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Using Programmed Prompting Phases to Increase Motor-Imitation Skills

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by

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DEDICATION

I dedicate this manuscript to my family who has provided me with more support and encouragement than ever imaginable. Their confidence in me has given me the courage to chase after my dreams without hesitation.

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ABSTRACT

Children with ASD often display deficits in imitative skills in comparison to neurotypical children and age-liked peers. Acquiring motor-imitation skills allow individuals to learn a variety of other skills through attending and observing others in their environment. In this study, a programmed prompting sequence with two prompters was used to teach motor imitation skills in a child with autism spectrum disorder (ASD). The results exhibit the use of programmed prompting with two therapists increased the acquisition of motor imitation.

INTRODUCTION

Children with disabilities (e.g., ASD) often display deficits in imitative behavior in comparison to their neurotypical peers (Williams et al., 2004). Imitative skills serve as behavior cusps for various skills and have been proven to generalize to other social skills (Baer et al., 1967; Garcia et al., 1971; Rosalez-Ruiz & Baer, 1997). Once learned, they can use the skill to learn further skills (e.g., allowing model prompts to be successful). Some specific skills that can be acquired through imitative skills include independent living tasks (e.g., washing hands, vacuuming, etc.) and social functioning (e.g., functional play, expressing emotions, etc.). Imitation is not only a skill utilized by clinicians, but also by any adults the individuals observe in their everyday lives (Vivanti et al., 2014). As behavior analytic researchers and clinicians focus on teaching imitative skills, they have utilized various interventions.

One example of an effective program for teaching imitative skills is discrete-trial training. A typical application of this approach is for a therapist to present a modeled discriminative stimulus (S^D) paired with the vocal instruction to imitate (e.g., "do this," "copy me," etc.). Their continued procedures are dependent on the learners' responses. One limitation to this procedure is the need for the therapist to physically prompt correct responses. By doing so, the initial modeled prompt (i.e., S^D) is discontinued. This may make the pairing of the S^D with the correct imitated response difficult to achieve (Deshais et al., 2020).

Therefore, previous researchers have assessed the efficacy of various teaching strategies for teaching motor imitation by picking a procedure based on the skill deficits inhibiting the acquisition of imitation. Valentino et al. (2018) used a preassessment to evaluate each participant's level of attending and delayed imitation skills. Following the results of the pre-assessment, they designed three interventions for motor imitation skills, which included salient stimulus (i.e., incorporating novel objects to the motor imitation skill), secondary prompting, and least-to-most prompting. They targeted motor imitation skills both with and without the use of objects. They determined which participants' weaknesses were attending to others and which were responding to delays. They used the salient stimulus prompts with the participant whose deficit was in attending, and the results indicated the quickest acquisition of the skill occurred within that condition. For the participant whose deficit was in the delay, they utilized a secondary prompter. In this secondary prompter condition, the primary prompter continued modeling the correct response as the secondary prompter provided the series of physical prompts. Results for this participant also exhibited the greatest success (i.e., fewest trials to reach mastery criterion) during the deficit-correlated intervention.

Deshais et al. (2020) evaluated the effects of three variations of model presentation and prompting on the acquisition of gross motor responses. The three variations used were delayed prompting with one prompter, delayed prompting with a secondary prompter, and concur rent prompting with a secondary prompter. In the delayed prompting with one prompter condition, a therapist presented the S^D, prompts, and reinforcement. For the delayed prompting with a secondary prompter condition, one therapist provided the S^D and reinforcement while a second therapist provided most-to-least prompting (MTL) prompting. The concurrent prompting with a secondary prompter condition consisted of one therapist

modeling the S^D during every prompt and delivering reinforcement and the second therapist providing MTL prompting from behind the participant. During the conditions with two prompters, the second therapist prompted from behind the participant and delivered the prompt fading procedures when a correct response was exhibited. Trials were done through massed trial teaching (MTT) and utilized MTL prompting. MTT is the repeated presentation of target responses over consecutive trials (Rapp & Gunby, 2016). Deshais et al. (2020) used MTT with three training phases. Training phases were sessions in which the participants were assigned to a predetermined sequence of programmed prompts (i.e., prompt-to-independent trials in the 6:4 ratio). Each session began with a probe for the targeted motor imitation response. A correct probe response indicated that the participant would then begin with independent trials whereas an incorrect probe response indicated that the participant would begin with the predetermined programmed prompting sequence. All sessions consisted of 10 trials; after two incorrect responses within the independent trials, the participant was prompted according to the predetermined sequence for the remaining trials. The purpose of this study was to evaluate the procedures from Deshais et al. (2020) with MTT combined with two-therapist concurrent prompting.

METHOD

Participants and Setting

Sabrina served as the participant of this case study. At the time of the study, Sabrina was 3 years-old and had a diagnosis of ASD. Sabrina had no functional communication skills and used a gait trainer to walk. Sabrina received services in Applied Behavior Analysis (ABA) in both clinic and in-home 4 days weekly. Intervention took place in the ABA clinic in a room with a small number of peers and other therapists present.

Materials

Materials included preferred items to serve as reinforcers, a printed datasheet, and a pen. Preferred items were identified as any items Sabrina engaged with in her natural environment immediately preceding a session. A chair was occasionally used by the secondary prompter.

Target Behaviors and Data Collection

Correct and incorrect responses served as the dependent variables. A correct response was defined as any instance Sabrina independently completed the same physical response (i.e., clapping hands) as the modeled S^D. An incorrect response was defined as any time Sabrina did not correctly imitate the same physical response, or she did not emit any response within 5-s. An AB design was used, each session was divided into 10 blocks on the datasheet to represent each prompt or independent trial within the session. The primary prompter recorded the prompt type, or independent trial, and the participant's response. Although scoring was calculated as the percentage of correct responses among independent trials only, the researcher also indicated on

the datasheet whether each prompt was tolerated (i.e., without engaging in maladaptive behavior, including elopement, aggression, tantrum, and self-injury). One session was conducted daily, which always consisted of 10 trials.

Treatment integrity and IOA were not collected due the need for a second therapist to implement the procedures and the limited staff working within the clinic; other therapists were rarely available to observe the sessions. Treatment integrity would have been collected for at least 40% of the sessions using procedures similar to Deshais et al. (2020). The observer would have used a printed task analysis for all phases of the study to analyze the implementers' behaviors. Treatment integrity would have been scored by dividing the number of correct steps for each prompter and multiplying by 100 to determine a percentage. IOA would have been collected for 40% of the sessions by independently scoring the participant's responses with trial-by-trial agreement. The number of independent trials with agreement would have been divided by the total number of independent trials and multiplied by 100.

Experimental Design and Procedures

An AB design was utilized to evaluate the effects of a 2-therapist concurrent prompting with a 6:4 programmed prompting sequence for motor-imitation responding. Sessions were conducted using MTL for the 6:4 phase. Both 6:4 prompting, and independent trials phases were conducted using MTT. Probes were used for baseline. During intervention, probes were used to determine which phase of the intervention would be provided.

Baseline

Baseline consisted of three cold probes with one opportunity to elicit a response per session. For each trial, one therapist sat in front of the participant, removed the object the participant was engaging with, and provided the S^D with the modeled target response (i.e., clapping hands) for 3-s (Deshais et al. 2020). The target response was determined based on the existing skills and behaviors of the participant. If the participant responded correctly, the therapist handed her the object previously removed. If the participant responded incorrectly, the therapist moved on to the next trial.

Programmed Prompting

Pre-session set-up similar to that of baseline. The primary therapist sat in front of the participant, removed the object she was engaging with, and provided the S^D with the modeled target response. The first presentation of the S^D served as a cold probe to indicate whether the session would begin with the programmed prompting sequence or the first independent trial (Deshais et al. 2020). Each phase was predetermined to begin with 6:4 prompting. Every time Sabrina elicited a correct response, the therapist provided praise and allowed engagement with the identified, preferred activity. Preferred activities were recognized as any activity or object she was engaging with immediately preceding each trial. The participant was allotted 20 s of contact with the reinforcer before starting the next trial.

Prompting Sequence. If the cold probe resulted in an incorrect response, the participant went through a series of prompts based on the 6:4 programmed prompting procedures. Within 6:4 programmed prompting, the secondary prompter sat behind Sabrina and provided MTL prompting. MTL was selected based on recent research indicating MTL is more effective for the

acquisition of skills in young children with ASD (Cengher et al., 2016; Valentino et al., 2018). The 6:4 prompting sequence consisted of two full-physical prompts (i.e., hand-over-hand), two partial physical prompts (i.e., near elbows), two guided prompts (i.e., shoulders), and four independent trials without prompts. During the four independent trials, if Sabrina emitted an incorrect response, the prompting sequence was represented for the remaining trials. There were always 10 trials within a session, regardless of the last trial being prompted.

Independent Trials. The independent trials were similar to Deshais et al. (2020) in which the participant had a total of 10 opportunities per session to engage in correct responses. The difference between Deshais et al. (2020) and this study was that the participant was only allowed one incorrect response before the therapist began the programmed prompting sequence, whereas Deshaid et al. (2020) allotted for two incorrect responses.

RESULTS

The results are presented as the percentage of independent responses per session (See Figure 1). Probes were also recorded and represented in the visual analysis to illustrate correct responses that were not a part of the prompting sequences. The results indicate the programmed prompting sequence was an effective method for the acquisition of motor imitation. Although the percentage of independent responses during the prompting sequence was variable, the correct probe still occurred in the session even when independent responding was lower. The correct probes indicate skills were being learned even when incorrect or no responses occurred in independent trials.

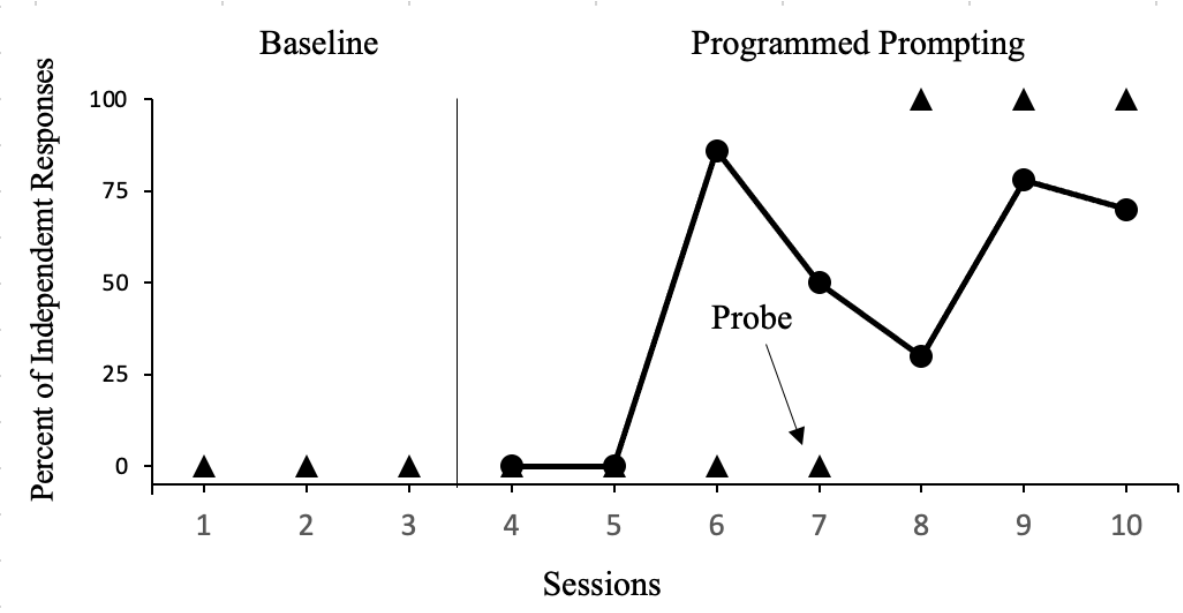

Figure 1. *Motor Imitation with Programmed Prompting*

DISCUSSION

The purpose of this study was to extend research on programmed prompting with two therapists, concurrently prompting. The result from this study extends literature by illustrating the utilization of programmed prompting with MTT. Our findings could also support the effects of two-therapist prompting as discussed by Valentino et al. (2018) and two-therapist concurrent prompting discussed by Deshais et al. (2020). However, a component analysis should be conducted in future research to evaluate if the effects would persist without the use of a second prompter. Although the participant had variability in independent responding, the probes showed correct responding even when there was low correct responding during training trials, thus showing that learning or compliance of the skill occurred. With this situation, we can question the participant's motivation for correct responding as an explanation for lower responding in some sessions where responses were variable.

The use of two-therapist prompting was also utilized to extend the literature for using two prompters. When implementing motor imitation interventions with one therapist, the therapist delivers all components of the intervention. By using a second prompter, the primary prompter was able to provide the S^D and model for the participant (i.e., when the participant visually attends to the modeled response) while the second therapist solely provided prompts from behind the participant without interrupting the participant's visual attendance. Additionally, by utilizing two prompters, the participant does not have to discriminate between S^D, prompts, and

consequences (Valentino et al. 2018) because they are delivered with correct timing by separate individuals.

The findings of this study also contribute to the research supporting the use of MTT (Rapp & Gunby, 2016). When Sabrina was presented with demands during her regular clinical interventions, she commonly engaged in maladaptive behavior (i.e., in addition to task refusal). Maladaptive behaviors included aggression, repetitive behavior, and elopement. With the implementation of MTT, maladaptive behavior was minimal during the implementation of this intervention. The decrease in maladaptive behavior could also be a result from the second prompter sitting behind Sabrina. For example, having the second prompter sitting behind her could have prevented elopement by blocking any attempts to elope. Further research should incorporate collecting data on maladaptive behaviors during this intervention to evaluate its effects on escape-maintained behaviors. Research should also compare two-therapist prompting with the use of MTT.

One potential limitation to this study is the assessment of the 6:4 programmed prompting sequence only. Deshais et al. (2020) utilized a phase consisting of 7:3 programmed prompting after the responses during the 6:4 phase reached criterion. Future research should compare the 6:4 programmed prompting to the 7:3 programmed prompting sequence.

Another limitation is the inclusion of only one participant for this study. The effect for one participant is not representable of a larger population. Having multiple participants would better indicate the efficacy of this intervention. A suggestion for future research is to utilize multiple participants across multiple baselines. Another recommendation for future research would be to target multiple motor imitation responses. Clapping hands was the only targeted response due the participant's existing skills at the time of the study. Deshais et al. (2020)

grouped motor imitation targets by three skills in a set and extended baselines for the following set. By doing so, the confounding variable referring to the simplicity of motor targets was controlled and the results from intervention demonstrated effects across various targets.

Lastly, research should conduct probes to identify motor imitation generalization. Considering motor imitation skills are taught to increase the generalization of other important skills, research should include an assessment of novel responses. Novel responses should extend beyond simple motor imitation skills, including steps from a life-skill task analysis (e.g., putting a sock on a foot).

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