EVALUATING THE EFFECTS OF DIFFERENT ERROR CORRECTION STRATEGIES WITHIN SIMULTANEOUS PROMPTING ON SKILL ACQUISITION IN A CHILD WITH DISABILITIES WHO HAS NO VOCAL REPERTOIRE

by

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(Under the Direction of Rachel Cagliani)

ABSTRACT

This study examined the effects of three error correction strategies: blocking, demonstration, and no response on acquisition of a receptive identification task with a high-tech speech generating device for one child with autism spectrum disorder and complex communication needs. Researchers evaluated the three responses to errors during discrete trial training with simultaneous prompting using an adapted alternating design. The results of this study provide some preliminary evidence that responding to errors with a demonstration or model may result in faster acquisition. There were no major differentiations in session duration for this task.

INDEX WORDS: blocking, demonstration, error correction, simultaneous prompting, discrete trial training

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CHAPTER 1

Introduction

Direct Instruction (DI) is a form of instruction that is explicit and focuses on students' individual success (Grossen, 2004; Fisher et al., 2011). Direct instruction focuses on the student making progress and acquiring skills at their own rate. The main goal is to eliminate challenges that are preventing underperforming students from catching up to their peers academically (Grossen, 2004). The participants are given clear and simple instructions to make learning more salient. Once individuals master certain concepts then very systematically, they are provided with more skills to build upon what they have already mastered. Direct instruction creates opportunities for generalization to occur by providing different sets of instructional materials (Fisher et al., 2011; Watkins & Slocum, 2004). For example, when teaching 1:1 correspondence instructor used pictures and different objects. Individuals with disabilities like autism spectrum disorder (ASD) can have more challenges with skills like reading comprehension than non-disabled students (Flores & Ganz, 2007). However, direct instruction is effective in increasing reading comprehension in children with ASD (Flores & Ganz, 2007).

Discrete trial training (DTT) is a teaching method that provides instruction in manageable amounts, it is simplified and includes an “SD, controlling prompt, response, and a consequence” to enrich learning (Kates-McElreath & Axelrod, 2006). DTT is a method that is used to teach various skills for people with disabilities in school and clinic settings. According to Smith (2001), DTT has many advantages including various opportunities for learning to occur, it can include rewards to keep participants motivated to learn, and the instructor can format the

sessions duration to accommodate each participant's needs and abilities. DTT combined with other strategies can aid children with disabilities to build up their skills and promote generalization (Smith, 2001).

There are many strategies used to prevent or decrease errors in learning. Errors can hinder the individual from making real progress. There could be many reasons why individuals make errors including motivation and skill acquisition (Skinner et al., 2005). Simultaneous prompting is a method that promotes errorless learning through probes and 0-s delay teaching trials (Gibson & Schuster, 1992). For the probe, the instructor or therapist provides instructions to the student and presents the materials. The student is given a certain amount of time to respond. The instructor will collect data on the first response provided by the student and these data are used to evaluate learning (Collins, 2022). After the task is probed, teaching trials are conducted with the target. During the teaching trial, the instructor provides the same instruction and immediately prompts the correct response with the identified controlling prompt (Collins, 2022). This prevents the student from engaging in an error and assures an opportunity to practice correct responding. There is no established recommended number of teaching trials for students to complete for simultaneous prompting to be effective. Scheduling, time per session, and schedule of reinforcements are important considerations when choosing the amount of teaching trials to conduct. Birkin (2005) evaluated the use of simultaneous prompting with three different tasks with three different participants. Within this study, Birkin (2005) completed two teaching trials with one participant and three teaching trials for the other two participants. The findings of Birkin (2005) were that simultaneous prompting was effective for all participants. According to Morse and Schuster (2004), simultaneous prompting has been shown to be effective in skill acquisition for children and adults of various ages and different disabilities. This prompting

method can also be used to teach various tasks including vocational tasks (Collins et al., 2017), academic tasks (Singleton et al., 1996), and leisure tasks (Colozzi et al., 2008; Waugh et al., 2011).

Cariveau et al. (2019), provided an overview of commonly used error correction strategies that are effective when teaching children with developmental disabilities. This study focused on the error correction strategies demonstration, no response, and interruption of errors also known as blocking. According to Cariveau et al. (2019), the demonstration strategy, modeling the correct response following an error, was shown to be the most efficient when compared to other methods like active student response (ASR) and remove and represent. This method led to fewer errors and was more effective for more participants. Another error correction strategy is blocking or preventing errors before they occur. Norman et al. (2001) showed the use of video modeling, prompting, constant time delay, and interruption of errors to be effective in teaching functional skills to children with disabilities. Interruption of errors can be achieved by physically removing incorrect materials or by physically moving a person's hand before they engage in the incorrect response. Another approach is providing no response when errors occur.

The purpose of this study is to extend the research by (Cariveau et al., 2019; Kodak et al., 2016) by evaluating the effects of different error correction strategies on skill acquisition. Many studies have been completed with children who have some vocal repertoire but there is a lack in the research with participants whose primary mode of communication is using an AAC device to complete a receptive identification task. This study looks to answer the question. What are the effects of using error correction strategies demonstration, blocking, and no response on skill acquisition on a child with disabilities with no vocal repertoire?

CHAPTER 2

Method

Participants and Setting

To be included in this study, participants had to show no knowledge in the subject being taught, have experience using a receptive identification procedure, ability to imitate and a formal eligibility of a disability. Participants were excluded if they did not meet all the above requirements. One student, Dawson participated in the study. Dawson was an 8-year-old male with an eligibility of autism spectrum disorder (ASD) and a speech-language impairment. Dawson communicated with a high-tech speech-generating device (SGD). Dawson's parents gave him permission to participate in this research project through the university institutional review board consent process.

This study took place in a self-contained elementary classroom in the southeast United States. There was a certified teacher and six other professionals in the classroom who were master students at the university. The main purpose of the classroom was to provide support in intensive communication and challenging behaviors. The sessions took place in the back of an approximately 9 m x 4.5 m classroom at a rectangular table with two chairs right next to each other, one for therapist and one for the student.

Materials

Materials needed for this study were the student's SGD device and white index cards with twenty pictures of target animals. The pictures of the animals were glued to the index cards and laminated. The pictures did not have any background and only contained the picture of the

animal. One page on the AAC device was used to display all the target and distractor animals' names with no pictures. Target animals where animals that data were collected on and were being taught. Distractor animals were animals that were not being taught or probed, they were used to help account for side biases, attending, and stimulus control. They were scattered on the page randomly.

The animals were grouped into four different groups. Group A was assigned the control condition, Group B the blocking condition, Group C the demonstration condition, and Group D the no response condition. The order of conditions was randomized using block randomization every day for each session. For group A, the target animals consisted of small insects. They were bee, bat, beetle, butterfly, and ladybug. For group B, the target animals consisted of animals that live in the ocean. They were whale, walrus, dolphin, seal, and shark. For group C, the target animals consisted of safari animals. They were tiger, zebra, goat, horse, and giraffe. For group D, the target animals consisted of two legged animals. They were flamingo, duck, dove, kangaroo, and penguin. The distractor animals were dragon fly, wasp, flea, spider, moth, squid, sea horse, fish, sea lion, manatee, elephant, fox, cheetah, bison, hippopotamus, ostrich, bear, owl, turkey, and peacock.

Procedures

Simultaneous prompting consisted of probes and teaching trials. For the probe, instructors presented the materials and provided the corresponding instruction. For correct responses, the teachers responded with praise. For incorrect responses, the teacher's response varied across conditions. For the teaching trial, the therapist pulled up the animals' page on Dawson's device. The therapist held a picture of a target animal and provided the SD "What animal is this?" and immediately or within 0s touched the correct response. The therapist

repeated these steps with a new target until all targets were taught. Once all targets were taught an edible reinforcer was provided. For the blocking, demonstration, and no response conditions, two teaching trials were administered following the completion of the probe.

Baseline

In this condition, the therapist pulled up the animals' page on his device and started the timer. The therapist held a picture of a target animal and provided the SD "What animal is this?" If the participant touched the correct or incorrect word on his device the therapist provided neutral praise "nice job working". This was repeated until all targets were probed and then the therapist stopped the timer.

Demonstration Condition

The demonstration condition was modeled after Kodak et al. (2016). For the probe, the therapist pulled up the animal page on Dawson's device and started the timer. The therapist held a picture of a target animal and provided the SD "What animal is this?" If the participant touched the correct response, praise was provided. If they touched the incorrect response, the therapist stated neutral praise and touched the correct word. For example, "nice job working but this is tiger." The therapist then waited five seconds. Within those five seconds, if the participant touched the correct word, the teacher provided praise and if they did not touch the correct word the therapist moved on to presenting the next target. When all the targets were probed, the therapist stopped the timer and provided access to preferred items and food items.

Blocking Condition

For this condition, the therapist pulled up the animals' page on Dawson's device and started the timer. The therapist held a picture of a target animal and provided the SD "What animal is this?" If the participant touched the correct response praise was provided. If they

attempted to touch the incorrect response, the therapist would use their hand to block the incorrect responses on the device. The therapist did not block the learner's hand but blocked the word from being touched. The therapist then moved on to presenting the next target. When all the targets were probed, the therapist stopped the timer and provided access to preferred items and food items.

No Response Condition

The purpose of the no response condition was to examine the effects when instruction was provided but not error correction. For the probe, the therapist pulled up the animals' page on Dawson's device and started the timer. The therapist held a picture of a target animal and provided the SD "What animal is this?" If the participant touched the correct response praise was provided. If they touched the incorrect response, the therapist stated neutral praise and moved on to probe the next target. When all the targets were probed, the therapist stopped the timer and provided access to preferred items and food items.

Control Condition

The purpose of the control condition was to serve as a baseline (Ledford & Gast, 2018). The control condition was used to compare the effectiveness of the other interventions. In this study, a control condition was needed to demonstrate that the learning occurring was due to the intervention and no other variables. For the probe, the therapist pulled up the animals' page on Dawson's device and started the timer. The therapist held a picture of a target animal and provided the SD "What animal is this?" If the participant touched the correct response praise was provided. If they touched the incorrect response, the therapist stated neutral praise and moved on to probe the next target. When all the targets were probed, the therapist stopped the timer and

provided access to preferred items and food items. No teaching trials were conducted for this condition.

Interobserver Agreement (IOA)

Exact agreement IOA was taken for skill acquisition. Exact agreement was recorded for 50% of baseline sessions and 46% of intervention sessions. Exact agreement for baseline and intervention was 100%. Total duration IOA was taken for session duration. Total duration IOA was recorded for 50% of baseline sessions and 46% of intervention sessions. The total duration IOA for baseline was 100% and 99.9% for intervention.

Procedural Fidelity

Procedural fidelity was recorded for 50% of baseline sessions and 39% of intervention sessions. It was 90% across baseline sessions and 100% across intervention sessions.

Dependent Variables

The primary dependent variables of this study were percent correct and session duration. Percent correct was calculated by dividing the number of targets answered correctly by the total targets and multiplying by 100 for each group. Session duration was defined as the time between when the first target was presented, and the last response was recorded. Also, targets mastered and trials to criterion were evaluated. Targets mastered was defined as the targets with correct responses for three consecutive sessions and this was measured using count. Trials to criterion were defined as sessions needed to achieve mastery for a target and this was measured using count.

Research Design

Researchers evaluated the effects of three responses to errors, demonstration, no response and blocking on skill acquisition and session duration in the context of an adapted-alternating

treatments design (Ledford & Gast, 2018). An adapted-alternating treatment design allows researchers and practitioners to compare different treatments to irreversible behaviors in different groups like academics and vocational tasks (Ledford & Gast, 2018). The sessions were randomized using block randomization which allowed the control of unaccounted treatment effects (Efird, 2011).

CHAPTER 3

Results

The results are presented in Figure 1 for percent correct and Figure 2 for session duration. The demonstration condition reached 100% correct faster than blocking and no response. The demonstration condition took 28 sessions to reach 100% correct responding while blocking and extinction never reached 100% correct. The demonstration condition showed high variability in responding while the blocking condition showed low variability. The blocking condition took 31 sessions to reach 60% correct and overall skill acquisition was between 20% and 40% correct. The data path in the blocking condition showed an increasing trend. The no response and control conditions showed low variability, and both showed low levels of skill acquisition.

Session Duration

The demonstration condition took the longest time, an average of 94.2 s to complete. The no response condition took an average of 60.7 s to complete, and the blocking condition took 76.6 s. There was a difference of 17.6 s between the demonstration and blocking conditions.

Targets Mastered and Trials to Criterion

In the blocking condition, two target animals (seal and shark) met mastery criteria. It took 13 sessions for seal to be mastered and 30 sessions for shark. In the demonstration condition, the target animal (zebra and tiger) met mastery criteria. It took 16 sessions for zebra to be mastered and 30 sessions for tiger. Both conditions mastered two targets, the demonstration condition took three more sessions than blocking to master out the first target. Also, both second mastered targets for both conditions were mastered on the same session. A three-session difference is not a

notable difference. However, the demonstration condition showed a major difference in percentage of skill acquisition overall making it more effective.

CHAPTER 4

Discussion

The purpose of this study was to evaluate the effects of error correction strategies blocking, demonstration, and no response during simultaneous prompting probes on skill acquisition. The participant's data showed a higher percentage of correct responding in the demonstration condition suggesting that it is more effective for skill acquisition. The demonstration sessions took an average of 18 s more to complete. Both demonstration and blocking conditions resulted in the mastery of two targets and the trials to criterion for these targets showed no major differentiation. Since no learning occurred in the no response and control conditions, researchers concluded that the changes observed in the demonstration condition were result of the intervention. Overall, the data suggests that the demonstration error correction strategy which models correct responses results is more effective than blocking and no response.

This study further corroborates the results of the studies by (Kodak et al., 2016; Cariveau et al., 2019) which indicated that the demonstration condition was the most effective error correction strategy when compared to others. This study extended the research by showing that demonstration can also be effective for another population of participants, those who use alternative methods of communication. The tasks and materials used in this study were also different than most materials and tasks observed in the common research.

Limitations

The first limitation in the intervention was the placement of the words on the device. All the names of the animals remained in the same place on the same page. This could have led to faulty stimulus control since the participant could have memorized the position of the words on the page. Further, the picture of the animal might be under the stimulus control of the location of the word and not the word or name of the specific animal. The second limitation in Dawson's intervention was that the demonstration method was the method used in the classroom. Therefore, Dawson had a stronger learning history with this method at the time of the study. More experience could account for the higher performance.

One observation and a possible third limitation was that Dawson seemed to develop a preference for certain animals both in the blocking and demonstration conditions. The participant started manding for certain animals outside of the study. This could suggest that the reason these animals were mastered were not because of the error correction strategies but because the participant preferred some target animals over others. The last limitation was that this study did not program for generalization or maintenance of target animals mastered. There was no data suggesting that the skills learned were maintained over time. Additionally, due to time constraints the researchers were unable to replicate the demonstration condition to the control condition.

Future Research Studies

Future studies should continue to evaluate error correction strategies with receptive identification tasks. They can continue to extend the research by examining various skills and tasks on an AAC device and accounting for the position of the items. They can also program for maintenance by probing targets at two and four weeks after mastery.

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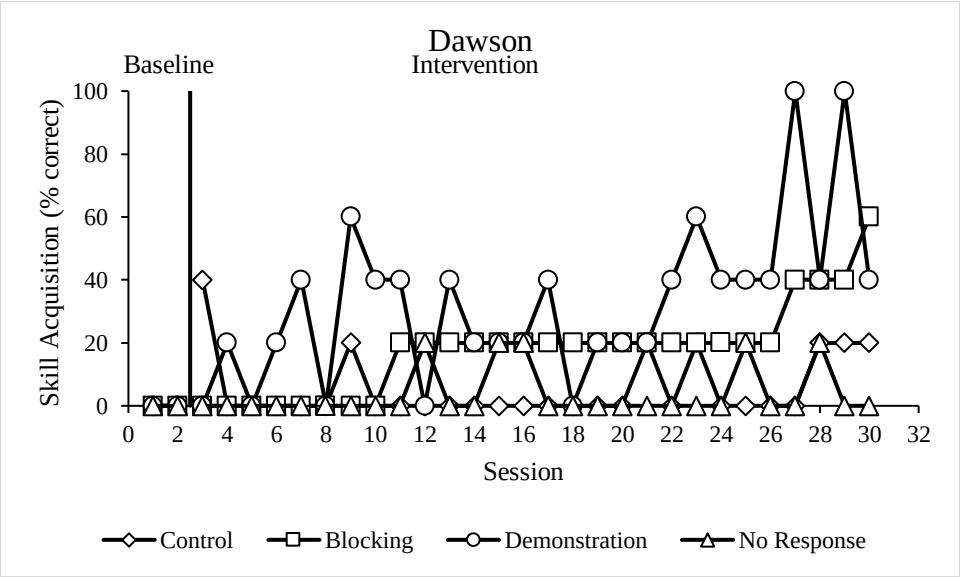

Figure 1. Percentage of correct responses across all conditions for Dawson.

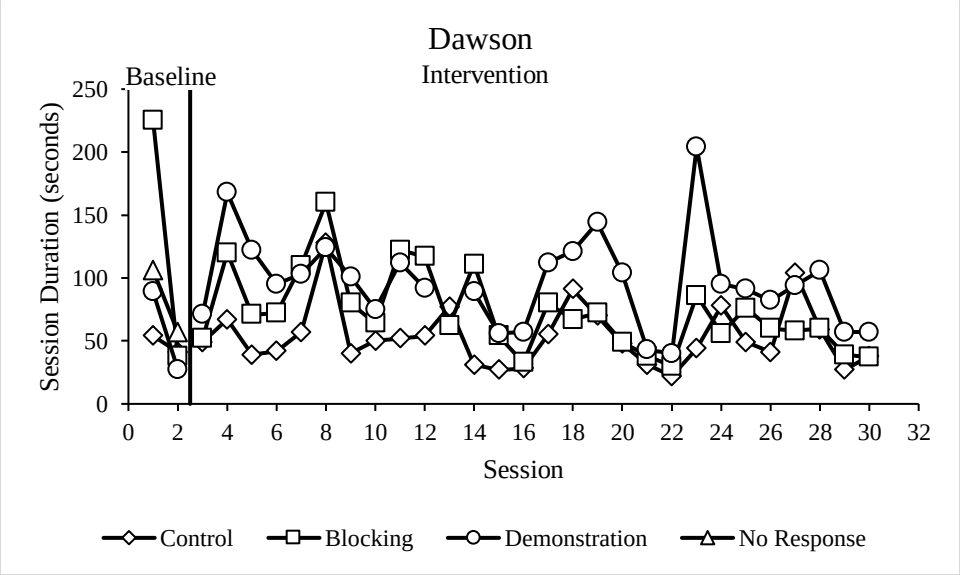

Figure 2. Session duration in seconds across all conditions for Dawson.