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Application of Response-to-Intervention in a Pre-Kindergarten Special Education Classroom

Justin J. Daigle

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APPLICATION OF RESPONSE-TO-INTERVENTION IN A PRE-KINDERGARTEN SPECIAL EDUCATION CLASSROOM

by

Justin J. Daigle

A dissertation submitted to the Graduate College in partial fulfillment of the requirements for the degree of Doctor of Philosophy
Psychology
Western Michigan University
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APPLICATION OF RESPONSE-TO-INTERVENTION IN A PRE-KINDERGARTEN SPECIAL EDUCATION CLASSROOM

Justin J. Daigle, Ph.D.

Western Michigan University, 2018

Lovaas (1987) applied behavior analysis to the treatment of autism and demonstrated a 47% “recovery” rate. He also reported that around 10% of the population that received his services made little-to-no improvement. The present study used a response-to-intervention framework to systematically identify and treat students in an early childhood, special-education classroom who were in danger of falling within that 10%. This study set out to identify, classify, and differentiate the treatment based on the student’s response to the standard classroom intervention. Improvements in multiple students’ rates of acquisition based on this system were recorded. This indicated a possibility of improved outcomes that were previously unavailable for a wider range of students receiving behavior analytic services.
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Justin J. Daigle
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INTRODUCTION

Lovaas (1987) described the effects of a behavior-analytic-based intervention on individuals with autism and showed that 47% of his experimental population were “recovered.” Similar results were obtained across a variety of replications (Anderson, Avery, DiPietro, Edwards, & Christian, 1987; Harris & Handleman, 2000; Howard, Sparkman, Cohen, Green, & Stanislaw, 2005; Weiss, 1999). What has often been forgotten in this discussion was the portion of these populations that were either low responders or non-responders to the intervention. To have a more complete applied science of human behavior, our field must shift more attention to these low- and non-responder populations.

Previous research with this “non-responsive” population has been limited and has been focused mostly on applied research that seeks to create more molecular procedures to troubleshoot treatment failures (Chow, 2011; Fonger, 2017; Fronapfel-Sonderegger, 2012; Lichtenberger, 2016; Mrljak, 2017; Shane, 2016). These specific interventions yielded varying results and no data were reported on the effects of these procedures on other procedures or on overall rates of acquisition. We sought to provide individualized versions of these more molecular procedures as a treatment package to measure the effects on rate of skill acquisition. This entailed providing interventions for several different skill sets simultaneously instead of addressing one skill set at a time.

We previously created and utilized a response-to-intervention (RTI) model to determine which students would receive the various levels of intervention (Daigle, 2017; Glover & Vaughn, 2010; Hulac, Terrell, Vining, & Bernstein, 2011; Jimerson, Burns, & VanDerHeyden, 2007). This model has been described as a method to assess and provide differential treatment based on
the student’s response to a standard intervention (in contrast to an assess and treatment model). The RTI model has traditionally co-existed with a Multi-Tiered System of Support (MTSS) model. We created a tiered structure (see Figure 1) based on RTI and MTSS models. We also used previously analyzed classroom-wide data to identify statistical outliers to our standard classroom intervention (Daigle, 2017). These data were used to set standards based on how students have traditionally responded to the classroom intervention. The overall goal for the combination of the RTI assessment model and the MTSS intervention model was to create a systematic way to evaluate a student’s response to a behavior-analytic intervention and to differentiate treatment based on this evaluation.

**Figure 1.** Summary of updates to RTI framework adapted from Daigle (2017).

The same tiered structure could easily fit Lovaas’s (1987) outcomes. Like MTSS, Lovaas used three categories to place participants, based on their post-treatment IQ scores. Lovaas used the terms “Recovered,” “Aphasic”, and “Autistic/Retarded.” We are simply replacing
these outdated terms with new terms based in the tradition of RTI and MTSS: “Tier 3a,” “Tier 3b,” and “Tier 3c.” In addition, we are de-emphasizing IQ scores as a measure of success – replacing it with classroom-performance measures (Daigle, 2017).

Both MTSS and RTI publications have used the term “intensity” of services to delineate between each tier; however, it is not always clear or consistent what a given author intends to convey to the reader when using the term “intensity.” One meaning could be time allocated to the intervention. More exposure to the treatment per a given time period would certainly be describable as “more intensive”; however, in our case, additional exposure to the treatment was not a logistical option.

Another possible meaning of “intensity” involved a combination of both staff ratio, staff skill-level, and individualization of intervention. If a student required a more “intense” intervention, we have traditionally seen those students placed in classrooms with a smaller student-to-teacher ratio; and the teachers in these classrooms tend to have higher-levels of formal education and experience. Certainly, these factors could be described as “more intensive”, and they were more feasible for our setting. Most of our students received services with a 1:1 student-to-tutor ratio; so, increasing this ratio meant that there could be more than one trained adults working with a single student. In addition, we were able to change “intensity” of services by placing Tier 3b and Tier 3c students with tutors who have more formal education and training.
METHOD

This study was conducted at a public school’s Early Childhood Special Education preschool classroom that provided behavior-analytic procedures that were originally modified from Lovaas’s *The Me Book* (1981) for students ranging from 1.5-6 years of age. Each student traditionally received individualized behavior-analytic services using a 1:1 ratio for 15 hours a week with typically scheduled holiday and semester breaks.

Students were chosen for participation based on meeting inclusion criteria for the three tiers as established by Daigle (2017; See Table 1 for a summary of tier inclusion information). Critical values were calculated by measuring trials to mastery for each procedure goal. These critical values allowed us to analyze each student’s response to their given intervention despite their skill level. In addition, a second inclusion criterion was added to ensure that students who were not meeting any procedure goals would be detected (See Table 1). The criteria were all based on historic classroom data that included all levels of performers. Those data were used to create “critical values” to identify students performing differently than the classroom norms.

The first inclusionary criterion was based on the number or percentage of procedures in which the number of teaching trials exceeded the established critical value. The secondary inclusionary criterion was based on the total number of procedures mastered in each 6-month period. This secondary criterion was established to identify students who were not making progress because there were not sufficient teaching opportunities available. For instance, there may be a student who engaged in frequent problem behavior. Typically, the tutor would conduct 30 learning trials a day for an imitation procedure. But, problem behavior might bring the number of learning trials down to an average of 10 per day. These days of low learning
opportunities may have been acceptable intermittently, but a criterion needed to exist to establish that insufficient learning is occurring, and additional steps should be taken.

Table 1

**Summary of Inclusionary Criteria for Each Tier (Adapted from Daigle, 2017)**

<table>
<thead>
<tr>
<th>Tier</th>
<th>Title</th>
<th>Percentage of Students</th>
<th>Inclusion Criterion 1</th>
<th>Inclusion Criterion 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 3a</td>
<td>Standard Intervention</td>
<td>79%</td>
<td>0 procedure at or above the critical value of trials to mastery</td>
<td>Total number of procedures mastered every 6 months is greater than 1 standard deviation below the mean</td>
</tr>
<tr>
<td>Tier 3b</td>
<td>Targeted Intervention</td>
<td>13%</td>
<td>At least 1 procedure at or above the critical value of trials to mastery</td>
<td></td>
</tr>
<tr>
<td>Tier 3c</td>
<td>Intensive Intervention</td>
<td>8%</td>
<td>30% or more of procedures at or above the critical value of trials to mastery</td>
<td>Total number of procedures mastered every 6 months is less than or equal to 1 standard deviation below the mean</td>
</tr>
</tbody>
</table>

If a student were placed in a Tier 3b or Tier 3c intervention, we developed modified procedures that reduced the number of pre-requisite skills needed to be successful for the target. These pre-requisite skills may have been intentionally or unintentionally assumed within the standard procedure. These modified procedures also featured teaching techniques (i.e., prompting strategies, error-correction procedures) that were not utilized in the standard classroom intervention because they were often too difficult for inexperienced tutors to implement accurately and reliably. Any modified procedures always terminated with the same mastery criterion as the standard classroom procedure.
In addition to using modified procedures, we also utilized more experienced tutors with higher levels of formal education in behavior analysis to implement Tier 3b and Tier 3c procedures. For instance, if a Tier 3b student required a modified version of the procedure “Identification of Objects”, a second-year master’s student familiar with the student would be the only person allowed to implement that procedure. This was done to maintain consistency of implementation.

The classroom established a treatment team that made all clinical decisions. This treatment team was led by the classroom teacher and was comprised of professionals including the IEP. This also included the consulting BCBA and a master’s student who was receiving supervision and training as part of their formal education.

The independent variable was the treatment package provided at various levels of intensity. This package included the procedures developed, supervision frequency, and tutor formal education level and experience level. The dependent variable was the rate of skill acquisition which was measured by calculating the number of procedures mastered per month. All modified procedures utilized a mastery criterion, or procedure goal, that was identical to the similar standard classroom procedure. In the results section, we have provided a classroom average for the rate of skill acquisition for comparison in all presented data.

**Tier 3a Method**

Tier 3a was our standard classroom curriculum. This involved different procedures to meet a variety of students’ needs. Every student in the classroom was required to meet inclusionary criterion for special education service. Goals were established by the treatment team during the Individualized Education Plan (IEP) process upon intake and were always
customized to the student’s individual needs. Typically, the goals specified in the IEP related directly to programs that existed in the standard curriculum. This was the only intervention method in place prior to this study.

There were no consistent requirements for frequency of supervision or treatment integrity measures in the standard classroom intervention. Typically, supervisors collected treatment integrity data on individual tutors twice weekly and across a variety of procedures. They also provided immediate verbal feedback if they observed treatment drift during periods of direct observation. The classroom teachers served as the head of the intervention team for each student. They consulted with a BCBA who typically provided supervision and recommended programing updates for each case at least weekly. Data were updated and analyzed at least weekly before supervision meetings. All program changes and program updates were required to be approved by the student’s teacher.

This level of intervention was successful for about 80% of the students. However, the remained 20% of the classroom population had difficulty meeting the procedure goals as specified in their IEP. This necessitated the development of additional intervention strategies to address the needs of the student not responding to the standard classroom intervention.

We chose to report on three Tier 3a students in this manuscript in order to provide a set of comparison data. These three students were selected randomly from a list of Tier 3a students in the classroom. The only limitation was the criterion that the student selected must have been receiving services in the classroom for at least three months prior to the completion of this project. Many students in this tier remained in the classroom for less than 6-months.
**Tier 3b Method**

Tier 3b students were successful in the classroom with the majority of their procedures; however, at least one procedure being targeted surpassed an established critical value. Additionally, students who were successful in a Tier 3c intervention were included in Tier 3b, if they still required more intensity for at least one procedure. Either of these criteria qualified the student for inclusion in the Tier 3b intervention. Once a student qualified for this intervention, the team would clarify the treatment goal or goals being addressed (see Appendices A and B for student-specific information). Specialized procedures were then developed and implemented to address the area(s) of concern. There were no systematic changes in supervision practices or treatment integrity measures at this point unless requested. As in Tier 3a, the procedures were updated or altered during weekly supervision meetings if the treatment team determined the intervention was not working as projected.

Tier 3b interventions were completed for two students: Owen and Wesley. Owen received a Tier 3b intervention after he successfully completed a Tier 3c intervention. The Tier 3c intervention included 5 concurrent standard classroom procedures and 3 modified procedures – “Basic Direction Following”, “Raise Hand”, and “Identification of Written Name.” During the Tier 3c intervention, Owen made progress but failed to master the procedure “Basic Direction Following”. The treatment team determined that after the Tier 3c intervention, he should receive a Tier 3b intervention to continue to address this procedure. In addition, several months into the Tier 3b intervention, the treatment team decided to address additional areas of concern that were not a part of the standard classroom procedures. This was addressing raising his hand in a group setting and identifying his written name.
During the Tier 3b intervention, Owen received most of the intervention using the standard classroom practices. The tutors providing the standard procedures of the Tier 3b intervention ranged from undergraduates in their first semester of practicum to master’s students in their first semester of practicum. The modified procedure, basic instruction following, was only conducted by a second-year master’s student familiar with the procedure and with the student. A different second-year master’s student familiar with the procedures and with the student provided the other modified procedures which included raising hand and identification of his written name.

Wesley was the second student who received a Tier 3b intervention. Before being placed in the classroom, his skills were briefly assessed by a team of professionals. His initial classroom procedures were chosen based on the report provided from that group. Once he entered our classroom and adjusted to his new environment, he began to demonstrate a higher skill set than we had originally planned to accommodate. He quickly mastered his initial standard procedures within the first month of his Tier 3a intervention. The treatment team made the decision to increase the difficulty of his procedures to match the skill set he was demonstrating. This increase in difficulty within the second month of treatment was met with an increase in problem behavior including head banging, flopping during transitions, and eloping from the work area.

At this point, the treatment team requested the help of a Ph.D. student who was interested in studying problem behavior. This new member of the team and his research assistants began collecting data on the student’s problem behavior. It was noted that problems
occurred during and immediately after two procedures: “My Turn” and “Identification of Objects”. Both procedures involved receptive language.

Shortly after the correlation between these two procedures and the problem behavior was noted, Wesley met the critical value for “Identification of Objects”. This required a Tier 3b intervention. When this procedure appeared on his schedule, a second-year master’s student familiar with the procedure and the student, implemented a modified version of that procedure. This was done while all other standard procedures were being implemented using the typical classroom practices. Once he mastered the modified procedure, he would be required to maintain performance with his standard tutor before returning to a standard Tier 3a intervention.

No formal intervention was in place to address the problem behavior at any time. The hypothesis of the treatment team was that the problem behavior was caused by task difficulty. The modified procedure attempted to decrease the difficulty of each task to reduce the probability of problem behavior and increase the probability of task compliance. There was a safety protocol put in place at this time that included measures such as padding and re-arranging the work area to decrease his ability to elope.

**Tier 3c Method**

A Tier 3c intervention was implemented for students who met the criterion for inclusion in Tier 3c, as defined in Table 1. At this point, we convened the student’s treatment team and attempted to identify prerequisites skills that should be targeted during our intervention. We selected 5-6 intervention targets based on the students’ skill level and existing treatment goals (see Appendices B and C for student-specific information).
Once the treatment team identified individualized goals, procedures were written for all treatment goals as described in Tier 3b methods. These procedures tended to be more difficult to implement; therefore, we collected treatment integrity and inter-observer agreement measures more frequently to ensure accuracy of intervention and reliability of data. We graphed and analyzed data daily, instead of weekly. We would make frequent changes to the intervention based on those data. This intervention package was intended to be the most intensive services possible within the hours of service allotted by the classroom.

These intensive treatments were scheduled for 6-week periods. This was an arbitrary limitation to reduce the burden on human resources. If a procedure goal was not achieved in this period, the student returned to Tier 3b status to continue these intensive procedures just for those goals that were not mastered during the Tier 3c intervention. This meant that the modified procedures remained in placed with specific tutors, but rates of treatment integrity measures and inter-observer agreement decreased to the standard frequency.

Two students received a Tier 3c intervention: Owen and Berkley. Owen, prior to the Tier 3b intervention mentioned above, received a Tier 3c intervention. He had been in the classroom for 14 months and with a below-classroom-average performance throughout that time. It was during this period that this project was conceived.

During the first seven months of service, Owen had failed to master a standard matching procedure. For the last several months of that period, he had not mastered a single procedure. His supervising BCBA began working more intensely with his tutors. It was during this time that he began mastering procedures again. Because there was a noticeable difference in performance during this time, the concept of an intensive intervention began to form.
During the tenth month of service, another Ph.D. student began working with Owen to address deficits in eye contact (Fonger, 2017). Her involvement lasted two months, during which a large increase in other procedures mastered occurred, which was attributed to his mastering eye contact – a possible prerequisite skill for those procedures. This supported the idea of an intensive intervention (i.e., Tier 3c) that addressed a number of missing prerequisite skills. After these fifteen months in the classroom, he began receiving a Tier 3c intervention.

The involvement of a Ph.D. student implementing a modified procedure would now be labeled as a Tier 3b intervention. Since the tiered system was not in place at this time, we have chosen to represent the data prior to the Tier 3c intervention only as Tier 3a. This was because there was no formal process for a Tier 3b intervention involved and because intermittent involvement by Ph.D. students were considered a classroom standard practice at the time.

The second student who received the Tier 3c intervention was Berkley. His performance was below classroom average for the first 25 months in the classroom. The treatment team reviewed his records and previous performance as well as conducted some direct observation sessions. Five treatment goals were identified, and modified procedures were created for the Tier 3c intervention to begin.

**Supervision Measures**

We collected supervision duration data for a typical week in the fall semester. The site involved seven BCBA s who provided supervision. We asked every BCBA at the site to record the total number of minutes spent involved in each student’s case. These activities could vary in nature. The most common activities included direct observation, case discussion, supervision, and coordination of services with other professionals. The goal of this measure was to observe
how existing contingencies within the system supported the distribution of the supervisors’
time. We did not manipulate any variables.

Treatment Integrity Measures

We collected treatment integrity measures throughout the classroom during the fall
semester. We utilized paper data sheets and direct observation. We attempted to get a
balanced measure across tutor experience levels and student tier classifications. Treatment
integrity would be measured for each procedure by placing the components of the procedure
into a data sheet. Each procedure had a different number of requirements; therefore, we
measured percentage of compliance. The goal of this measure was to observe how existing
contingencies within the system supported the treatment integrity of the procedures in
question. We did not manipulate any variables.

Data were collected across tiers and across four tutor experience levels. The first level
was “Basic” which included undergraduates in their first-semester within the classroom. These
students had completed a Preliminary Practicum course and an Introduction to Behavior
Analysis course prior to their experience that provided some introductory training as well as
behavior-skills training-based training during their first week of the semester. There was no way
to account for previous experience implementing behavior analysis procedures; however, no
tutor had previous experience at the site conducting the specific procedures in the classroom
curriculum.

The second category was “IP/AP”. This was a combination of two practicum courses –
Intermediate Practicum (IP) and Advanced Practicum (AP). These courses involved
undergraduate students who have completed at least one semester at the practicum site. The
third included master’s (MA) students studying behavior analysis. All students in this category were in their first semester of a graduate-level practicum. We did not account for previous experience, including previous experience at the practicum site. The final category included one PhD student who implemented two procedures as part of the Tier 3c intervention. The PhD student was a Board Certified Behavior Analyst with over 5 years of experience.
RESULTS AND DISCUSSION

Tier 3a Results and Discussion

The data on rates of acquisition were reported for three randomly chosen students who received only a Tier 3a intervention package (see Figure 2). The rates of acquisition vary across participant but are near average in each case. All data displayed for these students were three months in length. This appeared to be a common theme for these students who remained in Tier 3a interventions throughout their time in the classroom – once they demonstrate their ability to learn in a classroom setting, they were transitioned to a less-intensive setting.

Tier 3b Results and Discussion

Two students, Owen and Wesley, received this intervention package (see Figure 3). Owen first received the standard Tier 3a intervention and was then provided with a Tier 3c intervention. After the Tier 3c intervention concluded, Owen then received a Tier 3b intervention. Owen’s graph is repeated in both Figures 3 (Tier 3b interventions) and 4 (Tier 3c interventions) for easier comparison. During this Tier 3b intervention, we used three modified procedures: “Basic Direction Following”, “Raise Hand”, and “Identification of Written Name”.

The “Basic Direction Following” procedure was not mastered within the 13-month recording period. The procedure began with the modifications used in the Tier 3c intervention. Once it become apparent that the procedure was not being successful, alternative modification were made throughout this period. Owen made continued progress in each version of the procedure; however, independence and mastery were never established.
Figure 2. Cumulative graph of procedures mastered per month for students receiving Tier 3a interventions. The dashed line represents the cumulative average rate of skill acquisition for students across all three tiers within their first 16 months in the classroom. After 16 months, the same line represents the predicted average rate of acquisition (this was necessitated because many students are not in the classroom longer than 16 months).
The “Raise Hand” and “Identification of Written Name” procedures were not mastered within the last 4-months of this project’s recording period. These procedures were in place for a much shorter time because there was a need for additional assessment and procedure development before it was implemented. Slow, gradual progress was occurring; however, it was not as rapid as his rate of acquisition on the standard classroom procedures during this time. It was difficult to determine if his rate of acquisition on these procedures was acceptable since no comparison could be made to other students – he was the only student to receive these procedures.

In contrast to the targeted procedures mentioned above, during the Tier 3b intervention, Owen’s rate of skill acquisition had increased from baseline (i.e., Tier 3a). This increase in rate was solely based on the mastery of the standard classroom procedures since no targeted procedures were mastered. During the 3b intervention, he never went above critical value for any of his standard classroom procedures. This should be contrasted with over 33% of his procedures surpassing the critical value in baseline. It is possible that this improved rate could be attributed solely to the Tier 3c intervention he received before this Tier 3b intervention.

Wesley’s rate of skill acquisition increased to an above-classroom-average performance by the end of the Tier 3b intervention package. The PhD student supervising his problem behavior also noted the rate of problem behavior decreased throughout the intervention. The high rate of skill acquisition and low rates of problem behavior maintained when Wesley was returned to a Tier 3a intervention. After two months and based on his performance, the treatment team decided to transition him to the next classroom.
Figure 3. Cumulative graph of procedures mastered per month for students receiving Tier 3b interventions. The dashed line represents the cumulative average rate of skill acquisition for students across all three tiers within their first 16 months in the classroom. After 16 months, the same line represents the predicted average rate of acquisition (this was necessitated because many students are not in the classroom longer than 16 months).
Tier 3c Results and Discussion

The Tier 3c intervention was used with two students and was beneficial for both (see Figure 1). An average student performance in the classroom (including all three tiers) mastered 1.5 procedure targets in a calendar month. Both Tier 3c students averaged about 1 mastered procedure target per month while initially starting services (i.e., while in Tier 3a). This slower rate of skill acquisition over several months indicated that they were low- or non-responders to the standard classroom intervention. Both students displayed a clear increase in rate of skill acquisition while in the Tier 3c intervention. The rates of acquisition post-intervention continued to be higher than before the intervention for one participant indicating that the skills targeted may have been pre-requisites to success with the standard intervention.

The first student, Owen (i.e., same student as Tier 3b), consistently performed below classroom average for the first 14 months in the classroom (i.e., while classified as Tier 3a). There were two measures that can be derived from these data. The first measure was the cumulative number of procedures mastered as compared to the classroom average. Owen’s cumulative number of procedures mastered was below classroom average until the Tier 3c intervention package was completed. He remained above classroom average for the 13 months recorded after the conclusion of the Tier 3c intervention package.

The second measure was rate of skill acquisition (i.e., cumulative procedures mastered/time). This measure was the most sensitive measure to our interventions. During the Tier 3a intervention package, Owen’s mean rate of mastery was 0.8 procedures/month. This increased to a mean rate of 2 procedures/month when Fonger (2017) began her involvement. This rate continued to increase in the Tier 3c intervention to 3.5 procedures/month. These rates
decreased when transitioned to the Tier 3b intervention - a mean rate of 1.46 procedures/month. It should be noted that 1.46 procedures/month was very close to the classroom average of 1.5 procedures/month. This was a socially significant increase from the initial rate of skill acquisition.

The combination of the two measures demonstrated that it is possible for a low-responding student to make significant progress so that they would match the performance of their peers within the special education classroom. Some combination of variables within this intervention (e.g., the acquisition of eye contact, the Tier 3c intervention package, the increased rate of supervision) resulted in Owen establishing and maintaining a rate of skill acquisition comparable to his peers.

Berkley’s rate of skill acquisition increased from a mean of 1.12 (Tier 3a) to 3 (Tier 3c) procedures mastered/month. This rate put his cumulative number of procedures mastered at slightly-above-average classroom performance. Following the Tier 3c intervention package, his treatment team returned him to a Tier 3a intervention package. He was unable to maintain his higher rates of acquisition when returned to the Tier 3a intervention. This demonstrated that more attention should be placed on the exiting criteria for Tier 3c interventions.

We took inter-observer agreement on 74% of all learning opportunities during Tier 3c interventions with the average score being a 97% agreement with a range from 68-100%. We completed treatment integrity measures for 47% of all learning opportunities which produced an average score of 98% accuracy with a range from 15-100%.
Figure 4. Cumulative graph of procedures mastered per month for students receiving Tier 3c interventions. The dashed line represents the cumulative average rate of skill acquisition for students across all three tiers within their first 16 months in the classroom. After 16 months, the same line represents the predicted average rate of acquisition (this was necessitated because many students are not in the classroom longer than 16 months).
Supervision

Supervision practices varied by supervisor, but common themes were observed (see Table 2). First, substantially more supervision was allocated to students who were classified as Tier 3c students. That tier represented only 8% of the classroom students, but these students received 68% of the total supervision time. The existing system has contingencies in place to support more frequent supervision for students in need of more intensive services.

Supervision processes appear to be an important variable in treatment outcomes. This is contrary to the practices held by many funding agencies that provide universal limitations to supervision hours for all individuals receiving services. For instance, many insurance companies limit a practitioner to supervising only 10% of a student’s treatment hours. These situations place practitioners in an ethically compromised situation. There is mounting pressure for employers and insurance companies to provide supervision for the 10% that has been approved for reimbursement – despite the fact that treatment results may be hindered by this limitation. More research should be conducted to establish any causal relationship between supervision and student outcomes – especially those outcomes associated with Tier 3c students.

Table 2

Supervision Allocation Data Divided by Tier

<table>
<thead>
<tr>
<th>Tier</th>
<th>Percentage of students within tier</th>
<th>Mean percentage of a student’s time in the classroom that was supervised by a BCBA</th>
<th>Percentage of overall time spent by BCBAs in classroom supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a</td>
<td>58%</td>
<td>9%</td>
<td>16%</td>
</tr>
<tr>
<td>3b</td>
<td>33%</td>
<td>9%</td>
<td>16%</td>
</tr>
<tr>
<td>3c</td>
<td>8%</td>
<td>37%</td>
<td>68%</td>
</tr>
</tbody>
</table>
Treatment Integrity

Treatment integrity scores were collected across a variety of tutor experience levels and student tier classifications. A total of 136 measures were collected (see Figure 5). Procedures in Tier 3b and Tier 3c are generally considered more difficult to implement. This could be due to the complexity of the procedures and the lack of cooperation from the student.

The first goal was to evaluate the levels of treatment integrity with a variety of tutors. The standard classroom methodology of assigning tutors was to place the more experience tutors with Tier 3c and Tier 3b students. This was done to ensure that the most experience tutors were working with the difficult programming. However, there were times when less experienced tutors were assigned to more difficult programming due to logistic limitations. This methodology seems to be supported by the data since the median treatment integrity score of basic students working with Tier 3b students dropped in comparison. The scores for both IP/AP and MA tutors were constant across both Tier 3a and Tier 3b students. Though, the median score for IP/AP students were higher in both categories.

The second goal was to ensure that high levels of treatment integrity were achieved in the Tier 3c intervention. Each bar in Tier 3c represents multiple scores from a single tutor at each level. This was because the number of tutors involved with the intensive intervention were limited. Generally, scores for the Tier 3c interventions were much higher despite the difficulties that are typically encountered. To the extent that the procedures may be more difficult, and the students may be less cooperative, we were able to maintain a high level of treatment integrity across tiers.
Figure 5. Median percentage for treatment integrity measures by tier and experience level. Bars represent range of scores. Number in bar represent the number of measures taken in that category.

Recommendations for the Future

There were several important considerations to note that may guide future projects. First, a detailed database for the classroom now exists that allows us to analyze the social impact on the lives of the students. This database could easily be the foundation for numerous follow-up studies. This database should continue to be updated and reviewed periodically, at least every time a procedure is updated or on an annual basis. The current database allows the site the ability to have an ongoing analysis of four areas: (1) which procedures need to be updated or revised based on student performance, (2) which procedures are becoming more
effective at teaching – and, in contrast which procedures need more research to establish better responding, (3) when, if ever, critical values need to be updated, and (4) a measure of the overall impact of the classroom across all students.

This database could also be updated to include post-transition data for the students. This will allow us to measure the socially valid impact of the classroom. This can be done by including clear measures of performance on exit of our classroom and the type of service into which the student transitions.

Second, in the graphs presented throughout this manuscript, we used an average line that was calculated across all students in the classroom despite tier status. Alternative graphing methods of the same data may prove useful. For instance, Appendix D provides another alternative graphing method that outlines the area associated with each tier. Another alternative to the graph could also include average lines for each tier or a line representing typical development.

Third, this project raises the question of whether any predictive variables to performance exists. This may provide an opportunity to begin a Tier 3c intervention immediately rather than requiring the response to intervention measure.

Finally, Berkley demonstrated little progress after the Tier 3c intervention. This was in contrast to Owen’s improvement. One possible variable to explain this is that for Berkley it was “too little, too late”. The system to detect low- and non- responders was not in place until Berkley has received two years of Tier 3a intervention. It is possible that early detection and intervention plays a key factor in the value of this model.
Summary

This project has: (1) demonstrated that there is a possibility of improved outcomes that were not previously available for students who have been labeled as “non-responders,” (2) modified an existing framework into a behavior analytic service system, and (3) provided data to show the effects of such a system on rates of skill acquisition. This provided further evidence that the practice of implementing behavior analysis should continue to evolve and improve using data-driven decision making.

Using a response-to-intervention or tiered assessment methodology can be accurate and useful in this type of setting. Using that assessment methodology to inform different intensities of treatment has benefits to rates of acquisition for students. This type of structure could be, and should be, used in a variety of service-delivery settings to maximize the effects of behavioral interventions. Additional research should occur on some of the informal processes used during this project which were selecting treatment goals and post-intervention strategies.

Supervision practices should be free to be systematically customized to an individual case. This may be a key variable in student outcomes and should be researched further. In addition, more research should be done to identify the key prerequisite skills and the best ways to teach those skills. This is an important step to a more comprehensive method of providing services to a wider-range of students. We hope that the field will dedicate more applied and experimental research to refine these methodologies for the betterment of those we serve.
REFERENCES


Fonger, A. (2017). *Teaching eye contact and responding to name to low-performing children with autism*. Unpublished manuscript, Department of Psychology, Western Michigan University, Kalamazoo, MI.


Appendix A

Tier 3b: Wesley’s Treatment Overview
Tier 3b Overview

<table>
<thead>
<tr>
<th>Target Area and Procedure Name</th>
<th>Therapeutic Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptive Language – Identification of Objects</td>
<td>Identification of an object from an array when verbally given the name of the item</td>
<td>Mastered. Generalization and maintenance recorded. No further action.</td>
</tr>
</tbody>
</table>

Procedure Details
Appendix B

Tier 3c and 3b: Owen’s Treatment Overview
### Tier 3c Intervention Package Overview
(Procedures based on Clements, 2017; Daigle, 2017; Fonger, 2017)

<table>
<thead>
<tr>
<th>Target Area and Procedure Name</th>
<th>Therapeutic Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptive Language – Basic Direction Following</td>
<td>Following simple directions</td>
<td>Not met – Continue in Tier 3b intervention</td>
</tr>
<tr>
<td>Imitation – Manipulative Imitation</td>
<td>Imitating novel manipulating an object model</td>
<td>Mastered. Generalization and maintenance recorded. No further action.</td>
</tr>
<tr>
<td>Vocal Language – Imitate Early Sounds</td>
<td>Reliably imitate developmentally appropriate approximations to vocal prompts</td>
<td>Mastered. Some generalization recorded. Maintenance recorded. Continue to develop with additional procedures.</td>
</tr>
<tr>
<td>Attending – Shaping and Spontaneous Eye Contact; Respond to Name</td>
<td>Reliably makes eye contact when name is called while increasing incidents of spontaneous eye contact throughout the day</td>
<td>Mastered. Generalization and maintenance recorded. No further action.</td>
</tr>
</tbody>
</table>

### Procedure Details

**Target:** Receptive Language (Tier 3b and 3c)

**Procedure:** Basic Direction Following

It is important to keep all antecedent stimuli the same regardless of the trial and to randomize the order that you present the trials. This means that each trial should look exactly the same and only differ in the $S^D$ being presented. Keeping all trials, the same is important because it will help ensure that the student is attending/discriminating between the auditory stimuli rather than attending to irrelevant stimuli in the environment (e.g., inadvertent prompts: eye gaze to a particular spot, hand placement or movements, tone of voice, presence of other stimuli including people or materials, removal or presentation of other materials etc).

- Turn the student’s chair toward you so that he/she could stand up easily without having to manipulate the chair. The chair should remain this way for all listener responding trials.
- Identify a reinforcer (preference assessment).
- Allow brief access to the reinforcer for a few seconds. Be prepared to present the $S^D$ as soon as possible after removing the item.
- **Correct Tutor Antecedent Behavior:** As soon as you remove the item, place your hands at your sides, establish eye contact and deliver the $S^D$ in a neutral tone.
- **Correct Student Behavior:** Phase specific. See below.
• **Correct Tutor Behavior:** Phase specific. See below.
• Randomly rotate through targets during this time.

---

**Phase 1:**

- **Tutor Prompting:** Provides full physical prompts for the student to complete the response
- **Correct Student Behavior:** Does not resist prompts
- **Incorrect Student Behavior:** Resists prompts
- **Tutor Behavior:**
  - Correct Student Behavior: Immediately provide a highly-preferred edible and tangible along with social praise
  - Incorrect Student Behavior: Use least-to-most prompting for the student to complete the response and provide a neutral “good”
- **Note:** If student responds at a lesser prompt level (partial or independently) at any time, provide “double” the reinforcement (2 edibles, more praise, etc)
- **Phase Change Criteria:** 3 sessions at 90%

---

**Phase 2:**

- **Tutor Prompting:** Provides partial physical prompts for the student to complete the response
- **Correct Student Behavior:** Does not resist prompts (full physical prompts not required)
- **Incorrect Student Behavior:** Resists prompts (full physical prompts required)
- **Tutor Behavior:**
  - Correct Student Behavior: Immediately provide a highly-preferred edible and tangible along with social praise
  - Incorrect Student Behavior: Use least-to-most prompting for the student to complete the response and provide a neutral “good”
- **Note:** If student responds at a lesser prompt level (independently) at any time, provide “double” the reinforcement (2 edibles, more praise, etc)
- **Phase Change Criteria:** 3 sessions at 90% or above, 2 sessions at 90%

---

**Phase 3:**

- **Tutor Prompting:** Provides partial physical prompts for the student to complete the response after **waiting 2 seconds**
- **Correct Student Behavior:** Does not resist prompts (full physical prompts not required)
- **Incorrect Student Behavior:** Resists prompts (full physical prompts required) or engages in another response before the prompts are provided
- **Tutor Behavior:**
  - Correct Student Behavior: Immediately provide a highly-preferred edible and tangible along with social praise
  - Incorrect Student Behavior: Use least-to-most prompting for the student to complete the response and provide a neutral “good”
- **Note:** If student responds at a lesser prompt level (independently) at any time, provide “double” the reinforcement (2 edibles, more praise, etc)
- **Phase Change Criteria:** 1 session at 100%
Phase 4:
- **Tutor Prompting**: Provides partial physical prompts for the student to complete the response after **waiting 4 seconds**
- **Correct Student Behavior**: Does not resist prompts (full physical prompts not required)
- **Incorrect Student Behavior**: Resists prompts (full physical prompts required) or engages in another response before the prompts are provided
- **Tutor Behavior**:
  - Correct Student Behavior: Immediately provide a highly-preferred edible and tangible along with social praise
  - Incorrect Student Behavior: Use least-to-most prompting for the student to complete the response and provide a neutral “good”
- **Note**: If student responds at a lesser prompt level (independently) at any time, provide “double” the reinforcement (2 edibles, more praise, etc)
- **Phase Change Criteria**: 1 session at 100%

Phase 5:
- **Tutor Prompting**: Provides partial physical prompts for the student to complete the response after **waiting 6 seconds**
- **Correct Student Behavior**: Does not resist prompts (full physical prompts not required)
- **Incorrect Student Behavior**: Resists prompts (full physical prompts required) or engages in another response before the prompts are provided
- **Tutor Behavior**:
  - Correct Student Behavior: Immediately provide a highly-preferred edible and tangible along with social praise
  - Incorrect Student Behavior: Use least-to-most prompting for the student to complete the response and provide a neutral “good”
- **Note**: If student responds at a lesser prompt level (independently) at any time, provide “double” the reinforcement (2 edibles, more praise, etc)
- **Phase Change Criteria**: 1 session at 100%

Phase 6:
- **Tutor Prompting**: No prompts should be provided
- **Correct Student Behavior**: Independently engages in the appropriate response
- **Incorrect Student Behavior**: Engages in a response other than the appropriate response or fails to respond to the direction
- **Tutor Behavior**:
  - Correct Student Behavior: Immediately provide a highly-preferred edible (2) and tangible along with lots and lots of social praise
  - Incorrect Student Behavior: Use least-to-most prompting for the student to complete the response and provide a neutral “good”
- **Phase Change Criteria**: 3 sessions at 100%

Phase 7:
- While randomly rotating through previously mastered targets, begin to train responding to a novel direction. Take data only on this new target.
- Return to phase 1 for the new target and continue until mastered.
- For phases 1 and 2 only need 1 session at 100% to phase change for this new target.
Basic Following Directions – Model Prompt

- **Targets**
  - Clap hands
  - Tap desk
  - Wave bye

- **Tutor** and child should be seated at child sized table. Child should be seated at the table. Tutor may be seated in a small chair or seated on the floor. Tutor should present the SD in the same tone each time, across targets. Targets should be randomly selected each time the procedure is ran.

- The following prompting hierarchy should be used
  - 1st prompt: model
  - 2nd prompt: partial physical
  - 3rd prompt: full physical

- **Scrolling protocol**
  - Scroll: child engages in any behavior other than the target behavior
    - E.g., If the target behavior was clapping, but the child waved
  - Block the scroll (put in quiet hands), and turn away from child for 3s.
  - Present the SD again and immediately provide the model prompt
  - Mark trial as incorrect and move on to next trial

- **Phase 1**
  - **Tutor prompting:** Tutor provides model of the action immediately after delivering the SD
    - model and SD should NOT happen at the same time
  - **Correct student behavior:** Student completes the action within 5 seconds of the SD
  - **Incorrect student behavior:** Student does not complete the action within 5 seconds of the SD OR student engages in any other response
  - **Tutor behavior**
    - **Correct student behavior:** Immediately deliver highly-preferred edible, tangible, and social praise
    - **Incorrect student behavior:** Implement scrolling protocol
    - **Student does not respond:** Use least-to-most prompting for the student to complete the action
  - **Phase change criteria:** 1 session at 80% or higher

- **Phase 2A**
  - **Tutor prompting:** Tutor provides model of the 1 second after delivering the SD
  - **Independent student behavior:** Student completes the action before the model is delivered
  - **Correct student behavior:** Student completes action within 5 seconds of the SD
  - **Incorrect student behavior:** Implement scrolling protocol
    - **Student does not respond:** Use least-to-most prompting for the student to complete the action
- **Tutor behavior**
  - **Independent student behavior:** Immediately provide double the reinforcement (2 pieces of edible, extra social praise, extended time with tangible)
  - **Correct student behavior:** Immediately provide highly-preferred edible, tangible, and social praise
  - **Incorrect student behavior:** Use least-to-most prompting for the student to complete the action

- **Phase change criteria:** 3 consecutive sessions at 80% or greater or 2 consecutive sessions at 90% or greater

- **Phase 2**
  - **Tutor prompting:** Tutor provides model of the action 2 seconds after delivering the $S^D$
  - **Independent student behavior:** Student completes the action before the model is delivered
  - **Correct student behavior:** Student completes action within 5 seconds of the $S^D$
  - **Incorrect student behavior:** Student engages in another behavior before the model is delivered (-) OR the student does not engage in the behavior within 5 seconds of the model (NR)
  - **Tutor behavior**
    - **Independent student behavior:** Immediately provide double the reinforcement (2 pieces of edible, extra social praise, extended time with tangible)
    - **Correct student behavior:** Immediately provide highly-preferred edible, tangible, and social praise
    - **Incorrect student behavior:** Implement scrolling protocol
    - **Student does not respond:** Use least-to-most prompting for the student to complete the action

- **Phase change criteria:** 3 consecutive sessions at 80% or greater or 2 consecutive sessions at 90% or greater

- **Phase 3**
  - **Tutor prompting:** Tutor provides model of the action 4 seconds after delivering the $S^D$
  - **Independent student behavior:** Student completes the action before the model is delivered
  - **Correct student behavior:** Student completes action within 5 seconds of the $S^D$
  - **Incorrect student behavior:** Implement scrolling protocol
  - **Student does not respond:** Use least-to-most prompting for the student to complete the action
  - **Tutor behavior**
    - **Independent student behavior:** Immediately provide double the reinforcement (2 pieces of edible, extra social praise, extended time with tangible)
Correct student behavior: Immediately provide highly-preferred edible, tangible, and social praise
Incorrect student behavior: Implement scrolling protocol
Student does not respond: Use least-to-most prompting for the student to complete the action

Phase change criteria: 3 consecutive sessions at 80% or greater or 2 consecutive sessions at 90% or greater

Phase 4

Tutor prompting: Tutor provides model of the action 6 seconds after delivering the S^D

Independent student behavior: Student completes the action before the model is delivered
Correct student behavior: Student completes action within 5 seconds of the S^D
Incorrect student behavior: Student engages in another behavior before the model is delivered (-) OR the student does not engage in the behavior within 5 seconds of the model (NR)

Tutor behavior

Independent student behavior: Immediately provide double the reinforcement (2 pieces of edible, extra social praise, extended time with tangible)
Correct student behavior: Immediately provide highly-preferred edible, tangible, and social praise
Incorrect student behavior: Implement scrolling protocol
Student does not respond: Use least-to-most prompting for the student to complete the action

Phase change criteria: 3 consecutive sessions at 80% or greater or 2 consecutive sessions at 90% or greater

Phase 5

Tutor prompting: no prompts should be delivered
Correct student behavior: Student completes the action within 5 seconds of the S^D
Incorrect student behavior: Student engages in another behavior before the model is delivered (-) OR the student does not engage in the behavior within 5 seconds of the model (NR)

Tutor behavior

Correct student behavior: Immediately provide highly-preferred edible, tangible, and social praise
Incorrect student behavior: Implement scrolling protocol
Student does not respond: Use least-to-most prompting for the student to complete the action

Phase change criteria: 3 consecutive sessions at 80% or greater or 2 consecutive sessions at 90% of greater
• **Phase 6**
  - Probe to determine if the child has generalized direction following. If the child does not pass the probe, start back on phase 1 with three new targets
### Target: Imitation
### Procedure: Manipulative Imitation

<table>
<thead>
<tr>
<th>Phase</th>
<th>Tutor Presentation/Preparation</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>Criteria for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time. Push the car = 5 trials Put the car on your head = 5 trials</td>
<td>Student imitates tutor model within 5 seconds of the second model. Deliver edible and social praise</td>
<td>Student does not imitate tutor model within 5 seconds of the second model.</td>
<td>80% or &gt; for 3 or 90% or &gt; for 2 consecutive sessions.</td>
</tr>
<tr>
<td></td>
<td>Important tutor note It is crucial that the child attends to the tutor’s model for each trial. Do not continue to deliver SDs if your child is not attending to the models. If you have trouble getting your child to attend, ask a supervisor for suggestions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time. Walk the horse = 5 trials</td>
<td>Student imitates tutor model within 5 seconds of the second model. Deliver edible and social praise</td>
<td>Student does not imitate tutor model within 5 seconds of the second model.</td>
<td>Repeat SD and follow the prompt hierarchy. 80% or &gt; for 3 or 90% or &gt; for 2 consecutive sessions.</td>
</tr>
<tr>
<td>Row</td>
<td>Task Description</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
| 3   | Raise the horse’s front legs = 5 trials  
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | 3 | 3 | Same as above. | Same as above. |
|     | Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action.  
Then, the tutor gives the child the corresponding object and models the action for the second time. | 3 | 3 | Same as above. | Same as above. |
|     | Hug the doll = 5 trials  
Kiss the doll = 5 trials  
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | 3 | 3 | Same as above. | Same as above. |
| 4   | Talk on the phone = 5 trials  
Push the buttons on the phone = 5 trials  
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | 4 | 4 | Same as above. | Same as above. |
| 5 | Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time.  
Jump the frog on the desk = 5 trials  
Put the frog on the booth wall = 5 trials  
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | Student imitates tutor model within 5 seconds of the second model. | Deliver edible and social praise | Student does not imitate tutor model within 5 seconds of the second model. | Repeat SD and follow the prompt hierarchy. | 80% or > for 3 or 90% or > for 2 consecutive sessions. |
|---|---|---|---|---|---|
| 6 | Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time.  
Drink from the cup = 5 trials  
Turn the cup upside down = 5 trials  
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | Same as above. | Same as above. | Same as above. | Same as above. | Same as above. |
| 7 | Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time. 
Pound the hammer on the desk = 5 trials 
Tap the hammer on the palm of your hand = 5 trials 
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | Same as above. | Same as above. | Same as above. | Same as above. | Same as above. |
|---|---|---|---|---|---|---|
| 8 | Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time. 
Put the hat on your head = 5 trials 
Put the hat on your stomach = 5 trials 
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | Student imitates tutor model within 5 seconds of the second model. | Deliver edible and social praise | Student does not imitate tutor model within 5 seconds of the second model. | Repeat SD and follow the prompt hierarchy. | 80% or > for 3 or 90% or > for 2 consecutive sessions. |
| 9 | Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time.  
“Read” the book (flip the pages) = 5 trials  
Tap your finger on the cover of the book = 5 trials  
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | Same as above. | Same as above. | Same as above. | Same as above. | Same as above. |
|---|---|---|---|---|---|
| 10 | Tutor sits across from student and establishes eye contact with student. Tutor says, “Do this” while simultaneously modeling the action. Then, the tutor gives the child the corresponding object and models the action for the second time.  
Stack the blocks vertically = 5 trials  
Place the blocks side-by-side = 5 trials  
Also, run about 5 trials of any previously mastered actions (don’t take data on these trials). | Same as above. | Same as above. | Same as above. | Same as above. | Same as above. |
| *** | TUTORS: As soon as phase 10 meets mastery criterion, inform a supervisor or TA that the child is ready to be tested for generalized manipulative imitation, and move on to the M/C phase, listed below.  
SUPERVISORS: If the child meets criteria for generalized manipulative imitation, inform the teacher. If the child does not meet criteria for generalized manipulative imitation, inform the teacher that Man IM List #2 may be needed. | | | | | |
<p>| M/C | Following mastery of phase 10, continue to run this procedure whenever it appears in your child’s schedule. Run ten trials of any previously mastered item/action combinations, recording data on all trials. | Same as above. | Same as above. | Same as above. | Same as above. | N/A |</p>
<table>
<thead>
<tr>
<th>Phase</th>
<th>Tutor Presentation/SD</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>No Response</th>
<th>Mastery Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Student</strong></td>
<td><strong>Tutor</strong></td>
<td><strong>Student</strong></td>
<td><strong>Tutor</strong></td>
</tr>
<tr>
<td>1</td>
<td>Tutor sits facing student and establishes eye contact with the student Tutor says “duh” or “ahh” Randomly rotate between the two sounds (5 trials of each sound) Mark d or a in target column</td>
<td>Student imitates sound within 5 seconds of SD (+)</td>
<td>Immediately delivers edible and 15-sec of video on iPad</td>
<td>Student makes any other sound (-)</td>
<td>Represent the SD up to 3 times (4 total presentations) If student responds to repeated SD, deliver 5-sec of video on iPad</td>
</tr>
<tr>
<td>2</td>
<td>Tutor sits facing student and establishes eye contact with the student Tutor randomly rotates between saying “duh”, “ahh”, or “buh” Run and take data on 10 trials of “buh” Mark b in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td></td>
<td>Tutor sits facing student and establishes eye contact with the student</td>
<td>Student imitates sound within 5 seconds of SD (+)</td>
<td>Immediatly delivers edible and 15-sec of video on iPad</td>
<td>Student makes any other sound (-)</td>
<td>Represent the SD up to 3 times (4 total presentations)</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>3</td>
<td>Tutor says “duh”, “ahh”, or “buh” Randomly rotate between sounds (take data on 10 trials) Mark d, a, or b in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td>4</td>
<td>Tutor sits facing student and establishes eye contact with the student Tutor randomly rotates between saying “duh”, “ahh”, “buh”, or “uh” Run and take data on 10 trials of “uh” Mark u in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td>4a</td>
<td>Tutor sits facing student and establishes eye contact with the student Tutor says “duh”, “ahh”, “buh”, or “uh”</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td>Randomly rotate between sounds (take data on 10 trials) Mark d, a, b, or, u in target column</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>Tutor sits facing student and establishes eye contact with the student Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh” or “oh” Run and take data on 10 trials of “oh” Mark o in target column</td>
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<tr>
<td></td>
<td>Student imitates sound within 5 seconds of SD (+)</td>
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<tr>
<td></td>
<td>Immediately delivers edible and 15-sec of video on iPad</td>
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<tr>
<td></td>
<td>Student makes any other sound (-)</td>
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<tr>
<td></td>
<td>Represent the SD up to 3 times (4 total presentations) If student responds to repeated SD, deliver 5-sec of video on iPad</td>
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<tr>
<td></td>
<td>Student does not imitate sound within 5 seconds of SD (NR)</td>
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<tr>
<td></td>
<td>Represent the SD up to 3 times (4 total presentations) If student responds to repeated SD, deliver 5-sec of video on iPad</td>
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<tr>
<td></td>
<td>80% or greater for 3 consecutive sessions or 90% or greater for 2 consecutive sessions</td>
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<tr>
<td>6</td>
<td>Tutor sits facing student and establishes eye contact with student Tutor says “duh”, “ahh”, “buh”, “uh”, or “oh” Randomly rotate between</td>
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<td></td>
<td>Same as above</td>
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<td>Same as above</td>
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<tr>
<td>7</td>
<td>Tutor sits facing student and establishes eye contact with the student. Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh”, ‘oh’ or “puh”. Run and take data on 10 trials of “puh”. Mark p in target column.</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
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</tr>
<tr>
<td>8</td>
<td>Tutor sits facing student and establishes eye contact with student. Tutor says “duh”, “ahh”, “buh”, “uh”, “oh”, or “puh”. Randomly rotate between sounds (take data on 10 trials). Mark d, a, b, u, o, or p in target column.</td>
<td>Student imitates sound within 5 seconds of SD (+)</td>
<td>Immediately delivers edible and 15-sec of video on iPad</td>
<td>Student makes any other sound (-)</td>
<td>Represent the SD up to 3 times (4 total presentations) If student responds to repeated SD, deliver 5-sec of video on iPad</td>
</tr>
<tr>
<td>9</td>
<td>Tutor sits facing student and establishes eye contact with the student.</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td></td>
<td>Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh”, “oh”, “puh” or “eee” Run and take data on 10 trials of “eee” Mark e in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
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</tr>
<tr>
<td>10</td>
<td>Tutor sits facing student and establishes eye contact with student Tutor says “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, or “eee” Randomly rotate between sounds (take data on 10 trials) Mark d, a, b, u, o, p, or e in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td></td>
<td>Student imitates sound within 5 seconds of SD (+)</td>
<td>Immediately delivers edible and 15-sec of video on iPad</td>
<td>Student makes any other sound (-)</td>
<td>Represent the SD up to 3 times (4 total presentations) If student responds to repeated SD, deliver 5-sec of</td>
<td>Student does not imitate sound within 5 seconds of SD (NR)</td>
</tr>
<tr>
<td>11</td>
<td>Tutor sits facing student and establishes eye contact with the student Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee” or “mmm” Run and take data on 10 trials of “duh” Mark m in target column</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tutor sits facing student and establishes eye contact with student</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
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</tr>
<tr>
<td>12</td>
<td>Tutor says “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee”, or “mmm” Randomly rotate between sounds (take data on 10 trials) Mark d, a, b, u, o, p, e, or m in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td>13</td>
<td>Tutor sits facing student and establishes eye contact with the student Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee”, “mmm” or “huh” Run and take data on 10 trials of “huh” Mark h in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
</tbody>
</table>
| 14 | Tutor sits facing student and establishes eye contact with student Tutor says “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee”, “mmm”, or “huh” Student imitates sound within 5 seconds of SD (+) Immediately delivers edible and 15-sec of video on Student makes any other sound (-) Represent the SD up to 3 times (4 total presentations) Student does not imitate sound within 5 seconds Represent the SD up to 3 times (4 total presentations) 80% or greater for 3 consecutive sessions or 90% or greater for 2
<table>
<thead>
<tr>
<th></th>
<th>Tutor sits facing student and establishes eye contact with the student Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee”, “mmm”, “huh” or “wuh” Run and take data on 10 trials of “wuh” Mark w in target column</th>
<th>Same as above</th>
<th>Same as above</th>
<th>Same as above</th>
<th>Same as above</th>
<th>Same as above</th>
<th>Same as above</th>
<th>consecutive sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Tutor sits facing student and establishes eye contact with student Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee”, “mmm”, “huh” or “wuh” Run and take data on 10 trials of “wuh” Mark w in target column</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
<tr>
<td>16</td>
<td>Tutor sits facing student and establishes eye contact with student Tutor says “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee”, “mmm”, “huh”, or “wuh” Randomly rotate between sounds (take data on 10 trials)</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
</tbody>
</table>
New tutor sits facing student and establishes eye contact with student. Tutor randomly rotates between saying “duh”, “ahh”, “buh”, “uh”, “oh”, “puh”, “eee”, “mmm”, “huh”, or “wuh”. Mark d, a, b, u, o, p, e, m, h, or w in target column.

<table>
<thead>
<tr>
<th>17</th>
<th>Student imitates sound within 5 seconds of SD (+)</th>
<th>Student makes any other sound (-)</th>
<th>Represent the SD up to 3 times (4 total presentations)</th>
<th>Represent the SD up to 3 times (4 total presentations)</th>
<th>80% or greater for 3 consecutive sessions with 3 different tutors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Immediately delivers edible and 15-sec of video on iPad</td>
<td>If student responds to repeated SD, deliver 5-sec of video on iPad</td>
<td>If student responds to repeated SD, deliver 5-sec of video on iPad</td>
<td>If student responds to repeated SD, deliver 5-sec of video on iPad</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C

Tier 3c: Berkley’s Tier 3c Treatment Overview
## Tier 3c Overview

<table>
<thead>
<tr>
<th>Target Area and Procedure Name</th>
<th>Therapeutic Target</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attending Behaviors</strong></td>
<td>Student will make eye contact with adult with 5s of the removal of a toy reinforcer, consumption of an edible reinforcer, and after completing an assigned task. Modified from Fonger (2017).</td>
<td>Mastered. Generalization and maintenance recorded. No further action.</td>
</tr>
<tr>
<td><strong>Auditory Discrimination</strong></td>
<td>Within 5s of hearing a programmed sound, student will select button with the corresponding picture. Modified from Lichtenberger (2016).</td>
<td>Not mastered. This was a prerequisite skill for basic instruction following. Basic instruction following was probed at the end of the procedure and it was determined that he had the needed prerequisite skills for the procedure despite not formally mastering this auditory discrimination procedure.</td>
</tr>
<tr>
<td><strong>Manding – Stimulus-Stimulus Pairing</strong></td>
<td>Student would independently and vocally mand for the targeted item when shown. Modified from Daigle (2017).</td>
<td>Mastered. No generalization and no maintenance data were recorded.</td>
</tr>
<tr>
<td><strong>Icon Exchange</strong></td>
<td>Student will independently exchange an icon representing a desired item.</td>
<td>Mastered. Generalization and maintenance recorded. No further action.</td>
</tr>
</tbody>
</table>
### Procedure Details

**Physical Imitation**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Tutor Presentation/Preparation</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>Criteria for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tutor should ensure booth is clear from any toys or clutter. They should then obtain student’s attention and motivation. The tutor should then say, “Do This” while providing a model for a targeted response. The model should continue for the entire 5 seconds or until the student engages in the correct response. Instruction should NOT be repeated during that 5 second model. Randomly rotate between the <strong>CLAP HANDS, STOMP FEET, PAT STOMACH, WAVE, POINT.</strong></td>
<td>Student imitates model within 5 seconds of verbal S⁰ and onset of model.</td>
<td>Student does not imitate model within 5 seconds of verbal S⁰ and onset of model.</td>
<td>Repeat S⁰ and restart model up to three times as needed. Small piece of chip should be offered if he complied with any request. If he does not respond to any of the models, turn away for 5 seconds.</td>
</tr>
<tr>
<td>2</td>
<td>Same as above; except, Randomly rotate between the OPEN/CLOSE MOUTH, LIFT ONE LEG (SEATED OR STANDING), SHAKE HEAD (SIDE-TO-SIDE), SHAKE HEAD (UP &amp; DOWN), HUG SELF</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
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</tr>
<tr>
<td>3</td>
<td>Same as above; except, Choose targets at <em>random</em>. They should not be previously listed targets. No target should be repeated during this phase. Some ideas to help you think of targets: 1) Arm and Finger Placement 2) Motions that cross the “center line” of the body 3) Facial imitation 4) Leg, body, and trunk imitation 5) Wrist, hip, knee, and neck movements</td>
<td>Student imitates model within 5 seconds of verbal S° and onset of model.</td>
<td>Provide a large piece of chip.</td>
<td>Student does not imitate model within 5 seconds of verbal S° and onset of model.</td>
</tr>
<tr>
<td>4</td>
<td>Conduct Physical Imitation Generalization Test and Observe to see if imitation occurs naturally (if it is maintained by a behavior trap)</td>
<td>Same as above</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
</tbody>
</table>
## Procedure Details
### Attending Behaviors

<table>
<thead>
<tr>
<th>Pupil:</th>
<th>Teacher: MN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Procedure Writer: JM/JS/CC</td>
</tr>
<tr>
<td></td>
<td>Date Written: 07/10/13, Rev: 09/2017</td>
</tr>
</tbody>
</table>

### IEPC Goal:
Student will look at tutor upon completion of a response/task, the removal of the reinforcer, or ending an activity (consumption of edibles or playing w iPad), and engage in eye contact for duration of 3 seconds.

### Objective:
Acquisition of spontaneous eye contact – Please pay attention to correct and incorrect pupil criteria

### Materials:
Highly preferred reinforcer(s) & a timer

### Notes:
- It’s okay to wait the entire 5-min session without delivering a reinforcer. DO NOT PROMPT EYE CONTACT. If the child isn’t reaching or looking for the item, stop the timer, do a preference assessment, and then continue the session.

### Reinforcer:
See student’s reinforcers list. Do a preference assessment prior to beginning a session. Pair socials with tangible and edible reinforcers.

### Data collection:
5 minute sessions: ~20 trials, (+) for correct and (-) for incorrect. Support coordinators may adjust amount of time or trials. See specific data sheets.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Tutor Presentation/Preparation</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>Criteria for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pupil Behavior</td>
<td>Tutor Behavior</td>
<td>Pupil Behavior</td>
<td>Tutor Behavior</td>
</tr>
<tr>
<td>1</td>
<td>1. Tutor removes all unnecessary items from the booth. 2. The tutor sits across from student at the desk and does a preference assessment for both an edible and a toy. Tutor allows the student to play with the toy for within 5 seconds of the</td>
<td>Student establishes eye contact once (for 1 full second) with tutor</td>
<td>After the third instance of eye contact (1 full second) occurs within 5 seconds from completing HP-</td>
<td>Student establishes eye contact with tutor after 5 seconds of reinforcer removal and/or Complete the eye contact → HP-ELO → eye contact → HP-ELO → eye contact sequence, and</td>
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<tr>
<td>10-15 seconds.</td>
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<tr>
<td>3. Tutor starts the timer for 5 min and then removes the toy gently (without saying anything), and maintains eye contact with student until they <strong>establish eye contact for 1 full second</strong>.</td>
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<tr>
<td>4. Tutor immediately presents a <strong>High-Probability ELO</strong> (HP-ELO) (ex. High-five, tap table, wave, etc.).</td>
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<tr>
<td>5. Tutor waits for the child to <strong>establish eye contact for 1 full second again</strong>, for a second time.</td>
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</tr>
<tr>
<td>6. Tutor immediately presents a <strong>High-Probability ELO</strong> (HP-ELO) (ex. High-five, tap table, wave, etc.).</td>
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<tr>
<td>7. Tutor waits for the child to <strong>establish eye contact for 1 full second again</strong>, for a third time.</td>
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</tbody>
</table>

Tutor prompts the student back to the chair or quiet hands if necessary. If the child is not establishing eye contact and is not reaching or looking for the item, stop the timer and perform a preference assessment. Tutor does not use any prompts to get eye contact (DO NOT: get in the child’s face, use a toy to get them to look, block looking at anything else).

<table>
<thead>
<tr>
<th>preferred item removed <strong>AND</strong> eye contact a <strong>second time</strong>, (for 1 full second) after completing the HP-ELO, <strong>AND</strong> eye contact a <strong>third time</strong>, (for 1 full second) after completing a second HP-ELO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELO, in addition to the entire sequence, immediately provide simple social praise (“good job”) and deliver the tangible/edible reinforcer to student.</td>
</tr>
<tr>
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<tr>
<td>completion of the HP-ELO.</td>
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</tr>
<tr>
<td>*Be sure to wait for eye contact to occur then immediately deliver the toy and mark trial as incorrect (-).</td>
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<tr>
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<tr>
<td>Allow up to 5 seconds of manipulation.</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>20 sessions without a phase change, or 10 sessions with 0% correct.]</td>
</tr>
</tbody>
</table>
1. Tutor removes all unnecessary items from the booth.
2. The tutor sits across from student at the desk and does a preference assessment for both an edible and a toy. Tutor allows the student to play with the toy for 10-15 seconds.
3. Tutor starts the timer for 5 min and then removes the toy gently (without saying anything), and maintains eye contact with student until they establish eye contact for 1 full second.
4. Tutor immediately presents a procedural task (one the child typically responds correctly on).
5. Tutor waits for the child to establish eye contact for 1 full second again, after reinforcing a correct response on the procedural task.

Tutor prompts the student back to the chair or quiet hands if necessary. If the child is not establishing eye contact and is not reaching or looking for the item, stop the timer and perform a preference assessment.

Tutor does not use any prompts to get eye contact (DO NOT: get in the child’s face, use a toy to get them to look, block looking at anything

<table>
<thead>
<tr>
<th>Student establishes eye contact once (for 1 full second) with tutor within 5 seconds of the preferred item removed AND eye contact a second time, (for 1 full second) after completing the procedure task and receiving the reinforcer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the student responds correctly to a procedural task, immediately provide social praise along with a highly-preferred edible reinforcer.</td>
</tr>
<tr>
<td>After the second instance of eye contact (1 full second) occurs within 5 seconds of consuming the edible reinforcer, immediately provide simple social praise (“good job”) and deliver the tangible reinforcer back to the student.</td>
</tr>
<tr>
<td>Complete the eye contact → procedure task → reinforcer → eye contact sequence, and then immediately deliver the toy and mark trial as incorrect (-).</td>
</tr>
</tbody>
</table>

*Be sure to wait for eye contact to occur

Allow up to 5 seconds of manipulation.

<table>
<thead>
<tr>
<th>80% or &gt; for 3, or 90% or &gt; for 2, consecutive sessions.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[WB criteria 20 sessions without a phase change, or 10 sessions with 0% correct.]</td>
</tr>
<tr>
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</tbody>
</table>
Tutor prompts the student back to the chair or quiet hands if necessary. If the child is not establishing eye contact and is not reaching or looking for the item, stop the timer and perform a preference assessment. Tutor does not use any prompts to get eye contact (DO NOT: get in the child’s face, use a toy to get them to look, block looking at anything else).

| required for a correct trial, for this phase (unless eye contact is maintained before, during, and after the task). | to the student. Allow up to 15 seconds of manipulation |

*Support coordinators, BCBAs, and classroom teachers: The eye contact procedure has a maintenance data sheet, which works on rotating through eye contact without additional demands and eye contact in between trials. Please use the Shaping Eye Contact Maintenance Data sheet after mastery of Phase 6 in Part 2.*
### Procedure Details
**Conditional Auditory Discrimination**

<table>
<thead>
<tr>
<th>Pupil:</th>
<th>Teacher: MN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Procedure Writer: JD</td>
</tr>
<tr>
<td></td>
<td>Date Written: 10/16/14, Rev: 09/2017</td>
</tr>
</tbody>
</table>

**Objective:**
Acquisition of conditional auditory discrimination

**Materials:**
Highly preferred reinforcer(s), five sound buttons and Ipad (or other sound recording device)

**Reinforcer:**
See student’s reinforcers list. Pair socials with tangible and edible reinforcers.

**Data collection:**
0 trials, + for correct, - for incorrect, i for independent, and NR for no response

<table>
<thead>
<tr>
<th>Phase</th>
<th>Tutor Presentation/Preparation</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>Criteria for Change</th>
</tr>
</thead>
</table>
| 1 Simple Aud. Disc. | Before conducting the session, the tutor should conduct a quick forced choice preference assessment with food items. The edible chosen should be used in this procedure. The session may be halted to conduct additional preference assessments as needed to maintain compliance. Booth should be clear from clutter and distractions. Student should be prompted to sit and face the table at around a 90 degree angle. Tutor should sit behind, and slightly to the right of the student for prompting. | **Pupil Behavior**
Student presses the button until an audible “click” is heard within 5 seconds of the sound ending. | **Tutor Behavior**
Provide the preferred edible. | **Pupil Behavior**
Student does not press the button until an audible “click” is heard with 5 seconds of the sound ending OR Student resist the prompt | **Tutor Behavior**
Tutor does nothing. 2 consecutive sessions where: 100% of trials are at independent level and student responds correctly 80% or more trials. |
A large button is placed on the table and a bluetooth speaker is placed behind the button. Periodically, a second tutor should place a neutral sound (e.g., a sound that is not produced by a specific animal or tool).

Tutor should immediately provide the prompt as needed. If the student gets the correct response twice on a given prompt level, fade down the list. If the student gets the incorrect response twice on a given prompt level, fade up the list.

1. Full Physical
2. Write
3. Forearm
4. Shoulder
5. Independent

<table>
<thead>
<tr>
<th>2</th>
<th>Cmpx Aud Disc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before conducting the session, the tutor should conduct a quick forced choice preference assessment with food items. The edible chosen should be used in this procedure. The session may be halted to conduct additional preference assessments as needed to maintain compliance.</td>
<td>Student presses the correct button until an audible “click” is heard within 5 seconds of the sound ending.</td>
</tr>
</tbody>
</table>
Booth should be clear from clutter and distractions. Student should be prompted to sit and face the table at around a 90 degree angle. Tutor should sit behind, and slightly to the right of the student for prompting.

Three large buttons with different colors should be placed in front of the student. Each button should feature a 2”x2” picture of a preferred item. Buttons and sounds should always be mathematically randomized (via the provided data sheet).

A second person should play the randomly selected sound through the speaker. Immediately after the sound, the tutor should immediately deliver the prescribed prompt level for that stimulus.

<table>
<thead>
<tr>
<th>2a Tighter Details</th>
<th>Student presses the correct button hard enough that an audible click is heard.</th>
<th>Tutor immediately delivers the highly preferred edible.</th>
<th>Student does not respond or presses the incorrect button hard enough that an audible click is heard.</th>
<th>Tutor should immediately place preferred edible to the side.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Student resist the prompt OR Student presses the incorrect button</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>stimulus.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Continue replaying the sound and moving into more invasive prompt levels until the correct response (appropriate to the prompt level) is achieved.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Once achieved, the tutor should deliver the preferred edible</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Before conducting the session, the tutor should conduct two quick forced choice preference assessment. One should be for food and one should be for tangibles. The edible and tangible chosen should be used in this procedure. The session may be halted to conduct additional evaluation and interventions as needed.
<table>
<thead>
<tr>
<th>preference assessments as needed to maintain compliance.</th>
<th>quiet hands using the least-intrusive prompt to be successful.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Booth should be clear from clutter and distractions. Student should be prompted to sit and face the table at around a 90 degree angle. Tutor should sit behind, and slightly to the right of the student for prompting.</td>
<td>Second person should replay the sound.</td>
</tr>
<tr>
<td>Three large buttons with different colors should be placed in front of the student. Each button should feature a 2”x2” picture of a preferred item. Buttons and sounds should always be mathematically randomized (via the provided data sheet). Tutor should ensure the position of the buttons and order of the sounds are presented exactly as prescribed by data sheet.</td>
<td>During or at the end of the sound, the tutor should provide the next most intrusive prompt level for that stimulus.</td>
</tr>
<tr>
<td>The tutor should hold the student’s most highly preferred edible in their right hand and say “Quiet Hands”. Tutor may prompt student into quiet hands position as needed.</td>
<td>Continue replaying the sound and moving into more invasive prompt levels until the correct response (appropriate to the prompt level) is achieved.</td>
</tr>
<tr>
<td>A second person should play the randomly selected sound through</td>
<td>Once achieved, the tutor should deliver a neutral “good” and the toy selected during the initial</td>
</tr>
</tbody>
</table>
the speaker while the tutor blocks students from engaging in any other behaviors. Two seconds after the sound is completed, the second person should play the sound once again.

During or immediately after the second sound, the tutor should remove their hands from blocking a response and immediately deliver the prescribed prompt level for that stimulus.

Before conducting the session, the tutor should conduct two quick forced choice preference assessment. One should be for food and one should be for tangibles. The edible and tangible chosen should be used in this procedure. The session may be halted to conduct additional preference assessments as needed to maintain compliance.

Booth should be clear from clutter and distractions. Student should be prompted to sit and face the table at around a 90 degree angle. Tutor should sit behind, and slightly to the right

| 2b Center Bias | Before conducting the session, the tutor should conduct two quick forced choice preference assessment. One should be for food and one should be for tangibles. The edible and tangible chosen should be used in this procedure. The session may be halted to conduct additional preference assessments as needed to maintain compliance. | Student presses the correct button hard enough that an audible click is heard. | Tutor immediately delivers the highly preferred edible. | Student does not respond or presses the incorrect button hard enough that an audible click is heard. | Tutor should immediately place preferred edible to the side. Without saying anything, tutor should immediately prompt student into quiet hands using the least-intrusive prompt to be successful. Second person should replay the sound. | 80% or higher for 3 consecutive 10-trial sessions across all three stimuli. |
of the student for prompting.

Three large buttons with different colors should be placed equidistance from the student. Each button should feature a 2”x2” picture of a preferred item. Buttons and sounds should always be mathematically randomized, but excluding the possibility of the center position holding the correct answer (via the provided data sheet). Tutor should ensure the position of the buttons and order of the sounds are presented exactly as prescribed by data sheet.

The tutor should hold the student’s most highly preferred edible in their right hand and say “Quiet Hands”. Tutor may prompt student into quiet hands position as needed.

A second person should play the randomly selected sound through the speaker while the tutor blocks students from engaging in any other behaviors. Two seconds after the sound is completed, the second person should play the sound once again.

During or at the end of the sound, the tutor should provide the next most intrusive prompt level for that stimulus.

Continue replaying the sound and moving into more invasive prompt levels until the correct response (appropriate to the prompt level) is achieved.

Once achieved, the tutor should deliver a neutral “good” and the toy selected during the initial preference assessment.
During or immediately after the second sound, the tutor should remove their hands from blocking a response and immediately deliver the prescribed prompt level for that stimulus.
# Procedure Details

**Manding – Stimulus-Stimulus Pairing**

<table>
<thead>
<tr>
<th>Pupil:</th>
<th>Teacher: Margaret</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Procedure Writer:</strong> CC</td>
</tr>
<tr>
<td></td>
<td><strong>Date Written:</strong> 09/24/17</td>
</tr>
</tbody>
</table>

**IEPC Goal:**
To increase and maintain the frequency of functional vocal mands

**Objective:**
To increase and maintain the frequency of functional vocal mands

**Reinforcer:**
See student’s reinforcer list.

**Data collection:**
5 consecutive model vocalizations = 1 pairing trial

<table>
<thead>
<tr>
<th>Phase</th>
<th>Tutor Presentation/Preparation</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
<th>Criteria for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pupil Behavior</td>
<td>Tutor Behavior</td>
<td>Pupil Behavior</td>
</tr>
<tr>
<td>1</td>
<td>Wait for child to demonstrate interest in an item/exchange icon for item. Once the child has made the exchange, hold up the reinforcer and model the target vocalization for a total of five consecutive times (e.g. “cookie,” “cookie,” “cookie,” “cookie,” “cookie”). The item should be simultaneously delivered on the third vocalization.</td>
<td>Child emits target vocalization at any time during which the tutor is modeling the target vocalization OR Child independently emits target vocalization outside the pairing trial</td>
<td>Immediately deliver the requested reinforcer and provide social praise Note: If child emits the correct vocalization more than once during the pairing trial, the item should be immediately delivered after each vocalization. Continue to say the</td>
<td>Child emits incorrect vocalization during pairing trial OR Child does not emit any response during pairing trial. Deliver item as specified during the third model and proceed with the next two vocalizations. For two sessions, if the total number of imitative of that target vocalization equaled at least 80% of the pairing trials, or if independent responses comprised more than 80% of the total number of responses, or a combination of both.</td>
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</tbody>
</table>
| **delivered in a neutral tone.**  
**Do not accept “duh” or “chip” as a vocalization.**  
***Record on data sheet whether child responded independently or during the pairing trial.** | **name of the item after it has been delivered.** |   |   |
| 2 | **Wait for child to demonstrate interest in an item/exchange icon for item. Once the child has made the exchange, hold up the reinforcer and **wait 2 seconds** before delivering target vocalization for a total of five consecutive times (e.g. “cookie,” “cookie,” “chip”). The item should be simultaneously delivered on the third vocalization.**  
*Item’s name should be delivered in a neutral tone  
**Do not accept “duh” or “chip” as a vocalization.**  
***Record on data sheet whether child responded independently or during the pairing trial.** | **Child emits target vocalization at any time during which the tutor is modeling the target vocalization**  
**OR**  
**Child independently emits target vocalization outside the pairing trial** | **Immediately deliver the requested reinforcer and provide social praise**  
**OR**  
**Note: If child emits the correct vocalization more than once during the pairing trial, the item should be immediately delivered after each vocalization. Continue to say the name of the item after it has been delivered.** |
|   | **Child emits incorrect vocalization during pairing trial**  
**OR**  
**Child does not emit any response during pairing trial.** |   | **Deliver item as specified during the third model and proceed with the next two vocalizations.** |
<p>|   | <em>Ignore all incorrect responses</em>* |   |   |
|   | For two sessions, if the total number of imitative of that target vocalization equaled at least 80% of the pairing trials, or if independent responses comprised more than 80% of the total number of responses, or a combination of both. |   |   |</p>
<table>
<thead>
<tr>
<th></th>
<th>independently or during the pairing trial.</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Wait for child to demonstrate interest in an item/exchange icon for item. Once the child has made the exchange, hold up the reinforcer and <strong>wait 4 seconds</strong> before delivering target vocalization for a total of five consecutive times (e.g. “cookie,” “cookie,” “cookie,” “cookie,” “cookie”). The item should be simultaneously delivered on the third vocalization. *Item’s name should be delivered in a neutral tone **Do not accept “duh” or “chip” as a vocalization. ***Record on data sheet whether child responded independently or during the pairing trial.</td>
<td>Same as above.</td>
<td>Same as above.</td>
<td>Same as above.</td>
</tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>Wait for child to demonstrate interest in an item/exchange icon for item. Once the child has made the exchange, hold up the reinforcer and <strong>wait</strong> Child emits target vocalization at any time during which the tutor is modeling the target vocalization</td>
<td>Child emits target vocalization</td>
<td>Immediately deliver the requested reinforcer and provide social praise</td>
<td>Child emits incorrect vocalization during pairing trial</td>
</tr>
</tbody>
</table>
5 seconds before delivering target vocalization for a total of five consecutive times (e.g. “cookie,” “cookie,” “cookie,” “cookie,” “cookie”). The item should be simultaneously delivered on the third vocalization.

*Item’s name should be delivered in a neutral tone

**Do not accept “duh” or “chip” as a vocalization.

***Record on data sheet whether child responded independently or during the pairing trial.

OR

Child independently emits target vocalization outside the pairing trial

Note: If child emits the correct vocalization more than once during the pairing trial, the item should be immediately delivered after each vocalization. Continue to say the name of the item after it has been delivered.

OR

Child does not emit any response during pairing trial.

*Ignore all incorrect responses

80% of the pairing trials, or if independent responses comprised more than 80% of the total number of responses, or a combination of both.

5

Wait for child to demonstrate interest in an item/exchange icon for item. Once the child has made the exchange, hold up the reinforcer and wait 8 seconds before delivering target vocalization for a total of five consecutive times (e.g. “cookie,” “cookie,” “cookie,” “cookie,” “cookie”). The item should be simultaneously
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>Wait for child to demonstrate interest in an item/exchange icon for item. Once the child has made the exchange, hold up the reinforcer and wait for the child to independently mand for the item. <strong>Do not provide any model of the target vocalization.</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Child independently emits target vocalization within 5 seconds of holding up the item OR Child independently mand for item at any time during the session.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immediately deliver the requested reinforcer and provide social praise</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Child emits incorrect vocalization OR Child does not emit correct response within 5 seconds of holding up the reinforcer</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|   | Provide a neutral good and proceed to next trial.  
*Ignore all incorrect responses* |
|   |   |
|   | For two sessions, the total number of independent responses comprised more than 80% of the total number of trials for that specific target. |

*Whistle-blow criteria: For two sessions, if the total number of imitative target vocalizations equaled less than 50% of the pairing trials, move target back to stimulus-stimulus pairing procedure.**Procedure Mastery Criterion: Will independently mand for a novel item after 5 pairing trials
### Procedure Details
#### Icon Exchange

<table>
<thead>
<tr>
<th><strong>Phase</strong></th>
<th><strong>Tutor Presentation/Preparation</strong></th>
<th><strong>Correct Response</strong></th>
<th><strong>Incorrect Response</strong></th>
<th><strong>Criteria for Change</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tutor clears booth of clutter or distraction. Tutor either offers a choice between two items or waits for student to attempt to grab an item. After student selects item, tutor withholds delivery of the item and places the corresponding icon between the tutor and the student. The tutor then waits 5 seconds for student to initiate exchange. If student attempts to grab item or if the 5</td>
<td>Student reaches towards icon, picks up icon, reaches towards tutor, and release icon into tutor’s open (or closed) hand.</td>
<td>Tutor holds up icon to the corresponding item and provides a verbal name for item. Tutor then delivers the item</td>
<td>Prompt only the response that has not occurred or in which the error was made.</td>
</tr>
</tbody>
</table>

#### Data collection:
- 10 trials (+) for correct and (-) for incorrect

**IEPC Goal:**  
**Objective:**  
**Materials:**  
**Reinforcer:** See reinforcer list  
**Teacher:**  
**Procedure Writer:**  
**Date Written:**  
**Revised Date:**
<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Tutor clears booth of clutter or distraction. Tutor either offers a choice between two items or waits for student to attempt to grab an item. After student selects item, tutor withholds delivery of the item and places the corresponding icon between the tutor and the student. Tutor provides prompt level specified by procedure. Procedures utilizes Most-to-Least within-session prompt fading. Begin prompting immediately at level 1. For every two consecutive correct responses at a prompt level, proceed to the next less-invasive prompt. For every two consecutive incorrect responses at a prompt level, increase the invasiveness of the prompt.</td>
</tr>
<tr>
<td>1</td>
<td>Full Physical Prompt</td>
</tr>
<tr>
<td>2</td>
<td>Partial Physical Prompt</td>
</tr>
<tr>
<td>3</td>
<td>Independent</td>
</tr>
</tbody>
</table>

| Student does not resist prompt (level 1 and 2) OR Student initiates towards icon within 5 seconds of icon being placed out (level 3) | Tutor holds up icon to the corresponding item and provides a verbal name for the item. Tutor then delivers the item. Tutor marks a “+” on the data sheet. (Note: Tutor should also mark a + in the main. Column if the student independently picks up, reaches, and releases icon) | Student resists prompt (level 1 and 2) OR Student does not initiate towards the icon within 5 seconds of icon being placed out (level 3) | Tutor turns away from student for 5 seconds and does not deliver the item. Begin a new trial after the 5 second delay. Tutor marks a “-“ on the data sheet. (Note: Tutor should also mark a - in the main. Column if the student does not independently pick up, reach, and release icon) | Student must independently reach towards the icon 80% of trials across 3 sessions or 90% of trials across 2 sessions. |
Appendix D

Graphing Alternatives
Graph Alternative. Each color within the graph represents the area of response for a particular tier. The blue area represents the area in which a typical Tier 3c student would appear. Orange represents Tier 3b and grey represents Tier 3a. The grey area is capped based on the highest performer on record. The average line presented on the other graphs throughout the manuscript would appear in the center of the orange area.
Appendix E

HSIRB Approval
Date: January 30, 2017

To: Richard Malott, Principal Investigator
    Justin Daigle, Student Investigator

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number 17-01-42

This letter will serve as confirmation that your research project titled “Complete Practitioner Model” has been approved under the exempt category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may only be conducted exactly in the form it was approved. You must seek specific board approval for any changes in this project (e.g., you must request a post approval change to enroll subjects beyond the number stated in your application under “Number of subjects you want to complete the study”). Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: January 29, 2018