AN EVALUATION OF RESPONSE COST IN THE TREATMENT OF INAPPROPRIATE VOCALIZATIONS MAINTAINED BY AUTOMATIC REINFORCEMENT

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In the current study, we examined the utility of a procedure consisting of noncontingent reinforcement with and without response cost in the treatment of inappropriate vocalizations maintained by automatic reinforcement. Results are discussed in terms of examining the variables that contribute to the effectiveness of response cost as treatment for problem behavior maintained by automatic reinforcement.

DESCRIPTORS: autism, automatic reinforcement, inappropriate vocalizations, noncontingent reinforcement, response cost

Automatic reinforcement, a reinforcement contingency that exists independent of the social environment, presents numerous difficulties to behavior analysts (see Vollmer, 1994, for a discussion). Recent research on the treatment of problem behavior maintained by automatic reinforcement has focused on the use of noncontingent access to preferred items (NCR; e.g. Shore, Iwata, DeLeon, Kahng, & Smith, 1997). When NCR is used in the treatment of automatically reinforced problem behavior, there are two competing sources of reinforcement available. As such, NCR may not always be effective as a treatment for problem behavior maintained by automatic reinforcement. However, if the reinforcer that is used in the NCR procedures is removed contingent on the occurrence of the target behavior (i.e., response cost), an increase in appropriate behavior and a decrease in problem behavior may be observed.

Keeney, Fisher, Adelinis, and Wilder (2000) recently evaluated a procedure in which noncontingent access to positive reinforcers was used to treat problem behavior maintained by negative reinforcement. Results showed that NCR alone was not effective as a treatment. However, when a response-cost procedure was implemented contingent on problem behavior, inappropriate responding decreased. Other studies (e.g., Mason & Iwata, 1990) have shown similar results for destructive behavior maintained by attention (positive reinforcement). In the current investigation, we attempted to replicate the results of the prior studies by evaluating the effects of NCR alone and NCR with response cost in the treatment of problem behavior maintained by automatic reinforcement.

METHOD

Participant, Setting, and Data Collection

Derek, an 18-year-old man who had been diagnosed with autism, was enrolled in a full-day (6-hr) program for the assessment and treatment of multiple problem behaviors including inappropriate vocalizations. All sessions were conducted in two rooms measuring 4 m by 5 m and were 10 min in duration. The rooms contained only stimuli that were necessary for the condition in effect (e.g., toys, chairs).

Observers who had been previously trained in behavioral observation collected data on laptop computers from behind a one-way mirror. During all analyses, duration data were collected on inappropriate vocalizations (defined as any vocalization that was not appropriate to the context; e.g., singing, imitation of drumbeat or guitar) and on choice behavior (defined as Derek having his full body inside one of two rooms) during the choice analysis. Agreement coefficients for inappropriate vocalizations and choice responding were calculated by dividing the smaller duration (in seconds) by the larger duration and multiplying by 100%. Reliability data for inappropriate vocalizations were collected on 39% of functional analysis sessions and averaged 93.5% (range, 80% to 100%), 67% of treatment analysis sessions and averaged 94.5% (range, 53.3% to 100%), and 100% of choice analysis sessions and averaged 98.5% (range, 96.9% to 100%). Reliability data for choice responding were collected during all choice analysis sessions and were always 100%.

Procedure

Functional analysis. A functional analysis was conducted using procedures similar to those described by Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) to identify the reinforcer that maintained Derek's inappropriate vocalizations. Following the functional analysis, a phase of consecutive alone sessions was implemented to evaluate further the occurrence of the target behavior in the absence of programmed contingencies (Vollmer, Marcus, Ringdahl, & Roane, 1995).

Treatment analysis. The treatment analysis consisted of a comparison of baseline and two treatment conditions, NCR and NCR plus response cost, in a reversal (ABCACBC) design. Baseline sessions were similar to the alone condition of the functional analysis, except that the therapist was present and a preferred item (a Walkman® radio; identified via a preference assessment) was placed in the room to control for its presence in later treatment conditions. During baseline, Derek was not allowed to use the radio even though it was present. During the NCR condition, Derek was given continuous access to the radio, and the therapist provided no consequences for occurrences of the target behavior.

Although levels of inappropriate vocalizations decreased below baseline levels during NCR, the observed reduction was not clinically significant. Therefore, a response-cost component was added to the NCR condition. This condition was similar to the NCR condition except that Derek lost access to the radio for 5 s contingent on inappropriate vocalizations. At the end of the 5-s interval, the radio was returned.

Choice analysis. Following the treatment analysis, an analysis was conducted to test the hypothesis that Derek preferred the radio relative to engaging in inappropriate vocalizations. During the choice analysis, Derek could enter one of two rooms. In the "radio" room, Derek had free access to the radio (the response-cost procedure was not in place), whereas in the "sing" room he was able to sing (similar to the alone condition of the functional analysis). Prior to each session, the therapist directed Derek to enter each room to expose him to the contingen-
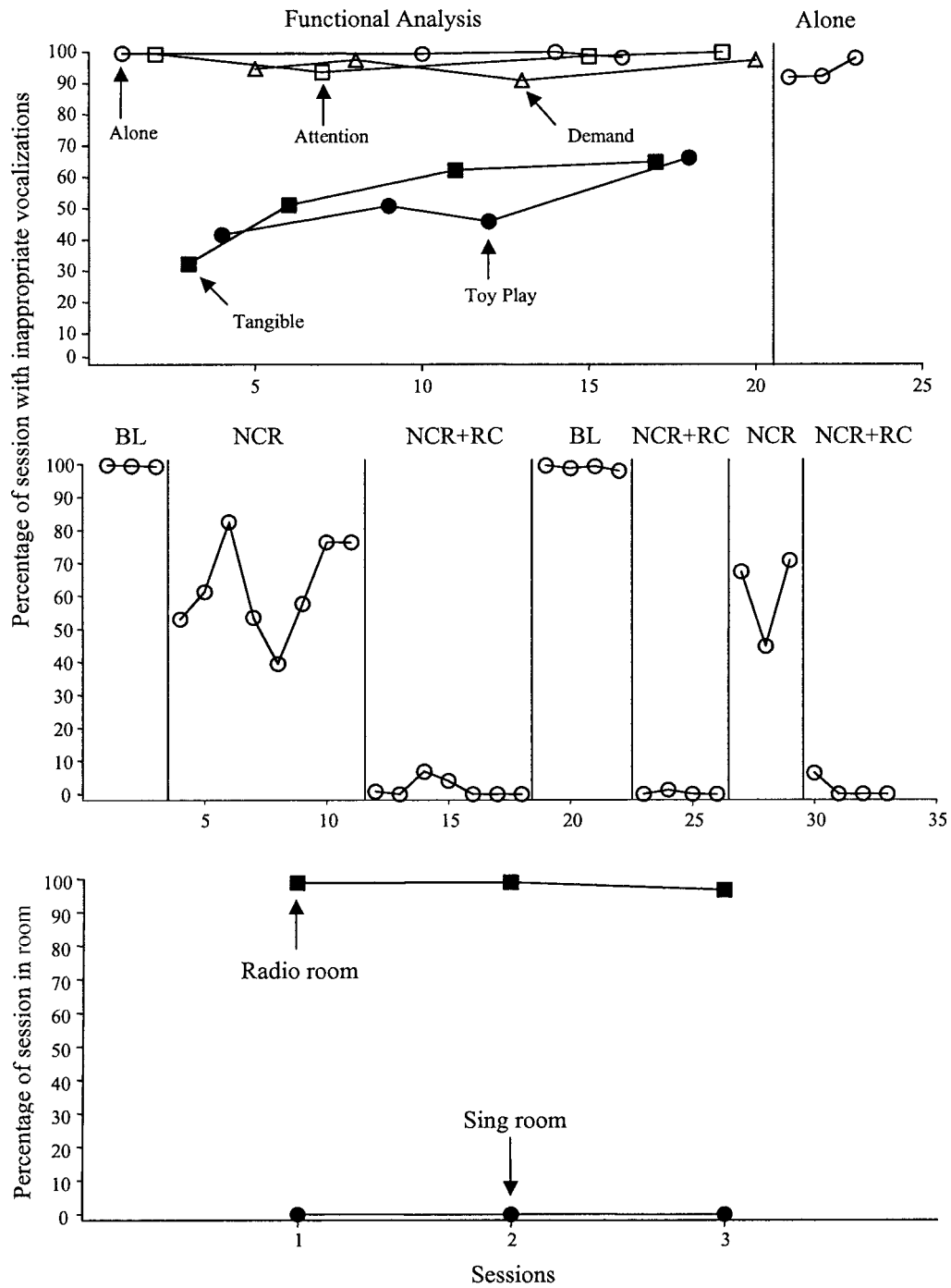
Figure 1. Average percentage of engagement in inappropriate vocalizations during the functional analysis (top panel) and treatment analysis (middle panel) and choice responding during the choice analysis (bottom panel). BL = baseline.

cies associated with each room. No therapist was present in either room.

RESULTS AND DISCUSSION

The results of the functional analysis suggested that inappropriate vocalizations were maintained by automatic reinforcement. This hypothesis was further supported because the behavior persisted during the alone phase (Figure 1, top).

The middle panel of Figure 1 shows the results of the treatment analysis. Derek's inappropriate vocalizations averaged 99.1% during baseline and 55.6% during the subsequent NCR condition. The addition of the response-cost component produced an immediate reduction in inappropriate vocalizations (M = 1.2%) relative to NCR alone. Inappropriate vocalizations reemerged during the reversal to baseline (M = 98.9%), decreased during NCR plus response cost (M = 0.3%), and returned to prior levels during the reversal to the NCR condition (M = 60.9%). During the final phase of NCR plus response cost, inappropriate vocalizations again decreased (M = 1.6%).

During the choice analysis (Figure 1, bottom), Derek allocated the majority of his responding to the "radio" room (M = 98.2%) and did not enter the "sing" room. These data suggest that Derek preferred listening to the radio relative to singing. It should be noted that while Derek was in the "radio" room he displayed low levels of inappropriate vocalizations (M = 1.1%; data not shown).

In the current investigation, the use of response cost reduced the occurrence of automatically reinforced problem behavior. These results are similar to the results of previous investigations (e.g., Keeney et al., 2000; Mason & Iwata, 1990) and suggest that for some individuals, the loss of high-preference stimuli may compete with engagement in automatically reinforced problem behavior.

Although the provision of an alternative reinforcer decreased problem behavior somewhat, the removal of the alternative reinforcer reduced problem behavior to near-zero levels. Apparently Derek preferred the stimulation derived from the radio relative to that derived from inappropriate vocalizations. Results of the choice analysis supported this hypothesis.

It was unexpected that Derek displayed low levels of vocalizations during the choice analysis. Although these sessions were similar to the NCR condition of the treatment analysis, rates of vocalizations were near zero in the choice analysis. It is possible that the history of exposure to the response-cost procedure during the treatment analysis may have contributed to this effect.

A potential limitation of the current results is that the specific reinforcing properties of the inappropriate vocalizations were not identified. For example, it is possible that the behavior was maintained by certain response products (e.g., auditory or physical) or a combination of products. In addition, the current investigation involved only 1 participant and only one schedule of response cost (continuous). Future research should examine the effects of various response-cost schedules.

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