ most likes to watch?

Response(s) to probe questions:

2. Some children really enjoy different sounds such as listening to music, car sounds, whistles, beeps, sirens, clapping, people singing, etc. What are the things you think ________ most likes to listen to?

Response(s) to probe questions:

3. Some children really enjoy different smells such as perfume, flowers, coffee, pine trees, etc. What are the things you think ________ most likes to smell?

Response(s) to probe questions:

4. Some children really enjoy certain food or snacks such as ice cream, pizza, juice, graham crackers, McDonald’s hamburgers, etc. What are the things you think ________ most likes to eat?

Response(s) to probe questions:

5. Some children really enjoy physical play or movement such as being tickled, wrestling, running, dancing, swinging, being pulled on a scooter board, etc. What activities like this do you think _______ most enjoys?

Response(s) to probe questions:

6. Some children really enjoy touching things of different temperatures, cold things like snow or an ice pack, or warm things like a hand warmer or a cup containing hot tea or coffee. What activities like this do you think _______ most enjoys?

Response(s) to probe questions:

7. Some children really enjoy feeling different sensations such as splashing water in a sink, a vibrator against the skin, or the feel of air blown on the face from a fan. What activities like this do you think _______ most enjoys?

Response(s) to probe questions:

8. Some children really enjoy it when others give them attention such as a hug, a pat on the back, clapping, saying “Good job”, etc. What forms of attention do you think _______ most enjoys?

Response(s) to probe questions:

9. Some children really enjoy certain toys or objects such as puzzles, toy cars, balloons, comic books, flashlight, bubbles, etc. What are _______’s favorite toys or objects?

Response(s) to probe questions:

10. What are some other items or activities that _______ really enjoys?

Response(s) to probe questions:

After completion of the survey, select all the stimuli which could be presented or withdrawn contingent on target behaviors during a session or classroom activity (e.g., a toy could be presented or withdrawn, a walk in the park could not). Write down all of the specific information about each selected stimulus on a 3” x 5” index card (e.g., likes a female adult to read him the ‘Three Little Pigs’ story.) Then have the informant(s) select the 16 stimuli and rank order them using the cards. Finally, list the ranked stimuli below.

1. __________________________  9. __________________________
2. __________________________  10. __________________________
3. __________________________  11. __________________________
4. __________________________  12. __________________________
5. __________________________  13. __________________________
6. __________________________  14. __________________________
7. __________________________  15. __________________________
8. __________________________  16. __________________________

Notes:

Appendix B: Preference Assessment Data Sheet
Eye Gaze- Preference Assessment

<table>
<thead>
<tr>
<th>Participant</th>
<th>Experimenter</th>
<th>Date</th>
<th>Session</th>
<th>Primary / Reli (circle one)</th>
</tr>
</thead>
</table>

**Directions:** Circle the # of the item that the individual selects via eye gaze.

<table>
<thead>
<tr>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td></td>
<td>No Choice</td>
</tr>
</tbody>
</table>

51
Appendix C: Baseline Reinforcer Assessment Data Sheet
Baseline Data - Eye Gaze

Student _______________________ Experimenter _______________________
Date _______________ Session # __________ Primary / Reli (circle one)

**Target Behavior:** selection of target color through eye gaze for ____ sec.

<table>
<thead>
<tr>
<th></th>
<th>BL - HP</th>
<th></th>
<th>BL - LP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left</td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>No Choice</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>No Choice</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>No Choice</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>No Choice</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>No Choice</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>No Choice</td>
<td></td>
</tr>
</tbody>
</table>

| % Correct: | | % Correct: | |
| IOA:       | | IOA:       | |
| Data Collector: | | Data Collector: | |

53
Appendix D: Reinforcer Assessment Data Sheet
Pre/Post Test Probes Data - Eye Gaze

Student ________________  Experimenter ________________
Date ________________  Duration ________________  Reli / Primary
Session # ______  HP / LP (circle one)  Target Colors: ________

Target Behavior: selection of target color through eye gaze for ___ sec.

<table>
<thead>
<tr>
<th></th>
<th>Pre</th>
<th></th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left</td>
<td>Right</td>
<td>Left</td>
</tr>
<tr>
<td>1</td>
<td>No Choice</td>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td>2</td>
<td>No Choice</td>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td>3</td>
<td>No Choice</td>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td>4</td>
<td>No Choice</td>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td>5</td>
<td>No Choice</td>
<td></td>
<td>No Choice</td>
</tr>
<tr>
<td>6</td>
<td>No Choice</td>
<td></td>
<td>No Choice</td>
</tr>
</tbody>
</table>

% Correct: ____________  % Correct: ____________
IOA: ________________  IOA: ________________
Data Collector: ____________  Data Collector: ____________
Appendix E: Preference Assessment Procedural Integrity Data Sheet
Preference Assessment
Procedural Integrity

Student _______________  Experimenter _______________

Directions: Place a X for each step if it occurs. If the experimenter’s behavior does not occur, leave the space blank.

1. Hold both items at student-specific eye level.
2. Present right item for 5 secs.
3. Present left item for 5 secs.
4. Remove both items (or block with a screen).
5. Represent both items (or unblock) and state, ‘Pick one’.

6. Upon a _____ sec (student specific) directional gaze beginning within 5 secs, the selected item was given to the student for 30 secs.
7. If no _____ sec directional gaze begins within 5 secs, steps 4-5 are repeated.
8. If no choice is made during second presentation, trial is terminated.

Date: _______________________
Session: _______________
Data Collector: _______________________
% TI: _______________________


Appendix F: Baseline Reinforcer Assessment Procedural Integrity Data Sheet
### Baseline Reinforcer Assessment Procedural Integrity

<table>
<thead>
<tr>
<th>Student</th>
<th>Experimenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Session #</td>
</tr>
</tbody>
</table>

**Condition:** HP / LP  (circle one)

**Directions:** Circle ‘Y’ for each step if the behavior occurs. If the experimenter’s behavior does not occur, circle ‘N’. If the behavior step is not applicable, leave the space blank.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Experimenter waited for neutral gaze</td>
<td>Y N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Present 2 randomized colors (pairing) at student-specific eye level and state, “Look at (target color)”</td>
<td>Y N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. If student looks at target color within 5 secs for a ______ sec (student specific) directional gaze or if student does not respond within 5 secs or looks at incorrect color for a _____ sec (student specific) directional gaze, color cards are removed, no consequences are provided, and the trial is terminated.</td>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
</tr>
<tr>
<td>5. Experimenter waited 5 seconds before beginning next trial.</td>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
<td>Y N</td>
<td>____</td>
</tr>
</tbody>
</table>

**Treatment Integrity % (Percent Y’s):** ____________________________

**Treatment Integrity Data Collector:** ____________________________
Appendix G: Reinforcer Assessment Procedural Integrity Data Sheet
Reinforcer Assessment
Procedural Integrity

Student ___________________________  Experimenter ___________________________
Date ___________________________  Session # ___________________________
HP / LP (circle one)  Test probe # 1 / 2 (circle one)

Directions: Circle ‘Y’ for each step if the behavior occurs. If the experimenter’s behavior does not occur, circle ‘N’. If the behavior step is not applicable, leave the space blank.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sample item (i.e., HP or LP stimulus) for 5 seconds</td>
<td>Y</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Item is removed</td>
<td>Y</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Present 2 colors at student-specific eye level and state, “Look at (target color)”</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4. Upon a ____ sec (student specific) directional gaze beginning within 5 secs at the target color, the HP/LP stimulus was given to the student for 30 secs.</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5. If no ____ sec directional gaze begins within 5 secs or an incorrect response, trial is terminated.</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>6. Experimenter waited 5 seconds before beginning next trial.</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
</tbody>
</table>

Treatment Integrity % (Percent Y’s): ___________________________
Treatment Integrity Data Collector: ___________________________

61
Appendix H: Parental Permission Consent Form
The Ohio State University Parental Permission
For Child’s Participation in Research

Study Title: Assessing preference in students with severe to profound intellectual and physical impairments: Eye Gaze

Researcher: Helen I Malone

Sponsor: FCBMRDD

This is a parental permission form for research participation. It contains important information about this study and what to expect if you permit your child to participate.

Your child’s participation is voluntary.
Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose:
The purpose of this study is study is to determine if eye gaze can be used to systematically assess preference in students with severe intellectual and physical disabilities.

Procedures/Tasks:
If you allow your child to participate in this study, s/he will participate in two different phases. In the first phase, we will do a preference assessment in which two items we think your child likes will be placed in their eye sight (approximately 2 feet apart). We will then get your child’s attention and tell them to “choose one”. If they look at one of the two objects for at least three seconds, we will consider this a choice. We will repeat this process with numerous items. Doing this several times will allow us to determine which items are more preferred. For example, if your child always looks at one particular item each time it is presented and never looks at another item, we would think that they liked the one they looked at more than the one they didn’t look at.

In the second phase of the study, we will test whether or not the items identified as preferred in the above phase will act as reinforcers for your child. To do this, we will ask your child to do something they know how to do (such as make eye contact when they hear their name). When they do the behavior, we will give them access to the preferred item. If the behavior increases, this would support the finding that the item is preferred. We will repeat both phases three times over the next six months to determine if preference remains constant over time.

In addition to participating in these two phases, we will collect information from your child’s educational file that is not publically available, including your child’s disability and standardized assessment scores (where available).
Duration:
This study will last approximately 6 months (until the end of this school year). During this study, we expect to work with each student four to five days per week for twenty to thirty minutes per day.

Your child may leave the study at any time. If you or your child decides to stop participation in the study, there will be no penalty and neither you nor your child will lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

Risks and Benefits:
We do not anticipate any risks as a result of participating in this study. Participants will be working with OSU students they are familiar with, so they should be comfortable in the study sessions. One potential risk is that the study is not successful in systematically identifying preferred items for individuals with significant intellectual and physical disabilities.

The main anticipated benefit of this study is that we will identify a means of systematically identifying preference for individuals with severe to profound developmental disabilities. Knowing whether the identified items are actually preferred and whether or not they can act as reinforcers for this sample of students would be extremely beneficial. If we are successful, we will be able to provide systematic instruction AND be able to reinforce the new behaviors with things that are actually reinforcing to the student, rather than using something that we think might be something the student likes.

Confidentiality:
Efforts will be made to keep your child’s study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child’s participation in this study may be disclosed if required by state law. Also, your child’s records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

Incentives:
There are no incentives for participating in this study.

Participant Rights:
You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status.

If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.
An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

Contacts and Questions:
For questions, concerns, or complaints about the study you may contact Helen Malone at 614-247-8710 or malone.175@osu.edu.

For questions about your child’s rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If your child is injured as a result of participating in this study or for questions about a study-related injury, you may contact Helen Malone at 614-247-8710 or malone.175@osu.edu.