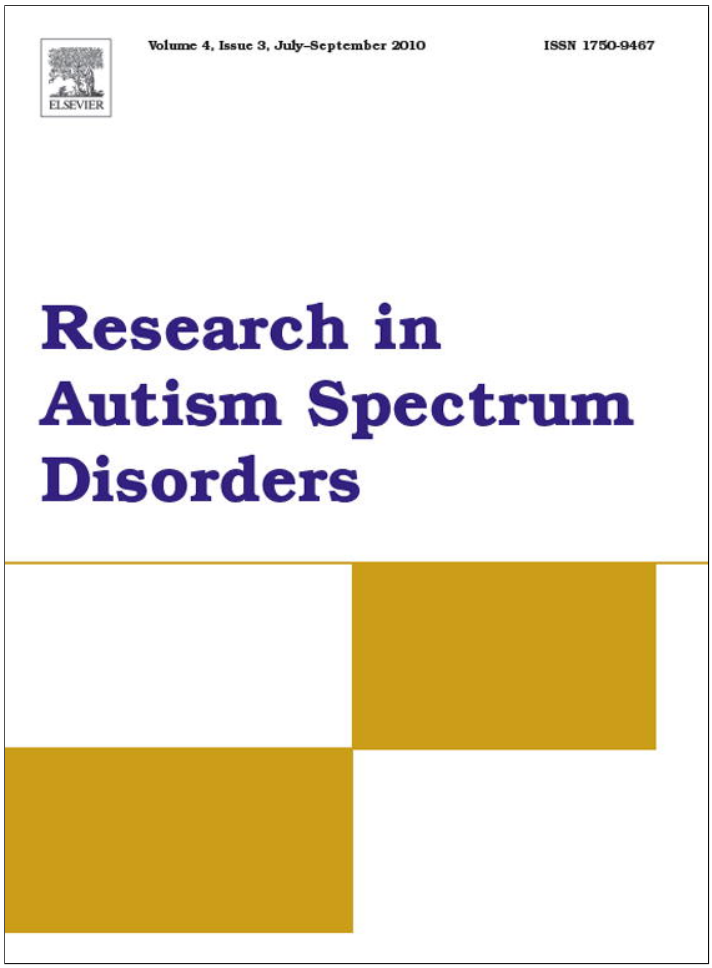

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Promoting generalization of mands for information used by young children with autism

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ABSTRACT

We investigated the extent to which mands for information taught using structured teaching trials (i.e., verbal discriminative stimulus, verbal prompts, and programmed consequences) while contriving the establishing operations to young children with autism generalized to novel stimuli and settings. Three students with autism participated in this study and were taught to mand for information using "where" during structured teaching trials. We conducted generalization probes in a hierarchical fashion to determine the extent to which generalization occurred. Manding for information did not completely generalize to natural settings when specific verbal cues were removed and that training in the natural setting in the absence of verbal cues was required for all three participants before generalized responding occurred.

1. Introduction

Asking questions is an adaptive repertoire that facilitates both successful social interactions and the development of more advanced language. It allows children to build vocabulary and build social interaction and communication skills. Children with autism often do not naturally learn how to ask questions and require specific training to learn to mand for items and information in the form of a question. Research evaluating effective ways to teach children with autism to mand for information in the form of questions has been sporadic within the past 10 years. Furthermore, the implications that can be drawn from the research published in this area in terms of generalization and maintenance are limited.

One method suggested by Sundberg, Loeb, Hale, and Eigenheer (2002) to teach mands for information using "where" and "who" to children with autism was to contrive the establishing operation (EO) by removing and hiding a preferred item. The hypothesis of this procedure was that if the child were motivated to play with an item, he or she would likely be motivated to gain information regarding the location of the item. In the first of two studies, Sundberg et al. (2002) used a multielement design with two participants to compare the effects of differing levels of establishing operations (EOs) when teaching children with autism to mand for information using "where" and "who". Kevin, a 5-year-old boy, and Billy, a 6-year-old boy both diagnosed with autism participated in this study. Baseline and teaching conditions consisted of placing either a high or low preferred item (based on participants' history) in a container that the participant could tact (verbally label) and then giving the container to the participant along with the verbal prompt, "Get your ___." The participant was then given the opportunity to look in the container, take the item out of the container, and briefly interact with the item.

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Following this contact with the item, the container and the item were removed from the participants and the participants were distracted. During teaching conditions, following brief contact with the item and a brief distraction, the participant was presented with two containers positioned approximately 2 m away from the participant, one of which contained the toy and was given the verbal prompt, "Get your ____." If the participant manded using, "where ___?" he was told which container contained the item and allowed 30 s to play with the item. If he did not mand for the item asking, "where ___?" he was then prompted with "Say ___." If the participant imitated the response, he was given the verbal information regarding the location of the item (i.e., which box the item was in). Prompts were faded by using partial prompts and delay procedures across trials.

Sundberg et al. (2002) reported that following the intervention on the first set of items, both participants were able to mand for information using "where". One purpose of the study was to examine if different levels of EOs (i.e., high vs. low preferred items) differentially affected acquisition of mands for information. If the EO was controlling the response (in other words, if wanting the item was increasing the probability the individual would ask where it was), one would expect the individual would be more likely to mand for information in the condition in which the high preferred item was used when compared to the low preferred condition. This difference was observed with one participant but was not replicated with the other. Furthermore, both participants acquired the skill with all items, regardless of the relevant EO. Both of these outcomes may suggest that the mands for information were not solely under the control of the EO. A potential alternative explanation for the participants responding similarly to both the high preferred and low preferred items is that the response was actually under full or partial intraverbal control. In other words, the mands for information were under the control (at least partially) of the verbal prompt, "Get your ____," and not completely under the control of the missing item. One limitation of this study is that the authors did not test for generalization of the mands for information in the absence of the verbal prompt (natural occurring behavior chains). Consequently, it is unknown which stimulus was controlling the response or if the response would transfer to novel settings.

In a recent systematic replication of Sundberg et al. (2002), Endicott and Higbee (2007) also used structured teaching trials to teach preschool-aged children with autism to mand for information using "where" and "who." Endicott and Higbee (2007) also used the verbal discriminative stimulus, "Get (missing item)," and verbal prompts to teach the participants to mand for information regarding location. The authors reported similar findings as Sundberg et al. (2002) in that the students that participated in their study acquired mands for information at similar rates in the high preferred item and low preferred item conditions. Endicott and Higbee (2007) also did not test for generalization using more natural behavior chains in which the verbal prompt was absent, but rather only tested for generalization in a novel setting (i.e., the child's home) for two of the three participants. Although the authors reported that the mands for information did generalize to the home setting, all of the procedures, including the use of a verbal discriminative stimulus ("Get ____") were used. Therefore, it remains unknown whether these procedures promote generalization to more natural behavior chains.

Although researchers such as Sundberg et al. (2002) and Endicott and Higbee (2007) have demonstrated that contriving EOs in combination with the use of verbal prompts and discriminative stimuli may be effective in teaching complex verbal responses such as mands for information, it remains unclear whether the response will generalize when the verbal discriminative stimulus or prompts are not present. Given the importance of the generalization of responses in the applied setting (Stokes & Baer, 1977), it may be beneficial to evaluate the extent to which these teaching procedures promote generalization across novel settings and stimuli. Therefore, the purpose of the current study was to extend the current research on teaching mands for information by assessing the degree of generalization of mands for information taught using verbal discriminative stimuli and contriving the establishing operation with young children with autism. This study used teaching procedures similar to those used by Sundberg et al. (2002) and Endicott and Higbee (2007). Following teaching using these methods, we created and tested a hierarchy of generalization before and after training to determine the extent to which mands generalized from a structured teaching session using verbal prompts to, ultimately, more naturalistic situations.

2. Methods

2.1. General procedures

2.1.1. Participants and setting

Three students that attended a preschool for children with autism participated in this study. All participants had a medical diagnosis of Autism Spectrum Disorder according to the DSM-IV criteria (American Psychiatric Association, 2000). All participants could use at least 2–4 word sentences and were able to mand for items that were or were not present in the environment.

Trevor was 5 years of age and attended a public preschool for children with autism. Trevor had a fairly complex language repertoire and could mand for items that were not present. He could communicate using complex sentences (usually five or more words). Travis was 3.5 years of age and had emerging complex language skills. He attended a university-based ABA preschool for children with autism. Trevor communicated using 2–4 word sentences or phrases and would mand for items only when they were present. Finally, Rachel is a 4.5-year-old female who also attended a university-based ABA preschool for children with autism. Rachel also had emerging complex language. She was able to mand for items that were not present and used 3–5 word sentences and phases to communicate.

Pre-training and structured teaching sessions were conducted in the participants' private learning cubicle that was partitioned from the rest of the classroom which included a table, two chairs, preferred toys used for training, and a video camera. We conducted generalization probes in the participants' private learning cubicle as well as in the open group area of the preschool classroom. Natural environment teaching took place in the open group area of the classrooms. Classrooms included a large preschool-size table and chairs, toy shelves, toys, a computer, bookshelves and other stimuli typical of a preschool classroom.

2.1.2. Materials

Sixteen preferred items were identified for each participant through interviews with the teachers and parents of each participant. These items included board games, puzzles, drawing devices (e.g., crayons, magna-doodle®, markers), etc. No consumable items were used (i.e., food or drink). To maximize motivation, all items used for this study were withheld for the participants outside of research sessions.

2.1.3. Assessment and pre-training

At the beginning of the study, we conducted a paired stimulus preference assessment (Fisher et al., 1992). After completing the preference assessment, the 16 toys were separated into two groups: the evenly ranked toys were assigned to the training condition and the oddly ranked toys to the generalization condition. The participants did not have access to the toys included in the assessment any time other than during research sessions.

Once the preference assessment was complete, we began tact training for each of the 16 items used in the study. During tact training, the instructor held up the item and asked the participant, "What is it?" If the student did not correctly identify the item, the verbal prompt, "Say (item name)" was given. Tact training ended when the participant was able to correctly label all 16 items on the first response without verbal prompts. Participants were also taught to independently go to the five different locations throughout the classroom (e.g., teacher's office, bookshelf, computer table, etc.) where preferred items would later be hidden. During location training, the instructor gave the instruction, "Go to (location)." If the participant did not independently go to the specified location, physical prompts were used to guide the participant to the appropriate location. Similar to tact training, participants completed location training when he/she could independently go to each of the target locations on the first attempt with no prompts. Once the preference assessment, tact training, and location training were complete, the participant began research sessions.

2.2. Measurement and experimental design

The percentage of independent mands for information using "where + (item name)" was measured during each session. Responses were scored either independent, incorrect or prompted. Independent responses were scored if the participant manded for information using "where + (item name)" without a verbal prompt within 5 s of being given an instruction during structured teaching and within 60 s of beginning the behavior chain during interrupted chain probes/training. Responses were recorded as incorrect if the participant (1) did not mand using "where + (item)," and no prompt was given (i.e., baseline or generalization probes) or (2) if the participant did not respond to two consecutive prompts during training. Prompted responses included responses in which the participant manded using "where + (item)," after a verbal prompt was given by the instructor. Prompts were not used during one-trial generalization probes. Therefore, the responses were scored as either correct or incorrect during probes. Interobserver agreement data were collected for at least 35% of sessions for each participant. Interobserver agreement (IOA) was calculated by dividing the number of trials in which the observers agreed on whether a participant responded correctly, incorrectly, or did not respond by the total number of trials and multiplied by 100%. IOA was 100% for all participants.

A multiple baseline design across participants was used to assess the generalization effects of training mands for information using "where + (item)" during structured teaching. All participants were exposed to baseline, training, and generalization probes prior to and immediately after training.

2.3. Experimental procedures

2.3.1. General procedures

During each session, a brief preference assessment in which five toys randomly selected from the pool of identified preferred items were presented either prior to the entire session (Trevor) or before each trial (Travis and Rachel). All sessions with the exception of generalization probes consisted of either five (Travis and Rachel) or 10 (Trevor and Travis) trials. Probes were one trial in length because the nature of the naturalistic situations (e.g., putting one's coat on before going outside to the playground) was not conducive to repeated trials. During all trials except natural chain probes, each trial began with allowing the participant 30 s accesses to the toy chosen in the preference assessment. Once the 30 s elapsed, the participant was instructed to put the toy on the table and the instructor distracted him or her while the toy was removed from the table and placed in a specified location. The participant was then brought back to the table and the verbal discriminative stimulus, "Let's play, get (missing item)" was given. The participant was given a chance to look for the item. If the participant responded within 5 s of the instruction by manding for information using "where + (item)," the instructor told the participant where the item was located and the participant was able to retrieve the item and have an additional 30 s access to that item.

2.3.2. Baseline

During baseline, the participant was not prompted to respond to the instruction, "Let's play. Get (item)." If the participant did not respond correctly by manding using "where + (item)," that trial ended and, following a brief (1–2 s) inter-trial interval, the next trial began.

2.3.3. Training

During training sessions, when the participant was given the instruction, "Let's play. Get (item)," he or she was given 5 s to look for the item and respond by manding, "where + (item name)." If the participant did not independently respond correctly, the instructor would then present the instruction "Let's play. Get (item)," followed by a verbal prompt, "Where's (item)?" The participant was then given 5 s to respond to the verbal prompt. If he or she did not respond following the first verbal prompt, a second verbal prompt was given. If the participant did not respond to the second prompt, the trial was recorded as incorrect and the next trial began after a brief 1–2 s delay.

If, however, the participant did respond to the first or second prompt, differential reinforcement was provided in the form of verbal praise. For example, if the participant responded to the prompt by imitating "where (item)", the instructor would give verbal praise (e.g., "that's nice asking") and the instruction, "Let's play. Get (item)," was immediately repeated. If the participant then responded independently, the location of the item was given. If he or she did not respond independently, the prompting procedures were repeated. Prompting procedures were repeated until the participant either responded in the absence of the supplemental verbal prompt or did not respond to two consecutive prompts. Differential reinforcement procedures were used to attempt to decrease the probability that the response would become dependent on the supplemental prompts.

2.3.4. Generalization probes

Generalization probes were conducted prior to and immediately after the structured teaching phase. Generalization probes were conducted across the following: (1) a novel toys in the training setting, (2) novel toys in novel settings, and (3) a natural behavior chain in which a specific verbal discriminative stimulus was not present. Each probe session consisted of one trial. Trials for the first two generalization probes were conducted using the same procedures as baseline (brief access to preferred item, distraction while item is hidden, "Get *item*" verbal instruction given with no supplemental prompts). An interrupted chain procedure was used to test for generalization to a natural behavior chain. This consisted of presenting an activity consisting of a multi-step behavioral sequence (chain), however, one critical stimulus required to complete that chain was missing. For example, the participants were told it was time to color. She then went to get paper and the crayon box, brought the materials to the table, opened the crayon box and found that the crayons were missing. The purpose of the probe was to determine if the participant manded for information regarding the location of the missing item using "where." Again, one trial was conducted, but, unlike the other generalization probes, no specific verbal discriminative stimulus was presented. Rather, the instructor provided a general instruction to engage in the behavior chain (e.g., "It's time to color"). Once the participant began the chain, he or she was given 60 s from the beginning of the chain to mand for information about the location of the missing item using "where + (item)". We increased the time allotted to mand during these probes because the chains often consisted of setting up other stimuli before it was apparent a critical stimulus was missing. For example, if the crayons were missing from the coloring box, the participant might not contact the missing stimulus right away. If the participant engaged in the target response (asking for the missing item using "where + (item)"), the information was provided, he or she was able to retrieve the critical stimulus, and was then able to complete the behavior chain. If he or she did not engage in the target response, no prompts were given and the trial ended.

2.3.5. Natural behavior chain training

If participants did not mand for the missing item during the natural behavior chain generalization probes, we conducted training using the interrupted chain procedure. During interrupted chain training, only three trials were conducted per session. The number of trials differed from the number of trials in the previous conditions because we only conducted training when the participants engaged in the target behavior chain naturally. For example, if we were training a chain in which the participant uses the computer, we only conducted sessions during the typical computer time. During this condition, each trial began with an informal instruction to engage in the target behavior chain (e.g., "It's time to play computer."). In each chain, one crucial item to complete the chain was missing. Once the participant came to the point in the behavior chain where the missing item was needed, the instructor verbally prompted the participant to mand for information using "where + (item)" using the same prompting procedure in training during structured teaching. Once the participant demonstrated independence in the interrupted chain, novel and untrained behavior chains were probed.

2.3.6. Treatment fidelity

An independent observer collected data on the research assistants' implementation of the experimental procedures. Treatment fidelity data were taken for at least 30% of sessions for all participants and were calculated by totaling the number of treatment components implemented correctly and dividing that number by the total number of treatment components and then multiplying by 100%. Treatment fidelity was greater than 99% for all participants.

3. Results and discussion

3.1. Results

The results for the percentage of independent mands for information using "where + (item)" are shown in Fig. 1 for Trevor, Travis, and Rachel. Trevor (top panel) did not engage in the target response during baseline sessions or generalization probes prior to training. When training began, the percentage of independent responses immediately increased to 80% (session seven) and maintained at 100% independent responding for the remainder of the phase. The response successfully generalized during the novel toys in the training setting probe (session 11) as well as the novel toys in the novel setting probe (session 12). However, the response did not generalize to the natural behavior chain probe in which his activity schedule book was missing during independent play time as seen in session 13 (probes using this chain are represented with a "1" under each session it was tested across conditions). Because the target response did not generalize to the natural behavior chain, Trevor was taught to mand for information using "where + (item)" with his activity schedule as the behavior chain. During this behavior chain, the activity schedule was hidden and Trevor was taught to mand for the activity schedule book using "where". Once Trevor independently manded for information about the location of his activity schedule on a consistent basis, novel and untrained interrupted chains were tested. In these subsequent probes, Trevor's responding generalized to three novel natural behavior chains including art with scissors missing (represented by "2" under each session it was tested), computer games with the computer mouse missing ("3"), and missing shoes after a sensory activity ("4"). Trevor also maintained this level of responding during maintenance.

Travis's data are shown in the middle panel of Fig. 1. Similar to Trevor, Travis did not mand for information using "where + (item)" during any of the baseline sessions or the generalization probes prior to teaching. However, unlike Trevor, Travis did not independently mand for information for the first three sessions of training using structured teaching. During session 14 and 15, Trevor independently manded for information 90–100% of the trials. Following session 15 there was a continual decrease in the percentage of independent responses. We hypothesized that this decrease in responding might be due to a decrease in motivation for the selected toys over the course of the 10 trials. Based on this hypothesis, modifications of procedures were made including decreasing the number of trials from 10 per session to five and beginning each session with a momentary preference assessment. These changes were made to ensure a strong EO was present for the target toys. Once this change was made, Travis's responding immediately increased to 100% independent responses per session. Again, similar to Trevor, mands for information generalized to novel toys in the training setting and novel toys in a novel setting during sessions 22 and 23, respectively. However, mands for information did not generalize to three different natural behavior chains (sessions 21, 24, and 25). During these sessions the following chains were probed (1) outside, (2) bowling, and (3) coloring.

Training in the natural setting was then implemented with Travis. Training began with the behavior chain of going outside (1) for a walk in which Travis was to go to his backpack, retrieve his coat and hat, and line up at the door. During this chain, his hat was the missing item. Travis demonstrated mastery of the target response within four sessions. However, when novel untrained chains were probed, Travis did not mand for information. Teaching then began using another behavior chain; a bowling game (2) in which the ball was missing. He demonstrated the skill within four sessions with this chain, however when new chains were tested, the behavior did once again failed to generalize. A third chain was then taught which included a game in which plastic pieces were missing (4). Travis demonstrated mastery in five sessions. During the probes after teaching behavior to mastery in the third interrupted chain condition, Travis's behavior began to generalize to novel chains and maintained at high levels during the maintenance checks.

Rachel's data are shown in the lower panel of Fig. 1. Rachel did not mand for information using "where + (item)" during any of the baseline sessions or generalization probes prior to teaching. Similar to Travis, Rachel did not independently mand for information during the first three sessions of training. Rachel began to demonstrate correct independent responding by the fourth training session with the percentage of correct independent responses fluctuating between 60 and 100% for the following six sessions and reaching mastery criteria within 12 sessions.

Similar to both Trevor and Travis, mands for information generalized to both the novel toy in the training setting and the novel toy in the training setting (sessions 28 and 29), but not to the natural behavior chains (bowling, 1; trains, 2; Play-Doh, 3; lucky ducks, 4). Training in the natural setting was then implemented for Rachel during the behavior chain of bowling with the ball missing (1). Rachel immediately demonstrated independent responding (session 34) and reached mastery in a total of seven sessions. However, mands for information did not generalize when the following three behavior chains (trains, Play-Doh, and lucky ducks) were probed. Training then began with the next behavior chain, in which the ducks were missing from the game. Rachel immediately demonstrated independent responding and within three sessions demonstrated 100% independent responding in the sessions. Two new behavior chains were then probed. The target response generalized to one chain (i.e., train table in which the trains were missing) but not to the other (e.g., Play-Doh, in which the play-doh inside the container was missing). Following these results, two additional novel behavior chains were tested (wagon ride, 5, with the wagon missing and water toy, 6, with fish missing) and manding for information did not generalize. Therefore, training began with the third interrupted chain (Play-Doh). Rachel demonstrated mastery within six sessions. Probes were then conducted after the third interrupted chain training phase and Rachel did not demonstrate generalization of the skill. Novel chains were probed prior to training of the wagon behavior chain and Rachel's behavior did not generalize to the first behavior chain probed (reading with books missing, 7), but it did generalize to the behavior chain of drawing with the

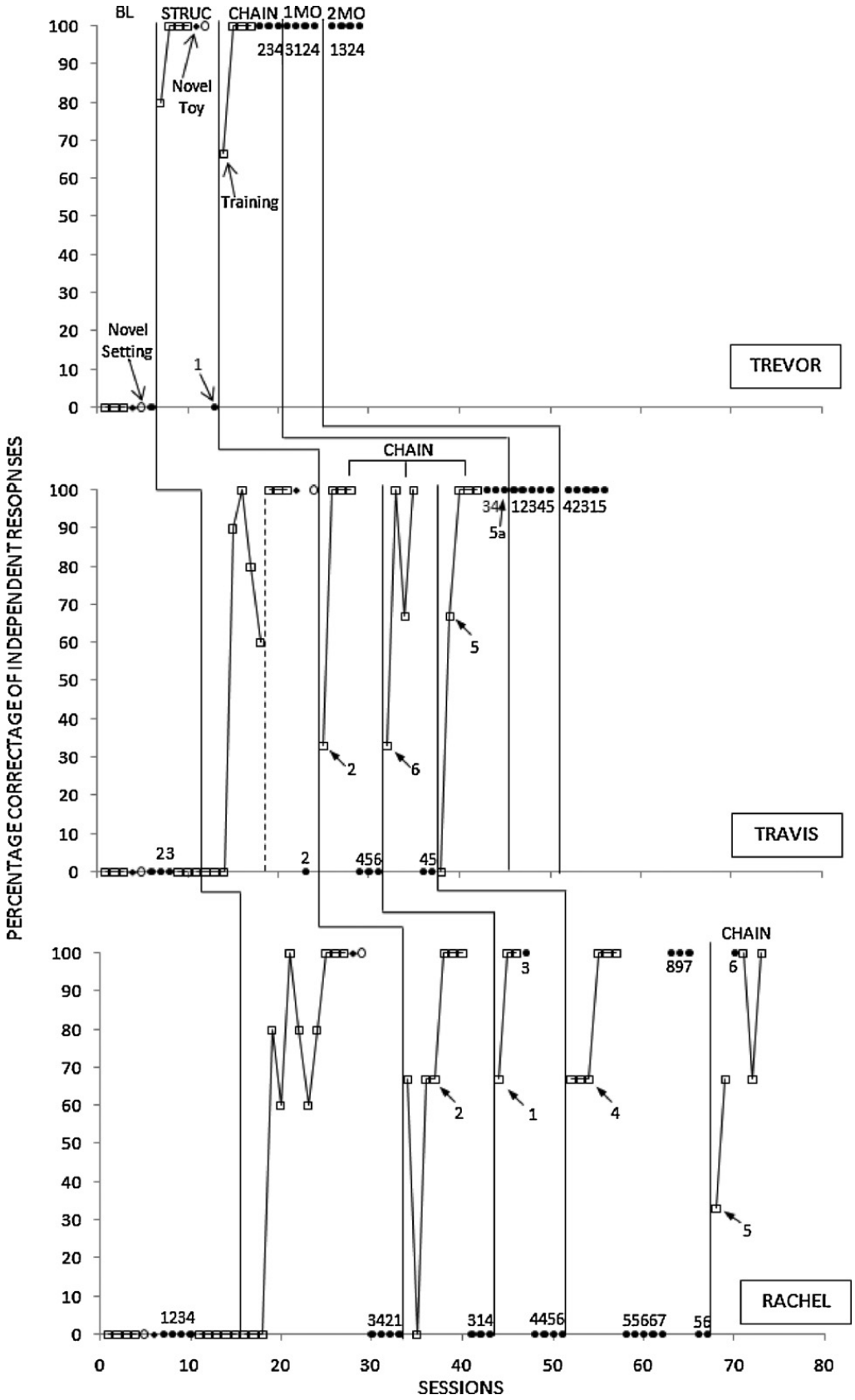

Fig. 1. Percentage of independent mands for information for Trevor (top panel), Travis (middle panel), and Rachel (bottom pane). The numbers under data points indicate which natural behavior chain was probed during the corresponding session.

markers missing (8) and playing "let's go fishing" with the fish missing (9). The other behavior chains were then re-probed and the skill generalized to the books, but not to the wagon and water game.

At this point a MSWO preference assessment was conducted. This was to determine if the lack of generalization to the wagon and water game was because an MO was not in place for these items. In other words, Rachel may have not been manding for the location of the toy because it was not a desired item. However, results of the MSWO suggested that the wagon and the water game were highly preferred toys, with the books ranking lowest. Due to the end of the school year rapidly approaching, training began simultaneously for both behavior chains (i.e., wagon and water toy). However, once two sessions were completed for the interrupted chain with the wagon, Rachel's behavior generalized to the water game. Rachel reached mastery of the last chain within four interrupted chain training sessions.

4. Discussion

The purpose of the present study was to investigate the generalization effects of mands for information when taught using methods similar to those used in previous research which include specific verbal discriminative stimuli (e.g., "Get *item*.") for participants to mand for information. We conducted a hierarchy of generalization probes to determine the extent to which the skill generalized to new toys and settings. After teaching, all participants manded for information with novel toys and in novel settings when procedures were similar to those used in training (i.e., verbal cues were used); however, none of the participants manded for information when items were missing during a naturally occurring behavior chain and no specific verbal instructions to obtain the missing item were provided. Thus, all participants required training in the interrupted chain procedure before generalization of responding was demonstrated in natural behavior chains in the absence of specific verbal cues. Furthermore, follow-up data for two participants demonstrated maintenance of the response over time.

Overall, the results of this study suggest that children with autism are able to learn to mand for information using "where" using a structured teaching approach that included specific verbal cues to mand for information. However, the generalization probes for all participants showed that the response did not generalize to the natural setting where specific verbal cues to mand were absent. One possible explanation is that the same verbal instruction "Let's play. Get (item)" used in during structured teaching was also used in the first two generalization probes but not during the probe in the natural setting. This suggests the response may have been under partial interverbal control (controlled by the verbal stimulus "Get *item*."). If this was the case, then the lack of transfer of control from the verbal instruction to the actual missing item may indicate that training the response in the absence of the verbal S^D or taking systematic steps to ensure transferring control away from the verbal stimulus may be important.

Consequently, all participants needed specific training to mand for information when items were missing from the natural chains. This was done using a sequential modification procedure (Stokes & Baer, 1977) in which systematic training occurred directly in the natural setting and then we tested for generalization for with novel chains. For some participants, several behavior chains needed to be taught before the responses began to generalize to new behavior chains. Once the participants were taught to mand for information in the natural setting using the sequential modification procedure, however, they all eventually demonstrated some generalization of the skill to untrained behavior chains. Therefore, direct teaching in the natural environment may have been more effective than the initial structured teaching approach in bringing the response under the appropriate stimulus control (i.e., the missing item). Transfer of stimulus control was not addressed in the current study, but future researchers should investigate whether the verbal instruction was, in fact, the controlling stimulus for the response and if so, how to transfer control from the verbal instruction to the actual missing item.

Although this study produced positive results, the outcomes should be taken as preliminary due to some potential procedural limitations. First, slight procedural modifications were implemented for two of the participants (Travis and Rachel) due to minor problem behavior observed during experimental sessions. These modifications included implementing a momentary preference assessment prior to each trial rather than one preference assessment at the beginning of the session and reducing the number of trials from 10 to 5.

Secondly, preference assessments were not conducted for the interrupted chains used during the generalization probes and training in the natural environment. Rather, the behavior chains were identified as preferred activities from teacher and parental interviews. Low responding for some of the participants may have been due to a lack of MO (e.g., Rachel's first probe of books). Future researchers may want to replicate the current investigation while including preference assessments prior to teaching the chains in the natural environment. Thirdly, during teaching in the natural environment using the sequential modification procedure, only one chain was taught at a time. This may have limited generalization of the response by not training multiple exemplars simultaneously. Future researchers should compare generalization of the skill when teaching multiple chains simultaneously, or with several stimuli, to teaching one chain at a time.

Future researchers should also investigate the effects that the exposure the participants had to training the response using a verbal prompt had on acquisition of the response during the interrupted chain training. It is unknown if this training effected the outcomes of responding in the natural setting because all participants in the current study experienced this training before natural environment teaching occurred using the interrupted chain procedure. Thus, it is not known the extent that prior structured teaching had on the efficiency of learning to mand for information in the interrupted chain procedure.

The current investigation extended the results of the studies by Sundberg et al. (2002) and Endicott and Higbee (2007) by investigating the extent to which generalization occurs when structured teaching procedures are used to teach young children with autism to mand for information. Overall, the results of the current study found results similar to those reported by studies, demonstrating that children with autism can learn to mand for information by contriving the EO and presenting a verbal discriminative stimulus. However, the current investigation also demonstrated that mands for information, when taught in this fashion may not transfer to the natural setting when the verbal stimulus is not present, even with the relevant motivating operations in place. This finding may be partially due to the lack of transfer of stimulus control from the verbal discriminative stimulus to the missing item itself. These results suggest that teaching mands for information using more naturalistic teaching procedures that do not include the establishment of stimulus control by verbal discriminative stimuli may be important.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (fourth ed. Text Revision). Washington, DC: American Psychiatric Association.

Endicott, K., & Higbee, T. S. (2007). Contriving motivating operations to evoke mands for information in preschoolers with autism. *Research in Autism Spectrum Disorders, 1*, 210–217.

Fisher, W., Piazza, C. C., Bowman, L. G., Hagopian, L. P., Ownes, J. C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis, 25*, 491–498.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10*, 349–367.

Sundberg, M. L., Loeb, M., Hale, L., & Eigenheer, P. (2002). Contriving establishing operations to teach mands for information. *The Analysis of Verbal Behavior, 18*, 15–29.