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THE EFFECTS OF RESPONSE COST IN THE TREATMENT OF ABERRANT BEHAVIOR MAINTAINED BY NEGATIVE REINFORCEMENT

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Positive reinforcement contingencies can sometimes be used to decrease problem behavior maintained by negative reinforcement (e.g., escape). In the current study, we evaluated the extent to which response cost (i.e., contingent removal of a preferred stimulus) would compete with the negative reinforcer maintaining destructive behavior. The response cost contingency reduced destructive behavior by 87% from baseline levels even though the negative reinforcement contingency (i.e., escape) remained in place.

DESCRIPTORS: destructive behavior, functional analysis, negative reinforcement, response cost

Aberrant behavior maintained by negative reinforcement in the form of escape from work activities is usually treated by discontinuing the escape contingency (i.e., escape extinction), by presenting escape contingent on some alternative behavior (i.e., differential reinforcement), or by modifying an establishing operation (e.g., decreasing the rate of demands). Another approach to the treatment of escape-maintained behavior has involved the use of positive reinforcement. For example, Carr, Newsom, and Binkoff (1976) embedded previously aversive demands into the context of noncontingent story telling and thus reduced levels of demand-related destructive behavior. Lalli et al. (1999) also arranged positive reinforcement contingencies for compliance to evaluate competition between positive and negative reinforcement. However, loss of positive reinforcers (response cost) has never been evaluated as treatment for escape behavior. In the current study, we assessed the effects of response cost (i.e., contingent removal of a preferred stimulus) as a treatment for escape-maintained behavior.

METHOD

Participant, Setting, and Data Collection

Shai, a 33-year-old woman with severe mental retardation and intermittent-explosive disorder, received inpatient assessment and treatment of severe destructive behavior, including self-injurious behavior (SIB) (face slapping, self-biting, head banging), aggression (hitting, biting, punching, kicking, scratching, hair pulling, pinching, pushing, grabbing others, throwing objects at a person within 0.6 m), and disruption (throwing objects not at a person, breaking objects, ripping, kicking objects, banging on surfaces, tipping over furniture).

Dependent measures were recorded on laptop computers during the functional analysis and with paper-and-pencil methods during the treatment analysis. Interobserver

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agreement data were collected during 67% of the functional analysis sessions and 62% of the treatment analysis sessions. Agreement coefficients averaged 99% during both the functional analysis and treatment analysis sessions, but were calculated using different formulas. Sessions were partitioned into 10-s segments for functional analysis sessions or into 40 trials for treatment analysis sessions to calculate interobserver agreement. For the functional analysis sessions, exact agreement coefficients consisted of the percentage of intervals in which both observers recorded exactly the same number of responses. For the treatment analysis sessions, interval-by-interval agreement coefficients were calculated by dividing the smaller number of recorded responses by the larger number for each trial. These quotients were then averaged and multiplied by 100%.

Functional Analysis and Preference Assessment

A functional analysis of Shai's destructive behavior (i.e., aggression, disruption, SIB) was conducted using procedures similar to those described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994). Demand, social attention, alone, and play conditions were assessed in a living area to simulate Shai's group-home environment. The staff at Shai's group home did not report that the provision of preferred items was a typical consequence for aberrant behavior; therefore, a condition testing the effects of tangible items was not included. The results of the functional analysis suggested that Shai's destructive behavior was sensitive to negative (escape) and positive (attention) reinforcement. Her escape-maintained behavior was the focus of the subsequent treatment evaluation, whereas attention-maintained behavior was treated in a separate series of interventions. Following completion of the functional analysis, a stimulus preference assessment was conducted using methods similar to those described by Piazza, Fisher, Hanley, Hilker, and Derby (1996), which identified music (played through headphones) as Shai's most preferred item.

Treatment Analysis

The treatment was evaluated in a combination multielement and reversal design. All sessions were conducted at a work station in a special education classroom and each consisted of 40 demands; thus, session length varied slightly from one session to the next. During baseline, demands were presented using sequential verbal, gestural, and physical prompts. Compliance following the verbal or gestural prompts resulted in brief praise followed by the start of the next trial. Destructive behavior at any point during the prompting sequence resulted in a 30-s break from the demands. This escape contingency for destructive behavior remained in effect during all subsequent conditions. During the noncontingent reinforcement (NCR) conditions, either attention (physical attention and positive verbal statements unrelated to the demands) or music (played through headphones) were freely available throughout the session. Otherwise, this condition was identical to baseline. During response cost (RC) conditions, the preferred stimulus (either attention or music) was freely available at the start of the session, but was withdrawn for 30 s contingent on destructive behavior. Thus, destructive behavior produced escape and loss of the preferred stimulus.

RESULTS AND DISCUSSION

Results of the functional analysis (Figure 1) suggested that Shai's destructive behavior was sensitive to negative (escape) and positive (attention) reinforcement (*M*s = 1.2, 1.0, 0.1, and 0.2 responses per minute in demand, attention, alone, and play, respectively). Results of the treatment analysis

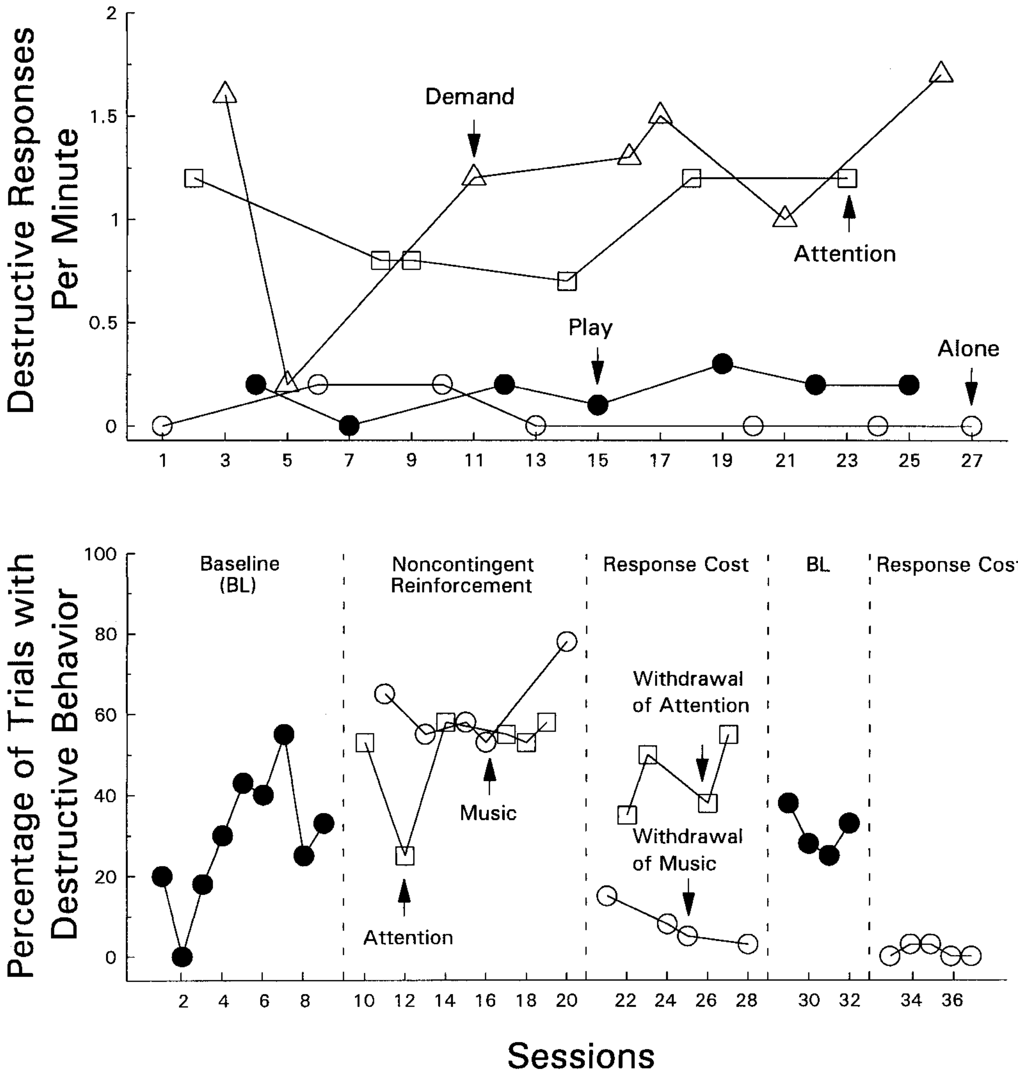

Figure 1. Rates of destructive behavior during the functional analysis (top panel) and the treatment analysis (bottom panel) of noncontingent reinforcement (NCR) and response cost (RC).

(Figure 1) revealed that destructive behavior occurred in an average of 29% and 31% of trials for the first and second baselines, respectively. Levels of destructive behavior remained high during NCR (*M* = 50% for attention and 62% for music). During RC, levels of destructive behavior decreased markedly when access to music was terminated contingent on the target response (*M* = 8% and 1% in the third and fifth phases, respectively), but not when access to attention was withdrawn for destructive behavior (*M* = 44%). In addition, although it was not targeted in this study, Shai's compliance increased slightly from a mean of 36% during baseline phases to a mean of 51% during the final RC (headphones) phase.

The goal of NCR was to reduce the reinforcing efficacy of the escape contingency by making the demand context less aversive through continuous and free access to a preferred stimulus (Carr et al., 1976). This treatment was ineffective (i.e., destructive behavior increased slightly), perhaps because

NCR continued during the escape interval and thus Shai experienced negative reinforcement (i.e., escape) while continuing to obtain the preferred stimulus (e.g., music). Interestingly, the addition of the RC contingency placed the negative reinforcer (escape) in direct competition with the preferred stimulus (attention or music). That is, destructive behavior produced escape, but it also resulted in loss of the preferred stimulus.

The current investigation illustrates how functional analysis and preference assessment data can be used to systematically develop response cost contingencies as treatment for escape behavior. One potential advantage of an RC contingency is its simplicity and ease of implementation. A second advantage of this treatment is that the amount and type of work Shai completed were not altered in order to reduce her destructive behavior (as is sometimes done with antecedent-based interventions). On the other hand, adding continuous access to preferred stimuli during instructional activities might sometimes interfere with the individual's performance or may evoke destructive behavior; however, this rarely occurred with Shai (i.e., only four destructive responses occurred during attention withdrawal across all sessions, and none occurred during headphone withdrawal).

As noted previously, caregiver report suggested that the provision of headphones was not a naturally occurring consequence for aberrant behavior. However, the absence of an empirical evaluation of the relation between headphones and the maintenance of destructive behavior is a limitation of the study. Future research should compare positive reinforcement and response cost in terms of levels of response reductions, compliance, and possible negative side effects.

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