

*ASSESSMENT OF MAND SELECTION FOR  
FUNCTIONAL COMMUNICATION TRAINING PACKAGES*

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We evaluated the effects of training novel and existing mands during functional communication training (FCT) to decrease problem behavior for 2 children. A functional analysis (Phase 1) identified mands for FCT. Phase 2 used distinct stimulus conditions to train novel and existing mands. Phase 3 evaluated allocation of responding within a concurrent-schedules design. When reinforcement for either mand was concurrently available, the children used existing mands more than novel mands, but higher levels of problem behavior occurred with existing mands.

DESCRIPTORS: functional analysis, functional communication training, problem behavior, mand selection

Although mands have been used successfully with functional communication training (FCT), little is known about the selection of mands to replace problem behavior. Durand and Carr (1991) showed that the long-term effectiveness of FCT was enhanced if the mand was reinforced in the natural environment. Other outcome variables include the effort involved in displaying the mand (Horner & Day, 1991; Richman, Wacker, & Winborn, 2001), the past relation of the mand to aberrant behavior (Derby, Fisher, Piazza, Wilke, & Johnson, 1998), or competing reinforcement schedules between communication and problem behavior (Kelley, Lerman, & Van Camp, 2002). This investigation extended these studies by measuring allocation of responding and levels of problem behavior during FCT with novel and existing mands.

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## METHOD

### *Participants and Settings*

Participants had been referred to an inpatient hospital unit for assessment and treatment of problem behavior. Ike was 2 years 6 months old with developmental delays and seizures. Problem behaviors included self-injury, noncompliance, and property destruction. The existing mand for Ike was saying "no" or shaking his head from side to side, and the novel mand was pressing a microswitch with the message, "Break, please." Julie was 2 years 5 months old with developmental delays and seizures. Problem behaviors included self-injury, aggression, tantrums, and noncompliance. The existing mand for Julie was saying, "all done," and the novel mand was handing the therapist a communication card with the word "break." Phases 1 and 3 were conducted in the same room with the same therapist. Phase 2 was conducted in two different rooms with two therapists (one for training each mand).

### *Response Definitions and Interobserver Agreement*

A 6-s partial-interval recording system was used to measure problem behavior and independent communication. Problem behav-

ior included self-injury, aggression, destruction, tantrums, and noncompliance. An existing mand was one the child had been observed to use on the unit during the demand context of a functional analysis. A novel mand was a communicative response the child had not used on the unit. Independent manding was a target mand emitted without physical guidance. Interobserver agreement was collected for the first 2 min of each session. Mean agreement for target behaviors during all three phases was 98% for Ike (range, 90% to 100%) and 97% for Julie (range, 81% to 100%).

#### *Experimental Design and Procedures*

During Phase 1, a functional analysis was conducted using a multielement design. During Phase 2, existing and novel mands were trained in distinct stimulus conditions (settings, therapists) in a counterbalanced order within a multielement design. An FCT package was developed to reduce problem behavior that was maintained by negative reinforcement (an attention function identified during the functional analysis for both Ike and Julie was addressed via a treatment package not included in the current investigation). To obtain reinforcement during mand training, Ike was prompted to either shake his head “no” or press the micro-switch, and Julie was prompted either to say “all done” or hand the communication card to the therapist. In practice trials at the beginning of each session, a therapist modeled the target mand and then used a three-step prompt sequence to prompt the participant to emit the target mand on two subsequent trials. The same task used during the escape condition of the functional analysis was used during mand training. Task compliance, use of the target mand, and absence of problem behavior resulted in a 30-s break from the demand, and contingent attention and preferred toys and activities were provided.

Problem behavior produced no programmed consequence (extinction).

The choice analysis (Phase 3) was the same as mand training, except that the child was given the choice to use either the existing or the novel mand to gain reinforcement. The child’s allocation of responding was evaluated within a concurrent-schedules design. Practice trials (similar to Phase 2) were conducted with both mands, and the prompt sequence was reversed across trials. If Ike or Julie did not emit either mand, he or she was prompted to complete another portion of the task and then could use either mand to request a break. When an existing mand was emitted, all subsequent problem behavior was scored as being associated with existing mands until a novel mand occurred. Conversely, when a novel mand was emitted, all subsequent problem behavior was associated with novel mands until an existing mand occurred. Within any 5-min choice condition, the total number of intervals of problem behavior was converted into a percentage and graphed by type of mand.

## RESULTS AND DISCUSSION

Results of the functional analysis during the demand-escape condition for Ike and Julie are shown in Figure 1 (Phase 1); problem behavior was responsive to negative reinforcement. (For the purposes of this study, only the results of the escape conditions and use of the existing mand during escape conditions only are depicted in Figure 1. The results from the complete functional analysis are available upon request from the first author.) The results of mand training (Phase 2) show that Ike’s initial use of the existing mand resulted in variable percentages of problem behavior and was rarely emitted independently. After seven training sessions, independent manding increased substantially and problem behavior decreased. During training sessions with the novel mand, high

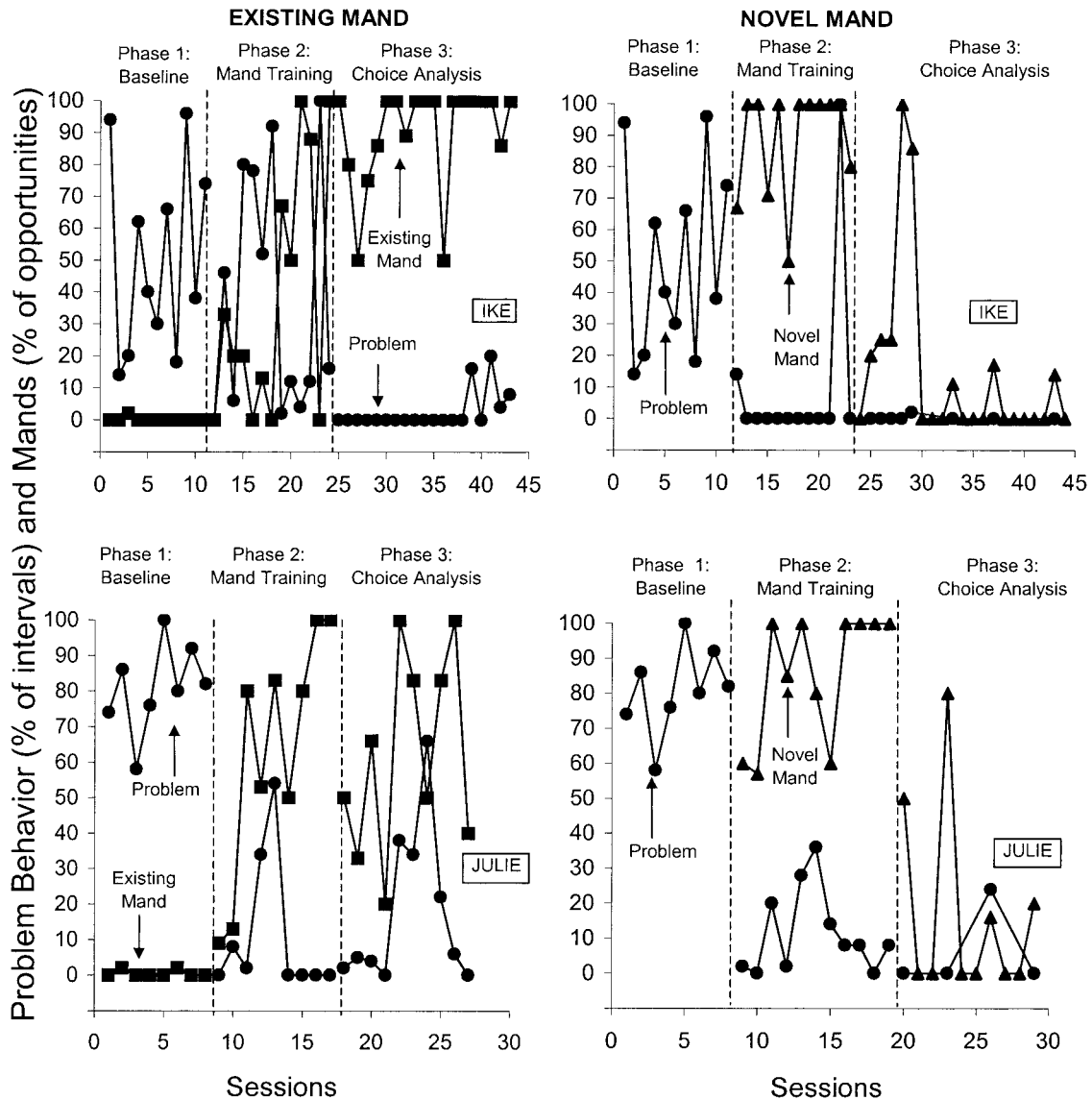


Figure 1. Percentage of problem behavior and existing mands in Phase 1 (left panels). Percentage of problem behavior and existing and novel mands in Phase 2 (center panels) and Phase 3 (right panels).

levels of independent manding and low levels of problem behavior occurred. For Julie, FCT with the existing mand resulted in an improvement in manding that began in the third session and continued throughout training. Problem behavior was reduced with the introduction of FCT. Training of the novel mand resulted in relatively stable percentages of manding after the first two sessions. Problem behavior, after a brief in-

crease, decreased across the final five sessions.

Despite Ike's successful use of the novel mand during Phase 2, in Phase 3 he typically chose the existing mand ( $M = 82\%$ ) more often than the novel mand ( $M = 15\%$ ). Problem behavior occurred at relatively low percentages compared to Phase 2. Similar results occurred for Julie, who emitted the existing mand more frequently ( $M$

= 53%) than the novel mand ( $M = 16\%$ ), but in contrast to Ike, problem behavior occurred at much higher percentages with the existing mand.

Overall, the results showed that both mands served as effective replacements for problem behavior during Phase 2, when trained within a DRA-plus-extinction package. However, FCT with the existing mand was correlated with lower percentages of manding and higher percentages of problem behavior than was FCT with the novel mand. If termination of treatment had occurred after Phase 2, the results would have supported the use of novel mands for FCT. In contrast, Phase 3 resulted in decreased use of novel mands and increased use of existing mands for both participants. For Julie more than for Ike, increased problem behavior also occurred with the existing mand. Thus, although Ike and Julie chose most often to use the existing mand, it may not have been the most effective mand because of (a) increased effort (Horner & Day, 1991; Richman *et al.*, 2001) required by the novel mand or (b) past pairings with reinforcement. These results suggest that, at least in novel contexts, existing mands may be displayed more often than novel mands, but increases in problem behavior correlated with these mands may also occur. One implication of these results is that long-term maintenance of treatment effects may be compromised, even after successful interven-

tion, if past relations between existing mands and problem behavior are not evaluated carefully.

A limitation of the study was the failure to include reversal or extinction phases during Phase 2 to increase experimental control. Increases in Ike's problem behavior during four of the final five sessions of Phase 3 also suggest that problem behavior may have continued to increase over time.

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