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REDUCING ESCAPE BEHAVIOR AND INCREASING TASK COMPLETION WITH FUNCTIONAL COMMUNICATION TRAINING, EXTINCTION, AND RESPONSE CHAINING

JOSEPH S. LALLI
THE UNIVERSITY OF PENNSYLVANIA
AND
SEAN CASEY AND KELLY KATES
CHILDREN'S SEASHORE HOUSE

The effects of functional communication training, extinction, and response chaining on 3 subjects' escape-maintained aberrant behavior were evaluated using a multielement design. Functional communication training consisted of teaching subjects a verbal response that was functionally equivalent to their aberrant behavior. Subjects initially were allowed to escape from a task contingent on the trained verbal response. In subsequent treatment phases, escape was contingent on the trained verbal response plus the completion of the specified number of steps in the task (response chaining). The number of steps was increased until a subject completed the task to obtain a break. Results showed that the treatment reduced rates of aberrant behavior and that the chaining procedure was effective in decreasing the availability of escape.

DESCRIPTORS: extinction, functional communication training, response chaining, escape behavior, task completion

In the treatment of aberrant behavior, functional communication training (FCT) is a two-step process. First, the therapist identifies the target behavior's operant function. Second, the therapist reinforces an alternative response with the same consequence as that produced by the aberrant behavior. FCT thus weakens the aberrant response–reinforcer relation by providing the reinforcer for inappropriate behavior contingent on the alternative response (Carr, 1988). Researchers have used FCT as part of a treatment package to reduce aberrant behavior maintained by attention (Carr & Durand, 1985; Durand & Carr, 1991; Lalli, Browder, Mace, & Brown, 1993), escape (Bird, Dores, Moniz, & Robinson, 1989; Carr & Durand, 1985; Durand & Carr, 1991; Fisher et al., 1993; Wacker et al., 1990), or access to preferred items (Bird et al., 1989; Fisher et al., 1993; Wacker et al., 1990).

One potential benefit of FCT is that an individual can regulate delivery of the reinforcer to a greater degree when compared to treatments that rely solely on the passage of time (e.g., response-independent reinforcement), time plus the absence of aberrant behavior (e.g., differential reinforcement of other behavior; DRO), or a predetermined performance requirement (e.g., task completion). However, this benefit is compromised to the extent that the reinforcer is not available immediately (e.g., a snack before a meal) or may not be in the best interest of the individual (e.g., escape from self-care routines). For example, in the treatment of escape-maintained behavior, therapists have sometimes terminated an ongoing task immediately when the subject emitted the trained escape response (Bird et al., 1989; Fisher et al., 1993; Wacker et al., 1990). Thus, although FCT may result in decreased rates of aberrant behavior, it may also disrupt an ongoing activity and limit teaching opportunities. For FCT to

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Reprints may be obtained from Joseph S. Lalli, Children's Seashore House, 3405 Civic Center Blvd., Philadelphia, Pennsylvania 19104.

be a viable treatment for escape-maintained behavior, therapists must use it in a way that can maintain treatment effects while improving participation in the required activity.

To address this concern, Bird et al. (1989) and Fisher et al. (1993) gradually increased the response requirements before their subjects could escape with the trained verbal response. Bird et al. increased the number of task steps required for completion before a subject could exchange a token for a 60-s break; the initial increase occurred after 6 weeks of FCT training, and subsequent increases occurred at 3-week intervals. Fisher et al. gradually increased the number of instructional requests presented to a subject from 2 to 26 before signing produced a 30-s break. Both studies successfully maintained low rates of aberrant behavior as performance requirements increased. However, neither study provided detailed descriptions of the procedures.

In the present study, we extended this line of research by evaluating the effects of response chaining following the implementation of FCT. We taught subjects an alternative escape response and then added a response chaining procedure to increase their participation in the task. We combined these treatment procedures with extinction throughout the study. Our objective was to first teach a subject to escape task-related activities with a socially appropriate response, and then to teach a subject to tolerate a delay (i.e., an increase in the performance requirement) prior to obtaining a break from the task.

METHOD

Subjects and Setting

Three individuals admitted to a hospital inpatient unit specializing in the treatment of severe problem behavior participated. All were enrolled in the unit's special education program throughout their admission. The teacher reported that each subject engaged in high rates of aberrant behavior during instructional activities. Subjects' admissions were sequential.

Joe was 10 years old with moderate mental retardation and was admitted for treatment of his self-injurious behavior. Joe interacted with others using utterances and responded to his name and some words. He was ambulatory, followed a few one-step directions, and could feed himself but he required physical prompting to complete his other self-care activities. Jen was 15 years old with moderate mental retardation and autism, and she was admitted for treatment of her self-injury. She interacted with others using one-word utterances and responded to familiar names, objects, and activities. Jen was ambulatory, followed one-step directions, and independently completed self-care activities. Kim was 13 years old with moderate mental retardation and autism, and was admitted for treatment of her aggressive behavior. She interacted with others using utterances and gestures (pointing), and responded to her name and other familiar names, objects, and activities. Kim was ambulatory, followed one-step directions, and demonstrated adequate fine and gross motor responses for participation in self-care routines.

All sessions were conducted individually in one of two therapy rooms (3 m by 3 m), and observers recorded data from behind a one-way mirror. A therapist and subject were present during sessions. Two 15-min sessions were conducted daily 5 days per week, with a minimum of 120 min between sessions.

Dependent Variables and Data Collection

Self-injury was defined as forceful contact of one's head or mouth against an object (Joe) or closure of upper and lower teeth on one's hand (Jen). *Aggression* was defined as forceful hitting or throwing objects at others (Kim). *Appropriate verbalization* was defined as a subject independently giving the therapist an index card with "BREAK" (Joe), saying "no" (Jen), or moving one's head horizontally to indicate "no" in response to a therapist's request (Kim). In the

FCT plus extinction with response chaining phases, appropriate verbalizations were defined as the subject independently requesting a break after completing the task requirement (i.e., on a fixed-ratio, FR, schedule). Compliance was defined as independently initiating a task within 10 s of the therapist's request. Data were also collected on the therapist's instructions, praise, and withdrawal of instructional materials to monitor procedural fidelity.

Observers used a computerized event-recording procedure for all topographies (Repp, Harman, Felce, VanAcker, & Karsh, 1989). We converted subjects' appropriate verbalizations and compliance to percentage of requests responded to independently with the respective responses. A second observer independently collected data during an average of 30% of the sessions, equally distributed across all phases and subjects. Interobserver agreement was determined using the "reliable" program (Repp et al., 1989). Occurrence agreement was scored when two observers recorded the onset of a target behavior within 2 s of each other. Occurrence agreement averaged 88% (range, 83% to 97%) across topographies, phases of the study, and subjects. Procedural fidelity data showed that the therapist correctly carried out the procedures on an average of 93% of the opportunities across all subjects.

Experimental Designs and Sequence

The teacher reported that the subjects engaged in aberrant behavior exclusively during instructional activities. Therefore, we initially assessed the subjects' aberrant behavior via a functional analysis to verify the hypothesized escape function. Conditions were presented during 15-min sessions in a multielement design.

The second phase of the study began with an evaluation of FCT plus extinction using a multielement design in which FCT plus extinction conditions alternated with baseline conditions. We paired each condition with a different therapist and setting to help subjects discriminate the conditions in effect. Subsequent treatment phases (FCT plus extinction with response chaining) consisted of gradually increasing the response requirement prior to obtaining escape from the task.

Functional Analysis

We assessed the subjects' aberrant behavior under demand and play conditions, based on procedures described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994). We selected tasks from the subjects' educational plans and developed 16-step task analyses for use throughout the study. During the demand condition, the therapist presented an instruction to the subject once every 30 s (approximately 16 per session), provided descriptive praise for correct responses, and provided a 30-s time-out from the task (escape) contingent on the occurrence of aberrant behavior. During the play condition, the therapist provided the subject access to preferred items, delivered neutral comments every 30 s, and did not respond to aberrant behavior.

Treatment Conditions

Baseline. Baseline conditions during the FCT plus extinction evaluation were the same as those of the functional analysis demand condition (described above) with one exception. During the baseline condition, the therapist provided descriptive praise contingent on the trained verbal response ("no") and restated the instruction. That is, trained verbal responses were placed on extinction during these conditions.

FCT plus extinction. The therapist presented a request to the subject as in the functional analysis demand condition. However, the therapist also said, "If you do not want to work now, say 'no' [or the other verbal responses]." The therapist allowed the subject 10 s to emit the trained verbal response independently. Contingent on noncompliance, the therapist provided either physical prompts (Joe) or modeled prompts (Jen and Kim) for the appropriate verbal response. If aberrant behavior occurred during a trial, the therapist waited 10 s after it

ceased, then prompted the verbal response. The therapist provided descriptive praise and a 30-s time-out from the task contingent on the verbal response (independent or prompted). In this manner, the subject escaped each request contingent on the verbal response.

FCT plus extinction with response chaining. The objective of these conditions was to gradually increase the response requirement before the subject could request a break from task demands. Thus, the FR designation refers to the number of steps in the task that the subject was required to complete before asking for a break was reinforced (i.e., FR 1 to FR 16). Escape was contingent on completion of the required number of steps in the task and emission of the trained verbal response. The number of requests per session depended on the FR schedule in effect. For example, in the FR 1 phase, the therapist presented 16 requests, with each request corresponding to one step in the task analysis, with a break allowable following the completion of each step. In this manner, the subject completed the entire task by the end of the session. In subsequent treatment phases, the therapist presented progressively fewer requests based on the FR schedule in effect (e.g., FR 2, eight requests; FR 4, four requests), and the subject received correspondingly fewer breaks. This procedure continued until the therapist presented one request per session (i.e., FR 16), which required the subject to complete the entire task before requesting a break.

During the response chaining phase, the therapist provided a request to the subject, stated the criterion for earning a break, and pointed to the instructional materials related to the specified criterion. Contingent on the verbal response, the therapist said, "Good saying no, but you have to do [task step] then you can ask for a break." Contingent on noncompliance, the therapist physically guided the subject to emit the task-related response. The therapist praised compliance, provided the level of assistance necessary (i.e., least-to-most prompt hierarchy) during the task, and did not respond to aberrant behavior that occurred during the task. If the subject did not ask for a break within 10 s of completing the criterion, the therapist said "Good, you finished. Do you want more work?" If aberrant behavior occurred after the subject completed the criterion, the therapist waited 10 s after it ceased, then repeated the above statement. The therapist immediately provided a 30-s break contingent on independent or prompted target verbal responses. We initially established the criterion for a break as completion of one step of the task (FR 1) and subsequently doubled the criterion for the next phase after three consecutive sessions without aberrant behavior.

RESULTS

Functional Analysis

Response patterns were similar for the 3 subjects; that is, aberrant behavior occurred exclusively in the demand condition (Figure 1). These findings suggested that aberrant behaviors were maintained by escape.

FCT plus Extinction

Results presented in Figure 2 show lower rates of aberrant behavior during the FCT plus extinction condition compared with the baseline condition for each subject. Joe's data show a gradual decrease in rates of self-injury, which eventually reached zero. By contrast, Jen's and Kim's data show more rapid reduction in rates of aberrant behavior. During the FCT plus extinction condition, Joe's independent verbalizations gradually increased from 0% to 69%, Jen's increased from 38% to 81%, and Kim's increased from 25% to 88% of the therapist's requests per session. Joe's independent verbalizations averaged 3% during the baseline condition (not graphically presented), and Jen and Kim never emitted the verbal response during baseline conditions. The subjects' task-related compliance in the FCT plus extinction conditions was zero, because escape was contingent on the trained verbal response. Task-related

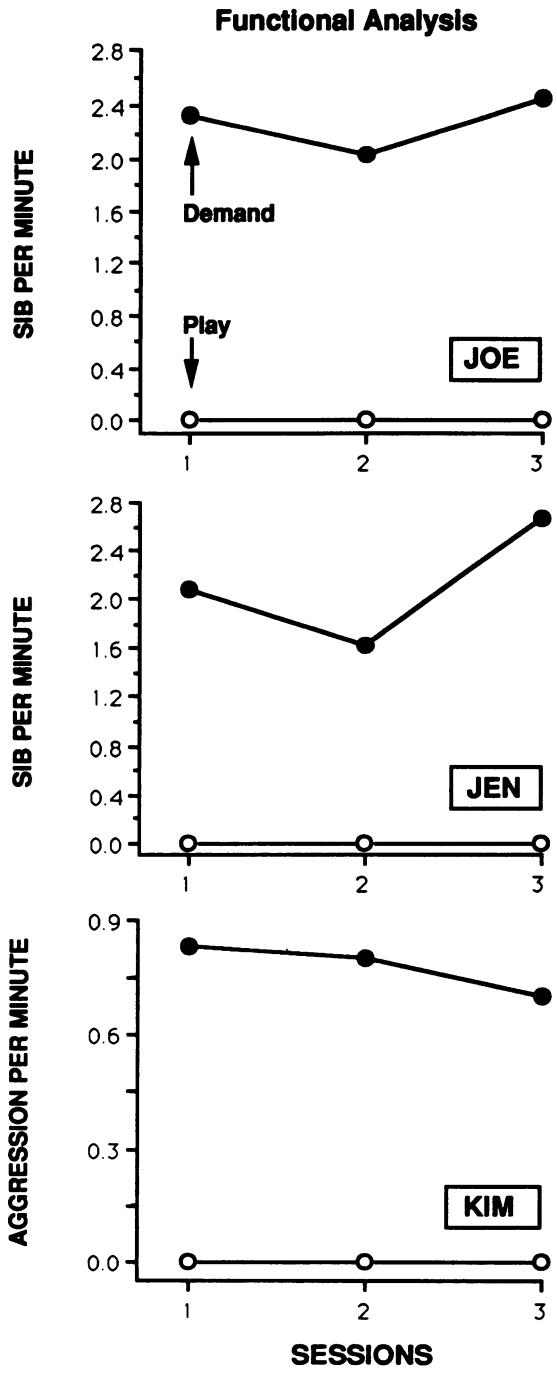

Figure 1. Responses per minute across assessment conditions.

compliance in the baseline condition averaged 3% for Joe, 13% for Jen, and 17% for Kim (not graphically presented).

FCT Plus Extinction with Response Chaining

We observed low rates of aberrant behavior for each subject during the initial FCT plus extinction with response chaining condition (FR 1, Figure 2). The subjects' rates of aberrant behavior stayed low throughout the remaining phases when performance requirements for obtaining a break were increased. Interestingly, we observed temporary increases in rates of aberrant behavior in each chaining phase for Jen and Kim and for Joe in the first and third chaining phases. However, the subjects' rates of aberrant behavior quickly decreased and remained stable throughout the phases.

In the response chaining phases, subjects had the opportunity to independently request a break following completion of the FR schedule. For example, in the FR 1 phase, subjects had 16 opportunities (i.e., following each completed request), considered as trials, to request a break independently. The number of trials decreased proportionately across subsequent FR phases. Therefore, data on appropriate verbalizations in the response chaining phases reflect the percentage of trials in which the subjects independently requested a break following completion of the FR schedule. Subjects always responded to the therapist's statement "Do you want more work?" by saying "no." However, these were considered to be prompted responses and are not graphically presented. Joe's independent verbalizations showed a gradual increase across response chaining phases before eventually averaging 100% in the FR 16 phase. By contrast, Jen's and Kim's independent verbalizations showed a more rapid increase. Jen's and Kim's independent verbalizations averaged 100% by the fifth session of the FR 2 phase and the third session of the FR 4 phase, respectively.

During the response chaining phases, we observed an increase in subjects' independent

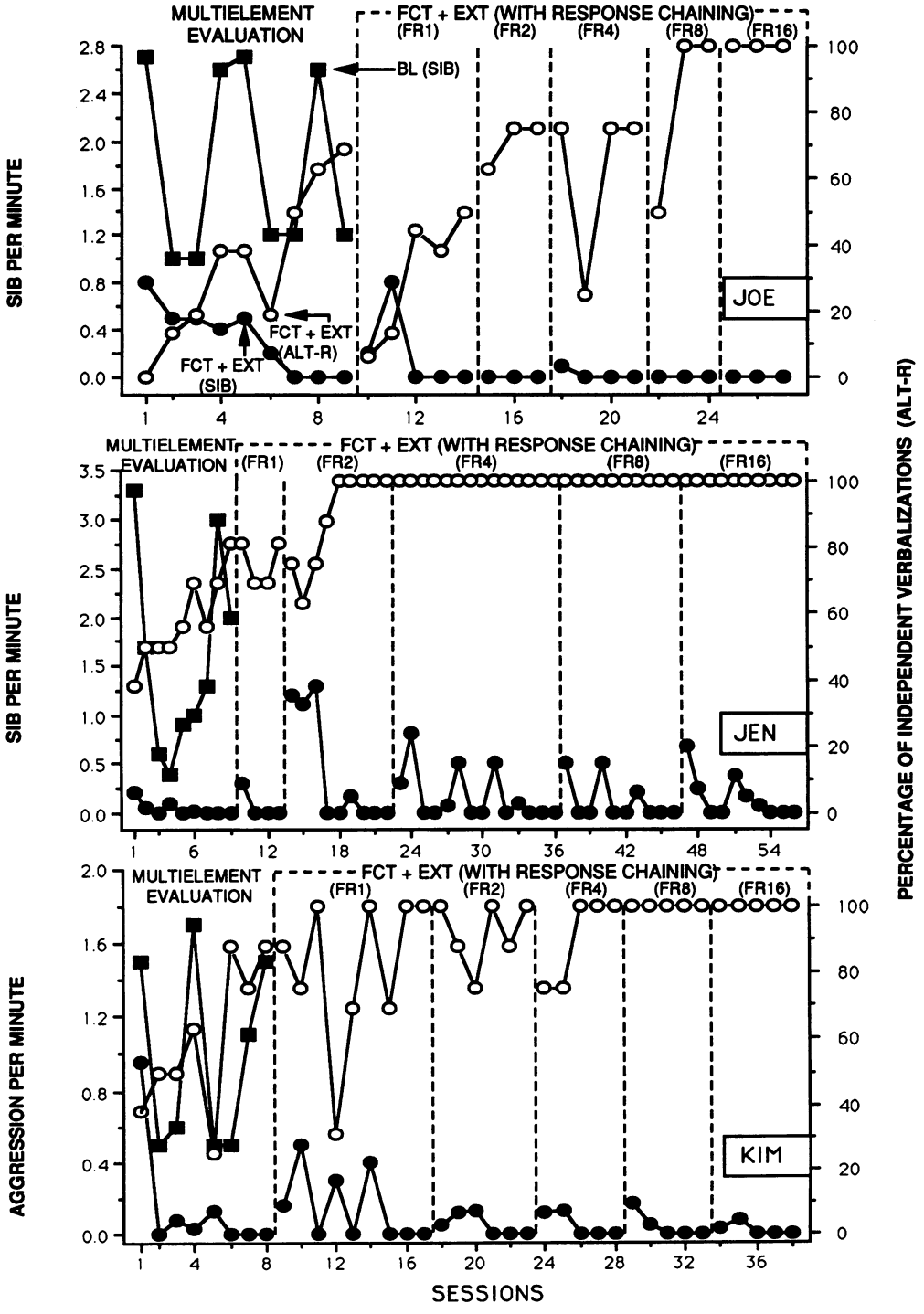

Figure 2. Responses per minute of aberrant behavior and the trained verbal response during the multielement evaluation and FCT plus extinction with response chaining. ALT-R = appropriate verbalization; EXT = extinction; FCT = functional communication training; FR 1 through FR 16 = task-related criterion for break across FCT plus extinction with response chaining phases.

compliance with requests compared with baseline. During baseline, compliance was low and variable. Joe's compliance averaged 20%, 46%, 81%, 83%, and 100% across the response chaining phases (i.e., FR 1 to FR 16). Jen's compliance averaged 48%, 63%, 77%, 85%, and 100% across the response chaining phases. Kim's compliance averaged 32%, 58%, 70%, 80%, and 80% during response chaining conditions.

DISCUSSION

Results of this study extend previous work on the effectiveness of FCT plus extinction (Carr & Durand, 1985; Durand & Carr, 1991). During the FCT plus extinction conditions (with and without response chaining), we observed an inverse relationship between subjects' appropriate verbal responses and their aberrant behavior (i.e., increased verbal responses and decreased aberrant behavior). Low rates of aberrant behavior were maintained throughout the response chaining phases when the requirements for obtaining a break were increased. In addition, we observed gradual increases in compliance with requests throughout the study. These findings suggest that combining FCT plus extinction with response chaining in this manner may be an effective way to maintain low rates of aberrant behavior while increasing subjects' participation in the task.

Fisher et al. (1993) recently reported that FCT plus extinction failed to reduce a subject's rate of escape-maintained aberrant behavior and speculated that treatment effects may be hampered by the temporal proximity between the appropriate and aberrant responses. That is, the appropriate and aberrant behaviors may have formed a response chain. We addressed this problem by requiring the absence of aberrant behavior for 10 s before providing a break contingent on the trained verbal response. A second concern reported by Fisher et al. was the relative reinforcement histories for the appropriate and aberrant responses. That is, the appropriate response probably has a shorter reinforcement history than the aberrant behavior. To address this problem, we started functional communication training immediately upon Jen's and Kim's admission to the hospital program. We initially taught Jen and Kim the appropriate verbal response by presenting them with nonpreferred items and telling them to say "no" if they did not want the item. We started functional communication training for Joe during the first FCT plus extinction phase. Interestingly, a comparison of the FCT plus extinction data showed that decreases in aberrant behavior and increases in independent verbalizations were obtained more quickly with Jen and Kim than with Joe. We suggest that differences in responding among the subjects might be a function of their individual histories with functional communication training.

A major focus of the present study was an evaluation of a response-chaining component as a means of increasing compliance with task demands as well as reducing the availability of escape. Although FCT plus extinction reduced rates of aberrant behavior initially, subjects did not participate in the task because escape was contingent only on the trained verbal response. This highlights a potential limitation of FCT—allowing an individual to escape from a required instructional activity (even if contingent on a socially appropriate response). To address this problem, we started treatment sessions with instructional requests and provided a break from the task contingent on compliance with one request (i.e., FR 1) and the trained verbal response. We doubled the criterion for a break across phases, with the criterion in the final phase requiring the subject to complete the entire task before earning a break. In this manner, subjects eventually completed the task in its natural progression. FCT plus extinction with response chaining gradually increased compliance with requests and maintained low rates of aberrant behavior.

In the present study, initial treatment effects may have been a function not only of FCT and

extinction but also of altering the establishing operation for escape. That is, by initially reducing the requirement for a break, the subjects' motivation to engage in escape behavior may also have decreased. Subsequently, the effectiveness of the response-chaining component may be attributed either to the gradually increasing response requirement (similar to that described by Zarcone, Iwata, Smith, Mazaleski, & Lerman, 1994) or to the fact that the instructional procedures (therapist's instructions, task consistency, and materials) increased the predictability of the situation (Flannery & Horner, 1994; Lalli, Casey, Goh, & Merlino, 1994).

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