*THE EFFECTS OF THE QUESTION “WHAT DO YOU WANT?” ON
MAND TRAINING OUTCOMES OF CHILDREN WITH AUTISM*

CRYSTAL N. BOWEN

MARCUS AUTISM CENTER

M. ALICE SHILLINGSBURG

MARCUS AUTISM CENTER AND EMORY UNIVERSITY SCHOOL OF MEDICINE

AND

JAMES E. CARR

AUBURN UNIVERSITY

Mands sometimes are taught using the question “What do you want?” as a supplement to the required features of the mand relation: an establishing operation and a related consequence. Although verbal prompts have been used during mand training, they also may result in undesirable stimulus control. However, no direct empirical evidence exists to support this concern. The purpose of the present study was to compare mand training with and without supplemental questions on acquisition rate and maintenance when those questions were no longer presented. The 2 training conditions did not differ substantially in their outcomes for 2 children with autism.

Key words: autism, language training, stimulus control, mands, verbal behavior

A mand is a verbal operant maintained by a characteristic reinforcer and is evoked by the establishing operation (EO) for that reinforcer (Skinner, 1957). A unique feature of mands is that they are sensitive to EOs, environmental events that momentarily alter the reinforcing efficacy of stimuli and evoke responses that produce them as consequences (Michael, 1988). Because mands directly benefit the learner, mand training has been recommended as an important early component of intensive behavioral intervention programs for children with autism (Sundberg & Michael, 2001).

In addition to being under the control of EOs, mands are often under stimulus control that may or may not be desirable. A common component of mand training programs is the

presentation of a verbal stimulus in the form of the question “What do you want?” prior to the response opportunity (e.g., Nigro-Bruzzi & Sturmey, 2010). Although such supplemental questions may occasion mands, they also may result in undesirable stimulus control and few unprompted mands (Sundberg & Partington, 1998). In addition, the use of a supplemental question may occasion undesirable echoics (e.g., the question is repeated) or intraverbals (e.g., the same response is emitted after every question irrespective of EOs). Unfortunately, despite these conceptually plausible concerns, little relevant empirical research has been published.

Jennett, Harris, and Delmolino (2008) evaluated naturalistic and structured mand-training procedures with children with autism. During their structured condition, the therapist held up preferred items and asked the participant, “What do you want?” During the naturalistic condition, the therapist did not present the question. Mands were acquired

James Carr is now affiliated with the Behavior Analyst Certification Board.

Address correspondence to Crystal N. Bowen, Marcus Autism Center, 1920 Briarcliff Road NE, Atlanta, Georgia 30329 (e-mail: crystal.bowen@choa.org).

doi: 10.1901/jaba.2012.45-833

more quickly by five of six children in the naturalistic condition. However, it is unclear whether this outcome was the result of the supplemental question or other procedural differences between the two conditions (e.g., no captured or contrived EO during the structured condition).

Given the limited research on the effects of supplemental questions during mand training, additional investigation is warranted. Thus, the purpose of this study was to compare the effects of mand training with and without the question "What do you want?" on acquisition and on maintenance of mands in the absence of the question for two children with autism.

METHOD

Participants, Setting, and Materials

Two children who attended an intensive behavioral intervention clinic participated. Aubrey was a 3-year-old girl who had been diagnosed with autism and whose targeted mand topography was sign language. Prior to the start of the study, Aubrey had received services for 2 days. In addition, she independently emitted two signed mands that had been targeted for intervention but had not met mastery criteria. The results of an initial language assessment indicated that she followed simple one-step instructions in isolation or with contextual cues and imitated simple gross motor movements. Chase was an 11-year-old boy who had been diagnosed with autism and whose targeted mand topography was vocal language. Chase had received services for 13 days prior to the study and had met mastery criterion for five vocal mands previously targeted for intervention. He reliably followed instructions and identified items in his environment. He exhibited few tacts and intraverbals but consistently imitated sounds and words. Based on initial language assessments, both Aubrey and Chase could respond differentially to auditory instructions provided by an instructor (e.g., "What is it?" and "What do you want?").

All trials were conducted in one of the clinic's classrooms with at least one therapist present. The room contained tables, chairs, shelves, and other teaching materials typically found in a classroom setting. Additional children and instructors were present but did not interact with the participants during trials. Study materials included preferred edible items that were relevant to the mands targeted for instruction and teaching materials specific to each participant's current clinical goals.

Measurement and Interobserver Agreement

Trained observers collected data via paper-and-pen recording on the mands emitted by participants. Observers collected data on independent response opportunities during pretraining and posttraining probes and on independent and prompted response opportunities during mand training. *Independent* response opportunities were responses emitted without a vocal or model prompt, whereas *prompted* response opportunities were responses that occurred following a vocal or model prompt. For each prompted and independent response opportunity, the observer scored whether a correct, incorrect, or nonresponse occurred. A *correct* response was defined as the participant emitting the target sign or vocal mand or an approved approximation within 5 s of the item presentation. An *incorrect* response was defined as the participant emitting a response other than the target mand or approximation within 5 s of the item presentation. A *nonresponse* was defined as the participant not emitting a response within 5 s of the item presentation.

A second observer collected data simultaneously and independently of the experimenter during pretraining probes, mand training trials, and posttraining probes. Point-by-point interobserver agreement was calculated by dividing the number of agreements by the number of agreements and disagreements and converting the ratio to a percentage. An agreement was defined as both the primary and secondary observer recording a response as correct, incorrect, or a nonresponse during independent

and prompted opportunities within a trial. Agreement was assessed during 68% and 60% of pretraining and posttraining probes for Aubrey and Chase, respectively, and was 100% for each participant. Agreement was assessed during 37% and 59% of mand training trials for Aubrey and Chase, respectively, and was 100%.

Design

An adapted alternating treatments design (Sindelar, Rosenberg, & Wilson, 1985) was used to compare the effects of mand training with and without a supplemental question. Specifically, this design included the use of a different target response and reinforcer across the two mand-training conditions. A nonconcurrent multiple baseline design across participants was employed to evaluate the effects of mand training more generally.

Procedure

Stimulus preference assessment. A multiple-stimulus (without replacement) preference assessment (DeLeon & Iwata, 1996) was conducted, and preferred edible items (juice and fruit snack for Aubrey; fruit and Skittles for Chase) were identified for use in the mand training condition.

Pretraining probes. One of the top preferred items was presented in each trial, and the experimenter alternated the items across trials. The therapist placed the item in view of the participant approximately six to eight times per day. If the participant reached for the item, the therapist initiated the trial by holding the item up. If the participant emitted a mand within 5 s, the therapist delivered the item for 20 s or until consumed; otherwise, the trial ended. If the participant did not reach for the item when it was presented, a trial was not conducted and the participant was redirected to another activity. The same item may or may not have been presented on the next trial, but both items were alternated consistently.

Mand training. The same items used during the pretraining probes were assigned to one of

two mand training conditions. These trials were conducted incidentally during naturally occurring opportunities across a variety of activities and contexts throughout the day.

Question-present condition. During this condition, "juice" was the target mand for Aubrey, and "fruit" was the target mand for Chase. At the beginning of a trial, the therapist asked, "What do you want?" For the first eight trials, the therapist modeled (i.e., a vocal model for Chase and a model of the sign for Aubrey) the target word at a 0-s prompt delay. If the participant correctly imitated the model in the last three of the eight trials, the experimenter provided the opportunity for an independent response by increasing the prompt delay to 2 s. If the participant did not meet this criterion, the 0-s delay condition continued until he or she emitted three consecutive correct independent responses. After the participant emitted three consecutive correct independent responses at the 2-s delay, the delay increased in 2-s increments up to a 6-s delay. Contingent on all mands, both independent and prompted, the therapist provided the item for 20 s or until it was consumed. The acquisition criterion was nine correct independent mands in 10 consecutive trials.

Question-absent condition. Edible items in the question-absent condition differed from those in the question-present condition and included "fruit snack" for Aubrey and "Skittles" for Chase. Mand training was conducted as described above except that the therapist did not ask the supplemental question.

Posttraining probes. After the participant acquired the target mands, the therapist conducted posttraining probe trials identically to pretraining probes (i.e., the supplemental question was not presented, and prompts were omitted).

Procedural Fidelity

During all phases, an observer used a checklist to record whether (a) the therapist presented the preferred item, (b) the participant

Figure 1. Cumulative number of independent mands during baseline and posttraining probes for each participant.

reached for the item, (c) the therapist held the item out of reach, (d) the therapist presented the question “What do you want?” (question-present condition), and (e) the therapist delivered the correct consequence. Procedural fidelity was calculated by dividing the number of procedural steps performed correctly by the total number of steps and converting the ratio to a percentage. Procedural fidelity was assessed for 18% and 28% of trials for Aubrey and Chase, respectively, and was 100% for each participant.

RESULTS AND DISCUSSION

Figure 1 depicts the cumulative number of correct independent mands during pretraining and posttraining probes. Neither participant emitted mands during pretraining probes. During mand training in the question-absent condition, Aubrey (Figure 2, top) acquired the fruit snack mand in 127 trials. The 0-s delay

was discontinued, and independent response opportunities began at Trial 15. Prompts were required occasionally until Session 120, at which time she began to emit independent mands exclusively. She acquired the juice mand in 156 trials during the question-present condition. The 0-s delay was discontinued, and independent opportunities began at Trial 19. Prompts were required occasionally until she began to emit independent mands exclusively at Trial 148. The 0-s delay ended at Trial 39 for Chase (Figure 2, bottom) during the question-absent condition. Prompts were no longer needed after Trial 55, and he acquired the Skittles mand in 69 trials. The 0-s delay was discontinued at Trial 44, prompts were no longer needed after Trial 46, and the fruit mand was acquired in 65 trials during the question-present condition. During posttraining probes (Figure 1), Aubrey emitted seven independent mands for the fruit snack (taught in the question-absent condition) and eight independent mands for juice (taught in the question-present condition) during the eight probes. Chase emitted seven independent mands for Skittles (taught in the question-absent condition) and eight independent mands for fruit (taught in the question-present condition) during the eight probes.

These data show no meaningful differences in the number of trials to the acquisition criterion between mands taught with or without a supplemental question. Furthermore, mand maintenance did not differ after the therapist removed the supplemental question. Although authors have cautioned against the use of questions during mand training, our inclusion of questions did not appear to result in undesirable stimulus control.

Some limitations deserve comment. First, the presence of the target items may have acquired discriminative control and blocked the supplemental question from acquiring undesirable stimulus control (e.g., the participant imitated the question). Future research could evaluate the effects of the question-only versus the item-

Figure 2. Cumulative number of correct independent and prompted mands during mand training across question-absent and question-present conditions for Aubrey (top) and Chase (bottom). PPD = progressive prompt delay.

present-only during training. Second, because training conditions were alternated across successive trials, our outcomes may have been affected by multiple-treatment interference. Thus, acquisition of the mand in the question-absent condition might have facilitated performance in the question-present condition. Finally, the use of different target responses and reinforcers during the adapted alternating treatments design might have served as a confounding effect. Future research could address this concern by replicating training conditions across additional mand targets within participants.

Our results indicated that the use of supplemental questions during mand training did not deter acquisition of independent mands, suggesting that supplemental questions

did not result in undesirable stimulus control. However, given that we included only two participants, the generality of this finding remains unclear, and additional research that evaluates the effect of including supplemental questions and other types of verbal prompts is warranted. Therefore, we recommend that practitioners evaluate each learner's response patterns (e.g., acquisition rate, evidence of erroneous stimulus control) carefully during mand training with supplemental questions and modify their procedures if necessary. Although our study assessed whether mands were under undesirable stimulus control, mands also may be under desirable stimulus control (e.g., stating "Yes, I would like some Gatorade" in response to "What do you want to drink?"). Therefore, future research could evaluate whether verbal

prompts or other teaching procedures can facilitate desirable stimulus control of mands without compromising the effects of EOs.

REFERENCES

- DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis*, 29, 519–533. doi:10.1901/jaba.1996.29-519
- 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, 69–85.
- Michael, J. (1988). Establishing operations and the mand. *The Analysis of Verbal Behavior*, 6, 3–9.
- Nigro-Bruzzi, D., & Sturmey, P. (2010). The effects of behavioral skills training on mand training by staff and unprompted vocal mands by children. *Journal of Applied Behavior Analysis*, 43, 757–761. doi:10.1901/jaba.2010.43-757
- Sindelar, P. T., Rosenberg, M. S., & Wilson, R. J. (1985). An adapted alternating treatments design for instructional research. *Education and Treatment of Children*, 8, 67–76.
- Skinner, B. F. (1957). *Verbal behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Sundberg, M. L., & Michael, J. (2001). The benefits of Skinner's analysis of verbal behavior for children with autism. *Behavior Modification*, 25, 698–724. doi:10.1177/0145445501255003
- Sundberg, M. L., & Partington, J. W. (1998). *Teaching language to children with autism and other developmental disabilities*. Pleasant Hill, CA: Behavior Analysts, Inc.

Received August 17, 2011

Final acceptance July 25, 2012

Action Editor, Eileen Roscoe