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An analysis to determine the most efficient teaching procedures for children with autism

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Running head: AN ANALYSIS TO DETERMINE

**An Analysis to Determine the Most Efficient Teaching Procedures for Children with
Autism**

A Thesis Presented

by

Carolyn M. Sanchez

The Department of Counseling and Applied Educational Psychology

In partial fulfillment of the requirements

for the degree of

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**An Analysis to Determine the Most Efficient Teaching Procedures for Children with
Autism**

by

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Submitted in partial fulfillment of the requirements for the degree of
Master of Science in Applied Behavior Analysis
in the Bouvé College of Health Sciences Graduate School
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Abstract

A three phase pre-teaching assessment was evaluated using different response prompts and fading procedures to build arbitrary Lego® structures. One male with the diagnosis of an autism spectrum disorder (age 10) participated in the study. Phase 1 compared manual guidance, modeling and verbal plus gestural cues. Fading procedures were then applied to the most efficient prompt found in the first phase using least-to-most, most-to-least, and a delay fading procedure. Finally, the most and least successful response prompts and fading procedures were compared to one another in teaching more socially significant skills. The current results show that the pre-teaching procedure found to be most efficient in Phases 1 and 2 was generalized to the more socially significant skills taught in the final phase.

An Analysis to Determine the Most Efficient Teaching Procedures for Children with Autism

Persons diagnosed with an autism spectrum disorder may have difficulty acquiring new skills and need repeated and direct exposure in order to acquire new tasks. These deficits in skill acquisition can often be addressed using specific discrete trial and prompting methods in order to promote independence at a given skill or task. Prompts have been described as supplementary stimuli which, in the presence of certain discriminative stimuli, increase correct responding and eventually control the behavior (Bilingsley & Romer, 1983). Such prompts have been effective in teaching communication, academic and self help skills (Bourret, Vollmer, & Rapp 2004; Jerome, Frantino, & Sturmey, 2007; McDonnell & Ferguson, 1989).

Various prompting methods have been used to promote learning. Some commonly used prompts include, but are not limited to manual guidance (MG), modeling, and vocal instructions (Cuvo, Leaf, & Borakove, 1978; Egel, Richman, & Koegel, 1981; Glendenning, Adams, & Sternberg, 1983; MacDuff, Krantz, & McClannahan, 1993).

Manual guidance prompts involve the physical guidance of the completion of the desired response. MacDuff et al. (1993) taught four boys with autism to follow picture schedules and increase on-task behavior. Physical guidance was used in order to guide the participant towards the schedule, carry it to his bedroom and then complete the sequence as shown in the activity schedule. Results showed that all the boys showed an immediate increase in on-task behavior and on-schedule behavior and were able to engage in lengthy photographic schedules.

Verbal prompts consist of vocal instructions in order to complete a given task, most often paired with another prompt. Cuvo et al. (1978) used a series of vocal, modeling, and physical guidance to teach janitorial skills to six participants with mental disabilities. The prompting

consisted of progressively moving through a series of four prompts until eventually no prompts were needed. First the instructor verbally stated the step while modeling the desired response. Second the instructor verbally stated the step while physically guiding the participant through the desired response. Third, the instructor simply stated the step and finally no help was given in which the participant was expected to perform the response independently. All participants showed rapid response acquisition, generalization and maintenance. Glendenning et al. (1983) also using vocal prompting methods paired with physical prompts while teaching vocational tasks. Gestural prompts have also been used in conjunction with verbal prompts and are described as pointing or motioning to the desired response (MacDuff, Krantz, & McClannahan, 2001). Verbal-plus-gestural prompts were used for teaching derived manding skills to two adults with severe mental disabilities. The participants were taught to hand over PECS (picture exchange communication system) to the instructor and then a verbal-plus-gestural prompt was used to relate the dictated names of the items to the corresponding picture and text. Both participants showed the emergence of derived mands that maintained at probe sessions.

Model prompts involve the demonstration of a task by an instructor or peer. Egel and colleagues (1981) used typical peer models to demonstrate correct responding in discrimination tasks. A typical peer was seated across from the participant and given the task instruction. Upon modeling the correct answer and receiving reinforcement, the instructor then presented the same discrimination task to the participant. The participants demonstrated rapid acquisition and maintained correct responding when the typical peer models were removed.

When utilizing response prompts, fading of the prompt is also an essential element to promoting independence. Fading of the prompt used involves a transfer of stimulus control from

the prompts to the target stimulus. The three types of fading procedures used in this study were most-to-least, least-to-most and increasing time delay.

Most-to-least (MTL) prompt fading involves a decreasing prompt hierarchy through successive sessions. This would involve the teacher providing the most intrusive prompt first and gradually fading the intrusiveness of the prompt until the student is able to independently participate in a desired response. Jerome, Frantino, and Sturmey (2007) used MTL prompting to teach three adults with autism to access Internet sites. The prompting hierarchy consisted of hand-over-hand guidance, hand-over-wrist, hand-over-elbow and hand-over-shoulder guidance until no prompts were needed. This method of prompt fading is said to be associated with the least amount of errors than least-to-most prompting methods (Libby, Weiss, & Ahearn, 2008).

Least-to-most (LTM) prompt fading is an increasing prompt hierarchy through successive sessions. This method involves the teacher providing the least intrusive prompt first and gradually providing more intrusive prompting, as needed to complete a response. Typically in LTM, a brief time period is allotted for the student to respond independently. If no response, the next intrusive prompt is provided and so on until the most intrusive prompt is given. Horner and Keilitz (1988) taught eight mentally retarded adults the steps of a toothbrushing chain using LTM prompt fading. The hierarchy was faded so that initially no help was given for 5 s. If no initiations were made, a verbal prompt was then given and if incorrect responses resulted, verbal instructions about the desired task were then given to the student. If still no correct responses followed, demonstration-plus-verbal prompts were then implemented so that the therapist would demonstrate the desired response while simultaneously verbally describing the response; if still no correct responding resulted from this prompt, then physical guidance-plus-instruction was implemented in which the instructor physically assisted the participant while verbally describing

the desired response. This method was successful in increasing toothbrushing skills as compared to baseline for all participants, and was successful in teaching all steps for 6 participants. A combination of LTM and MTL prompting has also been combined in order to teach janitorial skills to 11 adolescents with mental retardation (Cuvo et al., 1978). Out of the 181-step task analysis (TA), 20 of these were deemed as more 'difficult' and therefore taught with the MTL prompting method whereas the remaining steps were taught with LTM prompting. The MTL fading hierarchy consisted of verbal instruction plus modeling, verbal instruction plus graduated guidance, verbal instruction, and no help. The steps taught with the LTM procedure went from verbal instruction, verbal instruction plus modeling, verbal instruction plus graduated guidance. This methodology was successful in teaching the janitorial skills, including their maintenance and generalization.

Time delay fading has been described as a method of transferring stimulus control between the natural cue and a controlling stimulus by steadily varying the delay interval (Touchette, 1971). This near-errorless procedure is employed when the prompt is paired with the target stimulus to which control will be transferred. Over trials, the delay is inserted between the two, which allows independent responding on the part of the participant when the control is transferred to the task from the prompt (Schuster, Gast, & Wolery, 1988). Constant time delay and progressive time delay are the two types of commonly used delays. In constant time delay a fixed interval is inserted between the prompt and the target stimulus. In progressive time delay, the time interval gradually increases throughout sessions. Schuster et al. (1988) used a 5-s constant time-delay to teach food preparation skills to four mentally retarded students. This procedure was effective across all participants, maintained over a 3-month period and generalized from school to home for two participants. Ingenmey & Van Houten (1991) used a

progressive time delay to teach spontaneous speech during play. Verbal prompts were delivered on a gradually increasing delay. This increased the child's spontaneous speech on the items that were trained and generalization to untrained items in the context of toy play. One problem that has been noted in using the time delay fading is that prompt dependency may develop and the students may simply wait for a prompt to be delivered rather than respond independently (Oppenheimer, Saunders, & Spradlin, 1993).

Teaching socially significant skills to individuals with autism has been successful through the use of behavior chains (Libby et al., 2008). As defined by Libby and colleagues, a behavior chain is a sequence of responses leading to a terminal behavioral objective. In order to develop a behavior chain, a given task is broken up into simpler steps and then taught in a step-by-step manner. The purpose is therefore to break down large, complex tasks into simple, discrete responses. These responses are then developed into a TA. The task analysis describes in detail the steps necessary to complete a behavior chain (Libby et al.). Libby et al. used forward chaining in which the chain was taught in its naturally occurring order, starting with training the initial step first. Upon a correct response at the training step, reinforcement was delivered and when that step was considered mastered, the next step to the chain was added on and so on until the entire chain was completed independently. Critical factors in evaluating chaining procedures are effectiveness and efficiency of teaching (Libby et al.). Defining a procedure as effective depends on if the desired skill was acquired and efficiency is defined as the speed or number of learning trials it takes for the participant to reach independence at the skill, also taking into consideration the amount of errors (Gast, Doyle, Wolery, & Ault, 1991).

All of the previously mentioned procedures have been shown to be widely effective in teaching skills to students with autism and other developmental disabilities. The area lacking in

this line of research are studies that directly compare teaching procedures to one another in order to find the most efficient method for a given student. The few studies that have compared different prompting procedures have continuously shown that individualized treatments have been more effective when tailored to an individual rather than using a particular procedure across participants (Bourret et al., 2004; Libby et al., 2008).

Bourret and colleagues (2004) conducted a study that used individualized treatments to teach manding skills to three participants with deficits in communication. The first experiment involved a pretreatment assessment identifying deficits in manding. This was done because it was thought that different deficits would result in the need for different instructional strategies. The three different prompt types were a non-specific prompt, a model prompt and a phoneme prompt. In the second study, based upon the results of the first study, individualized procedures were developed and these were found to be effective in producing vocal manding. This study showed the effectiveness of treatment tailored to an individual. This study, however, did not compare treatments against one another to determine effectiveness.

Murzynski & Bourret (2006) directly compared LTM prompting in combination with video modeling with LTM alone to teach daily living skills to two boys with autism. The LTM prompting procedure consisted of vocal, gesture, physical guidance at the forearm, and hand-over-hand physical guidance. The daily living skills examined were juice making, sandwich making, shirt and pant folding. Results showed that the chains taught with LTM plus video modeling were acquired faster and with fewer prompts than those taught with LTM alone.

Libby et al. (2008) directly compared MTL prompting to LTM prompting in teaching five children with developmental disabilities to build Lego® structures with blocks. Four participants were diagnosed with autism and the fifth with a pervasive developmental disorder.

Each participant was taught an arbitrary 8-step chain using both the MTL and the LTM prompting sequence. Results indicated that three participants learned most rapidly with LTM. The two remaining participants did not acquire the chain trained with LTM until it was switched to MTL. These results further support the need for individualized training procedures based upon an individual's learning history and repertoire.

These studies show the need for a more standardized procedure to identify effective treatment tailored to an individual's repertoire. No research to date has evaluated a generally applicable method for identifying and verifying optimal teaching procedures for particular individuals. The development of such a procedure may allow for the identification of a specific person's learning style prior to initiating intensive training. The purpose of the current study was to evaluate a method for identifying differentially effective teaching procedures.

Method

Participant and Setting

One boy diagnosed with an autism spectrum disorder who attended a day facility for students with autism and other developmental disabilities participated in the study. Andrew was a 10-year-old boy who communicated vocally and often had trouble attending to tasks and acquiring new skills. Andrew could follow 2-step directions and was in a 1:1 teacher: student ratio during the entire school day.

Sessions were conducted in the participant's classroom or a research room (1.5 m by 3 m) equipped with a table and two chairs, data sheets, pens, three Lego® sets, the highest preferred edibles and a video camera.

Materials

Twelve separate Lego® constructs were developed and then tested to match difficulty levels. Each set consisted of a main base (red, yellow or green) of which seven other pieces were built upon. Each set was then assigned to a specific phase and response prompt. An 8-step TA was developed for each of the 12 Lego® sets describing the specific placement of each of the building blocks; the first step was always to pull the base out from the pile of blocks. The base piece indicated where the first block was to be placed by shaded permanent marker (as in Libby et al.,2008).

Experimental Design

This study was similar in design to Libby et al. (2008). Prior to initiating training, a paired stimulus preference assessment was conducted based on the procedures of Fisher, Piazza, Bowman, Hagopian, Owens, and Slevin (1992). The most highly preferred edible found in the assessment was used as the reinforcer for correct prompted or independent responses. The preference assessment results can be seen in Figure 1. An alternating treatments design was used to assess the effects of different prompt modalities at the individual level. Experimental control was demonstrated if acquisition of a specific prompt was reliably faster with a specific prompt and fading procedure. The acquisition rate was measured by the number of trials it took the participant to acquire the behavior chains.

Phase 1. Phase 1 consisted of directly comparing three response prompts, including manual guidance, modeling, and verbal-plus-gestural cues, in an alternating treatments design. These three modalities were chosen because they are most commonly used to teach behavior chains and are used across a wide variety of skills. The verbal paired with gesture prompt cued the participant to “Pick up *color* block and put here” while simultaneously pointing to

corresponding block and position. The model prompt consisted of the therapist moving the construct in front of her and demonstrating the appropriate placement of the block, pausing for 2 s and then removing the block and placing it back in the pile for the participant to then respond. The manual guidance prompt consisted of hand-over-hand guidance of the placement of the blocks. After a correct prompted response, the prompt was faded in the next trial by delivering it 1-s, then 2-s, then 4-s after the stimuli were presented and then not at all (independent step). Before the initiation of training, probe sessions were conducted in order to determine if the participant was able to correctly place any of the Lego pieces without training. At the occurrence of an error or 15 s without any response, the probe trial was discontinued and training began at that step. All trials began with, “Let’s build Legos®” to signal the beginning of each trial. The eight Lego® pieces were randomly placed in a pile at arm’s length from the participant. Each construct consisted of eight piece Lego® sets which contained a base (differing in color depending on teaching modality) and seven additional pieces, which were to be placed in a predetermined structure assigned to each teaching modality.

The first trial of all modalities consisted of immediate prompting. The next three prompts were on an increasing time delay. Criteria to increase the training step were two independent correct responses at any prompt level, and two correct responses at the current step resulted in the use of the next less intrusive prompt. If two consecutive errors occurred at the training step, the next restrictive prompt was then used. Two consecutive incorrect responses on a previously mastered step resulted in the retraining of that step at the most restrictive prompt. Reinforcement consisting of the preferred edible and verbal praise such as “Nice job!” was delivered for all correct prompted and independent responses and withheld for any errors or upon no response from the participant. The trial was then discontinued. Immediately upon an error or

in the case of no response from the participant, all stimuli and attention were removed and a new trial would begin. Mastery criterion was the independent completion of the entire chain for two consecutive trials.

Once a construct with a particular teaching method was mastered, the procedure was then replicated with a new set of Lego® constructs to verify the results. Once again, three different Lego® constructs were used, each using a different predetermined construct specific to each teaching modality. If the construct using the same response prompt was again mastered first, then replication was successful and the participant moved on to Phase 2 of the study. If mastery criterion was met on a construct using a different response prompt than identified in Phase 1, Phase 1 was repeated with new Lego® constructs.

Phase 2. Phase 2 was an analysis of different fading procedures for the most effective prompt modality found in Phase 1. This involved teaching three new arbitrary response chains with new Lego® sets. The procedures were identical to those in Phase 1, except three fading methods with the prompt identified in Phase 1 were compared.

The LTM fading procedure consisted of providing the less intrusive prompt first, and providing more and more intrusive prompts every 2 s until the participant responded. If the most effective prompt was verbal plus gestural cues, then fading consisted of five prompt levels: independent, initial verbal, initial verbal plus gesture, partial verbal plus gesture and full verbal plus gesture. LTM fading procedure for the model prompt, if identified in Phase 1 as the most effective prompt, also consisted of five prompts consisting of independent, initial model (lifting up next block 1 inch above table for 2 s), partial model (lifting the next block and bringing it to the top middle of the base piece), base model (lifting the block and hovering it over the base piece to its designated position) and finally full model (lifting up block and placing it in its

correct position on the base piece). Finally if manual guidance was identified as the most effective prompt, LTM fading was as follows: independent, light touch/shadow, MG at upper arm, MG at forearm and hand-over-hand guidance.

MTL fading procedures consisted of immediately providing the most intrusive prompts first and not allowing for independent responding until the fifth and final prompting step. If the prompt found most effective in Phase 1 was verbal plus gestural then MTL consisted of full verbal plus gesture, partial verbal plus gesture, initial verbal plus gesture, initial verbal, and then no prompt (independent). If the model prompt was used then MTL consisted of full model, base model, partial model, initial model, and no prompt (independent), using the same methods as in LTM. Finally, if manual guidance was the most effective prompt then the prompt hierarchy was hand over hand, manual guidance at forearm, manual guidance at upper arm, light touch/shadow, and no prompt (independent).

Delay fading was using a progressive time delay procedure. For all prompt types delay fading was that prompt at 0 s (no) delay, 1 s delay, 2 s delay, 4 s delay and then no prompt (independent).

Criteria to increase or decrease a step or prompt were the same as those used in Phase 1 of the study. Once again probe trials were conducted prior to initiating training a new chain and training was started at the first step completed incorrectly or for which there was no response. Once the participants mastered one of the Lego® constructs with a particular fading procedure, replication of Phase 2 began. The replication of Phase 2 consisted of the same procedures as the initial Phase 2. If the participant mastered the new chain with the same fading procedure then Phase 3 began.

Phase 3. The teaching procedure found to be most effective and the teaching procedure found to be least effective were compared to each other while teaching more socially significant skills. The prompt and fading procedures found to be most effective from the previous phases were compared to the least effective procedures. Socially significant skills such as pant folding and shirt folding were broken up into 8 equally difficult steps and randomly assigned to a teaching procedure. Both socially significant skills were taught to the participant using an alternating treatments design. Once one chain was mastered, the other less successful teaching procedure was then switched to the most successful teaching method so that both skills were acquired.

Interobserver Agreement and Procedural Integrity. Interobserver agreement (IOA) was assessed by having a second observer in the research room simultaneously collect data or collect post-session data using videotaped sessions. The reliability observers either had their Masters in Severe Special Needs or were 2nd year students in a Masters in Applied Behavior Analysis program. All observers worked in the school where the research was conducted and had daily experience with conducting task analyses. They were either involved in the same experiment and had received training or were trained by the experimenter in the procedure and specific prompt hierarchies. Agreement was calculated on a session-by-session basis on at least 33% of all sessions. Reliability was calculated by dividing the number of agreements by the total number of agreements plus disagreements and multiplying by 100%. Mean agreement scores on the training step performance was 99% across conditions (range, 92% to 100%). Procedural integrity was also taken on the experimenter conducting the sessions by trained observers prior to initiating training and during the first sessions with the participants. Data were taken on the

accuracy of prompting procedures, prompting correct responses and delivery of reinforcement. Procedural integrity scores were 100%.

Results

Phase 1. Andrew's acquisition graphs may be seen in Figures 2 and 3. These graphs show the number of consecutive independent steps on the last training trial of each session as a function of prompt modality. In Phase 1 Andrew mastered the chain with the model prompt in 16 sessions. His responses were variable in all conditions until the 14th session when an increase in rate of acquisition occurred with the model prompt. By the last session, Andrew had acquired 4 consecutive independent steps in the constructs associated with verbal plus gestural and manual guidance prompts. During replication of Phase 1, Andrew again mastered the chain with a model prompt first (in 10 sessions) as can be seen in Figure 3. Independent steps were variable throughout all prompt modalities. By the last session Andrew had acquired seven consecutive independent steps in the constructs assigned to the verbal plus gestural prompts and manual guidance prompts.

Phase 2. Andrew's acquisition graphs may be seen in Figures 4 and 5. These figures show the number of consecutive independent steps on the last training trial of each session as a function of the prompt fading strategy. In Phase 2, Andrew mastered the construct using a model prompt with a time delay procedure in nine sessions as shown in Figure 4. Independent responding with the time delay fading was consistently higher than the other two fading procedures. By the 9th session, Andrew had acquired four consecutive independent steps using the LTM fading procedure and three consecutive independent steps using the MTL fading procedure. During replication, Andrew again first mastered the chain using modeling prompts with a time delay (in six sessions) as shown in Figure 5. During replication, modeling with time

delay also consistently had more independent steps than the other two fading procedures except in Session 2, where LTM had four independent steps. By the 6th session, Andrew had only three consecutive independent steps in the MTL fading procedure and two consecutive independent steps in the LTM fading procedure.

Phase 3. Andrew's acquisition graphs may be seen in Figure 6. Model with a delay, which was the teaching procedure found to be most effective for Andrew in Phases 1 & 2 was directly compared with verbal-plus-gestural prompts using a MTL fading hierarchy, which was the teaching procedure found to be least effective. The teaching procedure consisting of model with a time delay was assigned to the pant folding TA and the teaching procedure of verbal-plus-gestural prompts with MTL fading was assigned to the shirt folding TA. Andrew mastered pant folding in 24 sessions and had only 2 consecutive independent steps in the shirt folding TA. It can be seen that Andrew had trouble acquiring responses past Step 3 of this TA, but in Session 20, his rate of acquisition increased. It is also noted that Andrew was stalled at performing Step 1 of the shirt folding TA due to repeatedly completing the second step of the chain incorrectly. At Session 25, the shirt folding TA was switched to the model prompt using the time delay fading procedure and acquisition was acquired in four sessions.

Discussion

The results of the current study show the need for individualized, data-driven research directed towards identifying the most efficient teaching procedures for individuals with autism. The procedures used in the current study showed reliable utility as a general pre-teaching assessment; the results of Phases 1 and 2 were shown to generalize to more socially significant skills such as shirt and pant folding. This may be extremely useful prior to implementing intensive training. Similarly, when skills are not being acquired, this assessment may be applied

to determine a more appropriate teaching method for a particular individual. This is also useful due to the fact that.

As Phase 1 indicated, Andrew mastered the initial exposure to the Lego® structures with the model prompt. Replication of Phase 1 also resulted in mastery of the chain taught with the model prompt. Phase 1 was successful in determining the most effective prompt modality for Andrew.

The results of Phase 2 suggested the prompt fading procedure most effective for Andrew was the increasing time delay. This procedure consistently had higher amounts of independent steps than the other fading procedures in the initial exposure and also in the replication phase, except for Session 2 when a mistake on Step 3 terminated the session. This supports previous research in that differentially effective prompting procedures for an individual are identifiable.

The results of Phase 3 validate the previous phases' findings by confirming the most efficient prompt modality and fading procedures. As predicted by the first phase, Andrew learned best with a model prompt method and as predicted by the second phase, Andrew learned most efficiently through the time delay fading procedure. By applying these findings to more socially significant skills, it can be seen that efficiency and effectiveness were in fact a direct replication of the findings from the earlier phases. The shirt folding TA was not acquired until it was finally switched to the teaching procedure with the model and time delay fading strategy, which further validates previous phases' findings.

A limitation of this study is that a limited amount of socially significant skills were tested, so this method may not be applicable across all skills. Shirt and pant folding were the only socially significant skills tested for generality in the current study and it is unclear whether other these results would also generalize to other socially significant skills such as vocational

tasks or food preparation. Further research in this ongoing study is currently assessing other socially significant skills to overcome this limitation. Another limitation of the current study is that in Phase 1, the fading procedure used for all prompts was an increasing time delay. This could have skewed the results of Phase 2 due to the fact that the participant had already been exposed to this fading procedure prior to it being compared with the MTL and LTM fading prompts. This can be avoided in the future by providing the prompt types in Phase 1 and then, instead of implementing a fading strategy, conducting probe sessions to assess acquisition with the different prompt types. A third limitation was that the verbal-plus-gestural prompt did not isolate one single prompting method and is not commonly used in clinical settings. Further research should assess the verbal prompt in isolation.

Future directions in this line of research would be to apply the current study's assessment protocol to students in classroom settings in order to increase efficiency in skill acquisition. If every student had a specific individualized teaching plan which was clinically found to be the most effective and efficient, teachers' time could be better focused on other aspects of the child's behavior programs instead of spending intensive training time using an ineffective method. Given effective teaching procedures, students' rate of acquisition would increase thereby allotting more time to learn even more socially significant skills. According to Bear, Wolf and Risley (1968), effectiveness is one of the seven fundamental characteristics that are important when designing an intervention. This seminal article points out that an intervention must alter behavior enough to be socially important. Baer et al. also suggest that if the techniques do not produce effects for practical value, then application has failed. Future research could also apply similar assessment methods to identify effective teaching procedures for discrete trial training procedures for skills such as match-to-sample discriminations and other academic programs.

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Figure Captions

Figure 1: Represents the results of Andrew's preference assessment. Grapes and peaches were both picked in 93% of opportunities.

Figure 2. Represents initial exposure to Phase 1. Andrew acquired the chain with the model prompt modality. It took 16 sessions for him to acquire the chain.

Figure 3. Represents replication of Phase 1. Andrew acquired the chain with the model prompt. It took him 10 sessions to master the chain.

Figure 4. Represents initial exposure to Phase 2. Andrew mastered the chain using the model prompt with an increasing time delay. It took him 9 sessions to master the chain.

Figure 5. Represents the replication of Phase 2. Andrew mastered the chain using the model prompt with an increasing time delay. It took him 6 sessions to master the chain.

Figure 6. Represents Phase 3. Andrew mastered the pant-folding task using the model prompt and an increasing time delay. He mastered this chain in 24 sessions. The phase line indicates the 25th session when the shirt folding TA was switched from the teaching procedure with verbal and gestural prompts and MTL fading to the teaching procedure with model prompts and an increasing time delay fading strategy; Andrew then mastered this chain in four sessions.

Figures

Figure 1.

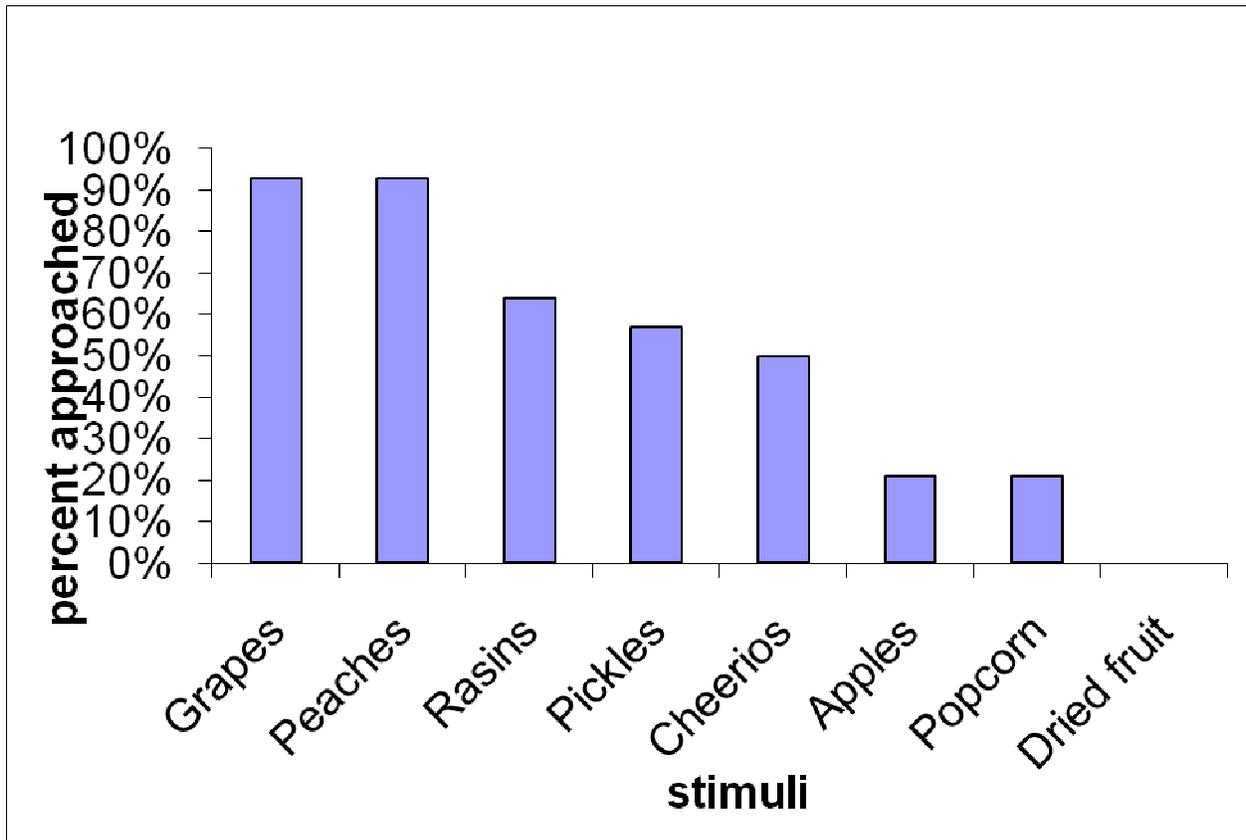


Figure 2.

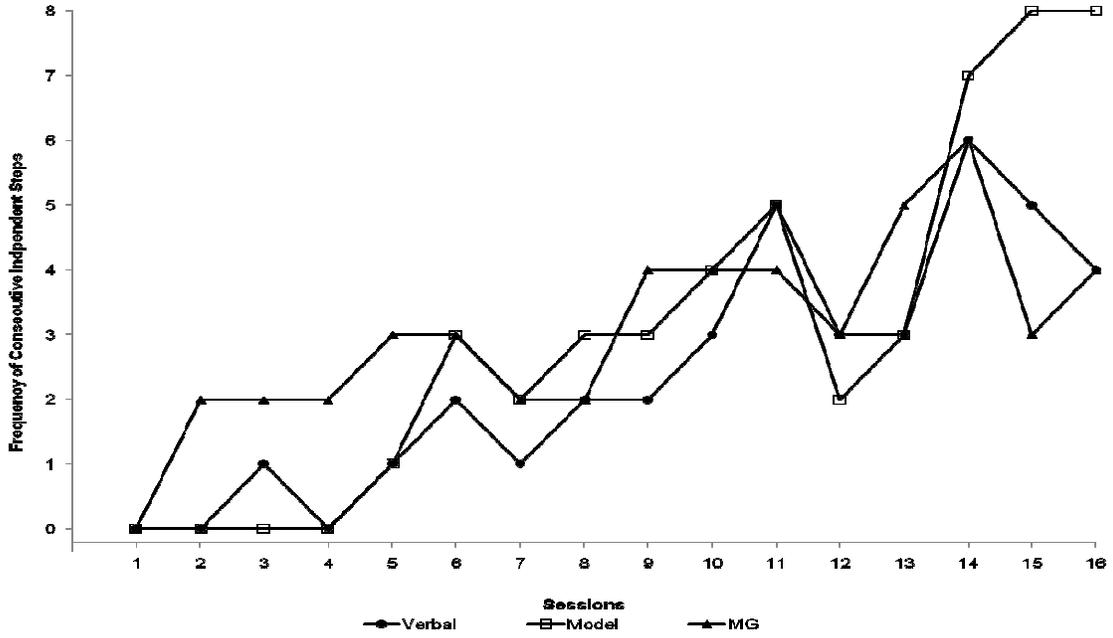


Figure 3.

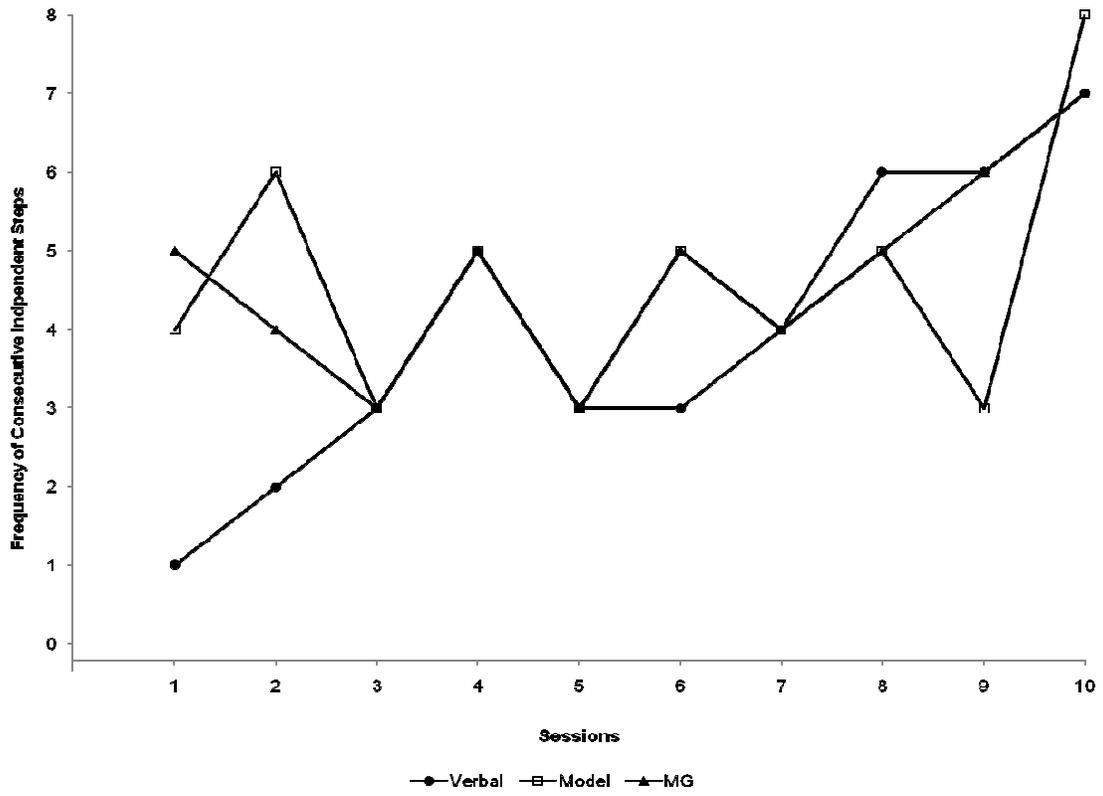


Figure 4.

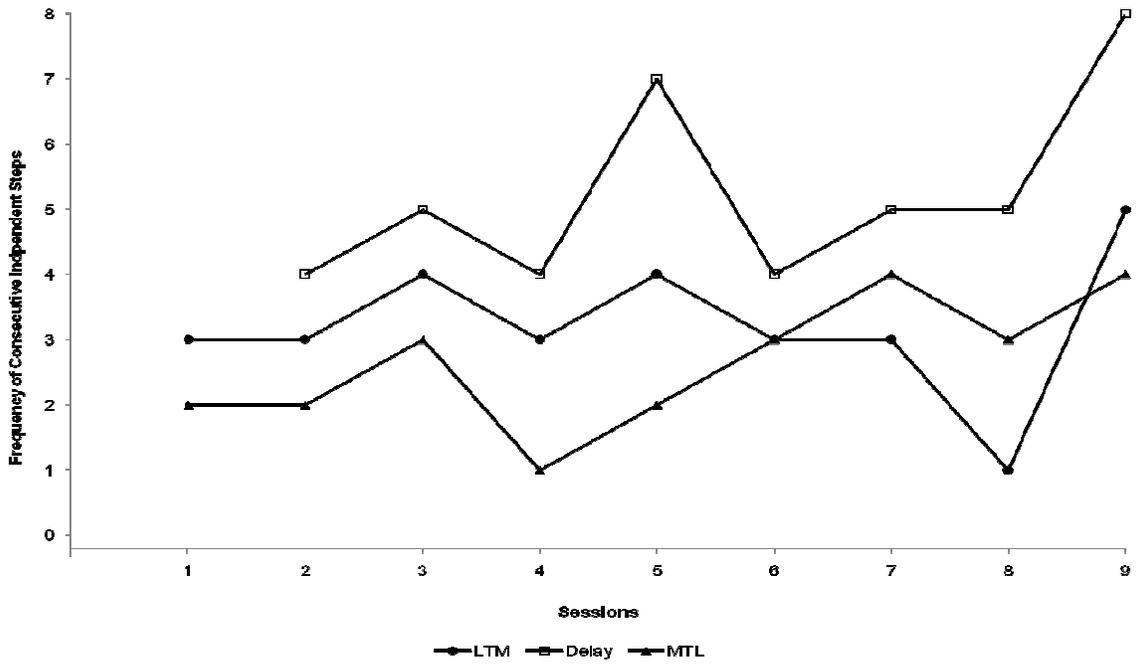


Figure 5.

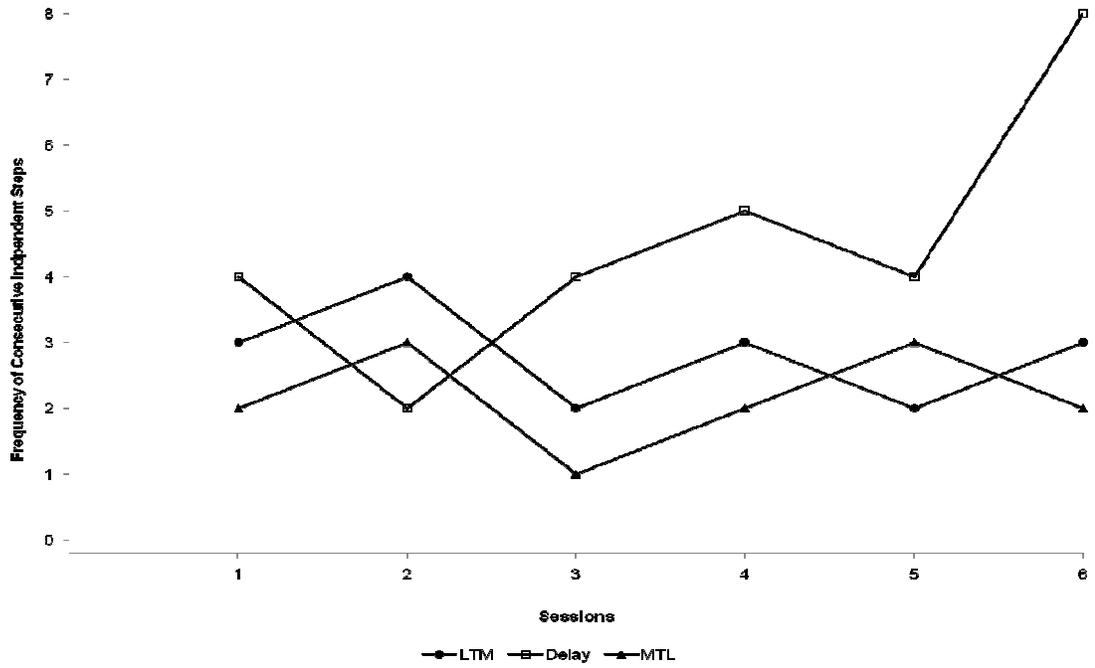


Figure 6.

