

*ON THE RELATION OF MANDS AND THE  
FUNCTION OF DESTRUCTIVE BEHAVIOR*LYNN G. BOWMAN, WAYNE W. FISHER,  
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When standard analogue functional analysis procedures produce inconclusive results in children with conversational speech, the child's mands may help to identify the function of destructive behavior. In the current investigation, functional analyses conducted with 2 children who exhibited self-injury, aggression, and property destruction were undifferentiated across conditions. Based on informal observations and school and parental report, an analysis was conducted using mands to help determine the function of the destructive behavior. Using a multielement design, the therapist's compliance with the child's mands occurred either on a fixed-ratio (FR) 1 schedule or contingent on destructive behavior. Destructive behavior occurred at high and consistent levels when reinforcement of mands was contingent on destructive behavior and at near-zero levels when reinforcement of mands occurred on the FR 1 schedule. Based on these results, a second analysis was conducted in which compliance to mands occurred only when the child appropriately requested it (i.e., functional communication training plus extinction) and, for 1 child, compliance with mands was terminated contingent upon destructive behavior (i.e., functional communication training plus response cost). For both children, the rates of destructive behavior decreased markedly. The results suggest that assessing the child's mands may be useful in decreasing destructive behavior when a functional analysis is inconclusive.

DESCRIPTORS: functional analysis, behavioral assessment, developmental disabilities, mands, verbal behavior

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The growth and development of functional analysis methods have had a pervasive impact on the study and treatment of aberrant behavior that is displayed by persons with developmental disabilities (Iwata, Pace, Dorsey, et al., 1994). One important effect has been the emergence of epidemiological investigations designed to test and validate operant hypotheses regarding the maintenance of aberrant behavior (e.g., Derby et al., 1992; Iwata, Pace, Dorsey, et al., 1994). For example, Carr (1977) articulated three operant hypotheses to help to explain why

some persons with developmental disabilities exhibit self-injurious behavior (SIB): that SIB was maintained by (a) positive reinforcement in the form of contingent social attention, (b) negative reinforcement in the form of escape from nonpreferred activities, or (c) the sensory stimulation produced by the behavior (i.e., a form of automatic reinforcement). Iwata and colleagues developed an experimental procedure to examine these three hypotheses simultaneously (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). Iwata, Pace, Dorsey, et al. (1994) subsequently described an epidemiological investigation that involved 152 experimental functional analyses conducted with children with developmental disabilities that produced results highly consistent with the operant hypotheses described by Carr. That is, Iwata, Pace, Dorsey, et al. found that 23%

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of the participants displayed attention-maintained SIB, 35.4% displayed escape-maintained SIB, and 25.7% displayed SIB consistent with the hypothesis that the behavior was maintained by automatic reinforcement.

A second important effect of the development of functional analysis procedures has been the refinement of extinction, differential reinforcement, and punishment procedures used to treat aberrant behavior. For example, Iwata, Pace, Cowdery, and Miltenberger (1994) showed how extinction procedures designed to treat SIB vary depending on behavioral function (e.g., discontinuation of contingent attention for attention-maintained SIB, continuation of the ongoing activity for escape-maintained SIB). Carr and Durand (1985) demonstrated how reinforcement of an alternative response (i.e., mands) with the reinforcer that had previously maintained aberrant behavior can both increase the alternative response and decrease the aberrant behavior. Thus, with this approach, the reinforcer used to increase an alternative behavior depends upon the function of the aberrant behavior. Similarly, identification of the function of aberrant behavior can help to identify effective punishment procedures. For example, time-out from attention is likely to be an effective treatment for attention-maintained aberrant behavior but not for escape-maintained aberrant behavior (Fisher et al., 1993; Wacker et al., 1990).

A third important effect is that the use of functional analysis procedures has helped to spark the development of new and innovative treatment approaches. For example, the treatment of escape-maintained aberrant behavior may be facilitated by removing (e.g., Touchette, MacDonald, & Langer, 1985), altering (e.g., Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991), or fading (e.g., Pace, Iwata, Cowdery, Andree, & McIntyre, 1993) the nonpreferred stimuli or activities associated with escape. Similarly, aberrant behav-

ior may be decreased by interspersing higher and lower preference tasks (e.g., Horner, Day, Sprague, O'Brien, & Heathfield, 1991; Mace & Belfiore, 1990). Noncontingent presentation of the identified reinforcer for aberrant behavior can reduce aberrant behavior maintained by either attention or escape (e.g., Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993; Vollmer, Marcus, & Ringdahl, 1995). Finally, provision of alternative forms of stimulation can be used to decrease SIB when functional analysis results are consistent with an automatic reinforcement hypothesis (e.g., Kennedy & Souza, 1995).

The functional analysis procedure developed by Iwata et al. (1982/1994) was originally designed for persons with severe developmental disabilities who displayed SIB. Over time, this and similar procedures have been used with other populations and other forms of behavior (e.g., Cooper, Wacker, Sasso, Reimers, & Donn, 1990; Fisher et al., 1993). In some cases, functional analysis procedures have been altered, either to fit specific populations or problems (e.g., Northup, Broussard, Jones, & George, 1995) or to test a wide variety of potential functions (Dunlap et al., 1993). However, Iwata (1994) suggested that functional analysis methods should be kept as simple as possible and that adding additional test conditions or permutations may be most appropriate when tests of the putative contingencies (e.g., attention, escape) produce inconclusive results.

We attempted to follow the approach suggested by Iwata (1994) for the 2 children in the current investigation for whom functional analyses using procedures similar to those of Iwata et al. (1982/1994) produced inconclusive results. Both children had extensive verbal repertoires and frequently made requests of staff (i.e., manding for specific forms of attention, tangible items, and initiation or discontinuation of

specific activities). We observed that the children requested (i.e., manded for) a wide variety of idiosyncratic items and social activities that changed over time. In addition, they often requested that social activities be performed in a very specific manner. When their requests were not honored (or the activity was not performed to their specifications), they often displayed destructive behavior.

According to Skinner (1957), a mand is a verbal response that specifies its reinforcer. Based on our observations of child behavior and Skinner's formulation of mands, we hypothesized that the function of destructive behavior was to increase the probability that the child's requests would be honored (i.e., adults could avoid the child's destructive behavior by complying with the child's requests). For children whose destructive behavior appears to function to increase adult compliance with mands, the analogue functional analysis (Iwata et al., 1982/1994) may sample controlling variables too narrowly. We hypothesized that the child's mands might be used to help to assess destructive behavior maintained by multiple reinforcers that were idiosyncratic and that varied over time. We examined this hypothesis in two assessment studies. In the first study, an adult complied with the child's mands on a fixed-ratio (FR) 1 schedule in one condition (the control condition), and the adult's compliance with the child's mands was contingent upon destructive behavior in a second condition (the test condition). In the second study, we assessed the validity of the findings from the first analysis. We evaluated whether presentation of the hypothesized reinforcer for destructive behavior (adult compliance with mands) following an appropriate request from the child (i.e., functional communication training, FCT) plus extinction or response cost resulted in decreases in destructive behavior.

## GENERAL METHOD

### *Participants and Setting*

The participants were 2 children who had been admitted to an inpatient pediatric unit for the assessment and treatment of self-injury, aggression, and property destruction. Ben was a 15-year-old boy who had been diagnosed with moderate mental retardation and a seizure disorder that had required a left temporal lobectomy. Jerry was a 12-year-old boy who had been diagnosed with pervasive developmental disorder, attention deficit hyperactivity disorder, mild to moderate mental retardation, and a seizure disorder. Receptive and expressive language skills were at the 5-year developmental level for both children. Ben demonstrated some good pragmatic skills, including appropriate eye contact and turn taking; however, he had significant difficulty generating novel vocabulary to describe unfamiliar events. Jerry's single-word vocabulary was at the 8-year level; however, he had difficulty combining words into sentences and frequently mumbled unintelligibly. Given their size (Ben was 5 ft 6 in. tall and weighed 102.3 kg; Jerry was 5 ft 6 in. tall and weighed 56.4 kg), both patients' destructive behaviors were quite problematic for their parents and younger siblings. For example, Ben's family had required emergency medical attention on several occasions due to his biting and punching. He had also tried to drown his sister by holding her under water and had had several severe aggressive episodes in moving vehicles, especially toward the driver. Jerry had thrown a large bookcase down the steps of his family's home, punched through a safety glass window, and torn down a chalkboard.

For both participants, assessment and treatment sessions were conducted in rooms containing one-way observation mirrors. Trained observers recorded the participant's

responses while seated in the room or behind the one-way mirror.

## STUDY 1

### METHOD

#### *Standard Analogue Functional Analysis*

Analogue functional analyses using procedures similar to those described by Iwata *et al.* (1982/1994) were conducted with both participants. The 10-min analogue conditions conducted were (a) demand, (b) social attention, (c) toy play, (d) alone (Jerry only), and (e) tangible.

During the demand sessions, the therapist used sequential verbal, gestural, and physical prompts every 10 s until the child either complied with the request or engaged in a destructive behavior. If the child complied with the request following a verbal or gestural prompt, he received praise from the therapist. If the child displayed a destructive behavior, the therapist terminated the demand and removed the materials for 30 s (*i.e.*, the child was permitted to escape the request). During social attention sessions, the child was given toys and was asked to play quietly. The therapist provided a verbal reprimand contingent on each destructive behavior displayed by the child. All other responses were ignored. In the toy play sessions, the therapist interacted with the child and presented praise once every 30 s contingent upon the first 5-s period in which no destructive behavior occurred. In the alone sessions, Jerry was alone in the room without materials. During tangible sessions, the child was allowed to play with preferred objects for 2 min prior to the start of the session. When the session began, the therapist withdrew the preferred objects and returned them for 30 s following each occurrence of destructive behavior.

*Data collection and reliability checks.* Trained observers used laptop computers to

record the frequency of targeted destructive behaviors per minute. For Ben, destructive behavior was SIB (body hitting and self-biting), aggression (punching, hitting, kicking, throwing objects at people, or biting others), and property destruction (hitting or kicking walls or objects, knocking over furniture, and throwing or breaking objects). Ben's aggression was so severe that his therapists routinely sustained injuries while wearing padded arm, chest, and head gear. Therefore, Ben was told that whenever he was going to hit someone, he could hit a mat instead (*i.e.*, substitute aggression) and would receive the same consequences as if he had hit a person. Substitute aggression was defined as hitting or punching a mat and was included in the measure of destructive behavior. For Jerry, destructive behavior was SIB (head banging and hitting self with objects), aggression (punching, hitting, kicking, throwing objects at people, and biting others), and property destruction (hitting or kicking walls or objects, knocking over furniture, and throwing or breaking objects).

During the functional analysis, data were collected by two independent observers during 64% of sessions for Ben and 26% for Jerry. For the purpose of calculating inter-observer agreement, each session was partitioned into 60 10-s intervals. Exact interval-by-interval agreement coefficients were calculated as a measure of reliability for destructive behaviors by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. An agreement was defined as a 10-s interval in which both observers recorded the same number of occurrences of the behavior. The mean exact agreement for Ben was 100% for SIB, 98% (range, 78.7% to 100%) for substitute aggression, 99.8% (range, 96.7% to 100%) for aggression, and 99.9% (range, 96.7% to 100%) for property destruction; for Jerry, mean exact agreement was 99.8% (range, 98.4% to 100%) for SIB,

99% (range, 86.9% to 100%) for aggression, and 98.2% (range, 82% to 100%) for property destruction.

#### *Parental Reports and Naturalistic Observations*

Because the functional analyses were inconclusive for both children, functional analysis-based treatments could not be developed. Therefore, antecedent-behavior-consequence data were collected by staff members during waking hours for both children. Observations were consistent with parental reports in that destructive behaviors appeared to serve multiple functions and, more specifically, occurred when the child's requests or mands were not honored. That is, both families reported that these children displayed destructive responses when family members did not comply to requests, even when the requests were unreasonable. For example, Ben insisted that his mother purchase him a coloring book every time they left their home. Destructive outbursts were quite severe for both children and led to significant property damage and injuries requiring emergency medical attention. Jerry insisted on directing where each family member sat during car rides or told his family to act as if they were animals or circus members. In summary, both families reported that destructive behavior occurred most often when the child "did not get his way." In addition, families reported that they would "do what he wanted" to "calm him down" or to avoid an episode of destructive behavior.

#### *Analysis of Mands*

A multielement analysis was conducted to test the hypothesis that destructive behavior was maintained by contingent compliance to the child's mands. That is, we tested the hypothesis that the children engaged in destructive behavior to get others to comply with their requests. Two conditions were

conducted: a test condition and a control condition. For approximately 2 min before the start of all sessions in both conditions, the therapist asked the child what he would like to do and how he would like to do it. The therapist then complied with all mands for 2 min until the session began. For example, Jerry instructed the therapist to walk around in circles while singing a song or to play a card game using only even-numbered cards.

In the test condition, the therapist complied with the child's mands contingent upon destructive behavior. When the session began, mands were on extinction (i.e., the therapist began to deviate from the activity specified by the child) until a destructive behavior occurred. Following a destructive behavior, the therapist complied with all mands for 30 s. After the 30-s interval elapsed, the therapist again began to deviate from the activity specified by the child. For example, if the child requested that the therapist sing a specific song while walking in a circle, the therapist might continue to walk in a circle but discontinued the song or altered the words or melody of the song. The therapist resumed the child-specified activity for 30 s contingent upon the first occurrence of destructive behavior.

In the control condition, the therapist complied with all mands (compliance on an FR 1 schedule) and every 30 s issued a brief reminder to the child that he or she was following the specified mand (e.g., "I'm going to keep walking and singing," or "I'm only going to play with the even-numbered cards because that's what you wanted"). Destructive behavior resulted in no differential consequence (extinction). In both conditions, if the child's mand was impossible or unsafe to complete (e.g., kick the window), the therapist would let the child know that he or she would try to honor the mand but would alter the request to make it possible to complete (e.g., the therapist might say, "OK, I'll

Table 1  
Examples of Mands During the Mands Analysis

Child	Requests
Ben	Therapist must play a board game with Ben. Ben requests to play with the board game or computer by himself. Therapist must laugh, switch seats, or clap on command. Ben requests to be left alone. The therapist must take a turn only when instructed to do so.
Jerry	Therapist must walk in circles with Jerry while singing. Therapist must pretend he or she is a circus trainer. Therapist must feed imaginary pets. Therapist must play a card game with Jerry using only even-numbered cards. Jerry requests to be left alone. Therapist must sit in the corner and act sad. Jerry requests to play with a preferred item by himself. Therapist must "act out" songs. Therapist must talk only when instructed to do so.

pretend to kick the window"). Examples of the child's mands are described in Table 1.

*Data collection and reliability checks.* Trained observers used laptop computers to record each occurrence of destructive behavior. Definitions for destructive behavior were the same as those used for the functional analysis with one exception. Although Jerry's SIB was originally targeted for treatment, it was observed during the functional analysis to be of extremely low intensity (Jerry banged his head lightly against the padding in the session room). Therefore, during the mands analysis, SIB was not included. During the mands analysis, data were collected by two independent observers during 42% of sessions for Ben and 64% for Jerry. Exact interval-by-interval agreement coefficients were calculated as described for the functional analysis. The mean exact agreement for Ben was 99.8% (range, 98.4% to 100%) for SIB, 100% for aggression, 91.8% (range, 47.5% to 100%) for substitute aggression, and 100% for property destruction. For Jerry, the mean exact agreement was 99.4% (range, 97.5% to 100%) for aggression and 98% (range, 93.4% to 100%) for property destruction.

## RESULTS

The results for the standard analogue functional analysis are depicted in Figure 1. For Ben, rates of destructive behavior were near zero across all sessions with the exception of two tangible sessions. The mean rate of destructive behavior during each functional analysis condition was 0 for social attention, 0 for demand, 0 for toy play, and 0.2 for tangible. For Jerry, rates of destructive behavior were variable across conditions. The mean rate of destructive behavior during each functional analysis condition was 4.3 for social attention, 3.6 for demand, 0.8 for toy play, and 0.2 for tangible.

The results for the multielement analysis of mands are depicted in Figure 2. For Ben, mean rate of destructive behavior was 2.4 (range, 1.4 to 3) when the responses resulted in the therapist's compliance with his mands (test condition) and 0.03 (range, 0 to 0.2) when the therapist complied with his mands on an FR 1 schedule (control condition). For Jerry, the mean rate of destructive behaviors was 1.7 (range, 0.3 to 3.5) when these responses resulted in the therapist's compliance with his mands (test condition)

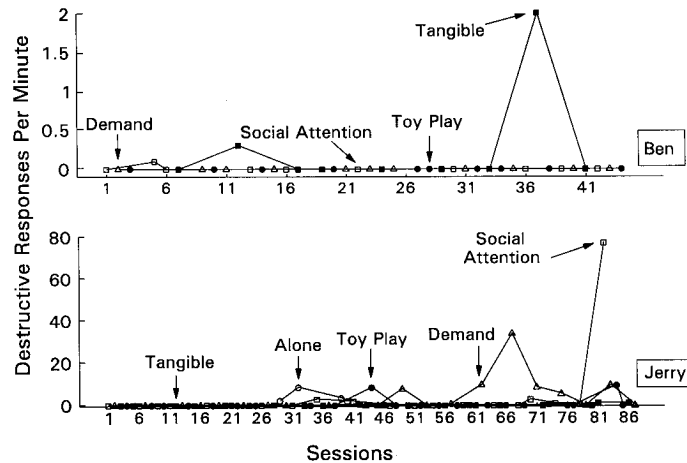


Figure 1. Mean rate (responses per minute) of destructive behavior during the analogue functional analysis for Ben (top panel) and Jerry (bottom panel).

and 0 when the therapist complied with his mands on an FR 1 schedule (control condition).

STUDY 2

METHOD

*Evaluation of Functional Communication*

*Baseline.* The baseline condition was identical to the test condition from the analysis of mands described above. That is, the therapist complied with mands contingent upon destructive behavior. At the beginning of the

session, the therapist deviated from the mands specified by the child and complied with mands again for 30 s following destructive behavior.

*Functional communication training trials.* First, the children were taught to use the phrases “Please play my way” (for Ben) and “Please play by my rules” (for Jerry) to gain access to reinforcement (therapist’s compliance with mands). The children were trained to use the phrase through instruction and verbal prompting. Ben emitted the phrase independently after the contingencies were

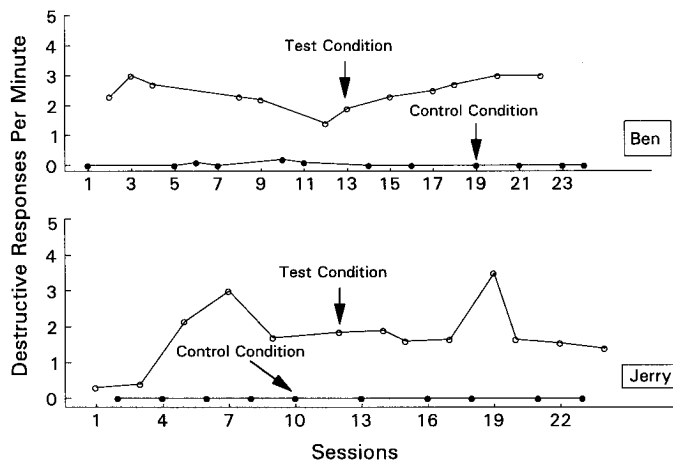


Figure 2. Mean rate (responses per minute) of destructive behavior during the mands analysis for Ben (top panel) and Jerry (bottom panel).

explained to him. For Jerry, the destructive behaviors and the FCT responses and their respective consequences were initially modeled. Then, training sessions were conducted in conditions similar to those of the treatment condition. During this training, Jerry was prompted to use the FCT response if he did not do so independently. If Jerry engaged in destructive behavior during training trials, he was told, "I'm not going to play by your rules if you hit me. You have to say, 'please play by my rules.'" The FCT procedure was implemented when he demonstrated independent and consistent use of the FCT phrase.

*FCT plus extinction (FCT + EXT).* This condition was similar to baseline except that (a) the therapist's compliance with mands was delivered for 30 s contingent upon the FCT response (e.g., "Please play my way"), and (b) there was no programmed consequence for destructive behavior (i.e., extinction).

*FCT plus response cost (Jerry).* These sessions were the same as FCT + EXT except that the therapist's compliance with mands was immediately terminated contingent upon destructive behavior. For example, if Jerry hit the therapist, the therapist immediately deviated from Jerry's mands. The therapist complied with the mands when Jerry said the FCT phrase again.

*Data collection and reliability checks.* Trained observers used laptop computers to record each occurrence of destructive behavior during 58% of FCT sessions for Ben and 49% for Jerry. Definitions for destructive behaviors were identical to those used for the mands analysis. In addition, the phrases used as FCT responses ("Please play my way" for Ben and "Please play by my rules" for Jerry) were also scored. During the FCT sessions, average agreement coefficients for Ben were 100% for aggression, 95% (range, 47.5% to 100%) for substitute aggression, 99.9% (range, 98.4% to 100%) for property de-

struction, and 98.5% (range, 93.4% to 100%) for the FCT response. For Jerry, the mean agreement coefficients were 99.6% (range, 93.4% to 100%) for aggression, 99.3% (range, 93.4% to 100%) for property destruction, and 98.4% (range, 91.8% to 100%) for the FCT response.

## RESULTS

The results for the evaluation of FCT are depicted in Figure 3. For Ben, the mean rate of destructive behaviors was 2.4 (range, 1.4 to 3) during baseline. During FCT + EXT, destructive behavior decreased to 0 after the first session, and the FCT response averaged 2.0 (range, 2 to 2.1). Destructive behavior increased to 2.1 (range, 2 to 2.2) responses per minute during the return to baseline, and the FCT response decreased to 0. When FCT + EXT was reimplemented, destructive behavior decreased to 0, and the mean for the FCT response increased to 2.0 (range, 2 to 2.1).

For Jerry, the mean rate of destructive behaviors was 1.9 (range, 1.5 to 2.6) during baseline. The mean for the FCT response was 1.7 (range, 1.3 to 2.2) during FCT + EXT; however, destructive behavior remained high and variable ( $M = 1.0$ ; range, 0 to 3.4). When the response cost was added, the FCT response remained high ( $M = 1.8$ ; range, 1.4 to 2.5), and the mean for destructive behaviors decreased to 0.4 (range, 0 to 2.7). Destructive behaviors increased ( $M = 2.0$ ; range, 0 to 15.4) and the FCT response remained high ( $M = 2.0$ ; range, 1.9 to 2.1) during the return to FCT + EXT. When the response cost was reimplemented, the mean for destructive behavior decreased to 0.1 (range, 0 to 1.1).

## GENERAL DISCUSSION

Functional analyses designed to examine whether destructive behavior was sensitive to attention, escape, tangible, or automatic



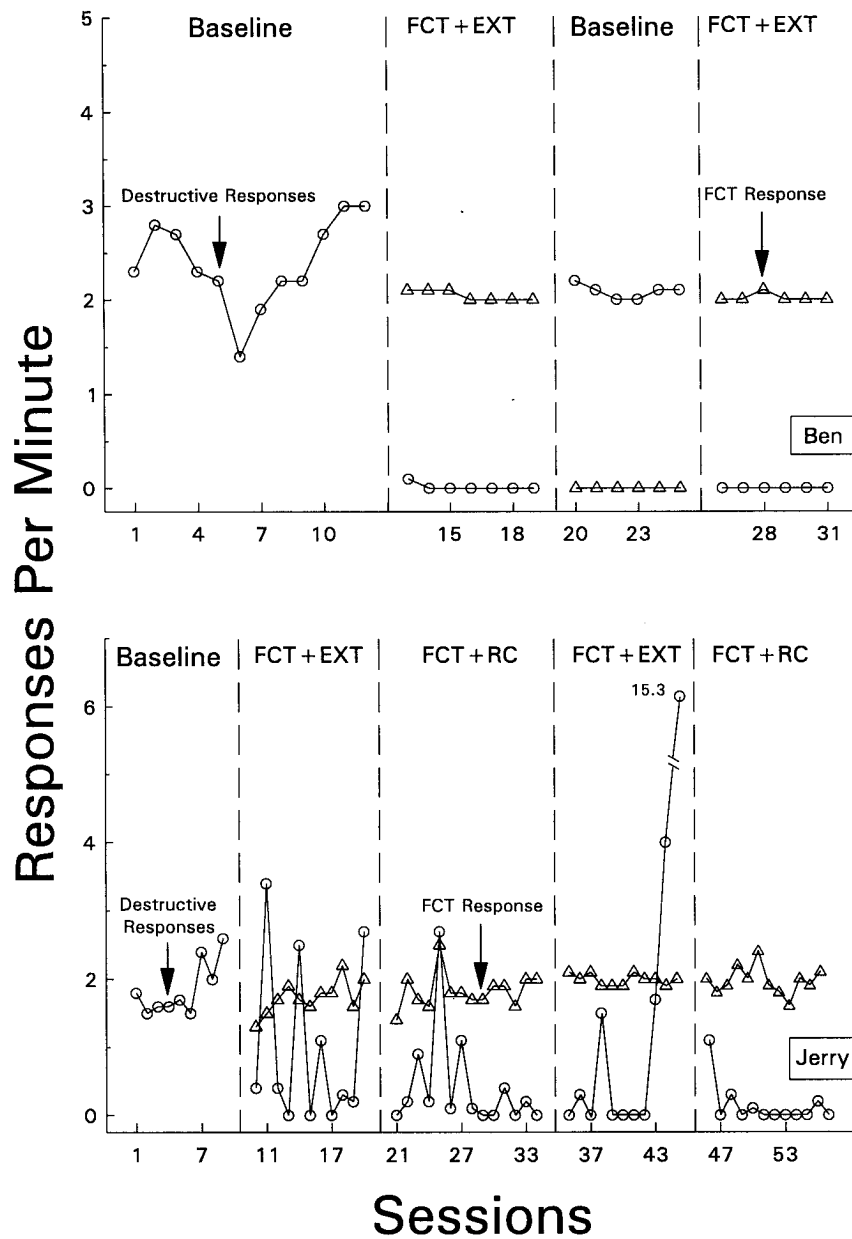


Figure 3. Mean rate (responses per minute) of destructive behavior and FCT responses during the evaluation of FCT for Ben and Jerry (top and bottom panels, respectively). EXT = extinction; RC = response cost.

(Jerry only) reinforcement were conducted with 2 children and produced inconclusive results (i.e., low and inconsistent levels of destructive behavior occurred across functional analysis conditions). In cases in which the results of standard analogue functional analyses are inconclusive, the development

of additional analyses to determine the function of aberrant behavior may be indicated (Iwata, 1994). In the current investigation, we conducted informal observations of these children interacting with their parents. We observed that the children emitted what appeared to be an unusually high number of

mands, and the parents complied with (i.e., reinforced) a remarkably high percentage of these mand, even ones that seemed to be unreasonable (e.g., Jerry manded for his parents to walk an imaginary dog in public). On those infrequent occasions when a parent did not comply with the child's mand, the child generally displayed a burst of destructive behavior.

Next, we developed an analysis of mands to simulate our observations of parent-child interactions. In the analysis of mands, the rates of destructive behavior were high in the test condition when destructive behavior resulted in adult compliance with the mands and were low in the control condition when the adult complied with the mands on an FR 1 schedule independent of destructive behavior. The validity of the findings from the mands analysis was assessed in the second analysis wherein (a) destructive behavior had no effect on the probability of reinforcement of mands (i.e., extinction) or resulted in termination of reinforcement of mands (i.e., a response cost), and (b) a functionally equivalent alternative response, FCT, altered the probability of reinforcement for mands. FCT plus extinction for Ben and FCT plus response cost for Jerry reduced destructive behavior to near-zero levels.

Based on these findings and Skinner's (1957) account of the reinforcement of mands, we hypothesized that the function of destructive behavior was to alter the probability that the parent would comply with (i.e., reinforce) the child's mands. Skinner (1957, pp. 35-51) proposed a paradigm of interaction between a speaker and a listener relative to the stimuli that occasion and reinforce mands. A mand is a verbal operant (usually a request) that specifies its reinforcer. With this paradigm, the presence of a listener is said to function as a discriminative stimulus ( $S^D$ ) that occasions a mand from the speaker (e.g., "Give me water"). The mand, in turn, serves as an  $S^D$  that occasions

a response (e.g., giving water to the speaker) from the listener. Presenting the water to the speaker functions both as reinforcement for the mand and as an  $S^D$  that occasions another response from the speaker (e.g., saying "thank you"). Saying "thank you" serves as reinforcement for the listener's presentation of water to the speaker. According to Skinner, a speaker may alter the probability that a listener will reinforce a mand through either positive reinforcement (e.g., saying "thank you") or negative reinforcement (e.g., following through on the threat, "Give me water or else!").

Even though Skinner focused on events that occasion and reinforce mands, his paradigm may be directly relevant to the current investigation, which focuses on events that occasion and reinforce destructive behavior. We hypothesized that the presence of the parent (or other adult) served as an  $S^D$  that occasioned the child's mands (e.g., "Walk the imaginary dog"). The child increased the probability of parental compliance with the mand through negative reinforcement (e.g., "Walk the dog, or else"). In this case, the "or else" was the child's destructive behavior. That is, the child engaged in destructive behavior when the parent failed to comply with his mand. Presumably, the child's destructive behavior was aversive to the parent. Therefore, over time, the parent learned that destructive behavior would cease or could be avoided altogether by complying with the child's mands (e.g., walking the imaginary dog). Thus, the function of destructive behavior in this paradigm was to alter the probability of reinforcement of another response, the mand.

The results of the two analyses also suggested that the adult's noncompliance with the child's mands served as an establishing operation (Michael, 1982) that increased the child's motivation to respond. In the test condition during the analysis of mands, when reinforcement (adult compliance with

the mands) was available for destructive behavior and the establishing operation was present (adult noncompliance with the mands), destructive behavior was high. In the control condition, when the establishing operation was not present because the adult complied with the mands on an FR 1 schedule, rates of destructive behavior were low. In the second analysis, when the establishing operation (adult noncompliance with the mands) was present, rates of the FCT response were high when reinforcement (adult compliance with the mands) was available for the FCT response and destructive behavior resulted in either no differential consequence (Ben) or a response cost (Jerry). The increases in the FCT response provided further evidence that it was a functionally equivalent alternative response (i.e., that the function of both destructive behavior and the FCT response was to increase the probability of adult compliance with the mands).

The pre-session contingencies of the test condition may have further increased the probability of destructive behavior. That is, the adult complied with the child's mands for 2 min prior to the test condition. When the session started, the establishing operation (adult noncompliance with the mands) was presented, resulting in a change in the density of reinforcement from continuous reinforcement (i.e., compliance on an FR 1 schedule) to no reinforcement (adult noncompliance). This change in the density of reinforcement might have increased the motivation to engage in destructive behavior even more than if the establishing operation (adult noncompliance) had been presented without a change in the schedule of reinforcement.

The analysis of mands differs from a standard analogue functional analysis in a number of important ways. During the standard analogue functional analysis, sensitivity is tested to one reinforcer at one point in time. In the mands analysis, the child's mands

specified one or more reinforcers that could change over time. For example, within one 10-min session, the individuals in this investigation could have manded for a card game (tangible items), to play the card game with the adult (adult attention), to walk the imaginary dog (to dictate adult activity), or to be left alone (the absence of tangible items and adult attention). Thus, the reinforcers were not limited to one or a few tangible items or adult attention that would be evaluated in a standard analogue functional analysis, but could have involved tangible items, adult attention, both, or neither. This variation in the function of destructive behavior over time (i.e., within a session) might explain why the standard analogue functional analysis, which assessed individual contingencies in each condition, produced inconclusive results. That is, the results of this investigation suggested that for these 2 individuals, destructive behavior was not consistently sensitive to a single source of reinforcement such as attention. In fact, the children sometimes requested interactive activities involving adult attention and at other times requested to be left alone during the same session.

In addition, for the children in the current investigation, the mand typically specified a reinforcer that was delivered in a particular way. For example, Jerry often dictated the seating arrangements in the van during family outings. When he manded for cards, he specified that the adults play the card game according to his rules (e.g., the child played with the numbered cards and the adults played with the face cards). In a standard analogue functional analysis, the reinforcer (e.g., escape) delivered in a particular condition (e.g., demand) is generally determined prior to the start of the analysis and remains constant throughout the assessment. Thus, if the stimulus or stimuli responsible for behavioral maintenance change over time or are particularly idiosyncratic (e.g., walk-

ing an imaginary dog), it may be difficult to determine behavioral function with a standard analogue functional analysis.

The mands analysis was based on hypotheses about the functions of two forms of child responses, mands and destructive behavior, and one parental response, compliance with the child's mands. The results of the current investigation provided some support for this paradigm by showing that destructive behavior was sensitive to changes in the reinforcement of mands. When reinforcement of mands was provided on an FR 1 schedule during the analysis of mands, destructive behavior occurred at near-zero levels. By contrast, destructive behavior occurred at high and stable rates when reinforcement of mands was contingent upon destructive behavior. In addition, the FCT response increased when reinforcement of mands was contingent upon this alternative response.

The current investigation did not provide empirical evidence relative to the hypothesized function of the critical parental response (i.e., parental compliance with the child's mands). That is, we did not show that termination or avoidance of the child's destructive behavior functioned as negative reinforcement of parental compliance with the mands. Even though this remains an untested component of the paradigm, evidence from other investigations on child effects suggest that it is a plausible hypothesis (e.g., Carr, Taylor, & Robinson, 1991; Wahler & Dumas, 1986). For example, Carr *et al.* (1991) showed that adults presented fewer and more limited instructional tasks to children who displayed problem behavior in work situations than to children who did not display problem behavior. Similar to the current paradigm, they hypothesized that problem behaviors functioned as aversive stimuli. That is, the adult's presentation of tasks that occasioned a child's problem behavior decreased because these behaviors

were aversive (i.e., a punishment effect). Both the model proposed by Carr *et al.* and the current paradigm suggest that our understanding of problem behavior may be enhanced by viewing this behavior as one component of an interaction between a child and an adult wherein each individual's behavior influences the responses of the other individual. Future investigations should be directed toward determining whether parental compliance with a child's mands may be maintained by negative reinforcement in the form of escape from or avoidance of the child's destructive behavior.

A somewhat different interpretation of these findings is that mands and destructive behavior represented a hierarchy of responses that were functionally equivalent (Lalli, Mace, Wohn, & Livezey, 1995). Lalli *et al.* described a 15-year-old girl who displayed escape-maintained screaming, aggression, and SIB that usually occurred in a hierarchical sequence. That is, when demands were presented, the girl usually screamed. If screaming didn't produce escape, she then displayed aggression. If aggression didn't produce escape, she then displayed SIB. The current results bear some similarity to those of Lalli *et al.* (1995), because reinforcement of mands on an FR 1 schedule essentially prevented the occurrence of destructive behavior. However, our results are different from those of Lalli *et al.* in that mands produced multiple reinforcers (i.e., whatever ones were specified by the mands), and destructive behavior produced a single consequence (altering the therapist's compliance with the participant's mands). In the Lalli *et al.* study, the three responses (screaming, aggression, and SIB) were functionally equivalent because they produced the same consequence (escape). By contrast, in our investigation, mands and destructive behavior were functionally related (destructive behavior altered the probability of reinforcement of mands) but did not produce the same

consequence. In the Lalli et al. study, it was possible to provide reinforcement for each response independently because the reinforcer (escape) was known and remained constant. In our investigation, the reinforcers changed both within and across sessions (sometimes tangible items, sometimes attention, etc.). Therefore, it would not have been possible to provide reinforcement for destructive behavior independent of mands. The mands were necessary to specify the reinforcers sought by the participant at any point in time, and destructive behavior increased the probability that the clients would receive the requested items.

The functional analysis methods developed by Iwata et al. (1982/1994) were originally designed for the assessment of SIB. It is possible that these methods may occasionally need to be altered based on the specific characteristics of the problem and population being assessed (Cooper et al., 1990). The mands analysis used in the current investigation represents one such modification that may be appropriate when a conventional functional analysis proves to be inconclusive. This mands analysis may be most appropriate for verbal children who appear to make unreasonable demands on their parents and who display destructive behavior primarily when their parents do not comply with the child's mands. Future investigations should be directed toward identifying the conditions under which conventional functional analysis methods should be altered and toward identifying the most appropriate modifications of the method developed by Iwata et al. (1982/1994).

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### STUDY QUESTIONS

1. Describe three effects on the assessment and treatment of behavior disorders of research on functional analysis methodologies.
2. What is a mand, and how might an assessment of mands aid in the functional analysis of behavior disorders?
3. The authors substituted another response for one of Ben's target behaviors—aggression—during his functional analysis. What was the substitute response, why was it included, and in what way could it be considered similar to responses that are strengthened via treatment procedures such as functional communication training?
4. Jerry's original functional analysis data were described as being undifferentiated. What features of the data suggest that Jerry's behavior problems were maintained by social reinforcement?
5. Given that no firm conclusions about behavioral maintenance could be reached following the initial functional analyses, how did the authors form hypotheses about the function of Ben's and Jerry's target behaviors?

6. Describe the analysis of mands, including the conditions compared, the results obtained, and the conclusions reached by the authors.
7. What treatment procedures were used with Ben and Jerry? What results were obtained, and what additional procedure was added to Ben's intervention?
8. What are some practical limitations of the intervention, and how might these be remedied?

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