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THE EFFECTS OF BEHAVIORAL SKILLS TRAINING ON MAND TRAINING BY STAFF AND UNPROMPTED VOCAL MANDS BY CHILDREN

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We evaluated the effects of a training package, including instructions, modeling, rehearsal, and feedback, for training staff members to conduct mand training with children. Experimenters collected data on staff performance on each step of a task analysis of mand training and on unprompted child vocal mands. Training resulted in increases in staff performance in mand training and in unprompted mands by children. We observed replication of these effects across settings for all staff and for 3 of the children.

Key words: mand training, staff training

Communication deficits among children are often associated with problem behavior (Matson, Boisjoli, & Mahan, 2009; Stevenson & Richman, 1978). In addition, problem behavior may serve a similar social function to that produced by appropriate forms of communication (Carr & Durand, 1985; Wacker et al., 2005). In these cases, an effective form of treatment involves withholding the maintaining reinforcer for problem behavior and delivering it contingent on an appropriate communication response, often referred to as a mand. Skinner (1957) defined a *mand* as a response that one reinforces with a specific consequence and is under the control of deprivation or aversive stimulation (pp. 35–36). Given the clinical importance of establishing an appropriate mand repertoire among children with communication deficits, experimenters have developed a number of mand training procedures.

One strategy experimenters have used to promote generality of mand training effects is to train staff or parents to conduct mand training (Laski, Charlop, & Schreibman, 1988). Laski et al. demonstrated that training was effective in promoting mand training among staff and parents; however, lengthy instructions were required. Behavioral skills training (BST) is a training package that is effective for promoting acquisition of discrete-trial teaching responses (Sarokoff & Sturmey, 2004) and preference assessment implementation (Roscoe & Fisher, 2008), which includes instructions, modeling, rehearsal, and feedback. It is unclear whether BST would be effective and efficient when used to train staff to implement mand training. Therefore, the purpose of the current study was to evaluate the effectiveness of BST for training staff to implement mand training.

METHOD

Participants, Setting, and Stimuli

Six children with autism spectrum disorders participated. The children in Dyads 1, 2, and 3 were 4 years old and attended school. The children in Dyads 5 and 6 were 2 years old, and the child in Dyad 4 was 6 years old. These children received in-home services. All children imitated vocal models. Six staff (three special

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Table 1
Task Analysis of Mand Training

1. Place preferred leisure items on the floor, with 3 cm between each toy.
2. Bring the child a few centimeters away from the leisure items and instruct him or her to "[get], [find], [show me], [point to] the one you want."
3. Level 1: When the child touches a leisure item, immediately remove it from his or her hands and hold it up a few centimeters in front of the child's face until he or she mands for the item or 3 s elapses. If the child mands, present him or her with the leisure item for 1 min and record the name of the item and the corresponding prompt level on the data sheet.
4. Level 2: If the child did not mand during Level 1, ask him or her "What do you want?" If the child mands within 3 s, deliver the item and record data as described for Step 3.
5. Level 3: If the child did not mand during Level 2, present the item with a vocal approximation (e.g., "mm" for music). If the child subsequently mands within 3 s, deliver the item and record data as described for Step 3.
6. Level 4: If the child did not mand during Level 3, present the item with the complete vocal model (e.g., "music"). Repeat the vocal model three times with 3 s between prompts. If the child subsequently mands within 3 s, deliver the item and record data as described for Step 3.
7. If the child does not mand during Level 4, place the item back in the array; record the name of the item on the data sheet.
8. After the child has had access to the manded item for 1 min or did not mand during Level 4, reinitiate mand training starting at Step 1. Repeat until the experimenter instructs you to stop.

education teachers and three speech therapists), who worked with the children on a regular basis, participated. None had received training in teaching manding. We paired the staff and the children into dyads, and each staff member worked with the same child throughout the study. Staff training and mand training sessions were conducted in the child's classroom, a room in their home, or a private office (staff training only). Staff conducted generality probes in a room outside the child's classroom. Experimenters identified five to eight items for use during mand training with each participant through staff and parent interviews and preference assessments (DeLeon & Iwata, 1996). Experimenters taped all sessions.

Response Measurement and Interobserver Agreement

An eight-step mand-training task analysis was developed (see Table 1). Each training step consisted of multiple components (e.g., prompting, delivery of the item, and data collection) to replicate the complexity of mand training in the natural environment where staff must perform multiple responses in a short period of time. Observers collected data for each mand opportunity, including those initiated by staff (e.g., when the staff asked a child to "find the one he or she wants") and those initiated by a child (e.g., when a child touched a toy). During each mand opportunity, only certain steps of the task analysis were applicable for data collection, depending on whether a staff member or a child initiated the mand opportunity and depending on the prompt level in effect when the child emitted a mand. For example, if a staff member initiated a mand opportunity and the child emitted a mand at Level 1 (Step 3), then only Steps 1, 2, 3, and 8 were applicable for data collection, whereas if the child initiated an opportunity and performed a mand at Level 1 (Step 3), then only Steps 3 and 8 were applicable for data collection. For each applicable training step, experimenters scored a correct response if the staff completed all components associated with that step in the sequence listed in the task analysis. If a staff member skipped a prompt level, experimenters scored that prompt level as incorrect. The experimenter recorded staff behavior during staff training role play in the same manner. We calculated the percentage of correct staff responses by adding the number of applicable steps scored as correct, dividing that number by the total number of applicable steps, and converting the ratio to a percentage.

Observers scored the number of mand opportunities and the corresponding prompt level (Levels 1 to 4) in effect when the first

mand was emitted for a given opportunity; subsequent mands emitted within the same opportunity were ignored and were excluded from data collection. Experimenters summarized data on the percentage of Level 1 mands by adding mands emitted during the Level 1 step, dividing that number by the number of mand opportunities, and converting the ratio to a percentage. Experimenters summarized data on percentage of steps performed correctly by dividing the number of applicable steps performed correctly by the total number of applicable steps and converting the ratio to a percentage. Experimenters collected interobserver agreement data during a minimum of 20% of sessions across participants. Experimenters summarized agreement scores by dividing the number of agreements by the number of agreements plus disagreements and converting the ratio to a percentage. Mean agreement for steps across staff was 90% (range, 83% to 97%), and mean agreement for mands across children was 92% (range, 77% to 100%).

Procedure

Experimenters used a multiple baseline design across participants. Baseline and posttraining sessions lasted 20 min.

Baseline. During Session 1, the experimenter presented staff with written instructions and a copy of Table 1 and read its contents aloud. The instructions described the definition of a mand, how to conduct mand training, and how to collect data on child performance. In subsequent sessions, staff received an abbreviated set of instructions that included the purpose and length of the session. The experimenter answered staff members' questions before every session. Staff rarely asked questions, and they typically involved procedural clarification related to data collection and the task analysis.

Staff training. During 30- to 60-min sessions, the experimenter provided instructions, a video model, role-play rehearsal, and performance feedback. After reading the abbreviated instructions, the experimenter showed the staff member a video depicting all steps listed in Table 1. Next, the experimenter role played the child while the staff member practiced the steps. The experimenter provided feedback (positive and corrective statements) on performance during role plays. Training sessions continued until staff performed 90% correct across three consecutive sessions. All staff members met criterion in three sessions.

Posttraining sessions. Sessions were identical to baseline.

Generality sessions. We assessed generality of children's manding and staff's correct performance across settings. Generality sessions were similar to baseline and lasted 5 min.

RESULTS AND DISCUSSION

Figure 1 depicts the percentage of staff members' correct performance of applicable task analysis steps and Level 1 child mands. During baseline, Dyads 1, 2, 4, 5, and 6 showed low percentages of staff members' correct performance and Level 1 child mands. Because Dyad 3 had an increasing trend during baseline, experimenters did not implement training with this dyad. During posttraining, percentages of staff members' correct performance and Level 1 child mands increased for Dyads 1, 2, 4, 5, and 6. The increases in mands for Dyad 4 were lower than those observed for the other dyads. For generality probes conducted in the context of baseline, staff and children in all dyads showed outcomes similar to those observed during their baseline sessions. For generality probes conducted in the context of posttraining sessions, staff and children in Dyads 1, 2, and 4 showed outcomes similar to those observed during their posttraining sessions. By contrast, only staff in Dyads 5 and 6 showed outcomes similar to those observed during their posttraining sessions; the children in these dyads showed discrepant responding (i.e., low percentages of Level 1 mands) from their posttraining sessions. Table 2 shows the range of Level 1 mands and

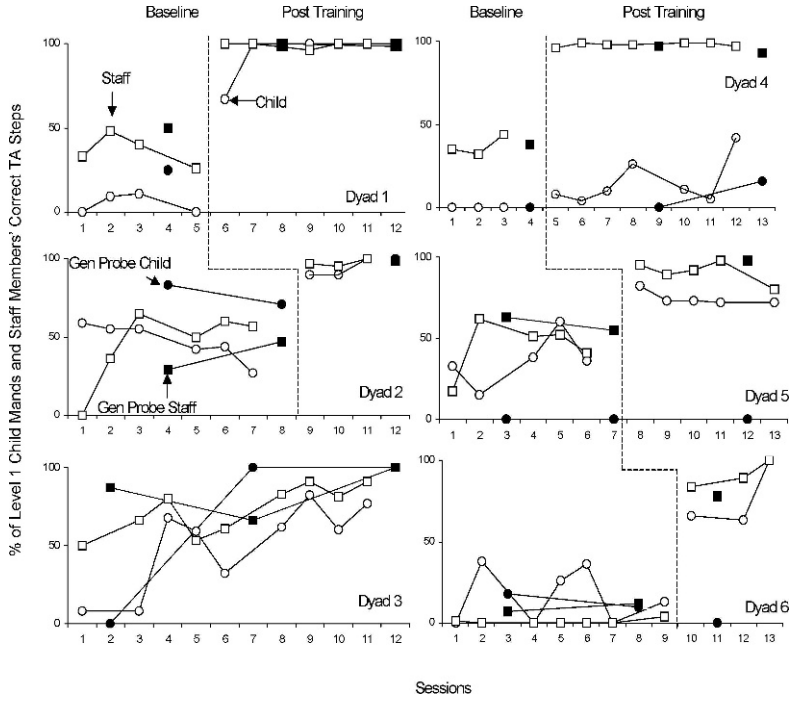

Figure 1. Percentage of Level 1 child mands (circles) and percentage of staff members' correct performance of applicable task analysis steps (squares). Open data points represent responses during sessions, and filled data points represent responses during generality probes.

mand opportunities and demonstrates that a greater number of mand opportunities in baseline compared to posttraining alone did not result in more Level 1 mands for Dyads 2 and 5.

Poor integrity of mand training during baseline was often due to staff presenting only some prompt levels (e.g., Level 4, a model) and omitting others (e.g., Level 1, initiating a delay). During baseline, the children's mands occurred most often when staff initiated a mand opportunity (at Level 2 or 4); the child in Dyad 2 was the only exception, in that she frequently initiated mand opportunities. During posttraining, mands occurred most often at Level 1. It is unclear why mand training generalized across settings for children in Dyads 1, 2, and 3 but not for children in Dyads 5 and 6. The child in Dyad 2 showed a high percentage of Level 1 mands during baseline generality probes; this may be due to her having previously acquired a manding repertoire for a particular item (movie) that was present in the generality setting.

This study extended previous research on BST by showing that experimenters can use it to train staff to teach children with autism. In addition, the mand training procedure was effective in increasing independent mands in children with autism, and this effect generalized across settings for three of the five children. An important feature of the staff training program was that staff completed BST in fewer than three 60-min sessions. The results suggest that experimenters can implement the mand training procedure across settings with minimal effort for staff and concomitant clinical benefit to children with autism.

Experimenters note some limitations. First, we could not evaluate the effects of the

Table 2
Range of Level 1 Child Mands and Mand Opportunities

	Baseline		Posttraining	
Dyad	Sessions	Generality probes	Posttraining	Generality probes
1	0–2, 13–20	1, 4	10–19, 15–19	4–7, 4–7
2	0–24, 28–40	5, 6–7	18–19, 19–20	5, 7
3	3–23, 21–36	0–6, 4–6		
4	0, 16–20	0, 8	2–10, 18–24	0–1, 6
5	2–9, 13–15	0, 2	14–18, 15–25	0, 2–5
6	0–14, 20–42	2–10, 11–12	16–21, 16–21	0, 5

Note. The table lists the range of Level 1 mands and the number of opportunities for each condition. Experimenters did not obtain posttraining data for Dyad 3.

independent variable with the staff member in Dyad 3 because she exhibited increases in correct performance during baseline. Second, each step of the task analysis consisted of multiple staff responses resulting in a less sensitive dependent variable (i.e., it was unclear whether an error was due to one or more incorrect responses). Third, the number of mand opportunities differed across sessions, which may have affected the percentage of Level 1 mands. Potential areas for future research include teaching staff to implement mand training using a pyramidal approach and modifying the task analysis for group instruction to further increase staff training efficiency.

REFERENCES

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis*, *18*, 111–126.

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.

Laski, K. E., Charlop, M. H., & Schreibman, L. (1988). Training parents to use the natural language paradigm to increase their autistic children's speech. *Journal of Applied Behavior Analysis*, *21*, 391–400.

Matson, J. L., Boisjoli, J., & Mahan, S. (2009). The relation of communication and challenging behavior in infants and toddlers with autism spectrum disorder. *Journal of Developmental and Physical Disabilities*, *21*, 253–261.

Roscoe, E. M., & Fisher, W. W. (2008). Evaluation of an efficient method for training staff to implement stimulus preference assessments. *Journal of Applied Behavior Analysis*, *41*, 249–254.

Sarokoff, R. A., & Sturmey, P. (2004). The effects of behavioral skills training on staff implementation of discrete-trial teaching. *Journal of Applied Behavior Analysis*, *37*, 535–538.

Skinner, B. F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.

Stevenson, J., & Richman, N. (1978). Behavior, language and development in 3-year-old children. *Journal of Autism and Childhood Schizophrenia*, *8*, 299–313.

Wacker, D. P., Berg, W. K., Harding, J. W., Barretto, A., Rankin, B., & Ganzer, J. (2005). Treatment effectiveness, stimulus generalization and acceptability to parents of functional communication training. *Educational Psychology*, *52*, 233–256.

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