

Teaching a Child With Autism to Mand for Information Using “How”

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Children with autism often do not learn to mand for information without structured teaching. Studies have demonstrated that manipulation of establishing operations (EOs), prompts, prompt fading, and differential reinforcement are effective in teaching children with autism to ask “wh” questions such as “what,” “who,” and “where.” To date, no studies have evaluated procedures to teach children with autism to mand for information using “how.” Teaching the mand, “how” is uniquely challenging because once the information regarding how to do something is provided, the EO may no longer be present. The following study evaluated a procedure to teach one child with autism to mand for information using “how” to obtain information to complete multiple activities. The results have implications for clinical application and future research on contriving EOs to teach the mand, “how.”

Key words: autism, establishing operations, generalization, language acquisition, mands, question asking

Typically developing children engage in frequent question asking (Brown, 1968). When question asking is under the control of an establishing operation (EO) and the behavior results in information that is specific to the EO, these questions may be functionally classified as mands for information (Michael, 1988). Unfortunately, many children with autism do not learn to mand for information without structured teaching (Charlop & Milstein, 1989; Endicott & Higbee, 2007).

Early studies established that question asking could be taught to individuals with disabilities using prompting, fading, chaining, differential reinforcement (Bondy & Erickson, 1976; Hung, 1977; Twardosz & Baer, 1973), and videotaped rehearsal and feedback (Knapczyk, 1989). Sundberg, Loeb, Hale, and Eigenheer (2002) noted that earlier studies may have neglected the role of the EO by teaching when an EO was not present and/or by using contrived reinforcers (e.g., tokens) rather than functional reinforcers (e.g., information). Unfortunately, this may result in less functional use of the mand. Several studies have effectively contrived

EOs and used functional reinforcers to teach the mands, “what?” (e.g., Williams, Donley, & Keller, 2000), “who?,” “where?,” (e.g., Endicott & Higbee, 2007; Lechago, Carr, Grow, Love, & Almason, 2010; Sundberg et al., 2002), “which?,” and “when?” (e.g., Shillingsburg, Valentino, Bowen, Bradley, & Zavatkay, 2011).

To date, no studies have investigated strategies for teaching children with autism to mand for information using the response form “how.” This may be due to the unique challenge of arranging multiple opportunities for teaching while ensuring that an EO controls the response. In other response forms such as “who” and “where,” trials can be arranged such that the information provided differs each trial, ensuring the information remains valuable. For example, the mand, “who?” might be taught when a child is told that someone has a preferred toy. The natural reinforcer for the mand would be information about who has her toy. Multiple learning opportunities can be arranged when information about who has the toy differs each trial. In contrast, when a child mands, “how?,” and information specific to the request is provided, the information may lose its value because the individual learns to complete the task independently, rendering the information unnecessary. This unique characteristic presents clinical challenges in teaching the mand for

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Table 1
Scenario Descriptions for Teaching the Mand, "How?"

Scenario	Description	Demonstration of EO	Therapist response
Computer	Sound muted while playing	Samuel says he can't hear his game	Therapist tells Samuel to unmute the computer
Walkie talkies	Talk button not pressed	Samuel talks without pressing talk button	Therapist tells Samuel to talk to the therapist
Swing	Gate to playground locked	Samuel attempts to open gate, asks for swing	Therapist tells Samuel to open the gate
Computer 2	Computer monitor unplugged	Samuel asks to play the computer/attempts to play	Therapist tells Samuel to plug in the monitor
TV	Remote missing batteries	Samuel attempts to use remote to turn on TV	Therapist tells Samuel to replace batteries
Snack	Snack closet locked	Samuel attempts to open locked closet	Therapist tells him to unlock the door

information "how." For example, if a therapist contrives a situation in which there is an EO for information, prompts the child to ask "how," and provides the information, there may be no other opportunities using the same scenario to present additional teaching trials. The purpose of the present study was to teach a child with autism to mand for information using "how." To ensure a sufficient number of trials, several scenarios were used to provide multiple opportunities to teach the mand. Additionally, independence with each task was continually assessed to determine if an EO was present.

METHOD

Participant, Setting, and Materials

Samuel, a 7 year 8-month-old male diagnosed with autism by an independent psychologist participated in the study. Samuel attended a full-day behavioral intervention program for children with language deficits and demonstrated well-developed mand, tact, and intraverbal repertoires. He emitted 3 to 6 word phrases and used prepositions, pronouns, and adjectives correctly. He typically used a variety of "wh" questions to access information (e.g., "what is that?" "when can we go outside?"). Samuel was selected for the study based on a report from his parents and therapists that he did not emit the mand "how" to access information to complete a

task or activity. In such situations, he typically persisted with mands for the activity or item and occasionally used the mand "help."

Samuel was taught in a one-on-one format using discrete trial instruction. Trials were conducted in a classroom and/or on the playground twice per week. Materials included typical classroom items (e.g., desks, chairs, shelves, toys) and the items necessary for each activity (see Table 1). Other children and instructors were present but did not interact with Samuel during sessions.

Response Measurement and Interobserver Agreement

Trial-by-trial data were collected on correct independent manding "how?" within 5 s of the therapist contriving the EO. These data were summarized as cumulative independent "how" mands across trials for each activity. A second independent observer collected data during 7.4% of trials. Point-by-point interobserver agreement (IOA) was calculated by dividing the number of agreements by the number of agreements and disagreements and multiplying by 100%. An agreement was defined as the primary and secondary data collector recording a correct independent correct mand during a trial. A disagreement was defined as one data collector recording an independent correct mand and the other data collector recording an incorrect response. IOA was 100%.

Experimental Design and Scenarios

A multiple baseline design across "how" scenarios was used to evaluate the effects of teaching. If the mand "how" emerged in untreated scenarios, treatment was not initiated with those scenarios. Six "how" scenarios involving highly preferred activities (according to the therapist report) were selected. The use of multiple scenarios allowed for trials to continue with other scenarios if there was not an EO for information about how to do a task for one scenario. In addition, this arrangement allowed for continual assessment of generalized manding under various conditions. The description, demonstration of the EO, and therapist response for each activity are provided in Table 1.

Experimental Procedure

One trial was conducted for each scenario each day, two days per week. Prior to each trial, an EO for the activity was assessed by asking Samuel if he would like to engage in the activity. Samuel responded by saying, "yes," nodding his head, or sometimes reaching for the activities if present.

Baseline. Each scenario was presented one trial at a time since one presentation of the information may abolish the EO. Samuel was given 5 s to begin to complete the necessary task independently or mand using "how." If he initiated completing the task, additional time was allowed for him to fully complete the task. If he did not initiate the task, 5 s was given for the response "how." If Samuel emitted the mand for information "how" during a scenario during the initial baseline, it was not included in the present study. Though Samuel had never been observed to emit the mand "how" in the natural setting, he did emit the mand "how" during two scenarios that were not included in the present study. If Samuel emitted an incorrect response or no response within 5 s, no information or reinforcer was provided, and the next trial was initiated by asking Samuel if he wanted to engage in one of the other activities.

Mand training. Upon implementation of treatment to a scenario, a trial was conducted with an immediate prompt for the correct

response without an opportunity for an independent response. All subsequent trials were presented with an opportunity to respond independently followed by a prompt if necessary. Sessions were conducted as in baseline with the following exceptions. If Samuel emitted no response or an incorrect response during the 5 s delay, the vocal model "how" was provided by the instructor. Once he echoed the response "how," information was provided that led to completion of the task and access to the preferred activity. If he emitted the correct mand "how" independently, the information and subsequent reinforcement were provided immediately and no prompts were given. If he completed the task independently, the trial was terminated and the scenario was no longer presented since the information was no longer necessary. If Samuel did not echo or gave an incorrect response to the vocal prompt, the trial was terminated; however, this never occurred. Each scenario in treatment was conducted until 3 consecutive trials resulted in an independent mand "how" or until the participant began to complete the task independently (i.e., without the information). Only the independent opportunity to respond during each trial is presented graphically.

RESULTS AND DISCUSSION

Figure 1 depicts Samuel's cumulative independent "how?" mands across trials during each scenario. During baseline for the Muted Computer scenario (Panel 1), Samuel did not mand "how?" Upon implementation of mand training, a teaching trial was immediately conducted (data not shown). On all subsequent days, each trial began with an opportunity to respond independently. Samuel independently emitted the mand "how" after two teaching trials; manding did not occur during any other scenarios. Additional teaching trials for the Muted Computer scenario were not conducted because Samuel learned to unmute the computer and did so independently during the next presented opportunity. Following implementation of treatment for the Walkie Talkie scenario (Panel 2), Samuel independently manded "how" after four trials (i.e., one initial teaching trial and three trials with

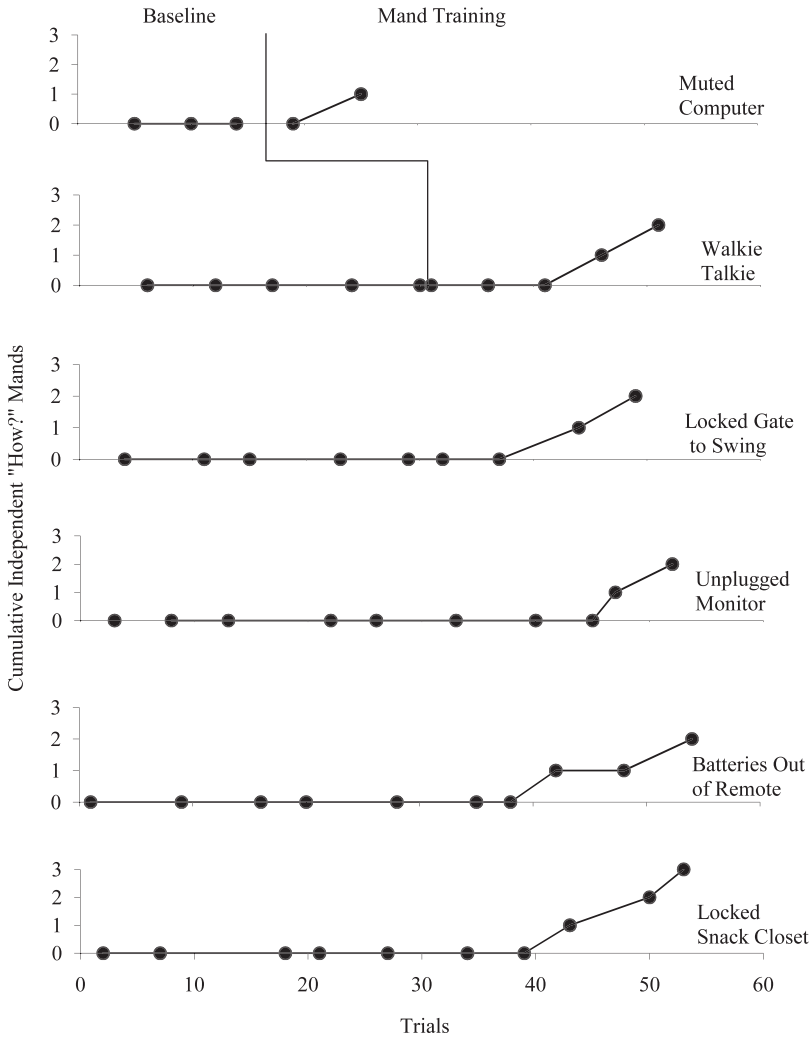


Figure 1. Samuel’s cumulative mands for information using “how” during each activity.

opportunities to respond independently). Interestingly, during mand training on the Walkie Talkie scenario, Samuel independently manded “how” in the other four scenarios still in baseline (Panels 3 through 6).

The current study is the first to evaluate an intervention to teach a child with autism to mand for information using “how.” The results obtained suggest that the preparation used facilitated appropriate stimulus control of the mand “how?” by contriving EOs for information, using natural reinforcers (i.e., information), and arranging multiple opportunities for teaching. An EO for information regarding how to complete the task was

indicated if Samuel attempted to, but could not complete the task independently, establishing the information on how to complete it as valuable. Future research could take additional steps to ensure EO control by alternating trials in which information is needed (e.g., playground gate is locked) with trials in which information is not needed (e.g., playground gate is unlocked).

There are some limitations to the current study that warrant discussion. Because only one participant was included, replication of these procedures with other participants is needed. As previously noted, Samuel had a history of emitting the mand “how” in two

contrived settings. While this skill had not been observed in natural settings, it is unknown whether similar results would be obtained with participants without a mand for information repertoire in general or with some mands for information but no history of manding "how." Future research should examine the individual characteristics that may result in differential effectiveness of this intervention.

The mand targeted was the response "how?" as opposed to a more specific response such as "how do I unmute the computer?" The general response form "how?" was selected because it was deemed simpler for Samuel to learn. Additionally, since the therapist gave an instruction in all of these scenarios, the "how" response was a functional response. However, this response may not be as functional as more specific mands in other situations. For example, in naturally occurring situations, the adult may not be aware of the task the child is unable to complete. Future research might examine teaching the mand "how" that is specific to a variety of scenarios.

Another limitation is the lack of assessment of treatment integrity, maintenance, and social validity. Given the importance of the EO and its complexity specific to the mand "how," a measure of treatment fidelity would allow for assurance that each scenario was contrived appropriately. In order to test for maintenance of the mand "how" additional scenarios would need to be included to ensure that an EO for the information was present. Again this highlights some of the additional challenges to teaching and assessing acquisition of this particular mand for information. While social validity was not formally assessed, manding "how?" would appear to be an important skill for children with autism when they are placed in settings where they are asked to complete unknown tasks. If an instructor is unaware that the child does not know how to complete a task, the child may not complete his or her work and this lack of work completion may result in negative consequences. However, if a child can effectively mand "how," he or she can then obtain information in order to effectively complete the task. This crucial skill allows for a child to effectively learn from the environment in a way that many

typically developing children do. Future studies might assess the social validity of the procedures and outcomes via caregiver interview.

It is acknowledged that the percentage of trials with IOA is lower than is typically reported in single subject design. According to Kazdin (1982) if checks on agreement show observers agree almost all of the time, agreement may not need to be checked frequently. In the current study, given the clarity of the operational definitions and the high agreement obtained, the lower percentage of trials with IOA still allowed for confidence in the reliability of the results.

The present study did not include procedures to promote generalization other than teaching in multiple scenarios. Though Samuel's manding generalized across situations after training in only two scenarios, some learners may require teaching with more scenarios before generalized manding is observed. Other ways to promote generalization might include training with multiple instructors and with multiple exemplars of each scenario (e.g., two different computer stations). Pre- and post-treatment generalization probes with novel instructors, exemplars, and scenarios could be used to assess generalized manding.

Finally, the generalization observed across baselines limits the experimental design employed in the current study. Following the initiation of treatment in the first scenario, the remaining scenarios remained at baseline levels providing some evidence that the increase in responding "how" in the first scenario was due to the teaching procedures. Following the implementation of treatment with the second scenario, again an increase in the response "how" was observed, replicating the results obtained with the first scenario. However, with the initiation of treatment with the second baseline, increases in the remaining baselines were also observed. Although this is an ideal clinical outcome, it limits the utility of the multiple baseline design in assessing the effectiveness of the current teaching procedures. Future research may employ alternative designs, such as a multiple baseline across participants, to increase internal validity. Despite this limitation, the current study introduces a procedure to teach the mand for information "how" and presents preliminary data supporting its use and

highlights the importance of assessing generalization.

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