

*THE EFFECTS OF COMPETING REINFORCEMENT SCHEDULES ON
THE ACQUISITION OF FUNCTIONAL COMMUNICATION*

MICHAEL E. KELLEY, DOROTHEA C. LERMAN, AND CAROLE M. VAN CAMP

LOUISIANA STATE UNIVERSITY

The initial efficacy of functional communication training (FCT) was evaluated when problem behavior continued to produce intermittent reinforcement. Results for 2 of 3 participants showed that FCT was most effective when problem behavior was also exposed to extinction, response blocking, or both.

DESCRIPTORS: developmental disabilities, extinction, functional analysis, functional communication training, intermittent reinforcement

Functional communication training (FCT) involves terminating the reinforcement contingency for problem behavior and using the maintaining reinforcer to teach an alternative communicative response. Treatment with FCT typically is implemented in two distinct phases. First, the communication response is taught via prompting and reinforcement. Then, a treatment procedure that includes both extinction of problem behavior and reinforcement of the alternative response is implemented. The efficacy of FCT without extinction has been evaluated in several studies after initial training of the communication response, because treatment is unlikely to be implemented with perfect integrity in the natural environment (e.g., Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998; Perry & Fisher, 2001). However, only a few studies have directly examined the role of extinction during the initial acquisition phase. In the study by Worsdell,

Iwata, Hanley, Thompson, and Kahng (2000), both problem behavior and an alternative response were reinforced on continuous schedules during the acquisition phase of FCT. The reinforcement schedule for problem behavior then was thinned until the participants acquired the alternative response and rates of problem behavior decreased. Although results suggested that a new response could be shaped while problem behavior continued to contact reinforcement intermittently, the terminal schedules for problem behavior may have been functionally equivalent to extinction. To evaluate the generality of the finding, we attempted to teach new responses while aggression and disruption were maintained on the same intermittent schedule prior to and during training.

METHOD

Participants, Setting, and Response Measurement

Three individuals who had been diagnosed with severe mental retardation participated. Roger was a 10-year-old boy who hit and shoved others. He had previously participated in a study on noncontingent reinforcement (Van Camp, Lerman, Kelley, Contrucci, & Vorndran, 2000). Gary was a 9-year-old boy with autism who engaged in

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Requests for reprints should be sent to Dorothea C. Lerman, Department of Psychology, 236 Aububon Hall, Louisiana State University, Baton Rouge, Louisiana 70803 (e-mail: dlerman@lsu.edu).

aggression. Jennifer was a 10-year-old girl with Cornelia de Lange syndrome who engaged in disruption. All sessions were conducted in unused rooms at the participants' schools. The rooms contained desks, chairs, tables, and materials relevant to conditions (see below). Two to five 10-min sessions were conducted 3 to 5 days per week during all phases of the study.

Aggression (Roger and Gary) was defined as hitting, biting, kicking, slapping, pinching, or shoving the therapist. *Disruption* (Jennifer) was defined as throwing or shoving an object (or attempting to throw or shove an object; see Procedure below). *Hand clapping* (Roger) was defined as audibly striking the palms together. *Card touching* (Gary and Jennifer) was defined as contact between a hand and a card placed nearby on the table. Independent communication responses were hand clapping or card touching that occurred without the therapist's assistance. Frequency data on all target behaviors were collected on laptop computers, and the data were calculated as number of responses per minute. Interobserver agreement was assessed during at least 25% of all sessions for each participant. Mean exact agreement across participants was 91.3% for problem behavior and 96.6% for independent communication responses.

Functional analyses were conducted using procedures similar to those described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994). As shown in Figure 1, results for Roger indicated that his aggression was maintained by access to tangible items. Results for Gary indicated that his aggression was maintained by escape from demands. Results for Jennifer indicated that disruption was maintained by both escape from demands and access to attention.

Procedure

The effects of FCT with and without extinction were examined using reversal and multiple baseline across subjects designs.

Baseline. The maintaining reinforcer (20-s access to a dish scrubber for Roger and 20-s escape from instructions for Gary and Jennifer) was provided contingent on each occurrence of aggression or disruption, and no consequences were arranged for the communication response. Reinforcement for problem behavior was then rapidly thinned to a variable-ratio (VR) schedule (VR 8 for Roger and Gary, VR 6 for Jennifer) that was based on the maximum number of responses observed prior to reinforcement delivery in the natural environment. The rationale was that, if a teacher was unable or unlikely to withhold reinforcement for problem behavior, the thinnest ratio schedule observed in the classroom might provide the best approximation of the schedule that would be implemented after the teacher was taught to conduct training.

Functional communication training without extinction. The therapist taught the communication response using procedures identical to those described by Worsdell *et al.* (2000); however, problem behavior continued to be reinforced on the terminal VR schedule. For Roger, the reinforcement for the communication response was eventually thinned to a VR 8 schedule.

Functional communication training with extinction. Gary and Jennifer participated in this condition. Escape was no longer provided contingent on aggression and disruption, and communication responses continued to be reinforced on a fixed-ratio 1 schedule. All other procedures were identical to those used during FCT without extinction. For Jennifer, response blocking was introduced because disruption often produced short breaks from demands when she threw task materials out of the reach of the therapist. All attempts to throw objects were blocked by briefly holding Jennifer's arm or taking the object from her.

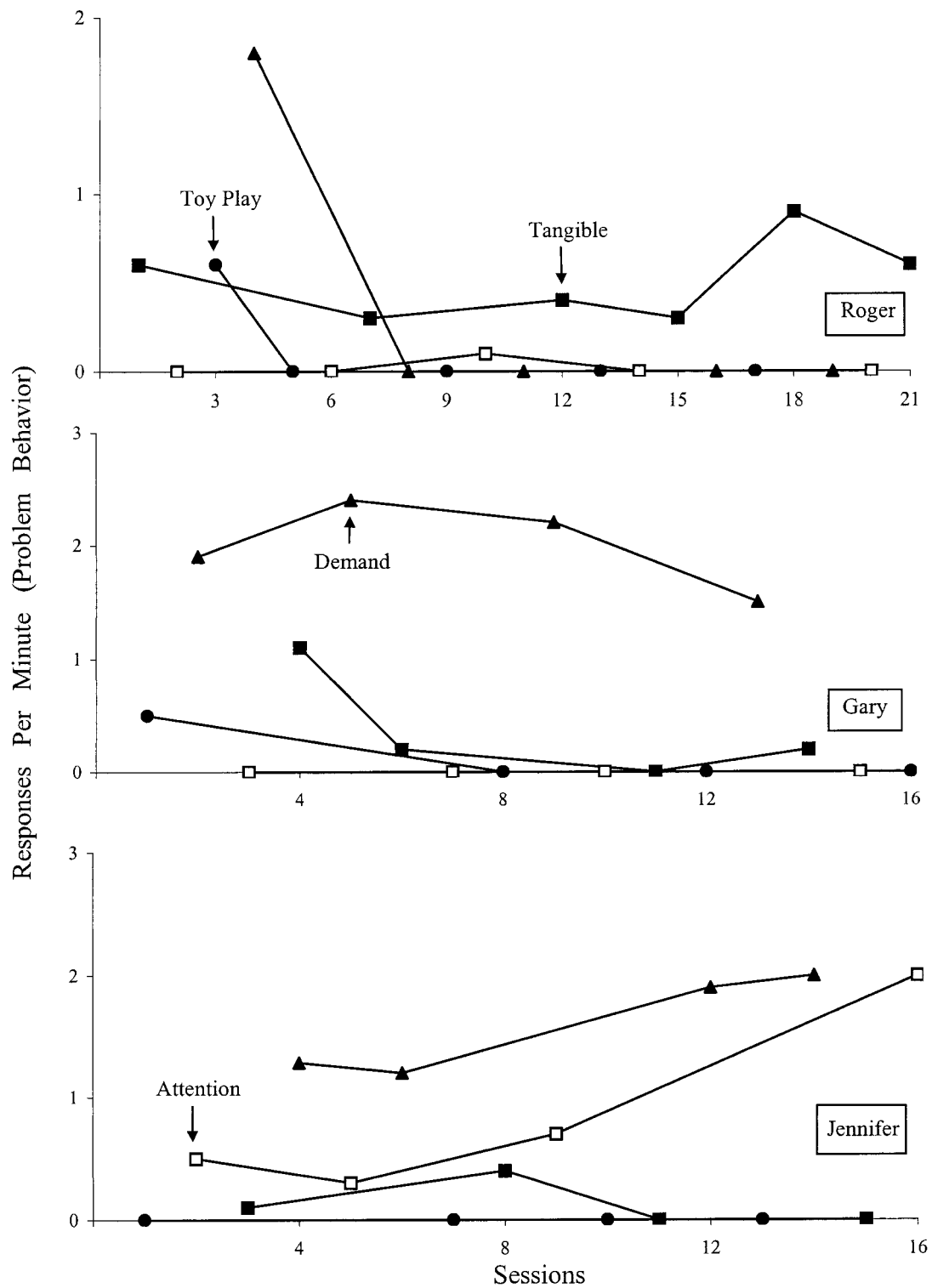


Figure 1. Number of responses per minute of problem behavior during the functional analyses for Roger (top panel), Gary (middle panel), and Jennifer (bottom panel).

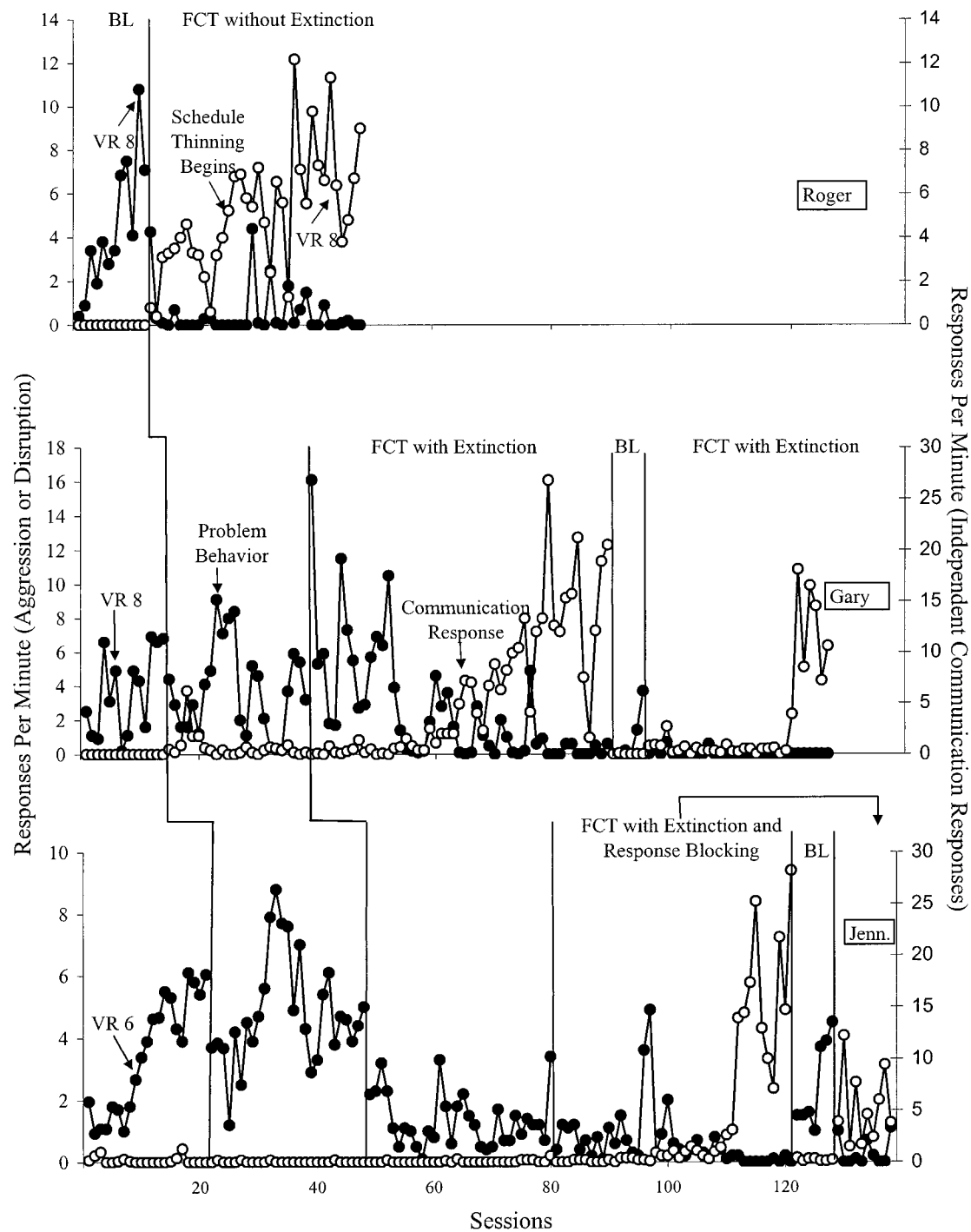


Figure 2. Number of responses per minute of problem behavior (left axis) and independent communication responses (right axis) across baseline and treatment conditions for Roger (top panel), Gary (middle panel), and Jennifer (bottom panel).

RESULTS AND DISCUSSION

Roger's aggression decreased and independent claps increased during the initial acquisition phase of FCT without extinction (Figure 2). Claps remained high and aggression remained low when the reinforcement schedule for clapping was thinned. For Gary, aggression remained high and variable across 24 sessions of FCT without extinction, and he did not acquire the communication response. With the introduction of extinction, aggression gradually decreased and independent card touches gradually increased. The effects of extinction were replicated a few weeks later following a return to baseline in a new school. For Jennifer, rates of disruption remained high and variable across 27 sessions of FCT without extinction, and she rarely independently touched the card. When extinction was introduced, disruption and card touches did not decrease below baseline until attempted disruptions were blocked. These treatment effects were replicated following a return to baseline.

These findings suggest that it may be difficult to teach a new response when problem behavior continues to be intermittently reinforced and that extinction may be necessary to reduce problem behavior during the initial acquisition phase of FCT. These findings, which are consistent with those of Worsdell et al. (2000), have important implications for the application of FCT in clinical settings, where teachers and caregivers may be unable or unlikely to completely withhold reinforcement for problem behavior.

Nevertheless, results were idiosyncratic across participants. In addition, lengthier exposure to FCT without extinction may have led to successful training outcomes. Jennifer's results also may have limited generality because her behavior appeared to be sensitive to both attention and escape from demands

during the functional analysis. Results of Worsdell et al. (2000) also were idiosyncratic, suggesting that other factors are likely to influence the efficacy of communication training. Potential factors include the prompting procedure, other dimensions of reinforcement (e.g., magnitude, delay), and the topography of the communication response (Richman, Wacker, & Winborn, 2001). Further research on variables that contribute to the efficacy of communication training is warranted.

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