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An evaluation of pre-teaching assessment of response prompting

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AN EVALUATION OF A PRE-TEACHING ASSESSMENT OF RESPONSE PROMPTING

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Abstract

Individuals with developmental disabilities, such as autism, often require prompts to acquire certain skills. Several teaching methods have been developed however few direct comparisons of these methods have been conducted to date. Once new skills are acquired, stimulus control must be transferred from the prompt to a naturally occurring stimulus with prompt fading. Evidence suggests that some procedures are more effective than others for particular individuals and, therefore, assessment of the effectiveness of various teaching methods for specific learners is warranted. The current research involved the evaluation of a pre-teaching assessment for determining a combination of the most effective prompting and fading procedures for specific learners through direct procedure comparison. The generality of the outcome of the assessment was then tested in the context of establishing novel, educationally relevant skills.

Evaluation of a Pre-Teaching Assessment of Response Prompting

Individuals with developmental disabilities, such as autism, often require prompts to acquire certain skills. These cues are useful in new skill acquisition, generalization and maintenance, serving as a crucial component of effective instructional programming. Such focused instruction may be necessary to gain and transfer stimulus control to a naturally occurring stimulus that will, following removal of the prompt, act as a discriminative stimulus for the newly learned behavior. Recent investigations suggest that the success of a teaching procedure depends on idiosyncratic variables including the repertoire of the individual learner.

Response prompts are additional antecedent stimuli used to "occasion a correct response in the presence of a discriminative stimulus that will eventually control the behavior" (Cooper, Heron, Heward, 2007). Prompting procedures, which typically include both a prompt and a method for fading the supplementary prompt, have been used to teach a wide variety of skills including self-help skills that promote independence for individuals such as crossing the street, checking out library books, buying snacks (Blew, Schwartz and Luce, 1985); brushing teeth (Schoen and Lentz, 1988); vocational skills including janitorial skills (Cuvo, Leaf, and Borakove, 1978); food preparation (Schuster et al 1988); appropriate social interactions such as initiation of peer interaction (Krantz and McClannahan, 1993); reciprocal social interactions (Odom and Strain, 1986); cooperative game play (Luyben, Funk, Morgan, Clark & DeLulio, 1986); and compliance with difficult tasks like appropriate behavior at the dentist (Conyers et al, 2004)..

Several prompting methods have been shown to be effective (Demchak 1990). These interventions are typically comprised of multiple components. Although many have been effective, component analysis is lacking and little examination of the best learning style for

particular individuals has been conducted. Reinforcement accessed through these different procedures are different, including compliance with instruction by subsequent appropriate action, imitation of others' behavior by performance of the same action and tolerance of physical guidance to complete a task. Whatever the modality, each requires the learner to possess an appropriate skill set for the intervention to be effective. In other words, the ability of an individual to learn from a particular teaching procedure requires a repertoire specific to that intervention (e.g., imitation requires that the individual attend to various aspects of a demonstrated behavior and physical mimicry of those same actions). Certain procedures will, therefore, be more or less appropriate for, preferred by or differentially effective for different learners (Bourret, Vollmer, Rapp, 2004; Lerman, Vorndran, Addison and Kuhn, 2004; Libby, Weiss, Bancroft, Ahearn, 2008).

Lerman and colleagues (2004) examined different methods for facilitating skill acquisition for individual participants. The authors evaluated the relative effects of the manipulation of reinforcement contingencies and prompting procedures on the acquisition of new skills for six children diagnosed with an autism spectrum disorder. Four conditions were assessed in a combined reversal and multiple baseline across tasks design.

Pre-academic and receptive language skills were selected and taught for each child. Some skills were acquired when a contingency including reinforcement was programmed. Others required prompting and some tasks were learned only when the intervention was a combination of prompting and reinforcement. Outcomes suggested that individuals learn most rapidly with different teaching procedures

In 2008, Libby, Weiss, Bancroft and Ahearn developed a protocol to systematically compare prompting procedures while teaching five children with developmental disabilities to

build block structures. Using a multielement design, least to most (LTM) and most to least (MTL) prompting were compared. In a subsequent phase LTM, MTL, and time delay (TD) fading were compared. With an unprecedented methodology, using arbitrary behavior chains taught with building block structures the authors directly compared the procedures. Results of Phase 1 of the study indicated that the MTL procedure was associated with fewer errors, but also required relatively more sessions to acquisition of the behavior chain. Alternatively, LTM was associated with faster acquisition and more errors.

Consistent with their hypothesis and findings of previous literature, the number of trials to acquisition of the behavior chain in training varied across individuals. LTM was the most efficient for three participants. However, two of the five participants failed to acquire the entire chain with the least to most procedure. It was only when MTL was implemented that the final steps were independently emitted.

Three students participated in Phase 2. The resulting data again indicated that the LTM procedure was associated with fastest acquisition of the chain and MTL the least efficient, requiring the greatest number of trials to mastery. The condition added for the second phase, TD, was almost as efficient as LTM and was concurrently associated with fewer errors. Because LTM did not consistently lead to acquisition and MTL required up to five times as many sessions, it was reasoned that TD is the best default procedure for prompt fading when a learner's history is unknown.

Research by Lerman et al (2004) and Libby et al (2008) indicates that teaching procedures are differentially effective per learner; however, direct comparison of these methods remains relatively unexamined. Perhaps more importantly, how to choose the right procedure for

individuals remains unclear. A systematic method of choosing the appropriate procedure for particular individuals would be an invaluable educational tool.

Using methods similar to those implemented by Libby et al (2008) with building block constructs, the current research was an evaluation of a procedure to directly compare prompting procedures to determining the most effective combination of prompting and fading procedures for individual learners. The response prompting procedures of a verbal cue plus gesture, teacher model and physical guidance were compared using different behavior chains while teaching block building play. Next, a comparison of procedures to fade the prompts, a crucial component of effective use of response prompting was conducted. Finally, the most efficient and effective prompting and fading procedures were combined to train additional socially significant skills and test the generality of the assessment outcomes.

Recognizing the need for direct comparison of procedures and individualized educational intervention, as well as the potential utility of a procedure that could be implemented prior to skill training that would tailor teaching procedures to idiosyncratic learning needs, the purpose of the current research was to evaluate a pre-teaching method for identifying the most efficient prompting and fading procedures for individual learners.

<div align="center">Method</div>

Participants and Setting

Three boys, Elliot, Charlie and Turner, diagnosed with an autism spectrum disorder completed all phases of the study. Elliot and Charlie were both 11-years old and could follow multiple step directives. Each had a vocal verbal repertoire including short sentences. Turner was 12-years old, could follow simple, one or two-step directions but his verbal repertoire was more restricted, including a few single syllable vocal verbal utterances, gestures and pointing to

pictures in a book he carried with him. All of the boys attended a private school for children with developmental disabilities and lived in residential housing associated with the school. Sessions were conducted in the individuals' classrooms and, for Charlie and Turner, a quiet room at their residences. Up to six sessions were run a day, up to five days a week.

Preference Assessment

A preferred edible was identified for each participant in a paired-stimulus preference assessment (Fisher et al 1992). The participants' teachers suggested items for inclusion in the assessment. Elliot chose pretzels at differentially higher rates relative to the other items in the assessment, in 79% of trials. Turner's most preferred item was cheese (chosen in 92% of trials). Charlie's most preferred item was Oreo® cookie (chosen in 100% of trials). Interobserver agreement was taken on 33% of sessions for Elliot and Turner. IOA was not collected during Charlie's preference assessment. Agreement was 100% for Elliot and for Turner. Preferred edibles were presented contingent upon correct completion of the training step in all phases of the study. Additionally, for Turner, if reinforcement was not earned for correct responding on two or three consecutive trials, three to five simple directives were delivered for which compliance with resulted in a small piece of edible in order to maintain a dense rate of reinforcement.

Experimental Design

This study consisted of three phases comparing acquisition rates of different behavior chains through a direct comparison of prompting and fading procedures. The assessment phases, Phases 1 and 2, were developed to determine a learner profile. A "learner profile" refers to the most efficient response prompting and fading procedure for an individual learner. Phase 3 was

the use of the learner profile to teach additional socially significant skills in a test for generalization.

Each condition began with a baseline probe to determine if the individual could independently complete the steps of the chain. Then, a multielement design consisting of alternating sessions of different procedures was implemented. Eight-step behavior chains were taught in all conditions to equalize exposure to each procedure for the most accurate comparison.

Response Measurement and Reliability

Data were taken for each trial on correct, incorrect, prompted and independent responses. No response for 5s at any point resulted in blocking further responding and discontinuation of the trial. If responding did not occur for 5s following the initial discriminative stimulus, the trial was discontinued and re-presented.

Interobserver agreement (IOA) and procedural integrity checks were conducted throughout the study either in vivo or from video recordings of the sessions. For Elliot, in phase 1 training, 31% of sessions were scored with 93% agreement (range 90% to 100%) and 30% scored in replication with 97% agreement (range 95% to 100%). In phase 2, 30% of sessions were scored during training sessions with 99% agreement (range 97% to 100%) and 33% of sessions during replication with agreement of 96% (range 91% to 100%). Phase 3 interobserver agreement was 100% and taken for 50% of sessions. IOA for Turner in phase 1 training was 99% (range 98% to 100%) for 31% of sessions and 92% (range 88% to 100%) during replication. During phase 2 for Turner, 35% of sessions were scored with an agreement of 99% (range 98% to 100%) and 36% of sessions during replication with agreement of 100%. Phase 3 had 97% agreement (range 93% to 100%). Phase 1 IOA for Charlie was 100% for 50% of trials during training and 100% (range 98% to 100%) during replication. Phase 2 training IOA agreement was

100% for 100% of trials for both training and replication IOA agreement for Phase 3 was taken for 40% of trials and was 100%.

PHASE 1: Response Prompting Assessment

In Phase 1, an assessment for identifying the most effective response prompting procedure for individual learners was evaluated. Using procedures similar to those implemented by Libby et al., 2008, and eight-piece building block sets to teach different response chains, a direct comparison was made of different procedures across particular individuals. One block was associated with each step of the task analysis used to teach each construct. The constructs were arbitrary; they did not resemble any common structure or object, thereby, reducing any potentially interfering history with building blocks. Multiple pre-training testers evaluated each construct and behavior chain prior to use to ensure an equalized difficulty level. In addition, constructs were counterbalanced across procedures during both training and replication for Charlie

Direct comparison of verbal plus gesture, model, and manual guidance prompting was conducted by rapidly alternating the three procedures in a multielement design, each associated with a different behavior chain and construct. A different color base block was associated with each condition to aid in discrimination of the prompting contingency currently in place. The remaining blocks were presented in an array on the table in front of the participant. A baseline trial was conducted for each construct to ensure that the participant did not independently complete the construct prior to teaching. Based on performance during baseline trials, all participants began training for verbal plus gesture constructs on step 1, and step 2 for the other conditions. Sessions consisted of ten trials and trials consisted of one assembly of the construct. Prompts were provided only on the step currently in training. All mastered steps were performed

independently without prompting or programmed reinforcement. Step 1 during all conditions consisted of the participant moving the base block forward from the array to a position on the table in front of themselves. Trials began with the discriminative stimulus, "Let's build Legos®". Three baseline trials were completed for each construct.

Verbal + Gesture

A verbal plus gesture prompt was defined as a combination of a verbal cue (i.e., "Pick up (*color*) block, put here.") and a point cue to the block associated with the current training step and then to the correct location on the construct in front of them.

Model

A model prompt was a teacher demonstration of the correct response for the training step. The teacher modeled the step by picking up the base in front of the participant and placing it on the table in front of herself. She would then demonstrate selection and placement of the block associated with the training step. With the block in place, the teacher paused for 2s, returned the block to the array, and the construct to its former position in front of the participant. The 2-s pause prior to returning the base to the array was programmed to better ensure that the participant would not imitate that portion of the teacher's behavior.

Manual Guidance

A manual guidance prompt was full physical assistance to correct completion of the training step. The teacher provided full hand-over-hand guidance to select the correct block from the array and place it in the correct position on the construct.

Prompting procedures were prescribed for the training step based on performance on the trial immediately previous. Untrained steps in the chain were not completed. In all conditions the learner was given five seconds to independently respond and then given an opportunity to

complete each previously mastered step. The criterion to decrease prompt intrusiveness was two consecutive trials with a correct response at the current prompt level. Two consecutive independent responses on a step was criterion to begin training the subsequent step. Errors resulted in a block of further responding and discontinuation of the trial. All modalities in this phase were faded using a most to least with an increasing time delay to the most restrictive prompt, reported by Libby et al (2008) to be the best default fading technique.

Independent and correct completion of all eight steps for two consecutive trials in any one condition resulted in "mastery" of the construct. Replication of Phase 1 was conducted following mastery of one of the chains to validate the results. It consisted of systematic replication of the phase with three new block constructs.

<div align="center">Results and Discussion</div>

The results of Phase 1 are depicted on Figures 4 through 9. The y-axis on each panel of all figures indicates the number of independent steps of the behavior chain completed. The x-axis of the top panel depicts responding in a trial-by-trial format and the x-axis of the bottom panel indicates the responses for the last trial of each session.

Elliot mastered (Figure 1) and replicated (Figure 2) Phase 1 constructs with a model prompt. Turner demonstrated manual guidance to be the most effective procedure to teach the two different behavior chains by mastering (Figure 3) and replicating (Figure 4) acquisition with this procedure. Results for Charlie, Figures 5 and 6, demonstrate all response prompting procedures to be effective teaching methods. He mastered and replicated all eight steps of the behavior chain with verbal plus gesture (43 trials, 37 trials), model (43 trials, 33 trials) and manual guidance (44, 33 trials) prompting. Each of the individuals' results was carried over to

Phase 2 where the most effective prompting strategy was used in a direct comparison of fading procedures.

PHASE 2: Prompt fading assessment

Phase 2 was an assessment for identifying the most effective prompt fading procedure for individual learners through direct comparison and by rapidly alternating three different behavior chains, each associated with a different procedure. Pre-training testers rated constructs to equate difficulty between them. Again, constructs were counterbalanced for Charlie to reduce the possibility that any one construct was more or less difficult than the others.

Method

Informed by the results of Phase 1, direct comparison of LTM, TD and MTL fading was conducted. Comparison of fading procedures of model prompts was conducted for Elliot and Charlie. Model prompting was selected for Charlie in Phase 2 because it was associated with the most independent steps during training and replication. For Turner, Phase 2 was fading of manual guidance prompts. Sessions consisted of ten trials and trials consisted of one assembly of the construct. Procedures were presented in a multielement design. A different colored base was associated with each condition to aid in discrimination of the prompting procedure currently in effect. During trials, previously mastered steps were performed independently with prompting provided only on training steps. Step 1 for all conditions was, as in Phase 1, to move the base block to a position on the table in front of themselves. All trials began with the verbal cue, "Let's build Legos®".

The prescribed training prompt and step were determined by performance on the immediately previous trial.. The learner was given five seconds to independently respond and then complete each previously mastered step. Untrained steps were not completed. Criterion to

decrease prompt intrusiveness was two consecutive correct at the prescribed prompting level. Two consecutive independent, correct responses was criterion to begin training the subsequent step. Two consecutive incorrect responses on any previously mastered step resulted in retraining the step with the most restrictive prompt and on the training step an increase in the prompt intrusiveness. Baseline trials were conducted for all constructs for all participants. Based on performance during baseline trials, all participants began training on step 2 for training and replication trials.

Least to Most

Response prompts were faded from the least intrusive to the most intrusive. Initially, 3s were allowed for independent responding to occur. If responding did not occur in this time, the next most intrusive prompt was provided every 2s until the most intrusive prompt was provided, independent responding was correctly demonstrated, or an error occurred.

Most to Least

Most to least prompt fading involved moving from the most restrictive to the least restrictive prompt in succession. The hierarchy was identical to that of the least to most in reverse order.

Time Delay Fading

Time delay fading involved the procedures described above in the most to least condition with an increasing time delay to the prompt (i.e., 1s, 2s, 4s, no prompt). This fading procedure was implemented in Phase 1.

Results and Discussion

The second component of the learner profile was determined in Phase 2. A direct comparison of LTM, TD and MTL fading procedures was conducted. Results of this phase are

depicted on Figures 7-12 each containing two panels. The y-axis of each graph shows independent steps completed. The top panel shows trials and the x-axis of the bottom panel shows the last trial of the session. Rates of acquisition and the most efficient procedures were again idiosyncratic for participants.

Using model prompting, Elliot mastered (Figure 7) and replicated (Figure 8) the constructs with the LTM fading procedure. Turner mastered and replicated the constructs in 79 (Figure 9) and 42 trials (Figure 10), respectively, using manual guidance. Results during training for Charlie indicated that both LTM and TD were effective in teaching the behavior chain (Figure 11), however; during replication (Figure 12), LTM was demonstrated to be most efficient procedure, again requiring the fewest number of trials to independent completion of the construct.

For Elliot, as well as for Charlie, the most efficient combination was model prompting with LTM prompt fading. Alternatively, for Turner, manual guidance prompting and TD fading were determined to be the most efficient procedures. A third and final phase was conducted to test generalization of the outcomes of Phases 1 and 2. To determine learner profile efficacy relative to other prompting and fading procedures a direct comparison was conducted teaching new, educationally relevant skills.

PHASE 3: Generalization Test

Determined in the assessment, comprised of a response prompting (Phase 1) and fading procedure (Phase 2) comparison, a learner profile was determined for each individual. Phase 3 was a comparison of learner profiles with less efficient procedures also identified by the assessment to test generality of the assessment and teach novel socially significant and educationally relevant skills.

Method

Using a multielement design, two educationally relevant skills were selected for each participant and paired carefully to best ensure comparable levels of difficulty. The skills were compared using the learner profile and the procedures identified as the least effective with the assessment to test the reliability of the assessment in identifying the most effective combination of procedures for skill acquisition for individuals. Behavior chains were again broken in to 8-steps, for ease of comparison with Phases 1 and 2. Following mastery of a task the teaching procedure combination associated with that task was implemented for the alternate skill. The switch to the more effective procedure was made for the second task even if learning was taking place to determine if mastery could be demonstrated more efficiently.

Elliot was taught stapling using his learner profile (i.e., model response prompting and LTM fading) and wallet assembly using a combination of the least effective procedures (i.e., verbal plus gesture response prompting and MTL fading). Turner was taught envelope stuffing with his learner profile (i.e., manual guidance prompting with TD fading) and stapling with his least effective procedures (i.e., verbal plus gesture and LTM fading). Charlie's learner profile (i.e., model prompting and LTM fading) was used to teach hole-punching and was compared with manual guidance prompting and MTL fading to teach stapling.

Results and Discussion

Participants were taught new skills using components of response prompting identified by the learner profile assessment. Figures 13 (Elliot), 14 (Turner) and 15 (Charlie) depict the resulting data of the phase.

Elliot learned the behavior chain associated with stapling in 20 trials and the eight-step chain for wallet assembly in 37 trials. He demonstrated one step of the TA independently during

baseline trials, training therefore, began on step two. Elliot demonstrated the first two steps of wallet assembly during baseline and started training that skill on step 3. Because teaching a behavior chain with MTL fading required a minimum of 10 trials per step to meet mastery criterion, mastery would not happen until trial 70 assuming no errors occurred for the remaining trials. Elliot's learner profile was at least 50% more efficient than the alternative procedure.

Turner learned the behavior chain for envelope stuffing in 40 trials and for stapling in 70 trials. Manual Guidance with TD fading was used to acquire envelope stuffing, while the alternative chain did not progress beyond step 2. Once his learner profile was implemented for the second task it was acquired in 30 trials.

During Phase 3 for Charlie, acquisition rate of hole-punching, taught with his learner profile (i.e., model prompting with LTM fading), was compared with the acquisition rate of the behavior chain to teach stapling with manual guidance and MTL fading. Hole-punching was independently emitted and mastered in 37 trials. After 40 trials stapling was still on step 3. Once his learner profile was implemented for stapling, Charlie acquired the skill on trial 56.

General Discussion

The purpose of this study was to assess the utility of a pre-teaching assessment for defining an individualized learner profile. By identifying the most effective procedure for response prompting and fading prior to skill training, individualized repertoires can be identified and tailored to, negative side effects associated with errors reduced, prompt dependence most effectively avoided and the best methodology for individual intervention implemented. The current procedure can also potentially identify repertoire deficits (e.g., inability to imitate modeled behavior) and sensory preferences (e.g., aversion to physical guidance) crucial to teaching procedures to those with an autism spectrum disorder, who may learn differently.

Concurrently, identifying deficient skill sets that afford less intrusive teacher intervention, may allow for the training of such skills resulting in access to reinforcement through more typical means or by methods easier and more likely to be implemented by teachers.

In addition to idiosyncratic results for effectiveness, errors and problem behavior appeared to be participant specific as well. Errors for Elliot typically involved using both hands, attempting to move through the steps too quickly and touching multiple blocks at the same time (even if they were associated with the subsequent step, this was criterion to terminate the trial). Turner demonstrated increased rates of problem behavior or deficient session behavior relative to other conditions in the verbal plus gesture condition. He emitted tantrum behavior (e.g., self-injurious behavior, flopping, crying, and bolting), particularly during phase 1, or emitted a break response escaping completion of sessions. Phase 1 training for Turner took a significantly longer time to mastery criterion. Deficits in Turner's vocal verbal repertoire might have contributed to his problem behavior in this condition because without the skill set to access reinforcement specific to a vocal verbal repertoire under natural circumstances the condition may have proven confusing, unclear, signaled the unavailability of reinforcement or even aversive.

Four was the maximum number of sessions completed with Turner in a day over the course of the entire day. Alternatively, Charlie frequently requested, "More Legos®" at the end of sessions. Charlie completed up to six sessions a day in less than two hours time. Charlie did not emit any targeted problem behavior during the assessment. The least efficient response prompting procedure for two participants during was the verbal plus gesture condition. The least efficient fading procedure, also consistent across two participants, was most to least which resulted in more trials to acquisition.. Both verbal plus gesture prompting and most to least fading were associated with the most problem behavior.

For two of the three participants' model prompting was the most effective procedure, however neither participant has that procedure prescribed for current programming. Imitation is a specific repertoire required for learning with a model prompt and common in incidental teaching. Manual guidance, a typical default for training skills to those with autism may be inappropriate because of sensitivity to certain types of sensory stimulation, is the most restrictive intervention or simply because it is less efficient for teaching.

No educational assessments that directly address learner repertoires from a behavioral perspective and with direct procedure comparison are being implemented at this time. This assessment provides a systematic method for individualizing teaching procedures. The benefits of providing instruction for idiosyncratic learning needs are vast.

In addition to repertoire assessment, this protocol also teaches a solitary play skill (i.e., block building). Independent leisure skills are frequently lacking in individuals with autism. Training these skills while executing the skill set evaluation is another direct benefit of the current protocol. Also, built in to the validation of procedural outcomes is the test for generality that includes additional educationally relevant skill training.

Limitations and Future Research

The number of trials required to complete the assessment varied greatly across participants. Although Charlie completed Phase 1 training in 50 trials in 5 sessions, it took Turner 290 trials. Criterion for discontinuation was 30 sessions. Because this is a pre-teaching assessment, perhaps the number of sessions and time dedicated to procedure identification should be further limited. It is possible that for some students this assessment is less effective than another might be and future research should explore other assessments for systematically determining the most effective individualized teaching procedures.

Another method for increasing the efficiency of the assessment to be explored in future research is the potential for considering the assessment complete following convincing separation in the data paths between procedures, as in the top panel of Figure 2, where learning with model prompting was on step 7 and for the other two procedures on step 2. Or on the trial-by-trial replication graph for Turner (Figure 4) where the data path associated with manual guidance separate from the others convincingly on trial 17 but the construct was not mastered until trial 53. Visual inspection of the data may, in some cases prove to be sufficient in determining the winning procedure long before the set criterion. By analyzing the gathered data to this end the assessment could be abbreviated in a functional and efficient way.

Most to least fading, due to specifics of the procedure, delays time to acquisition. Consideration of an added component for independent responding could be included for future comparison between procedures. Otherwise, no potential for independent responding on an eight-step behavior chain is possible until trial 80 (i.e., an immediate prompt is provided for every step until the programmed opportunity for independent responding and two independent, correct demonstrations are required for mastery).

Another benefit of this assessment is the potential for identification of lacking skill sets or repertoires for accessing reinforcement specific to certain modalities. Through identification of such skill sets, methods for teaching may be developed increasing consistency with the goal of greater independence. The learner, then, may benefit from less restrictive educational interventions. Future research should include other tests for the generality of this procedure as well as other procedures to assess current participant repertoires for educational advancement.

The current literature is lacking in a systematic, empirical method of determining the most efficient teaching procedure to utilize with individual students. Pursuit of this goal is

warranted. An assessment that efficiently identifies the method by which individual student

learns best may be helpful in determining optimal teaching strategies.
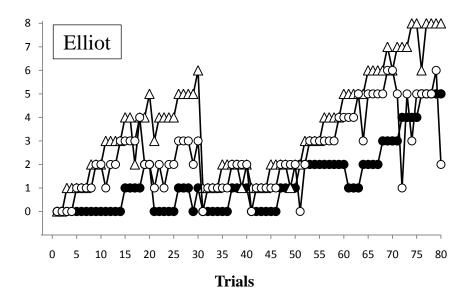
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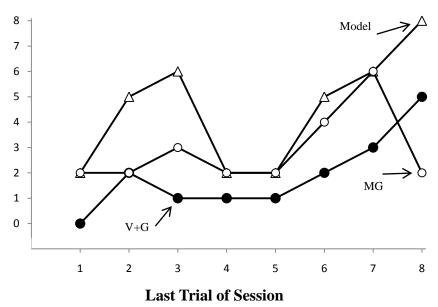
Figure 1. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.
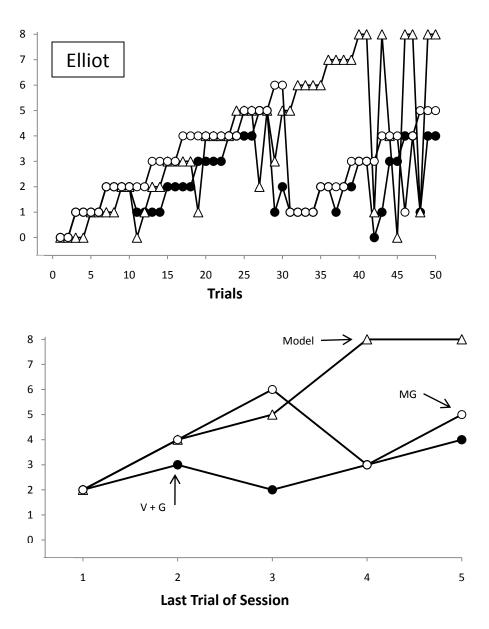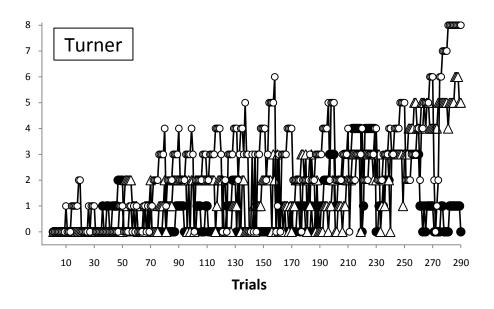
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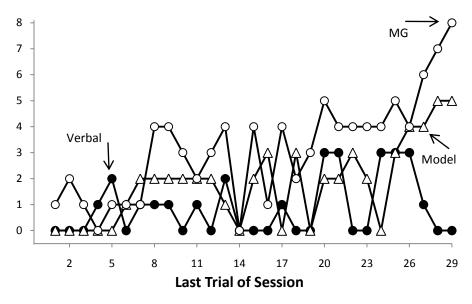
Figure 3. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.
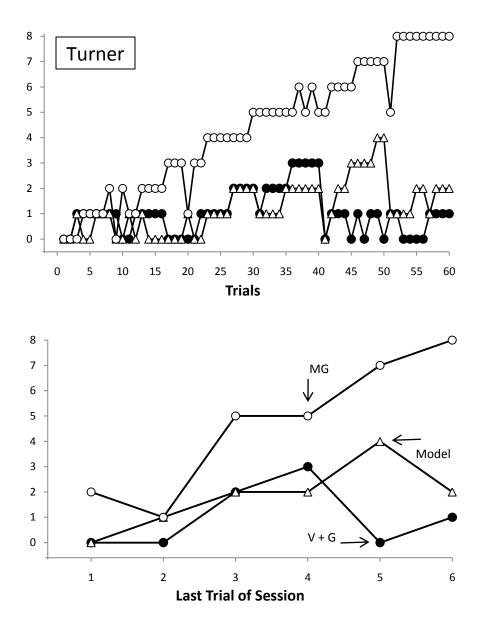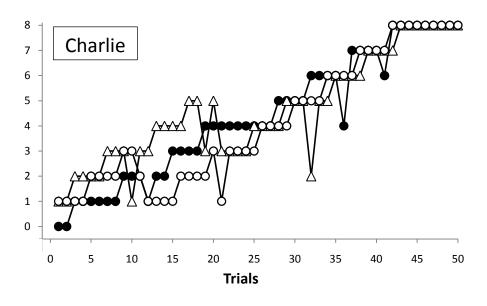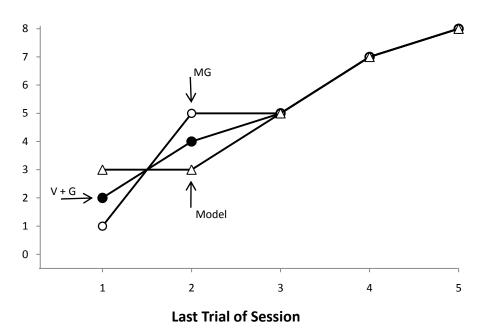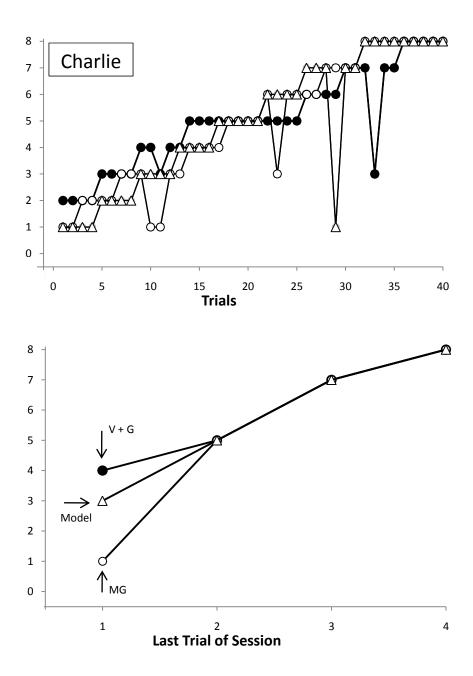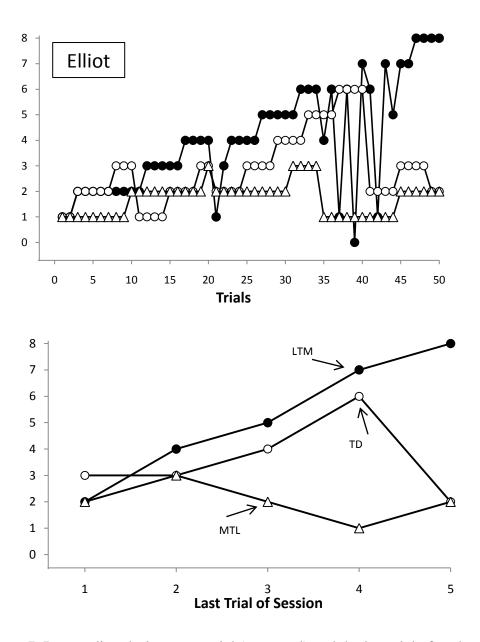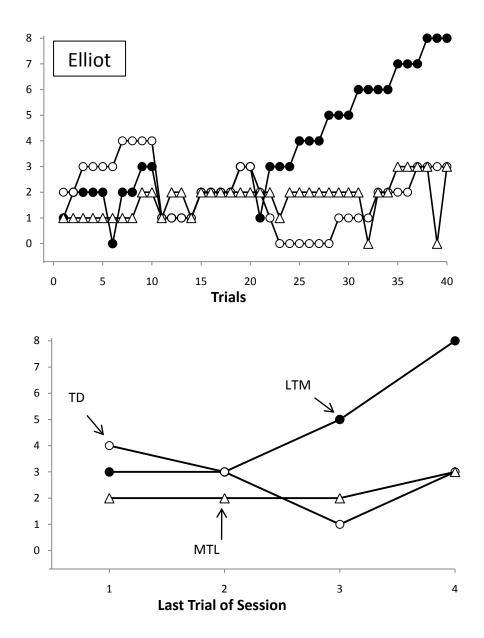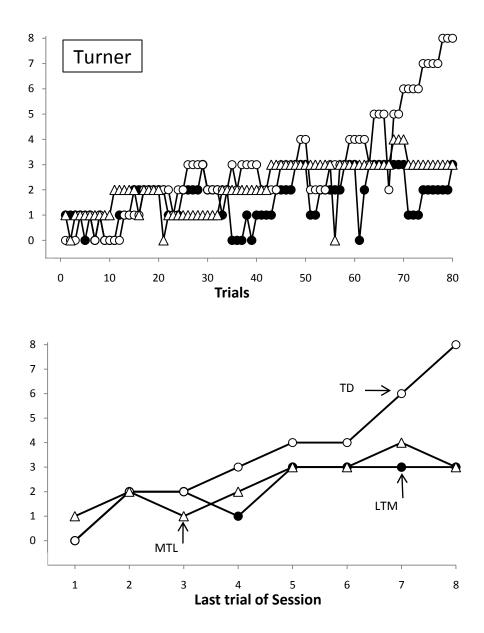
Figure 4. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.
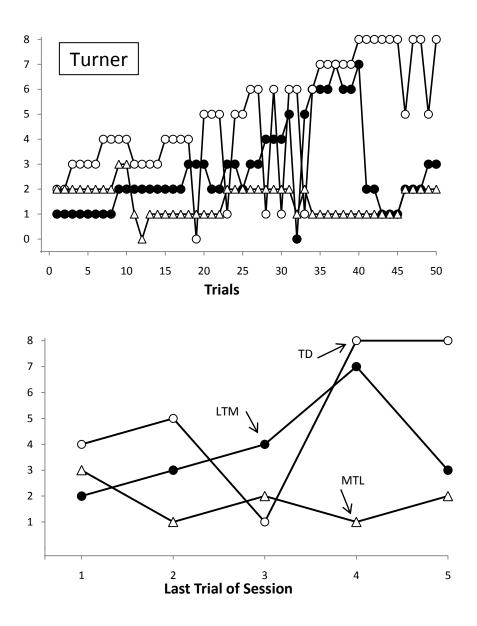
Figure 5. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.

Figure 6. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.

Figure 7. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.
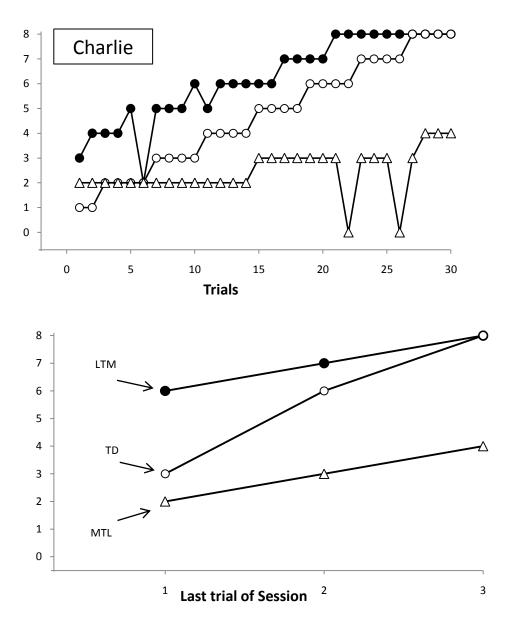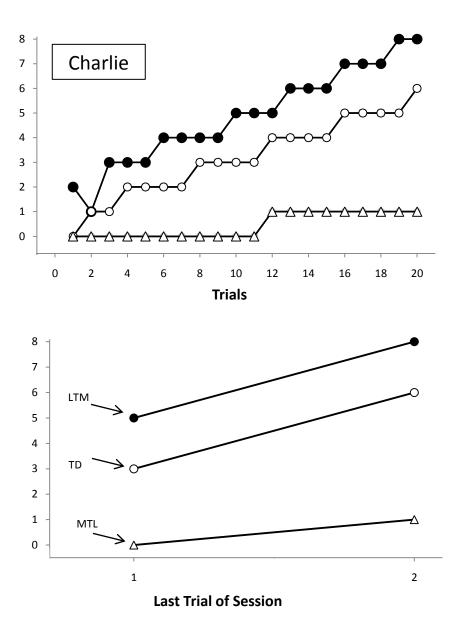
Figure 8. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.

Figure 9. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.

Figure 10. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.

Figure 11. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.

Figure 12. Responding during every trial (top panel) and the last trial of each session (bottom panel) for each procedure.
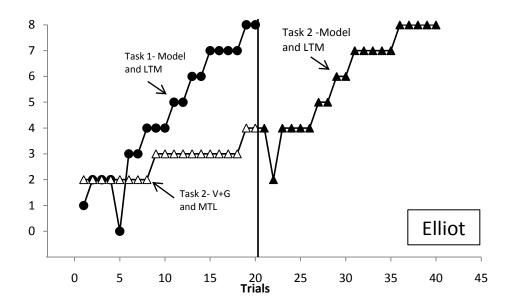
Figure 13. Responding for every trial for Task 1 (stapling) and Task 2 (wallet assembly) using Elliot's learner profile and an alternative procedure. The second phase indicates a switch in teaching procedures (Task 2 taught with the learner profile).
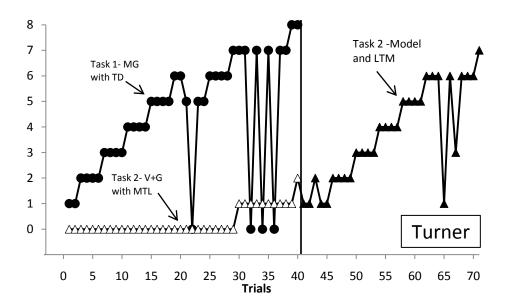
Figure 14. Responding for every trial for Task 1 (envelope stuffing) and Task 2 (stapling) using

Turner's learner profile and an alternative procedure. The second phase indicates a switch in

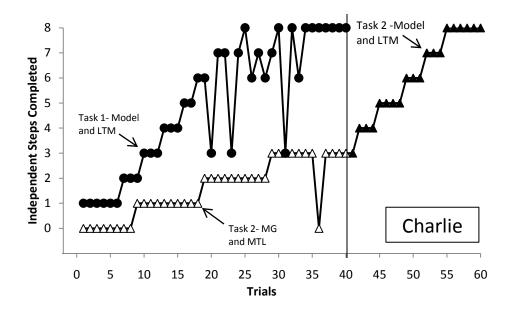teaching procedures (Task 2 taught with the learner profile).

Figure 15. Responding for every trial for Task 1 (hole-punching) and Task 2 (stapling) using

Charlie's learner profile and an alternative procedure. The second phase indicates a switch in

teaching procedures (Task 2 taught with the learner profile).