Assessing Prompting and Prompt-Fading Strategies in Individuals with Autism Spectrum Disorder

Ashley L. Frankenfield
University of South Florida

Follow this and additional works at: https://digitalcommons.usf.edu/etd

Part of the Behavioral Disciplines and Activities Commons, and the Psychology Commons

Scholar Commons Citation

This Thesis is brought to you for free and open access by the USF Graduate Theses and Dissertations at Digital Commons @ University of South Florida. It has been accepted for inclusion in USF Tampa Graduate Theses and Dissertations by an authorized administrator of Digital Commons @ University of South Florida. For more information, please contact digitalcommons@usf.edu.
Assessing Prompting and Prompt-Fading Strategies in Individuals with Autism Spectrum Disorder

by

Ashley L. Frankenfield

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Applied Behavior Analysis Department of Child and Family Studies College of Behavioral and Community Sciences University of South Florida

Major Professor: Sarah E. Bloom, Ph.D., BCBA-D Catia Cividini-Motta, Ph.D., BCBA-D Kimberly Crosland, Ph.D., BCBA-D

Date of Approval: March 15, 2021

Keywords: prompt dependency, intraverbal behavior, skill acquisition, language translation

Copyright © 2021, Ashley L. Frankenfield
Table of Contents

List of Tables .......................................................................................................................... ii

List of Figures ......................................................................................................................... iii

Abstract ....................................................................................................................................... iv

Assessing Prompting and Prompt-Fading Strategies in Individuals with Autism Spectrum Disorder .......................................................................................................................... 1

Method ......................................................................................................................................... 6
  Participants and Setting ........................................................................................................ 6
  Materials ............................................................................................................................... 6

Dependent Variables, Interobserver Agreement, Procedural Integrity, and Social Validity ................................................................................................................................. 7

Preference Assessment ........................................................................................................... 8

Design and General Procedure .............................................................................................. 9

  Prompting Assessment ........................................................................................................ 9
    Prompt Types .................................................................................................................... 10
    Baseline Phase ............................................................................................................... 10
    Assessment Phases ......................................................................................................... 10

  Prompt-Fading Assessment ............................................................................................... 11
    Prompt-Fading Procedures ............................................................................................ 11
    Assessment Phases ......................................................................................................... 12

  Comparing the Prompt/Prompt-Fading Combinations .................................................... 13
    Assessment Phases ......................................................................................................... 13

Results ........................................................................................................................................ 14

Discussion .............................................................................................................................. 28

References .............................................................................................................................. 32

Appendix A: Spanish Words List .......................................................................................... 37

Appendix B: Procedural Integrity Checklist .......................................................................... 44

Appendix C: Social Validity Parent Survey .......................................................................... 46
List of Tables

Table A1: Spanish Words List..................................................................................................................37
List of Figures

Figure 1: WK Prompt Assessment Combined Results .......................................................... 16
Figure 2: WK Prompt Assessment Separated Results .......................................................... 17
Figure 3: MC Prompt Assessment Combined Results ......................................................... 18
Figure 4: MC Prompt Assessment Separated Results ......................................................... 19
Figure 5: WK Prompt-Fading Assessment Combined Results ............................................ 20
Figure 6: WK Prompt-Fading Assessment Separated Results ........................................... 21
Figure 7: MC Prompt-Fading Assessment Combined Results ............................................ 22
Figure 8: MC Prompt-Fading Assessment Separated Results ........................................... 23
Figure 9: WK Most-Versus-Least Efficient Comparison Combined Results ....................... 24
Figure 10: WK Most-Versus-Least Efficient Comparison Separated Results ...................... 25
Figure 11: MC Most-Versus-Least Efficient Comparison Combined Results ....................... 26
Figure 12: MC Most-Versus-Least Efficient Comparison Separated Results ....................... 27
Abstract

Autism spectrum disorder (ASD) is characterized by restricted interests, repetitive behaviors, and deficits in social and communication skills. In order to help a person with ASD improve their communication skills, behavior analysts should place emphasis on teaching intraverbal skills. Each person has a unique learner history, meaning that different prompts and prompt-fading techniques will result in the most accurate and efficient mastery of intraverbal skills for different people. Assessments were used to identify each participant’s most efficient combination of prompt and prompt-fading procedures in order to maximize one’s potential for learning new skills. Participants’ most efficient prompt/prompt-fading combinations resulted in faster mastery of intraverbal skills compared to their least efficient combinations. These results highlighted the importance of individualized strategies for teaching novel behaviors.

Author Note: Due to the COVID-19 pandemic the thesis requirements for students graduating from the USF ABA program in 2021 have been modified and may include fewer participants, case studies, or a literature review. This study was completed as a thesis by the first author.
Assessing Prompting and Prompt-Fading Strategies in Individuals with Autism Spectrum Disorder

According to the American Psychological Association (2013), approximately 1% of the world’s population—77 million people—have Autism Spectrum Disorder (ASD). Common characteristics among individuals with ASD include social deficits, restricted interests or repetitive behaviors, and underdeveloped communication skills (Kuhlthau et al., 2013). Diagnosis of ASD is typically given to a child around the age of 2 (American Psychological Association, 2013). In an effort to promote independent life functioning for a person with ASD and help build foundational skill repertoires, applied behavior analysis (ABA) services are used in an early intervention model to improve social functioning and communication skills, as well as widen restricted interests and decrease repetitive behaviors (Peters-Scheffer et al., 2011).

Intraverbal behavior is an important element of social functioning and development as it allows humans to communicate with one another (Watkins et al., 1989). Skinner (1957) defined intraverbal behavior as a verbal response evoked by a non-corresponding stimulus. The most common intraverbal behavior can be observed when people hold conversations because each response evokes a new response from the other person (Sundberg & Sundberg, 2011). For example, when someone says, “Good” after being asked how they are and regardless of how they feel, that response is intraverbal behavior. Intraverbal behavior is more complex than other verbal behaviors such as mands, tacts, and echoics because it can allow for the exchanging of new ideas and communicating abstract thought (Skinner, 1957). Behavior analysts often target
increased engagement in intraverbal behavior for their clients diagnosed with ASD to address the deficit in communication skills individuals with ASD tend to have (Shillingsburg et al., 2018).

Prompts are often used to teach intraverbal behavior (Goldsmith et al., 2007). Prompts are additional stimuli used to evoke a specific response after the presentation of a stimulus alone did not result in the desired response (Collins et al., 2018). If a person engages in a target behavior after a prompt is delivered, reinforcement should be provided immediately after the response to help the person learn to engage in the behavior again in the future (Rinke et al., 1978).

Prompting procedures associated with intraverbal behavior include echoic, textual, and picture prompts (Ingvarsson, 2011). Echoic prompts evoke a vocal response when the learner hears a word or statement and then repeats it (Valentino et al., 2012). Textual prompts involve written or typed words displaying a word or statement which are then read aloud by the learner (Emmick et al., 2010). Picture prompts can be used to prompt an intraverbal response because a person can label the image when it is presented (Braam & Poling, 1983). Ingvarsson and Hollobaugh (2011) discovered that their participants acquired intraverbal skills more efficiently with visual prompts versus vocal prompts. However, the authors attributed this finding to the participants having similar learning histories, which were the prompts participants were the most familiar learning with in the past (Ingvarsson and Hollobaugh, 2011).

A person’s unique learning history is the biggest determinant for identifying the prompting procedure that is most effective for that person (Kay et al., 2020). Prompts that had been used recently to teach skills to a learner were found to be more effective in teaching new skills than prompts that had not been used recently (Coon & Miguel, 2012). The effect of
recency on efficiency of prompts was found to apply to individuals with ASD in addition to those who were typically developing (Roncati et al., 2019).

Sometimes a person only engages in a desired behavior after a prompt is given and thus becomes prompt dependent. Prompt dependency is problematic because a person is unable to initiate behaviors unless an unnatural stimulus like a blinking light or another person verbally telling the individual to engage in the behavior is present. A behavior like brushing teeth should ideally be under the control of a natural stimulus, like upon waking up in the morning, rather than an added stimulus like a parent providing a verbal reminder. Prompt dependency must then be decreased through the transferring of a discriminative stimulus from the prompt stimulus to a stimulus that exists in the natural environment (Wolery & Gast, 1984).

Transferring of stimulus control can be done by either using differential reinforcement for independent responses or by fading prompts (Thomas et al., 2010). Differential reinforcement for independent responses is the delivery of reinforcement for unprompted responses and the withholding of reinforcement for prompted responses (Karsten & Carr, 2009). Desired responses that only occur when a prompt is given are placed on extinction, leading to only independent desired responses emitted from the learner (Boudreau et al., 2015).

Cividini-Motta and Ahearn (2013) compared the use of highly preferred reinforcers versus moderately preferred reinforcers and highly preferred reinforcers versus no reinforcers for independent versus prompted responses. The authors found that although both forms of differential reinforcement were effective in reducing prompt dependency, the effectiveness likely depended on learner preference (Cividini-Motta & Ahearn, 2013). Fiske et al. (2014) evaluated the use of magnitude-based differential reinforcement and found that skill acquisition was most rapid when the prompted responses were reinforced with a small amount of a highly preferred
stimulus and independent responses were reinforced with a larger amount of a highly preferred stimulus.

Prompt-fading, the other method of transferring stimulus control, is the gradual decrease in prompt delivery by requiring higher learner effort with each repeated response continuing to receive reinforcement until the learner can independently respond (MacDuff et al., 2001). Prompt-fading techniques include progressive prompt delay (PPD), least-to-most prompting (LTM), and most-to-least prompting (MTL) (Schnell et al., 2020). PPD involves the gradual increase in time between the presentation of the intraverbal-eliciting stimulus and a prompt as the learner begins to respond independently (Kodak et al., 2012). LTM prompting uses the least intrusive prompt first to evoke a desired response and, if the response does not occur, works its way up to the most intrusive response until the response is emitted (Doyle et al., 1988). Wolery and Gast (1984) describe MTL prompting as beginning with the most intrusive prompt and gradually decreasing the prompt’s level of intrusiveness until an independent response is learned.

Researchers have studied the effectiveness of both prompting and prompt-fading techniques (Libby et al., 2008; Schnell et al., 2020; Seaver & Bourret, 2014). When comparing LTM prompting and MTL prompting, MTL prompting tends to result in less errors while a learner is rehearsing a behavior, but LTM prompting tends to result in a quicker mastery of the behavior (Libby et al., 2008). Seaver and Bourret (2014) examined and compared efficiencies of prompt and prompt-fading strategies in building specific Lego structures by conducting a series of assessments to find the most efficient prompt and prompt-fading combination for each participant. Assessments to identify the most efficient prompts and prompt-fading methods were done by comparing how many steps of building Lego structures were completed independently under each of the prompt and prompt-fading procedure conditions, with the conditions having
the highest independent responses considered as the most efficient (Seaver & Bourret, 2014). Once the most efficient prompt and prompt-fading methods were identified for an individual, the combination was used to teach new skills with the highest speed and accuracy (Seaver & Bourret, 2014). The efficiency of a prompt/prompt-fading combination was evaluated by comparing the time it took for a person to master a new skill using the most and least efficient combinations identified in the assessments (Seaver & Bourret, 2014). Schnell et al. (2020) found that participants mastered new auditory-visual conditional discrimination skills in significantly lower numbers of sessions using their most efficient prompt/prompt-fading combination, whereas the least efficient combinations did not lead to mastery and learning skills required more sessions. Before now, there had yet to be an application of prompt/prompt-fading assessments on intraverbal behavior.

This study applied the use of prompt/prompt-fading assessments with intraverbal behavior, specifically language translation. A common intraverbal behavior that is taught is the translation of words from a different language (Lane, 1964). Given that Spanish is the second most popular language spoken in the United States, it is beneficial for a young American to learn Spanish (Ryan, 2013).

The purpose of this study was to extend upon the prompt/prompt-fading research conducted by Seaver and Bourret (2014) and Schnell et al. (2020) through evaluating the effectiveness of the assessments in the acquisition of intraverbal skills while preventing the development of prompt dependency. The study compared percentages of correct responding within the various prompt and prompt-fading conditions to identify a unique combination that allowed each individual to learn Spanish-to-English translations most efficiently.
Method

Participants and Setting

Two children with ASD diagnoses participated in the study. WK was 15 years old and MC was 10 years old. Participants came from a non-Spanish speaking household. Inclusion criteria also required participants to be capable of reading three-letter English words. WK read at a first-grade reading level and MC read at a second-grade reading level. Parents of the participants reported that their child had not yet acquired the skills for Spanish words or only knew less than 10% of the terms provided on a list (see Appendix A). If a participant had known more than 0% but less than 10% of the Spanish words listed, those words would have been replaced with unknown Spanish words equivalent to the ones known. Participants had learning histories with at least one prompt and prompt-fading procedure used in this study. Children with severe problem behavior likely to occur during sessions were excluded from participating.

Sessions were held in the homes of the participants. Appropriate measures such as wearing masks were taken by the researcher to prevent any possible spread of COVID-19. The skills were practiced at tables in closed rooms for both participants. The areas were free from distractions such as highly preferred toys, siblings, and TV. Frequency of weekly sessions ranged from one to two days per week and were determined based on the availability of the participants.
Materials

Visual and textual prompts were placed on 3 in by 5 in index cards. Visual prompts consisted of cartoon images printed from the internet. Textual prompts were 3-letter English words to minimize the effort required by participants for reading. The words were typed and printed in Comic Sans font size 48 to be large enough to read and mimicked the print handwriting participants used in school. A cell phone camera was used to record sessions to assess the researcher’s data collection and implementation of the intervention. Small edibles were used as reinforcers for participants’ correct responses.

Dependent Variables, Interobserver Agreement, Procedural Integrity, and Social Validity

The acquisition of intraverbal skills was evaluated by calculating the percentage of trials with correct responding. A correct response was defined as the participant saying at an audible volume the correct English translation of the Spanish word provided and within 2 s of the researcher asking, “What is the English word for [Spanish word]?” For the sake of keeping participant responses and textual prompts simple, all Spanish words used in the experiment translated to three-letter English words. The number of correct responses was divided by the total number of opportunities for responding for each session and multiplied by 100 to calculate the percentage of trials with correct responding. After every trial, the researcher marked whether the response was correct or incorrect.

Interobserver agreement (IOA) was calculated for 32.9% of sessions to ensure internal validity of the study. A research assistant watched videos of recorded sessions and collected data on correct responding to compare to the data collected by the researcher. Exact count-per-interval IOA was evaluated, given that the behavior observed could either occur or not occur
IOA was calculated by dividing the number of agreements by the total number of agreements and disagreements, multiplied by 100. IOA was 100% for all sessions with both participants. In the case that IOA had dropped below the 90% requirement, the research assistant would have been re-trained on the operational definition of a correct response.

Procedural integrity was monitored for 26.2% of sessions by an independent observer watching recorded sessions. The procedural integrity was measured using a checklist (see Appendix B). The observer calculated the percentage of steps performed correctly by dividing the number of steps done correctly by the total number of steps and multiplying by 100. Procedural integrity was 100% for all sessions conducted with MC and for all but one session conducted with WK. The average procedural integrity during the prompt assessment sessions was 98.9% for WK. If procedural integrity had fallen below 95%, the researcher would have been re-trained on the steps included in the checklist.

Social validity was measured using a parent questionnaire (see Appendix C). The questionnaire had a 5-point Likert scale, with 1 being “strongly disagree” and 5 being “strongly agree.” Parents rated how efficient they found the intervention to be, how they thought their child liked working with the researcher, whether sessions affected daily routine schedules, and how practical they thought the intervention was.

**Preference Assessment**

Prior to any data collection, each participant underwent a preference assessment to identify potential reinforcers to use during the prompting and prompt-fading assessments. The stimuli used in the preference assessments were a variety of small edibles such as chips and candy. A multiple stimulus without replacement (MSWO) preference assessment was conducted
to identify the edibles that were the most potentially reinforcing for each participant (DeLeon & Iwata, 1996). The three most preferred edibles were used as reinforcers for correct responses during the prompt and prompt-fading assessments. At the beginning of every session, the participant was asked to pick one of the three edibles to work for to prevent habituation across sessions.

**Design and General Procedure**

Adapted from Schnell et al. (2020), a combination of an alternating treatments design and a modified trials to criterion was used. A control condition was included to compare percentages of correct responding when no prompts or prompt-fading procedures were used versus when using prompt and prompt-fading conditions.

The specific intraverbal skill targeted was stating the English translation for a Spanish word. The goal of the training was for participants to independently and correctly respond to the stimulus, which was the researcher asking, “What’s the English word for [Spanish word]?” A total of 33 Spanish words were used throughout the study (see Appendix A), so that with each new assessment and condition, novel words were being taught. Each condition was randomly assigned a list of Spanish words. The list of words was equated based on criteria outlined in Cariveau et al. (2020), with lists that did not contain rhyming words or words with the same beginning, middle, or ending sounds.

**Prompting Assessment.** Adapted from the Schnell et al. (2020) study, an assessment to identify the most efficient prompt was conducted with each participant. A baseline phase, which resembled the procedures outlined in the assessment phases but lacked a reinforcement
component, was used. A control condition lacking the use of any prompts was included in both the baseline and assessment phases.

**Prompt Types.** The prompts used in the prompting assessment included textual, visual, or echoic prompts (see Appendix A). Four different Spanish words were taught within each prompt condition. Textual prompts were given by placing a card in front of the participant with the correct response printed on it. Visual prompts were presented by placing a card containing an image of the correct response in front of the participant. Echoic prompts were the researcher vocalizing the entire response word for the participant to repeat.

**Baseline Phase.** The baseline phase consisted of presenting the stimulus simultaneously with either the textual, visual, or echoic prompt and waiting 2 s for a response. No additional prompts were provided, so the next stimulus was presented following the 2 s if no response was made. Regardless of whether a response was correct or incorrect, the researcher did not respond and moved on to the next trial. No prompt was presented with the stimulus in the control condition.

**Assessment Phases.** The assessment phases also consisted of presenting the stimulus simultaneously with either the textual, visual, or echoic prompt and waiting 2 s for a response. If the child responded correctly to the stimulus when presented simultaneously with the prompt, praise and an edible were delivered. If the participant correctly responded to 100% of trials with the simultaneous presentation of the stimulus and prompt for two consecutive sessions, the prompt was then delayed to 2 s after initial presentation of the stimulus and a “Phase 2” was initiated. Praise and edibles were still delivered upon correct responses in Phase 2. Two consecutive 50% or less correct responses in Phase 2 required a return to the simultaneous presentation of the stimulus and prompt, referred to as “Phase 1.” Training with a particular
Prompt ceased and was considered mastered if the participant correctly responded to 100% of trials for two consecutive sessions in Phase 2. If an incorrect response was made, the researcher did not provide any feedback or reinforcement and moved on to the next trial. No prompt was presented with the stimulus in the control condition. The assessment was considered complete once the participant mastered every prompt type or, for the sake of using the participants’ time wisely, if unmast ered prompt types took 25% more sessions than the number of sessions it took to master the first mastered prompt, as this indicated the mastery may take much longer or never occur.

**Prompt-Fading Assessment.** Once the prompting assessment was completed, an assessment to identify the most efficient prompt-fading procedure was also conducted with each participant. The first mastered prompt identified in the prompting assessment was used in the prompt-fading assessment. The prompt was broken down into three different levels on intrusiveness for the MTL and LTM procedures. For example, if a child mastered the visual prompt condition in the first assessment, the visual prompt was reprinted twice with increasingly less clear pictures to use as less intrusive prompts.

**Prompt-Fading Procedures.** The procedures used in the prompt-fading assessment included PPD, LTM, and MTL. Each prompt-fading strategy had four different Spanish words to teach. PPD had the same procedures outlined in the prompting assessment; The prompt was first presented with the stimulus simultaneously, then once 100% correct prompted responses occurred for two consecutive sessions Phase 2 was initiated and the prompt was delayed to 2 s after presentation of the stimulus. After two consecutive sessions of 100% correct responding, the prompt delay again increased to 4 s in Phase 3 and required 100% correct responding for two consecutive sessions to move to Phase 4. Once 100% independent correct responses occurred for
two consecutive sessions in Phase 4, the skill was considered mastered and the PPD condition was complete. With the LTM procedure, if a response was not emitted within 2 s of the presentation of the stimulus, the least intrusive prompt was provided simultaneously with a repeated presentation the stimulus. If no response or an incorrect response was emitted after 2 s of the repeated stimulus presentation, the stimulus was presented again with the next least intrusive prompt. This continued to increase in intrusiveness until the participant has responded correctly or the third most intrusive prompt was given. Incorrect responses after the most intrusive prompt was presented resulted in the researcher moving on to the next trial without providing any feedback or reinforcement. The LTM condition was considered mastered when the participant independently and correctly responded to 100% of trials for two consecutive sessions. Two consecutive sessions with 50% or less correct responding resulted in a return to the previous level of prompt intrusiveness. Phase 1 of MTL involved a simultaneous presentation of the most intrusive prompt with a repeated stimulus if no response was emitted within 2 s of the stimulus presentation. The researcher moved on to the next trial without providing feedback or reinforcement if a prompted incorrect response occurs. Two consecutive sessions with 100% correct responses in Phase 1 resulted in moving to Phase 2 and used the second most intrusive prompt. The prompt decreased in intrusiveness again in Phase 3 and no prompt was used in Phase 4. Mastery with MTL was achieved when two consecutive sessions of independent correct responding occurred in Phase 4. The participant returned to the previous phase if there was 50% or below correct responding for two consecutive sessions.

Assessment Phases. The assessment phases consisted of the LTM, MTL, and PPD procedures as outlined previously. Correct responses, both prompted and unprompted, resulted in praise and edibles and incorrect responses resulted in no response from the researcher and
moving on to the next trial or next level of prompt intrusiveness. No prompt-fading procedure was used in the control condition. The assessment ceased once all prompt-fading procedures were mastered or if unmastered prompt-fading procedures took 25% more sessions than the time it took to master the first mastered procedure.

**Comparing the Prompt/Prompt-Fading Combinations.** After both assessments were completed, training was conducted with a new set of Spanish-to-English translations. The training used both the most and least efficient prompt and prompt-fading combinations identified for each participant to compare the percentages of correct responding for each combination. The most efficient prompt and prompt-fading procedure was the first mastered and the least efficient was the prompt and prompt-fading procedure last mastered or with the overall lowest percentage of correct responding.

**Assessment Phases.** The assessment phases consisted of the most and least efficient prompt/prompt-fading combinations. Four different Spanish words were taught using the most and least efficient combinations, for a total of eight words. Praise and edibles were provided for prompted and unprompted correct responses, depending on the phase of prompt-fading being implemented. No prompt or prompt-fading procedure was used in the control condition. Mastery criteria and procedures were the same as outlined in the prompt-fading assessment procedure.
Results

Figures 1-12 depict the assessment and comparison results for both participants. Results for each assessment have been graphed both in a combined and separated fashion. Doing this allowed for visual analyses to be made both within and between conditions, with the combined graphs designed for general comparisons of the data and the separated graphs for more detailed comparisons. Both participants frequently shifted back and forth between phases during the assessments because criteria for advancing or returning to phases could be met in as little as 2 sessions. The control conditions for all assessments remained at 0% correct responding for both participants.

For the prompt assessment, WK mastered the echoic condition in 4 sessions (Figures 1 and 2). The other conditions did not approach mastery criteria, so the prompt assessment ceased after the remaining conditions lasted 25% more sessions than the mastered echoic condition. WK had a steady 50% correct responding for the visual condition trials. Correct responding varied between 25% and 50% for the textual condition. MC achieved the same results for the prompt assessment, with the echoic condition being the first mastered in 4 sessions (Figures 3 and 4). MC started Phase 2 for the visual condition but did not reach the mastery criterion before the assessment reached its 25% additional sessions criterion. Correct responding varied between 75-100% for the visual condition and 50-100% for the textual condition.

For the prompt-fading assessment, WK mastered the MTL condition in 13 sessions (Figures 5 and 6). Correct responding varied from 0% to 100% in both the LTM and PPD
conditions. Every time WK reached Phase 4 of the PPD condition that required independent correct responding to master, his correct responding dropped to 0% of trials. When WK returned to Phase 3 that required correct prompted responses, he reached the 100% in two consecutive sessions immediately. WK did not reach Phase 4 for the LTM condition before the prompt-fading assessment ended. MC also mastered the MTL condition, taking 15 sessions to do so (Figures 7 and 8). MC moved back and forth between Phase 3 and Phase 4 for both the LTM and PPD condition, as he failed to respond to 100% of trials independently and correctly in Phase 4. MC responded correctly for 50-100% of trials in the PPD condition and 25-100% for the LTM condition.

For the most-versus-least efficient combinations comparison, WK achieved mastery for the most efficient combination in 8 sessions, which is the lowest number of sessions possible to reach the criterion (Figures 9 and 10). The least efficient combination, comprised of the textual prompt and PPD procedure, varied in correct responding from 0% to 100%. MC also mastered the most efficient combination, echoic prompt combined with MTL procedure, in the lowest number of sessions possible (Figures 11 and 12). MC never made it past Phase 2 in the least efficient combination condition before reaching the 25% additional sessions criterion.

For the social validity survey, the parent of WK and the parent of MC rated statements similarly. Desired ratings for negative statements was 1, or “strongly disagree” and desired ratings for positive statements was 5, or “strongly agree.” Negative statements about scheduling sessions and participant exhaustion averaged a rating of 1.5, falling between “disagree” and “strongly disagree.” Positive statements about participant enjoyment and explanation of the study averaged a rating of 4, or “agree.” Positive statements about the relevance of teaching Spanish
translations and conducting prompt and prompt-fading assessments averaged a rating of 3.2, falling between “neutral” and “agree.”

Figure 1

*WK Prompt Assessment Combined Results*
Figure 2

*WK Prompt Assessment Separated Results*
Figure 3

*MC Prompt Assessment Combined Results*
Figure 4

MC Prompt Assessment Separated Results
Figure 5

*WK Prompt-Fading Assessment Combined Results*
Figure 6

*WK Prompt-Fading Separated Results*
Figure 7

MC Prompt-Fading Combined Results
**Figure 8**

*MC Prompt-Fading Separated Results*
Figure 9

WK Most-Versus-Least Efficient Comparison Combined Results
Figure 10

WK Most-Versus-Least Efficient Comparison Separated Results
Figure 11

MC Most-Versus-Least Efficient Comparison Combined Results
Figure 12

MC Most-Versus-Least Efficient Comparison Separated Results
Discussion

Specific prompt and prompt-fading combinations have resulted in faster skill acquisition by individuals with ASD than when compared with other combinations of prompts and prompt-fading procedures (Seaver & Bourret, 2014). By conducting assessments that identify the most efficient prompt and prompt-fading method, a learner can acquire new skills more efficiently (Schnell et al., 2020). Our findings that the most-efficient combination resulted in faster mastery than the least-efficient combination mirror those findings confirmed by Schnell et al. (2020) and Seaver and Bourret (2014), suggesting that an individualized learning method results in more efficient skill acquisition. The findings, which involved an application of prompt and prompt-fading assessments to intraverbal behavior, also add to the suspicion that these assessments would be useful to conduct before teaching a variety of skills to enhance acquisition rates.

Seaver and Bourret (2014) found that the most efficient prompt-fading procedure varied for each participant and Schnell et al. (2020) found that LTM was the most efficient prompt-fading procedure for all participants. Our findings differ from both of these studies, with results showing that MTL was the most efficient prompt-fading procedure for both participants. Although both participants in the current study had the same most efficient prompt-fading procedure, these results are different from previous studies (Schnell et al., 2020; Seaver & Bourret, 2014), adding to the argument that most efficient prompt-fading methods vary person-by-person. This difference in results, however, could be attributed to the different behavior targeted—intraverbal behavior.
Several limitations of this study exist. First, only two participants were included in the study. WK and MC had echoic prompting and MTL as their most efficient combination, possibly giving a false suggestion that this combination is the most efficient for everyone. If additional children had participated, it is likely that the echoic and MTL combination would not have been the most efficient for every participant, better supporting the idea that the effectiveness of prompts and prompt-fading procedures are unique to every individual.

Second, the social validity of the study was not as high as anticipated. Parents reported that learning Spanish words was not very relevant for their children. One of the primary aims of the study was to teach new skills with which the participants had very little previous experience. It is possible that a more socially valid behavior could have been targeted for this study which participants also had no prior experience.

Third, it is likely that the results of the prompt assessment are due to the varying amount of effort required to respond to each prompt type. Being told the answer in the echoic condition may have required less effort than having to read the answer or look at a picture of the answer. Also, the participant was likely to respond correctly every time to the echoic prompt if they had echoic skills in their repertoire, whereas textual and visual prompts had to be read or labeled and had a higher chance of being incorrect. For example, WK consistently had 50% correct responding in the visual condition because he could only correctly label 2 of the 4 pictures. Both participants mastered the echoic condition and had higher percentages of correct responding in the visual condition than the textual condition, possibly supporting the idea that the results of the prompt assessment were influenced by the different amounts of effort required of the participants.
Fourth, the participants may not have had enough time to respond during each trial. Participants had to respond within 2 s before a trial ended. In some trials, WK took longer than 2 s to read the textual prompt. If a longer amount of time had been used to allow the participant to respond, it is likely that a higher percentage of correct responding would have resulted.

Fifth, probes were not conducted prior to the assessments to check for which, if any, Spanish words the learner knew the correct English translations. Although it is unlikely that the participants knew any of the Spanish words (according to parent report), there is a possibility that participants knew some of the words used in the assessments. All words used in the prompt conditions of the prompting assessment included a simultaneous prompt, so an opportunity for independent response was never given. There is a small chance that an independent correct response would have been emitted prior to the researcher teaching the translation, despite parent report that their child did not know the word. Conducting initial probes for all words used would have prevented the possibility of this occurring.

Future research should be conducted on prompt and prompt-fading assessments to test their usefulness in efficiently teaching new skills to children with other disabilities or typically developing children with tendencies for developing prompt dependency. Other kinds of physical and verbal behavior should also be assessed to possibly identify certain skills that better benefit from these assessments than others. Future research should also test for learners’ initial skill levels prior to conducting these assessments.

Our findings, which both confirm and add to the findings of Schnell et al. (2020) and Seaver and Bourret (2014), call for a wider use of prompt and prompt-fading assessments among instructors and other service providers to children with ASD. Those who implement these assessments may find increased learning outcomes when teaching new skills to learners.
References


https://doi.org/10.1016/j.rasd.2013.04.006


# Appendix A:

## Spanish Words List

**Table A1.** Spanish Words List

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Textual Prompt</th>
<th>Visual Prompt</th>
<th>Echoic Prompt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher says, “What’s the English word for perro?”</td>
<td><strong>dog</strong></td>
<td><img src="image1" alt="Dog Image" /></td>
<td>Teacher says, “Dog”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for gato?”</td>
<td><strong>cat</strong></td>
<td><img src="image2" alt="Cat Image" /></td>
<td>Teacher says, “Cat”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for cama?”</td>
<td><strong>bed</strong></td>
<td><img src="image3" alt="Bed Image" /></td>
<td>Teacher says, “Bed”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for murcielago?”</td>
<td><strong>bat</strong></td>
<td><img src="image4" alt="Bat Image" /></td>
<td>Teacher says, “Bat”</td>
</tr>
</tbody>
</table>
Table A1. (Continued)

<table>
<thead>
<tr>
<th>Teacher says, “What’s the English word for gorra?”</th>
<th>cap</th>
<th>Teacher says, “Cap”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher says, “What’s the English word for coche?”</td>
<td>car</td>
<td>Teacher says, “Car”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for triste?”</td>
<td>sad</td>
<td>Teacher says, “Sad”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for sol?”</td>
<td>sun</td>
<td>Teacher says, “Sun”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for vaca?”</td>
<td>cow</td>
<td>Teacher says, “Cow”</td>
</tr>
<tr>
<td>Teacher says,</td>
<td></td>
<td>Teacher says,</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>“What’s the English word for huevo?”</td>
<td>egg</td>
<td>“Egg”</td>
</tr>
<tr>
<td>Teacher says,</td>
<td></td>
<td>Teacher says,</td>
</tr>
<tr>
<td>“What’s the English word for bañera?”</td>
<td>tub</td>
<td>“Tub”</td>
</tr>
<tr>
<td>Teacher says,</td>
<td></td>
<td>Teacher says,</td>
</tr>
<tr>
<td>“What’s the English word for telaraña?”</td>
<td>web</td>
<td>“Web”</td>
</tr>
<tr>
<td>Teacher says,</td>
<td></td>
<td>Teacher says,</td>
</tr>
<tr>
<td>“What’s the English word for cerdo?”</td>
<td>pig</td>
<td>“Pig”</td>
</tr>
<tr>
<td>Teacher says,</td>
<td></td>
<td>Teacher says,</td>
</tr>
<tr>
<td>“What’s the English word for pierna?”</td>
<td>leg</td>
<td>“Leg”</td>
</tr>
</tbody>
</table>
Table A1. (Continued)

<table>
<thead>
<tr>
<th>Teacher says, “What’s the English word for enojado?”</th>
<th>mad</th>
<th>Teacher says, “Mad”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher says, “What’s the English word for taza?”</td>
<td>cup</td>
<td>Teacher says, “Cup”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for caja?”</td>
<td>box</td>
<td>Teacher says, “Box”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for roja?”</td>
<td>red</td>
<td>Teacher says, “Red”</td>
</tr>
<tr>
<td>Teacher says, “What’s the English word for insecto?”</td>
<td>bug</td>
<td>Teacher says, “Bug”</td>
</tr>
</tbody>
</table>
Table A1. (Continued)

| Teacher says, “What’s the English word for oido?” | ear | Teacher says, “Ear” |
| Teacher says, “What’s the English word for ojo?” | eye | Teacher says, “Eye” |
| Teacher says, “What’s the English word for fregona?” | mop | Teacher says, “Mop” |
| Teacher says, “What’s the English word for chico?” | boy | Teacher says, “Boy” |
| Teacher says, “What’s the English word for alfombra?” | rug | Teacher says, “Rug” |
| Teacher says, “What’s the English word for rata?” | rat | Teacher says, “Rat” |
| Teacher says, “What’s the English word for pluma?” | pen | Teacher says, “Pen” |
| Teacher says, “What’s the English word for mapa?” | map | Teacher says, “Map” |
| Teacher says, “What’s the English word for barro?” | mud | Teacher says, “Mud” |
| Teacher says, “What’s the English word for zorro?” | fox | Teacher says, “Fox” |
| Teacher says, “What’s the English word for abejorro?” | bee | Teacher says, “Bee” |
| Teacher says, “What’s the English word for tarta?” | pie | Teacher says, “Pie” |
| Teacher says, “What’s the English word for brazo?” | arm | Teacher says, “arm” |
| Teacher says, “What’s the English word for dedo del pie?” | toe | Teacher says, “Toe” |
## Appendix B:

### Procedural Integrity Checklist

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The researcher waits 2 s after presentation of the stimulus for every trial or until a response is made, whichever comes first.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>All responses made in baseline phases result in no response from the researcher.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Correct responses during multielement comparison phases result in praise and delivery of edibles, including the control condition.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>When a prompt is provided after the stimulus is initially presented alone or simultaneously with a prompt, the stimulus is presented again with that prompt (multielement comparison phases).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>After the stimulus is presented in a control condition, no prompts are given.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Edibles are out of reach. The researcher hands the participant the edible one at a time when reinforcement is supposed to be given.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. The researcher follows the script, “What’s the English word for _____?”

8. The researcher records whether a response was prompted/independent and correct/incorrect after every trial.
Appendix C

Social Validity Parent Survey

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is beneficial for my child to know common Spanish words.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. My child enjoyed working with the researchers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. My child seemed exhausted after sessions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The prompting methods used to get my child to learn Spanish words could also work with everyday skills (following bedtime routine, interacting with peers appropriately, etc.).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The sessions scheduled made it difficult to schedule other appointments and activities throughout the week.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The researchers explained all procedures well and answered any questions I had if I asked any.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Knowing the results of the assessments conducted will help my child learn more information at a faster pace.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>