Comparison of Prompting Strategies on the Acquisition of Daily Living Skills

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Abstract: Determining the most effective prompting strategies to be used for individuals with significant intellectual disability can assist in the acquisition of skills, reduction of errors, and avoidance of prompt dependency. However, few studies have directly compared the effects of different prompting strategies to determine which are the most effective. In the present study, physical only and physical plus vocal prompting strategies were compared to determine if one led to more efficient acquisition of two folding tasks than the other. An alternating treatments design was used with two individuals with significant intellectual disability, whereby the prompting strategies were counterbalanced across folding a shirt and folding a pair of pants. Results demonstrated that both strategies were equally effective for one participant, whereas the physical only prompting strategy may have been the more effective strategy for the second participant. The results suggest that pairing vocal instructions with a physical prompting strategy neither inhibits nor assists the acquisition of daily living skills for individuals with significant intellectual disability.

Determining the most effective prompting strategies to be used for individuals with significant intellectual disability has the potential to increase the efficiency of skill acquisition, reduce the number of errors (Cooper, Heron, & Heward, 2007), and avoid prompt dependency (Oppenheimer, Saunders, & Spradlin, 1993). Prompts can be delivered before or during the performance of a behavior; those that are delivered during the target behavior are called response prompts, which vary in form, and include verbal instructions (i.e., vocal and nonvocal), modeling, and physical guidance (Cooper et al., 2007). In a review of the response prompting literature, Demchak (1990) concluded the following regarding the use of response prompting procedures for the acquisition of skills: (a) using a most-to-least prompting hierarchy results in fewer errors as compared to a least-to-most prompting hierarchy; (b) time delay procedures are more efficient than least-to-most prompting; (c) most comparative research has focused on discrete responses over chained responses, and (d) more research on the comparison of prompting procedures would be beneficial.

Although prompting strategies are tools that most practitioners utilize, few studies have directly compared strategies to determine which are the most effective. In one comparison study, McDonnell and Ferguson (1989) evaluated the use of a decreasing prompt hierarchy (i.e., most-to-least prompting) and a time delay procedure to teach four students with moderate disabilities to cash checks and use an automatic teller. In the most-to-least prompting procedure, prompts were faded by systematically reducing the prompt level used at each step of the task analysis. During the time delay procedure, the same prompt was utilized throughout the task analysis, but the delay to the prompt was systematically manipulated. The authors found that both strategies were effective, but that the decreasing prompt hierarchy (i.e., most-to-least prompting) was more efficient (i.e., fewer trials to mastery and less instructional time), and resulted in fewer errors. It should be emphasized that the authors evaluated the use of these prompting procedures with students with moderate disabilities. Therefore, the extent to which the findings can be generalized to students with more significant disabilities may be limited.
In another comparison study, Day (1987) evaluated the use of a decreasing prompt hierarchy (i.e., most-to-least prompting) and an increasing prompt hierarchy (i.e., least-to-most prompting) to teach six individuals with significant disabilities two tasks of comparable difficulty each. The tasks were chosen from each individual’s treatment plan and varied across participants (e.g., prepositions, sorting, assembly, receptive identification). The most-to-least procedure involved prompting the individual before they responded and fading prompts on subsequent trials. The least-to-most procedure involved prompting the individual after an error, and gradually fading the prompt on subsequent corrections. Results demonstrated that the most-to-least strategy was more effective, produced greater gains, and resulted in fewer errors than the least-to-most strategy. However, several of the participants did not reach or maintain mastery criterion with either strategy.

In a similar comparison, Libby, Weiss, Bancroft, and Ahearn (2008) directly compared the use of most-to-least and least-to-most prompting procedures in the acquisition of solitary play skills for five children with significant disabilities. Both procedures involved the same physical prompts: (a) hand-over-hand, (b) forearm, (c) upper arm, and (d) light touch. However, the most-to-least procedure began with the most restrictive prompt (i.e., hand-over-hand) and faded out to independence, whereas the least-to-most procedure began with independence and faded in to the most restrictive prompt. A third hierarchy was added in a second study that utilized the most-to-least format, but added a 2-s delay before each prompt. The authors found that participants acquired skills almost as quickly with most-to-least prompting with the delay, but with fewer errors, suggesting that it may be the best default prompting procedure. Whereas solitary play skills are important for many students with significant disabilities, students who are transition-aged could benefit from learning more functional, daily living skills.

Though a few articles have compared the use of various prompting strategies for individuals with significant intellectual disability, we were able to identify only one study that directly compared the effectiveness of a physical prompting procedure to a physical prompting procedure paired with vocal instruction. Glendenning, Adams, and Sternberg (1983) evaluated the use of three prompting sequences: (a) vocal cue, gesture, model, and full physical assistance; (b) vocal cue and full physical assistance, vocal cue and light physical assistance, vocal cue and gesture, and vocal cue; and (c) full physical assistance, moderate physical assistance, light physical assistance, and gesture. Twelve students with moderate disabilities were randomly assigned to one of the three prompting sequences and were taught a 48-step string-tying task analysis. The results demonstrated that the vocal prompts paired with physical guidance were superior to the other two strategies, including physical guidance alone. However, the prompting strategies that were evaluated varied in the type of prompt across strategies. In other words, the fading procedures were not equivalent across strategies.

Overall, most-to-least prompting has been found to be the most effective strategy when compared to other physical prompting strategies in the acquisition of skills by individuals with varying disabilities. In addition, one comparison article (i.e., Glendenning et al., 1983) found that a physical plus vocal prompting strategy was more effective than a physical only prompting strategy. Though this study used most-to-least prompting for two of the three strategies, it did not keep the fading procedures equivalent across strategies. Therefore, the purpose of the present study was to compare the effectiveness of both a physical prompting strategy and a physical plus vocal prompting strategy, while keeping the fading procedures consistent across strategies. The two prompting strategies were evaluated on the acquisition of daily living skills in individuals with severe to profound intellectual disability. The researchers aimed to identify the most effective strategy that resulted in fewer trials to mastery criterion.

**Method**

**Participants**

Two individuals with significant intellectual disability participated in the study. Amanda was a 14-year-old young woman. Previous eval-
uations documented Amanda as having diagnoses of cerebral palsy; developmental delays; severe mental retardation; and attention deficit/hyperactivity disorder, predominately hyperactive-impulsive type. Amanda communicated through two- to three-word sentences paired with some sign language, and engaged in echolalia. She displayed challenging behavior in the form of self-injury to the face and head, which occurred in isolation or in combination with crying or screaming.

John was an 11-year-old young man with no documented medical diagnoses. The disability determination on his individualized educational program (IEP) indicated “multiple disability.” John communicated through two- to three-word sentences paired with some sign language and picture symbols. He had a history of aggressive and noncompliant behavior and documented use of restraint.

Participants were chosen because they were approaching transition age; their IEP’s were focused on functional, daily living skills; and their instructional histories did not include folding clothing or general laundry skills.

Setting

Participants attended a county-funded school for individuals with severe to profound intellectual and physical disabilities. The classroom to which the students were assigned served six students and was led by two instructional assistants and a teacher. All sessions were conducted at a large table in the back of the students’ classroom during their morning work hour. The activities that the students typically participated in during this time were solitary vocational or functional academic tasks.

Task Analyses and Materials

Two task analyses were developed for the present study: folding a shirt and folding a pair of pants. Each task was broken into five steps. Folding a shirt included (a) placing the shirt tag-side down, (b) folding one side to the middle, (c) folding the other side to the middle, (d) folding the bottom to the top, and (e) flipping the shirt over and placing it in the right-hand corner of the table. Folding a pair of pants included (a) placing the pants tag-side up, (b) folding one side over to the other, (c) folding the bottom to the top, (d) folding the bottom to the top again, and (e) flipping the pants over and placing them in the right-hand corner of the table.

The shirt used for folding for both participants was a red, short-sleeved t-shirt, adult size medium. The shirt had a white design on the front and back and had a visible tag on the inside of the collar. Two pairs of pants were used for folding. For Amy, we used a pair of jeans, girls’ size 12. For John, we used a pair of jeans, boys’ size 12. Both pairs of pants had a visible tag on the inside of the waistband. Both the shirt and pants were the appropriate sizes for the participants to wear.

Dependent Measures and Data Collection

Data were collected on the percent of steps completed correctly on the two folding task analyses. To be scored as correct, the student had to perform the step as described in the task analysis during the delay to prompting, without prompting from the experimenter. For example, when given the instruction, “Fold the shirt,” if the student picked up the shirt and laid it down with the tag facing the table within 2 s, the first step was marked as correct. If the experimenter prompted the student, the step was marked as prompted, with the exact prompt used being recorded. For example, when given the same instruction, if the student picked up the shirt and held it in his or her hands, and the experimenter used hand-over-hand guidance for the student to lay it down with the tag facing the table, it was marked as a hand-over-hand prompt. If the student performed the step incorrectly during the delay to prompting, it was scored as incorrect. For example, when given the same instruction, if the student picked up the shirt and placed it on the table with the tag facing up, the experimenter delivered the error correction procedure and marked the step as incorrect. Mastery criterion was 100% independent accuracy (i.e., all steps completed correctly during the delay to prompting) of the entire task analysis across three consecutive sessions. Once mastery criterion was met, a generalization probe was conducted.
Experimental Design

An alternating treatments design (Gast, 2010) was used, with the two prompting strategies counterbalanced across tasks. The study included two conditions: (a) baseline and (b) intervention. Steady state responding (Johnston & Pennypacker, 2009) was used to determine when intervention should be implemented. In other words, stable baseline data (i.e., not generally increasing or decreasing) were required before beginning intervention. The prompting strategies were counterbalanced across tasks to demonstrate experimental control. Each task analysis was instructed with a different prompting strategy for each participant. By counterbalancing in this manner, we can be confident that any change in the target behavior was due to the prompting strategy, rather than the task.

Interobserver Agreement and Procedural Integrity

Interobserver agreement (IOA) and procedural integrity were calculated for 30% of all baseline and intervention sessions across both participants. A second observer was trained by the lead experimenter for the purposes of IOA and procedural integrity. The experimenter instructed the second observer on the dependent measures, as well as the steps involved in the procedural integrity measures. Following instruction, the second observer received training on data collection of the dependent measures until the mastery criterion was achieved (i.e., 100% agreement across two consecutive sessions).

For IOA, the second trained observer collected data on participant behavior, which included the percent of steps completed correctly, as well as the type of prompt used by the researcher. IOA was calculated by dividing agreements by agreements plus disagreements and multiplying by 100. Interobserver agreement was calculated to be 100% across all sessions.

For procedural integrity, the second trained observer collected data on whether or not the procedural steps were completed correctly. Procedural integrity was calculated by dividing the number of procedural steps completed correctly by the total number of procedural steps and multiplying by 100. Procedural integrity was calculated to be 100% across all sessions.

Procedure

Sessions were conducted up to four times per day, one to three times per week. Each session consisted of one presentation of one folding task. At the beginning of the day, the experimenter drew the folding task out of a hat, conducted a session for that task, and presented the other task at the next session. For example, if the experimenter drew “shirt” out of the hat, she presented the shirt for the first session. For the next session, she presented the pair of pants. On the third session, she again drew from the hat. This allowed for randomization of tasks, while assuring that each task received equal instruction.

Both folding tasks were trained in a total-task presentation (Cooper et al., 2007), with each step of the task receiving instruction during the session. As instruction progressed, the prompts delivered could vary depending on the step. In other words, not all steps of the task analysis necessarily received the same prompt within a session.

Baseline. The experimenter directed the student toward a large table with the item of clothing crumpled on the left-hand side and delivered the instruction, “Fold the (item of clothing).” The experimenter gave no further directions and did not prompt the student. The students had not previously received any instruction related to folding or laundry. A token system was already established in the classroom, and because sessions were conducted during the students’ morning work hour, students earned a token for participating in each session. Typically, students earned tokens on an FR1 schedule, with the back-up reinforcer being delivered after five tokens.

Physical only prompting strategy. The experimenter directed the student toward the table with the clothing item and delivered the instruction, “Fold the (item of clothing).” The experimenter then provided physical prompts in a most-to-least presentation, following a 2 s delay at each step. The prompts were (a) hand-over-hand, (b) forearm, (c) upper arm, and (d) light touch. A hand-over-hand prompt included the experimenter placing her hand on top of the student’s hand, and
physically guiding him or her to complete the task. A prompt at the forearm included the experimenter placing her hand on the student’s forearm, and physically guiding him or her to complete the task. A prompt at the upper arm included the experimenter placing her hand on the student’s upper arm, and physically guiding him or her to complete the task. A light touch prompt included the experimenter placing her hand lightly on the student’s shoulder or upper back, and physically guiding him or her to complete the task. The most restrictive prompt (i.e., hand-over-hand) was delivered for the initial teaching session. Following two consecutive sessions at the current prompt level, the next least restrictive prompt was used (e.g., move from hand-over-hand to forearm). If the student responded correctly during the 2 s delay, data were collected as correct independent for that step. If the student responded incorrectly during the 2 s delay, an immediate most-restrictive prompt was used (i.e., hand-over-hand) as an error correction for that step, and prompting continued as prescribed. If the student responded incorrectly on the same step for two consecutive sessions, error correction was provided, and the next most-restrictive prompt was used (e.g., move from forearm to hand-over-hand) for that step on the next trial.

Physical plus vocal prompting strategy. The experimenter directed the student toward the table with the clothing item and delivered the instruction, “Fold the (item of clothing).” The experimenter then provided the same physical prompts in the same hierarchy described for the physical only prompting strategy. In addition to these physical prompts, vocal instructions were paired with each step (e.g., hand-over-hand paired with, “fold bottom to the top”). For the shirt, the vocal prompts included (a) “tag side down,” (b) “fold side to the middle,” (c) “fold other side to the middle,” (d) “fold bottom to the top,” and (e) “flip it over.” For the pants, the vocal prompts included (a) “tag side up,” (b) “fold it over,” (c) “fold bottom to the top,” (d) “fold bottom to the top again,” and (e) “flip it over.” Criteria to advance through the hierarchy and to introduce the error correction were the same as the physical only prompting strategy.

Results

Amanda

The percent of steps Amanda completed correctly on the two folding tasks is presented in the top panel of Figure 1. During baseline, Amanda did not complete any of the steps of either folding task correctly. With the introduction of the physical only prompting strategy for folding pants, Amanda’s percent of steps completed correctly had a steady increasing trend. With the introduction of the physical plus vocal prompt strategy for folding a shirt, Amanda’s percent of steps completed correctly had an immediate increase, but leveled out. A clear separation in the percent of steps completed correctly between the prompting strategies began to develop in the 9th session, with the physical only prompting strategy becoming the more effective method. After the 13th session, Amanda was withdrawn from school without notice, and was not able to continue to participate in the study.

John

The percent of steps John completed correctly on the two folding tasks is presented in the bottom panel of Figure 1. During baseline, John did not complete any of the steps of either folding task correctly. With the introduction of the physical only prompt strategy for folding a shirt, John’s percent of steps completed correctly had an immediate increase, with a steady increasing trend. Similarly, with the introduction of the physical plus vocal prompt strategy for folding a pair of pants, John’s percent of steps completed correctly had an immediate increase, with a steady increasing trend, but temporarily remained stable at several points. In other words, as the task associated with the physical only strategy continued to increase in accuracy, the task associated with the physical plus vocal strategy increased with points of no improvement.

Overall, both strategies were equally effective in teaching folding to John. The physical only strategy took six sessions to reach 100% accuracy, whereas the physical plus vocal strat-
egy took seven trials. John did not have the opportunity to reach mastery criterion on either folding task due to the end of the school year.

Discussion

Results of the present study provide further support for the use of physical prompting strategy.

Figure 1. Percent of steps completed correctly across folding a shirt and folding a pair of pants, using a physical only or a physical plus vocal prompting strategy.
strategies to assist in the acquisition of daily living skills for individuals with significant disability. Results demonstrated that both physical only and physical plus vocal prompting strategies were effective in the acquisition of folding clothing. This study contributes to the existing literature by comparing two different prompting strategies, and extends the literature by comparing a physical prompting strategy to a physical plus vocal strategy. Furthermore, the results suggest that the addition of vocal instructions to a physical prompting strategy neither inhibits nor assists the acquisition of daily living skills for individuals with significant disabilities.

Limitations and Future Research

There were several limitations to the present study. First, only two students participated, one of whom was unexpectedly withdrawn from school and was not able to finish the study. In addition, both were individuals with significant disabilities. Because such a small, specific sample was used, attempts to generalize the present findings may be limited. Future studies should attempt to replicate with a larger sample, as well as with students with various disabilities.

A second limitation was that the tasks used may not have been of equivalent difficulty. Every attempt was made to create task analyses that would be of equal difficulty and appropriate for the study. For example, both tasks were folding tasks and included the same number of steps. We also counterbalanced the tasks across the prompting strategies to demonstrate clear experimental control. Future studies might consult with experts (e.g., occupational therapist) to ensure similar motor requirements, or interview independent practitioners on their opinions of the task difficulty (Gast, 2010).

Because a few of the task analysis steps overlapped (e.g., both tasks included folding the item from the bottom to the top), learning the step in one task analysis could have carried over to the second task analysis. Due to the nature of the target behavior (i.e., folding), it was necessary to include overlapping steps in the task analyses. However, future studies should attempt to exclude overlapping steps. This could be accomplished by choosing tasks that are of equivalent difficulty and of the same response class but with different topographies.

One could argue that the prompting strategies were not different enough, and perhaps the students were not differentiating between the conditions. The physical plus vocal strategy utilized the exact same hierarchy as the physical only strategy, but with the addition of vocals. The students might not have been attending to the vocals at all, which would leave them with two prompting strategies that were identical. In order to address this potential concern, two different clothing items were used for the two different prompting strategies (i.e., shirt and pants), to help the students differentiate between conditions. The vocal prompts were issued in an audible, clear voice to ensure that the students would hear the instructions. Future research should attempt to determine if the students are contacting each part of the strategy being used. This could be accomplished by requiring the student to repeat the vocal direction.

A comparison of physical only and physical plus vocal prompting strategies demonstrated that both strategies were effective in the acquisition of daily living skills for students with significant disabilities. Future research should evaluate the relative preference for prompting strategies utilized during acquisition tasks. In other words, researchers may wish to evaluate which prompting strategy students will choose, when given the option. Finally, future research should continue to compare different prompting strategies. Developing best practice guidelines for prompting strategies will require a thorough analysis of all prompting strategies, including comparison research.

Implications for Practice

Teachers of individuals with significant disabilities use response prompting to encourage correct responding in their students. Though they are common practice, prompting strategies can be difficult to implement with high integrity in the classroom. Furthermore, the type of strategy utilized can vary. A teacher’s attention is necessarily divided, and the procedural integrity and choice of prompting strategy can be based on ease of implementa-
tion or accessibility. Therefore, it is important to determine effective strategies that can be used easily and effectively by classroom staff. Libby et al. (2008) demonstrated that most-to-least prompting with a delay can be considered a default prompting procedure for students with more significant disabilities. The present study used this proven effective prompting hierarchy (i.e., most-to-least) with a physical only and physical plus vocal strategy to provide evidence for a second dimension of prompting strategies. With the 2004 amendments to the Individuals with Disabilities Education Act (IDEA), an emphasis has been placed on the use of evidence-based practices for individuals with disabilities. Therefore, it is imperative that we evaluate even our most basic teaching strategies, to determine which can be considered best practice.

By comparing the components of two commonly used prompting strategies (i.e., physical and vocal), we were able to demonstrate that the addition of vocal instructions may not be necessary in promoting the acquisition of certain skills. These results provide practitioners with more information regarding prompting procedures that have been demonstrated to be effective for individuals with significant disabilities, for the acquisition of daily living skills. The present study, in combination with related studies (Day, 1987; Libby et al., 2008), is a step in the right direction for developing best practice guidelines for prompting individuals with significant disabilities.

References


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