MAND TRAINING AND PROMPT FADING: TEACHING YES-NO MANDING

By

Jessie Kelly

A Project Presented to

The Faculty of Humboldt State University

In Partial Fulfillment of the Requirements for the Degree

Master of Arts in Psychology: Academic Research

Dr. Christopher Walmsley, Committee Chair

Ian Jewett, Committee Member

Dr. Chris Aberson, Program Graduate Coordinator

May 2020

Abstract

MAND TRAINING AND PROMPT FADING: TEACHING YES-NO MANDING

Jessie Kelly

Language is a collection of verbal skills which allows the speaker to have some control over how others interact with them. Saying the words “yes” and “no” are fundamental language abilities; The words impact the speaker’s environment by communicating acceptance or rejection of stimuli and experiences. Caregivers, teachers, and friends may have to make choices for an individual who cannot respond to yes-no questions. This skill deficit deprives the individual of autonomy and can lead to challenging behaviors occurring in place of clear communication. Applied Behavior Analysis offers techniques to teach language skills such as saying “yes” and “no” in response to verbal and environmental stimuli. This study used the techniques of mand training in discrete trial format while systematically fading prompts to teach two individuals with autism to correctly respond to the question “do you want this?” paired with the presentation of a highly preferred or lesser preferred item. Correct responding was predetermined with paired stimulus preference assessments by identifying “yes” items and “no” items. The results from this study suggest that these procedures are effective at producing correct responding to trained and untrained stimuli, thereby allowing the individual to functionally communicate their wants and needs.

Acknowledgements

Thank you to Ian Jewett, Liann Carrillo, Erin Buchan, and Kier Flicker at Multiplicity Therapeutic Services for approving and assisting with this project from beginning to end.

Thank you to Professor Walmsley at Humboldt State University for supporting this project and prompting consistent collaboration and meetings, despite skunk attacks and pandemics.

Table of Contents

List of Figures

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by deficits in social communication and restricted, repetitive patterns of behavior. The diagnosis is separated into severity levels according to the amount of one-on-one support the individual may require (American Psychiatric Association, 2013). For example, moderate to intense support may be needed to assist an individual with daily functioning and effective communication. The individual may lack the ability to gesture or point, respond to their name or simple directions, and may repeat words or phrases exactly as heard but out of context. These considerable skill deficits can hinder appropriate expression of needs, rejection of unwanted experiences, and initiation or responding to others (Buron, Wolfberg, & Grey, 2014).

In the mid-1900s, investigators began to experiment with various behavior analytic treatments to address the language acquisition challenges that individuals with autism face. These treatments are now trusted, evidence-based interventions for children, adolescents, and adults because they rely on established behavior principles and rigorous experimental research (Smith, 1999). Applied Behavior Analysis (ABA) is a type of behavioral science which focuses on the discovery and manipulation of environmental variables that reliably influence behaviors. Interventions based on ABA target interfering behaviors for reduction and socially important skills for acquisition while considering the ethical implications of each treatments (Cooper, Heron, & Heward, 2007).

Verbal behavior acquisition is a primary focus of ABA treatments. Fundamental components of language were identified in B.F. Skinner's book, *Verbal Behavior* (1957), and are referred to as the elementary verbal operants (tact, mand, intraverbal, echoic, textual, and transcription). An operant is a class of behavior which is influenced by consequence events in the environment (i.e. a learned behavior). A mand is a verbal operant to which a particular response is reinforced by a specific consequence and is therefore under the control of an establishing operation relevant to that consequence. An establishing operation is a behavioral effect that momentarily alters the reinforcing effectiveness of other events and alters the frequency of the kind of responses that have been reinforced by those other events (Michael, 1988). For example, an individual may ask for a snack because they are hungry. It can be said that that are experiencing food deprivation (establishing operation) and therefore the snack's reinforcing effects are altered (increased) and this evokes various responses associated with gaining access to a snack (manding "I want a snack please"). Plavnick and Ferreri (2012) describe a mand as allowing the speaker to have some control over the way other people in their environment provide reinforcement and for this reason it is suggested to be the initial training target for verbal behavior. Jennett, Harris, and Delmolino (2008) further state that when the speaker can make their needs and wants known by manding, behaviors that have previously interfered with the production of functional language will decrease and verbal behavior will increase. The vision of helping individuals with autism meet their needs with a recognizable and generalizable form (verbal behavior) has led to the development of specific teaching protocols based in ABA technology.

Mand training is the application of reinforcement specific to the mand. Mand training protocols may take advantage of naturally occurring stimuli and the resulting reinforcement contingencies (natural environment training: NET) or may contrive the environment to increase the chances of successful responding (discrete trial training: DTT). DTT is a controlled type of teaching in which an opportunity to mand (respond) is created in the environment (Cooper, et al., 2007). Although a combination of DTT and NET achieves a more complete language repertoire, previous research supports the hypothesis that specific manding skills are acquired to individualized criteria when taught using DTT alone (Sundberg & Michael, 2001). This study focused on the latter method of training in an effort to provide further empirical support for mand acquisition using DTT.

The response target for mand training will depend on the learner's verbal repertoire and the type of mand that will provide them with the most opportunities for reinforcement in their environment. In view of this information, this study focused on "yes" and "no" manding as the target responses to teach learners. Emitting "yes" and "no" in the presence of desired or undesired environmental stimuli (e.g. food, toys, a tangible item) is considered a basic language skill because of the potential for those responses to have multiple effects on the environment (Shillingsburg, Kelley, Roane, Kisamore, & Brown, 2009). For example, a child responding "no" to environmental stimuli may indicate to remove an item, allow a break from a task, or to give the child space when they want to be alone. Responding "yes" to environmental stimuli can indicate the acceptance of an item or the desire for continued access to an activity. Once yes-no manding skills are acquired in a controlled environment, responding may

generalize to naturally occurring stimuli because of the abundant opportunities for positive and negative reinforcement as a consequence of manding “yes” and “no.”

The study used DTT to teach yes-no manding to individuals with autism based on the results of a preference assessment. Research by Shillingsburg, et al. (2009) used preference assessments to establish correct yes-no responses to stimuli across verbal operants (tacts, mands, and intraverbals) and DTT format for teaching and generalization trials. Earlier studies such as Neef, Walters, and Egel (1984) and Hung (1980) used a combination of DTT and NET to teach yes-no manding but did not use preference assessments to identify stimuli as “yes” and “no” items which left correct and incorrect scoring up to subjective judgment. Many individuals with autism are unable to self-report their preferences. Without clear communication from the individual, others in the environment may guess what they want or choose for them out of necessity (Mangum, Fredrick, Pabico, & Roane, 2012). This study used a paired stimulus preference assessment to pre-identify highly preferred (“yes”) items in contrast to lesser preferred (“no”) items. Pre-identification allowed for objective scoring of correct and incorrect responses which indicated if the learner had acquired the skills of yes-no manding. This study attempted to fill the gaps in earlier research and extend recent research by adding empirical support for the use of a preference assessment to pre-determine highly preferred versus lesser preferred stimuli.

Some studies failed to test for generalization of yes-no mand responses with untrained stimuli. These studies showed that yes-no responses can be trained for preferred and lesser preferred food items, but trained mand responses may not result with

untrained stimuli (Hung, 1980; Neef, et al., 1984). This study used training techniques (errorless learning and prompt fading with a visual support) that have not been previously implemented in published research. This study found that the use of multiple training techniques resulted in the participants' ability to generalize yes-no responses to untrained stimuli.

Methodology

Participants

The participants in this study were recruited from an ABA agency in Humboldt County, California. Before recruitment took place, a research proposal was submitted to the Humboldt State University Institutional Review Board and was approved on May 15th, 2019 with the approval number IRD 18-191. Next, the primary researcher and the agency's clinical director identified potential participants through clinical reports and observations which indicated that they struggled with responding to yes-no questions. Three individuals were initially selected but the participation of one was discontinued due to revocation of assent during teaching trials. The remaining participants were Jacob, a three-year-old boy and Maya, a twenty-year-old woman, both diagnosed with ASD.

The clinical director began recruitment by meeting with the caregivers, describing the study, then asking if they would like to participate. During this meeting, each family was informed that participation was voluntary, and their choice would not affect current or future therapy services provided by the agency. If the caregivers agreed to participate, the clinical director reviewed the informed consent document with them and acquired a signature by at least one legal guardian.

Clinical staff from the agency were recruited to conduct reliability checks throughout this study. The researcher informed each clinician of the project objectives, the procedures they would partake in, and explained that there were no risks to their

person or employment whether they chose to participate or not. They verbally agreed to participate, then signed an informed consent document.

Inclusionary criteria. The researcher interacted with the individuals and assessed if they could echo “yes” and “no” when the words were said in their immediate proximity. The researcher also confirmed with caregivers that the individuals struggled with responding to questions with a vocal “yes” or “no” response. If the individual could repeat “yes” and “no” and they were reported to incorrectly respond to yes-no questions, they were included for participation in this research.

Materials

Food was used during the preferences assessments, baseline sessions, teaching trials, and generalization probes. The edible items were provided by the researcher and brought to each session in plastic food containers. Containers were placed behind a large cardboard barrier to prevent distraction while testing specific items. Participants were provided with a paper napkin, a plastic bowl, and water or a preferred drink. During the teaching trials, a paper with the words “yes” and “no” printed in black ink against a green or red background was used to prompt correct responding when the procedures required its use.

The researcher recorded responses on pre-made paper data sheets. These papers were kept with the researcher in a binder until they were transported to the university research lab and placed in a secure file cabinet with the informed consent documents.

Electronic forms were stored by the researcher on a flash drive which was also kept in the university's secure file cabinet.

Measures and Interobserver Agreement

The primary dependent measure in this study was correct and incorrect yes and no responses to the presented food item and the verbal stimulus "do you want this?" The second dependent measure was the ranked ordering of food items from the preference assessments. The third dependent measure was responses to the social validity survey.

During baseline, teaching trials, and the generalization probes, correct responses were recorded if the participant responded to the presented item and verbal stimulus with the appropriate response within 5-sec. Incorrect responses were recorded if the participant did not respond within 5-sec or did not respond appropriately. The data was summarized as the percentage of correct responding per session.

Preference assessment responses were recorded as the item chosen per trial. Each assessment consisted of 45 trials which assessed 10 food items. After the trails concluded, the researcher counted the number of times that each item was chosen and divided that number by the total amount of trials. The final score per item was the percentage of time it was chosen, and items were ranked from most to least chosen to indicate highly preferred to lesser preferred.

At the end of this study, the researcher asked both families to fill out a survey to assess their overall satisfaction. There were three 0-5 ranking scales to which a score of zero indicated low satisfaction while a score of five indicated high satisfaction. Both

families scored five for each ranked item. There were two additional questions, which both families scored "yes," indicating their agreement that they benefited from participating in this study and the teaching procedures were appropriate for each participant's learning style.

A clinical staff member independently collected inter-observer agreement (IOA) data during a mean of 46.5% of sessions. Agreement was defined as both the researcher and the additional observer agreeing on the occurrence or nonoccurrence of a correct or incorrect response. For both participants, point-by-point agreement scores were 100% per session and across sessions, which lead to a final IOA score of 100% agreement throughout this study.

Research Procedures

Setting. For Jacob, the procedures took place in his home. The researcher sat on the living room floor with Jacob during all trials while his mother was in a nearby room. The materials were near the researcher and behind a cardboard partition. For Maya, the caregiver interview took place in her home, while the other procedures took place at the agency's office. The office room contained one desk, a couch, and a small table. The materials were placed on the desk, behind the partition, and the researcher sat across from Maya, who sat on the couch.

Caregiver interview. The researcher met with the families and asked about known preferred and non-preferred foods and items. Based on the information, food was

determined to be highly preferred over toys or activities for both participants and was therefore selected for the preference assessments.

Preference assessments. Structured preference assessments are used to detect highly preferred and lesser preferred stimuli. Stimuli that are interacted with more often are deemed preferred and stimuli that are interreacted with less often are deemed lesser preferred (Kang et al., 2013). Food items were used to establish highly preferred and lesser preferred stimuli. Data from the preference assessments informed the correct responses during baseline, teaching trials, and the generalization probes.

The type of assessment used in this study was a paired stimulus preference assessment. First, the participant sampled each food item for approximately 30-sec, or until it was consumed. During the trials, the participant was presented with two food items at once and told to "pick one." The item chosen was recorded on a data sheet and the participant had approximately 10 to 30-sec to interact with the food. This process was repeated until all 10 pre-selected items were tested against each other over a total of 45 trials. If the participant did not make a choice when told to "pick one," the items were withdrawn after approximately 5-sec, then represented with the instruction of "pick one" once more. If the participant did not make a choice after the second presentation of the same items, the trial ended and was crossed out on the data sheet, then the next two items were presented. When this occurred, the final scores were adjusted based on the amount of trials that an item was selected. The same procedure was followed if the participant reached for both items at once or said "all done" when presented with a hypothesized lesser-preferred item. If the participant selected an item but did not eat it, or chewed it but

spit it out, the item selected was still indicated on the data sheet but a note was made next to it. This did not factor into the final assessment scores.

The final scores were written in descending order of most chosen to least chosen item. The top five items were chosen more often than the bottom five and therefore became the "yes" items while the lower ones became the "no" items for baseline and teaching trials. A second preference assessment, which followed the same procedures, was conducted after the teaching trials to select new items for generalization probes.

Baseline phase. The participant was presented with various items that were identified from the preference assessment. The participant was asked "do you want this" one time while the item was held in the researcher's hand, outstretched towards the participant. No prompting towards the correct response was provided and the item continued to be presented for 5-sec regardless of the response given. The participant could choose to take it out of the researcher's hand or to not interact with the item. The percentage of correct responding was calculated after 10 trials (i.e. one session).

Intervention. A four-step procedure consisting of errorless teaching, full-verbal prompting, partial-verbal prompting, and no prompting was used to teach the participants to appropriately respond to the presented stimuli.

Errorless teaching phase. The participant was presented with 10 food items in random order. The correct response to half of the items was "yes" and to the other half was "no." Criteria to continue to the next phase was set as 90% or more correct responding across two consecutive sessions.

"Yes" responding. These items were identified as preferred. Following the verbal stimulus "do you want this" and the presentation of the item, the researcher immediately said "yes" and gestured to "yes" on the visual card. Trials were counted as correct if the participant echoed "yes" within 5-sec of the verbal and visual prompt. The correct response was immediately reinforced with access to the item and verbal praise. Trials were counted as incorrect if the participant engaged in a verbal response other than "yes" or did not respond within 5-sec.

"No" responding. These items were identified as least preferred. Following the verbal stimulus "do you want this?" and presentation of the item, the researcher immediately said "no" and gestured to "no" on the visual card. Trials were counted as correct if the participant echoed "no" within 5-sec of the verbal and visual prompt. The correct response was immediately reinforced with the item's removal and verbal praise. Trials were counted as incorrect if the participant engaged in a verbal response other than "no" or did not respond within 5-sec.

Prompt fading phase. The participant was presented with 10 food items in random order. Criteria for continuation was set as 80% or more correct responding across two consecutive sessions before the prompt could be faded to the next phase (i.e., full echoic prompt then faded to partial echoic prompt then faded to no prompt).

Full echoic prompt. Immediately following the verbal stimulus "do you want this?" and the presentation of the item, the researcher said "yes" or "no" depending on the correct response. The visual card was not within sight and no gesture was made. Following an incorrect response, the item and verbal stimulus were re-presented along

with the visual card which the researcher gestured to. If the participant did not respond correctly after the trial had been re-presented, the trial was counted as incorrect and the next trial began. Reinforcement for correct responding was access to or removal of the item and verbal praise.

Partial echoic prompt. Immediately following the verbal stimulus "do you want this?" and the presentation of the item, the researcher made the phonetic sound for the letter "Y" or "N," depending on the correct response. A full verbal "yes" or "no" was not used, and the visual card was out of sight. Following an incorrect response, the item and verbal stimulus were represented along with a full verbal prompt of "yes" or "no". If the participant did not respond correctly after the trial was re-presented, the trial was counted as incorrect and the next trial began.

No prompt. Following the verbal stimulus "do you want this?" and the presentation of the item, the researcher waited 5-sec and provided no prompts toward correct responding. Following an incorrect response, the item and verbal stimulus were represented along with a partial verbal prompt. If the participant did not respond correctly after the trial had been represented, the trial was counted as incorrect and the next trial began.

***Generalization probes*.** Additional data was collected after the participant mastered the unprompted teaching trials. The participant was presented with 10 new food items that were identified from another preference assessment to be highly preferred or lesser preferred. The procedures were the same as in the baseline condition.

Research Design

This study used an ABC across multiple baselines design. This design allowed for the replication of baseline, intervention, and generalization phases across both participants. The data was input into an excel document and is displayed as a line graph. Calculation of the mean per phase and visual inspection of the overall trend, level, and variability of the data determined if the intervention caused the change in performance.

Results

Figure 1 depicts Jacob and Maya's results across baseline, intervention, and generalization trials. Jacob was tested across two baseline sessions which resulted in an average of 25% correct responding. During the intervention, Jacob responded correctly 99% of the time across eight sessions. In the generalization probes, Jacob correctly responded 90% of the time across three sessions. Maya was tested across five baseline sessions and responded correctly 2% of the time. In the prompt fading phase, Maya correctly responded 92% of the time across 10 sessions. During the generalization probes, Maya responded correctly 78% of the time across four sessions.

Across both participants, there is a clear level change and sharp upward trend in the data from baseline to intervention. Without an intervention, the baseline levels of responding would have continued to remain low. This suggests that the prompt fading intervention was responsible for the change in Jacob and Maya's performance. Jacob's data during the intervention is remarkably stable, showing little variability. Maya's data for the same phase is more variable, but overall stable with a slight upward trend. Jacob's performance during the generalization probes shows a mild level change and a slight downward trend from intervention to generalization. Maya's data during the generalization probes is more drastic and displays a slight level change and steeper downward trend across prompt fading and generalization. The data suggest that the skills taught during the intervention maintained once prompts were removed and participants were asked to respond to untaught items.

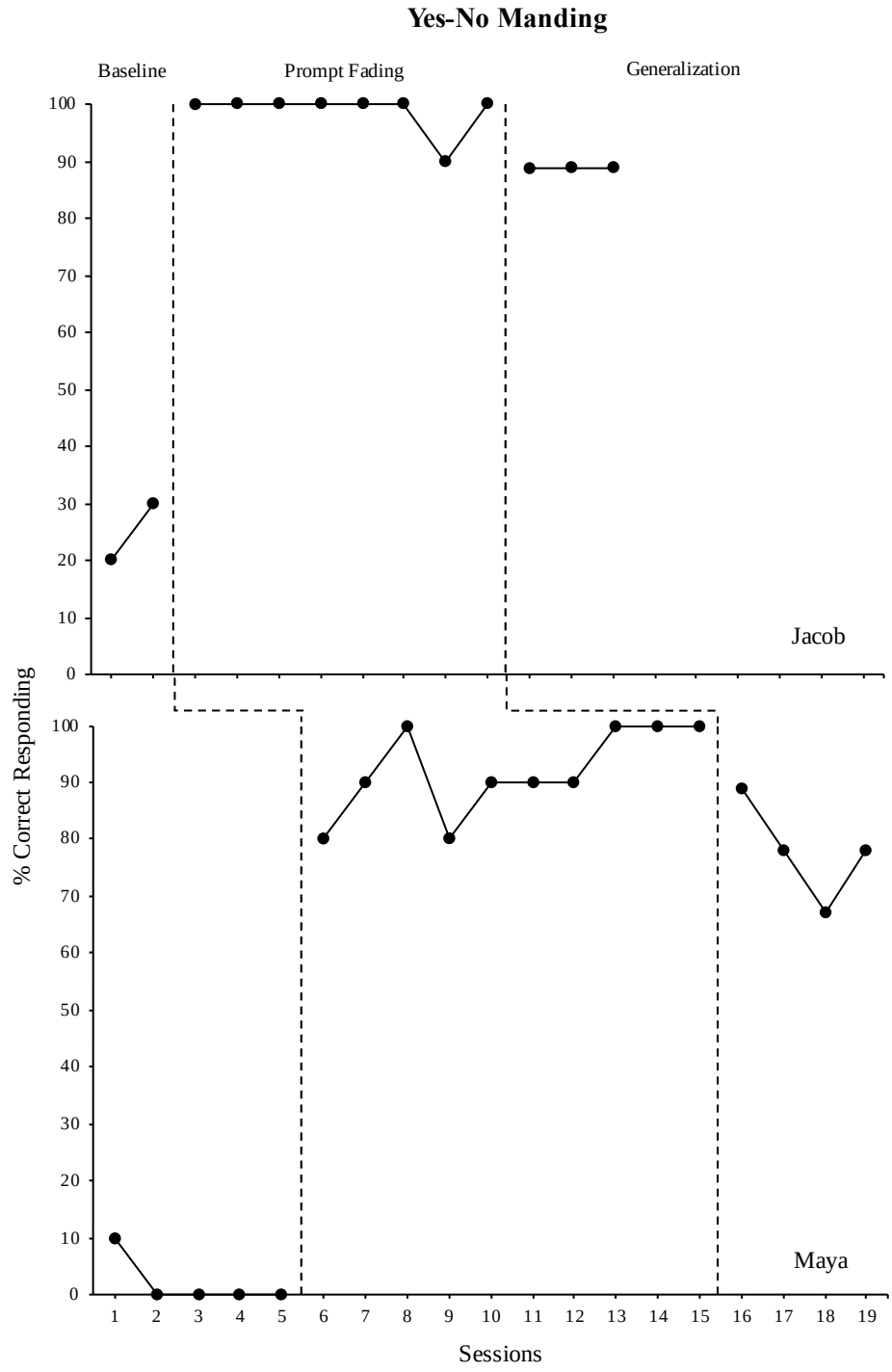

Figure 1. Jacob and Maya's results across baseline, prompt fading, and generalization phases.

Discussion

This study evaluated the intervention techniques of mand training and prompt fading in discrete trial format in order to increase correct yes-no responding. Individuals who cannot correctly respond to yes-no questions rely on others to make choices for them. The goal of this study was to help the participants develop fundamental language skills by teaching them to vocally respond to their environment with a clear "yes" or "no." Ideally, these skills would allow them to express their desires and reject what they do not want. Overall, both Maya and Jacob's data indicate that the intervention was successful at increasing their yes-no manding abilities and they were able to use their new skills when tested with untaught items.

Maya was a woman in her early 20s with limited language capabilities. She could communicate across multiple modalities, either vocally, by manual sign, or with the assistance of a communication binder or device. Her language mainly consisted of one- or two-word phrases or requests. For this reason, she had received behavior and speech therapy since she was a child. At one point, her language training included the use of a visual yes-no card to prompt vocal responding when needed. The visual card was split in half, one half was green with "yes" printed on it while the other half was red with "no" printed on it. Caregivers and teachers noted that Maya was quick to respond when a visual cue like this was present to assist her in communicating.

For this project, the researcher decided to incorporate this familiar yes-no visual as part of the prompt fading intervention. The visual was introduced to Jacob for the first

time during this study's procedures. Jacob's responding during the intervention scarcely varied from 100% and he required the minimum number of sessions per prompt phase. For the errorless phase, he correctly responded to the full vocal prompt and the visual with 100% over two sessions. In contrast, Maya needed three sessions with the full vocal and visual prompt, and her average correct responding was 90%. Maya also needed three sessions with the full verbal prompt and her average correct responding was 87%.

Differences in Maya and Jacob's correct responding scores across prompt phases could be due to a range of variables. Maya was 17 years older than Jacob and it is possible that she was less responsive to the combination of vocal and visual prompts due to her extended history of being prompted to communicated in ways that may have been different than the procedures used in this study. Jacob was just starting to learn vocal language when this project began. It is possible that he was receptive to these techniques due to his limited exposure to other language training programs. Maya may have struggled to overcome past prompting routines that resulted in reinforcement while Jacob had little to no experience with yes-no mand training and reinforcement contingencies had not been established yet.

Settings for the procedures were different across both participants. Maya's sessions took place in the agency's office. She sat on a large couch in a room with the researcher while a clinician was present to take IOA data. Jacob's sessions took place in his home, occasionally with a clinician present to take IOA data. His Mom was always present in the room or within ear shot and he had access to his preferred toys while sitting on the carpet with the researcher. Environmental stimuli varied across both of these

settings and without further investigation to isolate these variables, it is unclear how they impacted performance.

The timing of sessions relative to one another may have influenced the outcome of this study. All baseline sessions took place in one day. For Maya, intervention sessions six through eleven took place in one day, three weeks after baseline sessions. The rest of the intervention sessions took place the following week. Generalization sessions took place in one day, two weeks after intervention sessions. For Jacob, intervention sessions three through six took place in one day, one week after baseline sessions. Intervention sessions seven and eight occurred the following week, then sessions nine and ten the week after. Due to scheduling constraints, illness, and holidays, generalization sessions did not occur until five weeks after intervention had concluded. The amount of time between training and testing may have contributed to Jacobs drop in performance from an average of 99% to 89% correct responding.

The items used in conjunction with the verbal stimulus to evoke yes-no responding were selected based on the results of two paired stimulus preference assessments per participant. The assessments required testing of 10 items, five were hypothesized as highly preferred and the remaining five were hypothesized as lesser preferred. Maya's caregiver reported in the initial interview that she preferred food over any other tangible item, and it was difficult to identify foods that she did not like. For this reason, the researcher selected foods with intense flavors or textures, such as small pieces of raw garlic cloves, ginger root, white and green onions, or raw mushrooms. Individually tasted, Maya described these foods as "hot!" or she grimaced and drank

water afterwards. However, when these items were presented in quick succession during the intervention and generalization trials, Maya appeared to hold multiple food items in her mouth and chew them together while vocally describing them and smiling, possibly indicating a preference for the foods once combined. This unforeseen reinforcement contingency may have contributed to Maya's incorrect responding. For example, preference assessment results indicated raw mushrooms and onions as lesser preferred, therefore "no" was selected as the correct answer. However, when asked "do you want this?", Maya consistently responded "yes." Maya's answer was speculated to have been reflective of her desire to eat the combined food items and therefore functionally correct, but the data did not capture this, and her responses were recorded as incorrect.

Jacob's Mom described him as a picky eater with clear preferences for familiar foods. The first preference assessment which selected items for the intervention trials yielded results that appeared to accurately reflect Jacob's preferences. The second preference assessment results which selected items for the generalization probes was less clear. During generalization sessions, Jacob appeared to visually inspect an animal cracker that had been identified as a highly preferred "yes" item, before pausing and saying "no," annunciated in a manner different than his other yes-no responses. This "no" was not a short and concise answer but an elongated response with vocal emphasis on the "o." His Mom reported that he had never eaten an animal cracker before participating in this study. His lack of familiarity with the animal cracker and the five-week gap in between the preference assessment, when he had last been exposed to the animal cracker,

and the follow up generalization sessions may have contributed to his incorrect responding.

This study extends previous research in the field of Applied Behavior Analysis. Research by Neef, et al. (1984) and Hung (1980) evaluated similar training techniques but did not test if yes-no manding generalized to untaught items. This study found that Jacob and Maya could continue to correctly mand when presented with new, untrained items. Shillingsburg, et al. (2009) assessed a vocal prompt fading intervention across verbal operants and evaluated participants for generalized mand responses to untrained items. This study found the same results, confirming previous findings and validating vocal prompt fading techniques to teach yes-no manding. This study used a visual prompt along with a vocal prompt during the errorless teaching phase in the intervention. Previous research has not evaluated these types of prompts together to teach yes-no manding. The results of this study suggest that systematically faded visual and vocal prompts across discrete trials can help teach individuals to correctly mand “yes” and “no.”

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.

Buron, K. D., Wolfberg, P., & Gray, C. (2014). *Learners on the autism spectrum: preparing highly qualified educators and related practitioners*. Shawnee Mission, KS: AAPC Publishing.

Cooper J. O., Heron T. E., & Heward W. L. (2007). *Applied behavior analysis* (2nd ed.) Upper Saddle River, NJ: Pearson.

Hung, D. W. (1980). Training and generalization of yes and no as mands in two autistic children. *Journal of Autism and Developmental Disorders*, *10*(2), 139-152. doi: 10.1007/BF02408465

Jennett, H. K., Harris, S. L., & Delmolino, L. (2008). Discrete trial instruction vs. mand training for teaching children with autism to make requests. *The Analysis of Verbal Behavior*, *24*(1), 69-85. doi: 10.1007/BF03393058

Kang, S., O'Reilly, M., Lancioni, G., Falcomata, T. S., Sigafoos, J., & Xu, Z. (2013). Comparison of the predictive validity and consistency among preference assessment procedures: A review of the literature. *Research in Developmental Disabilities*, *34*(4), 1125-1133. doi: 10.1016/j.ridd.2012.12.021

Kazdin, A. E. (2011). *Single-case research designs: Methods for clinical and applied settings*. New York, NY: Oxford University Press.

Mangum, A., Fredrick, L., Pabico, R., & Roane, H. (2012). The role of context in the

evaluation of reinforcer efficacy: Implications for the preference assessment outcomes. *Research in Autism Spectrum Disorders*, *6*(1), 158-167. doi: 10.1016/j.rasd.2011.04.001

Michael, J. (1988). Establishing operations and the mand. *The Analysis of Verbal Behavior*, *6*(1), 3-9. doi: 10.1007/BF03392824

Neef, N. A., Walters, J., & Egel, A. L. (1984). Establishing generative yes/no responses in developmentally disabled children. *Journal of Applied Behavior Analysis*, *17*(4), 453-460. doi: 10.1901/jaba.1984.17-453

Plavnick, J. B., & Ferreri, S. J. (2012). Collateral effects of mand training for children with autism. *Research in Autism Spectrum Disorders*, *6*(4), 1366-1376. doi: 10.1016/j.rasd.2012.05.008

Shillingsburg, M. A., Kelley, M. E., Roane, H. S., Kisamore, A., & Brown, M. R. (2009). Evaluation and training of yes-no responding across verbal operants. *Journal of Applied Behavior Analysis*, *42*(2), 209-223. doi: 10.1901/jaba.2009.42-209

Skinner B.F. (1957). *Verbal behavior*. Englewood Cliffs, NJ: Prentice Hall, Inc.

Smith, T. (1999). Outcome of early intervention for children with autism. *Clinical Psychology: Science and Practice, 6*(1), 33. doi: 10.1093/clipsy.6.1.33

Sundberg, M. L., & Michael, J. (2001). The benefits of Skinner's analysis of verbal behavior for children with autism. *Behavior Modification*, *25*(5), 698-724. doi: 10.1177/0145445501255003