JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2004, **37,** 411–415 NUMBER 3 (FALL 2004)

A COMPARISON OF RESPONSE COST AND DIFFERENTIAL REINFORCEMENT OF OTHER BEHAVIOR TO REDUCE DISRUPTIVE BEHAVIOR IN A PRESCHOOL CLASSROOM

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This study investigated the effectiveness of response cost and differential reinforcement of other behavior (DRO) in reducing the disruptive behaviors of 25 children in a preschool classroom. Using an alternating treatments design, disruptive behavior was reduced when the participants earned tokens for the absence of disruptive behavior (DRO) or lost tokens for the occurrence of disruptive behavior (response cost). Initially, DRO was more successful in reducing the number of disruptive behaviors; however, over time, response cost proved to be more effective.

DESCRIPTORS: differential reinforcement, disruptive behavior, preschoolers, response cost

A few researchers have demonstrated the effectiveness of response cost and differential reinforcement of other behavior (DRO) for managing aggressive and disruptive behavior of children in preschool settings. In the response-cost procedures, individual children start with a number of tokens and then lose tokens contingent on each instance of the problem behavior. If a specified number of tokens remain at the end of the session, a reinforcer is delivered (e.g., McGoey & DuPaul, 2000; Reynolds & Kelley, 1997). In the DRO procedure, children earn tokens for the absence of problem behavior in continuous intervals during the session and receive a reinforcer if they have a specified number of tokens at the end of the session (Conyers, Miltenberger, Romaniuk, Kopp, & Himle, 2003). McGoey and DuPaul and Reynolds and Kelley both showed that response cost decreased problem behavior when implemented individually with 4 children in a preschool setting. Conyers et al. showed that DRO decreased problem behavior when implemented with an entire class of preschoolers. The purpose of the present study was to compare the effectiveness of response cost and DRO implemented on a classwide basis with preschool children.

We thank the staff, parents, and children at the Fraser Daycare Center for their support and cooperation.

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METHOD

Participants and Setting

The participants were 25 children in a preschool classroom. The participants included 4 girls and 21 boys, 4 to 5 years old, who exhibited a high level of disruptive behaviors. The study was conducted in a classroom (25 m by 25 m) with two to three teachers present during every session.

Target Behaviors and Data Collection

We recorded the number of children who exhibited disruptive behaviors during each observation interval using a 10-s interval-recording system (8 s observe, 2 s record). During all sessions, observation intervals were cued by a tape recorder with the vol-

ume set low enough so only the observers could hear it. A disruptive behavior was defined as any instance of screaming, crying, throwing objects or using them as weapons, and refusing to comply with a teacher's request (scored when a student overtly refused or did not comply with the teacher's request within 5 s).

Interobserver Agreement

Two observers independently recorded the number of children who exhibited disruptive behaviors in each interval during 67% of baseline sessions and 59% of intervention sessions. The percentage agreement between observers was assessed on an interval-by-interval basis by dividing the smaller number by the larger number. Interobserver agreement was calculated for each session by summing the percentages across intervals, dividing by the number of intervals, and multiplying by 100%. During baseline sessions, the mean percentage of agreement was 93% (range, 79% to 100%). During intervention sessions, the mean percentage of agreement was 92% (range, 84% to 100%).

Procedure

We compared response cost and DRO using an ABAB and alternating treatments design. Following baseline, response-cost and DRO sessions occurred on alternating days for 2 months. After a return to baseline, response cost was evaluated for an additional 7 months, as the procedure was faded. Sessions occurred one to three times per week.

Baseline. The researchers recorded the target behaviors as the teachers interacted with the children in their usual manner (i.e., disruptive behaviors typically resulted in a verbal reprimand). Baseline sessions lasted 30 min.

Alternating treatments. Treatment sessions in this phase lasted 15 min. A board with 15 spaces next to each child's name was set up in the classroom. At the beginning of each response-cost session, 15 tokens (stars) were placed beside each child's name on the board. The children were told that if they had enough tokens beside their name at the end of the session they would receive candy (e.g., Gummi Bears®, jelly beans, chocolate). However, if they exhibited disruptive behavior before the timer rang, they would lose a token. Next, the disruptive behaviors were defined and the children were told that they needed to have 12 tokens to obtain candy. The researchers showed the children where 12 tokens were on the board. At the beginning of the DRO sessions, the spaces beside each child's name were empty and the children were told that, when the timer rang, a token would be put beside their name if they had not engaged in any disruptive behavior. Then, the disruptive behaviors were defined and the children were told that they needed 12 tokens to obtain candy.

A research assistant then set a timer to a randomly chosen number between 30 s and 1 min 30 s (M = 1 min), and the observers recorded the number of children who exhibited disruptive behaviors in the 10-s intervals for 15 min. When the timer sounded at the end of the interval, the experimenter delivered the response-cost or DRO consequences in front of the entire class. During the response-cost sessions, when the timer rang, the children who had exhibited disruptive behavior were told that they had lost a token and were given a description of their disruptive behavior. The children who had not engaged in any disruptive behaviors received praise. During the DRO sessions, when the timer rang, the children who had not engaged in any disruptive behavior received praise and a token. No feedback was given to those who did not earn a token. At the end of the DRO and response-cost sessions, the children who had 12 tokens received a piece of candy. No programmed consequences were implemented outside the experimental sessions.

Baseline. Following the alternating treatment phase, baseline conditions were instituted for five sessions.

Response cost. Treatment sessions lasted for 15 to 60 min depending on the condition. In the 1-min phase, the response-cost intervention was reinstated as previously described. During the 2-min phase, the timer was set to a random number between 1 min 30 s and 2 min 30 s (M = 2 min). During the 3-min phase, the timer was set to a number between 2 min 30 s and 3 min 30 s (M = 3 min). In the 4-min phase, the timer was set to a random number between 3 min 30 s and 4 min 30 s (M = 4 min). In the 2-, 3-, and 4-min phases, 8 of the 10 available stars were required for reinforcement. In the 7-min phase, the timer was set to a random number between 6 min 30 s and 7 min 30 s (M = 7 min). Six of the seven stars were required for reinforcement. Finally, during the 12-min phase, the timer was set to a random number between 11 min 30 s and 12 min 30 s (M = 12 min). Four of the five stars were required for reinforcement.

RESULTS AND DISCUSSION

Figure 1 shows the percentage of intervals with disruptive behavior. Disruptive behavior occurred in a mean of 64% of intervals during baseline. When response cost was implemented, disruptive behaviors decreased over the course of treatment to a mean of 5% of intervals in the last six sessions. In DRO sessions, disruptive behavior was lower initially, but increased over the course of treatment to a mean of 27% of intervals in the final six sessions. When baseline was reinstated, disruptive behavior averaged 52% of intervals. Finally, when response cost was re-implemented and the intervals increased from 1 min to 12 min, the children maintained a low rate of disruptive behavior (5%, 4%, 10%, 4%, 8%, and 2%, respectively). In addition to a decrease in the percentage of intervals with disruptive behavior, there was also a decrease in the number of children who exhibited disruptive behavior in each interval that contained disruptive behavior. The mean number of children who exhibited disruptive behavior in each interval was 2.9 in the first baseline, 1.2 in DRO, 1.1 in response cost, 1.5 in the second baseline, and 1 in the final response-cost phases.

Because researchers conducted this investigation in experimental sessions in the classroom, it represents a relatively pure or analogue comparison of response cost and DRO, albeit on a classroom-wide scale. The response-cost and DRO procedures were somewhat labor intensive, especially early on when the interval was short. Future research might investigate ways to make such classroom-wide procedures less labor intensive. Two such possibilities include the evaluation of larger interval sizes and group contingencies (e.g., Putnam, Handler, Ramirez-Platt, & Luiselli, 2003).

Both DRO and response cost were implemented in a similar fashion; the difference was the gain or loss of tokens in each interval. However, in the response-cost condition, feedback also was provided to students who exhibited problem behavior. Therefore, it is not clear whether the loss of tokens or the provision of feedback (or both) made response cost more effective than DRO. This possible confounding effect could be addressed in future research by providing feedback following problem behavior in both conditions.

Another limitation of the present investigation is the absence of functional assessments to identify the conditions that maintained the students' disruptive behavior. Considering that the goal of the present study was to compare two procedures implemented with an entire class of students using an arbitrarily chosen reinforcer, prior functional assessments did not seem necessary. Nonetheless, it is important to conduct such as-

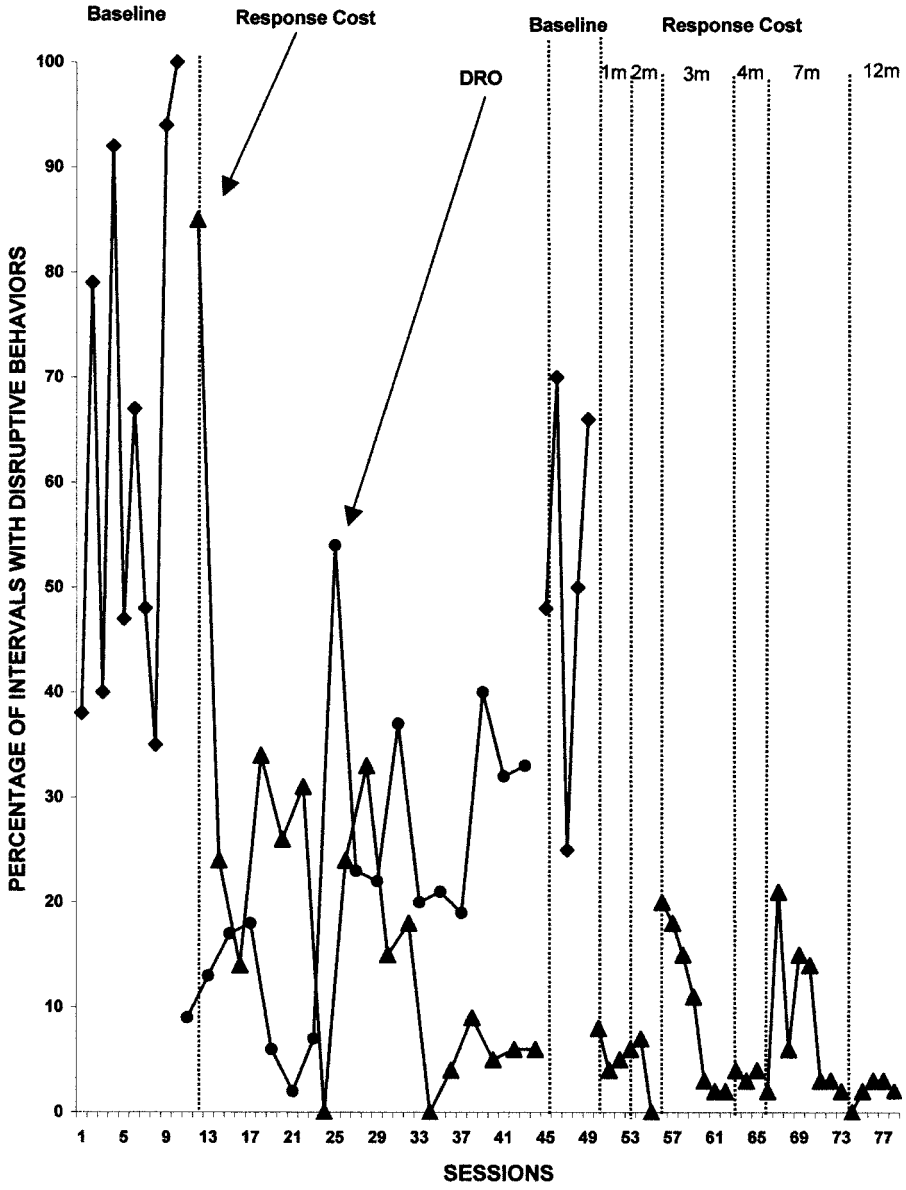

Figure 1. The percentage of intervals with disruptive behavior in baseline and treatment phases. Triangles represent response-cost sessions, and circles represent DRO sessions.

sessments to better understand the variables that may be responsible for the success of treatment, especially when evaluating punishment procedures such as response cost.

The use of punishment procedures is sometimes criticized because punishment is typically less acceptable than reinforcement and punishment may evoke emotional behavior or have other side effects. In the present study, the children's reactions were not different when they lost a token in the response-cost procedure and when they failed to receive a token in the DRO procedure, suggesting that response cost did not produce a relative increase in emotional responses. To increase the acceptability of response cost, it would be valuable to implement it along with reinforcement procedures. Future research

should evaluate whether the combination of procedures would produce a greater effect than response cost alone.

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Received July 14, 2003
Final acceptance May 19, 2004
Action Editor, Iser DeLeon