Evaluation of DRO Schedules to Reduce Disruptive Behavior in a Preschool Classroom

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ABSTRACT. This study examined the effectiveness of momentary DRO (mDRO) and whole interval DRO (wDRO) schedules on high rates of disruptive behavior in a classroom of 22 children. In both procedures, children earned tokens for the absence of disruptive behavior and exchanged tokens for tangible or edible reinforcers. mDRO and wDRO, with tangible reinforcement, produced modest decreases in disruptive behavior (36%-44% decrease from baseline). However, wDRO with edible reinforcement produced larger decreases in disruptive behavior (66-81% decrease from baseline). [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <http://www.HaworthPress.com> © 2003 by The Haworth Press, Inc. All rights reserved.]

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Differential reinforcement of other behaviors (DRO) is a procedure in which reinforcement is delivered contingent on the absence of a target behavior. In whole-interval DRO (wDRO), a reinforcer is given if the target behavior has been absent throughout the entire interval, whereas in momentary DRO (mDRO), a reinforcer is delivered if the target behavior is absent at the instant the interval ends. (e.g., Repp, Barton, & Brulle, 1983). A small number of studies has investigated the effectiveness of mDRO and wDRO schedules in suppressing problem behaviors exhibited by children and adults with developmental disabilities (Barton, Brulle, & Repp, 1986; Derwas & Jones, 1993; Kahng, Abt, & Schonbachler, 2001; Miller & Jones, 1997; Repp et al., 1983). Overall, these studies have produced mixed results. Barton et al. (1986) and Repp et al. (1983) found that mDRO was only modestly effective at reducing inappropriate behavior. However, Kahng et al. (2001) found mDRO to be effective and Derwas and Jones (1993) and Miller and Jones (1997) found mDRO to be more effective than wDRO for some subjects. The purpose of this study was to extend previous research by examining the effectiveness of mDRO and wDRO schedules and assessing their ability to suppress inappropriate behaviors within a classroom of young children.

METHOD

Participants and Setting

The participants included eight girls and 14 boys, two to three years of age, who exhibited a high level of disruptive behaviors. The study was conducted in a 20 m by 20 m preschool classroom for typically developing children. During each session, three to four teachers were present and the children engaged in a variety of activities including playing with toys, listening to stories read by a teacher, and engaging in group activities such as art projects around tables located in the room.

Target Behaviors and Measurement

Disruptive behavior was defined as screaming, crying, throwing oneself on the floor, hitting, kicking, property destruction, throwing objects or using them as weapons, and refusing, ignoring, or resisting a staff member’s request. The number of children exhibiting target behaviors
during each observation interval was recorded using a 10-s partial interval procedure (8-s observe, 2-s record). An additional observer was present during 48% of the sessions to conduct interobserver agreement assessments. Interobserver agreement was calculated by dividing the number of intervals of agreement by the total number of intervals and multiplying by 100%. The mean percentage of agreement was 94.2% (range: 90-98%).

**Procedure**

A reversal design with multiple treatment conditions was used. Sessions occurred on three separate days each week over the course of an eight-month period.

**Baseline.** During baseline no formal contingencies were in effect for either inappropriate or appropriate behaviors, and the staff interacted with the children in their usual manner. Disruptive behaviors typically resulted in a verbal reprimand. Each baseline session lasted 30 min.

**DRO.** DRO sessions lasted from 15 to 40 minutes depending on the condition. During mDRO-2 a board listing every child’s name was set up against a wall in the classroom. At the beginning of each session, the children were told that those who were not engaging in a disruptive behavior when the timer rang would receive a star beside their name. Next, disruptive behaviors were defined and the children were told how many stars were required to choose a prize at the end of the session. The timer was set to a randomly chosen number between 1 min 30-s and 2 min 30-s (mean, 2 min), and at the moment the timer rang, the children who were not engaging in disruptive behavior received a star and praise. No feedback was given to those who did not earn a star. At the end of a session, the children who had earned at least 8 out of 10 stars were allowed to choose a small toy from a box containing an assortment of small tangible items (e.g., toy car, bead necklace, stickers). In mDRO-1 the timer was set to a number between 30-s and 1 min 30-s (mean, 1 min) and the children had to earn at least 13 out of 15 stars to choose a tangible item at the end of the session. In wDRO-1 the children were told that in order to receive a star, they could not engage in any disruptive behaviors throughout the entire interval. The timer was set to a randomly chosen number between 30-s and 1 min 30-s (mean, 1 min). They needed 13 out of 15 stars to choose a tangible item at the end of the session. In wDRO’-1 the children who had earned at least 13 out of 15 stars received a ‘surprise’ edible reinforcer (e.g., jelly beans, chocolates, lollipops). In wDRO’-2 the timer was set to a number between 1 min 30-s
and 2 min 30-s (mean, 2 min) and the children were told that they had to earn at least 8 out of 10 stars in order to obtain an edible. In wDRO’-3 the timer was set to a number between 2 min 30-s and 3 min 30-s (mean, 3 min) and the children had to earn 8 out of 10 stars to obtain an edible. In wDRO’-4 the timer was set to a number between 3 min 30-s and 4 min 30-s (mean, 4 min) and the children had to earn 8 out of 10 stars to obtain an edible.

**RESULTS**

The top panel of Figure 1 shows the percentage of intervals with disruptive behaviors. During baseline, disruptive behavior occurred in a mean of 64% of intervals. Disruptive behavior occurred in 36% of intervals with mDRO-2, 41% of intervals with mDRO-1, and 38% of intervals with wDRO-1. The use of wDRO with edibles (wDRO’-1) decreased disruptive behavior to lower levels (mean = 22%). Disruptive behavior then increased to 70% of intervals in the second baseline phase and decreased to 14% of intervals in the second wDRO’-1 phase. In the following phases, during which the wDRO interval was increased from 1 to 4 min, disruptive behavior remained low (means = 14%, 13%, and 12%, respectively).

The bottom panel of Figure 1 depicts the mean number of disruptive children per scored interval. This number was calculated by dividing the number of scored intervals (intervals with disruptive behavior) by the total number of children engaging in disruptive behavior in those intervals. During baseline the number of children engaging in disruptive behavior per interval ranged from 1 to 4.7, with a mean of 2.8. In the first mDRO phase, there was just 1 disruptive child per interval. With few exceptions, the number of disruptive children per interval remained at 1 in the mDRO-1 and wDRO-1 phases using tangible reinforcers, and the wDRO-1’ phase using edible reinforcers. Furthermore, there was just 1 child engaging in disruptive behavior per interval as the DRO interval was increased from 1 to 4 min.

**DISCUSSION**

Overall, the mDRO and wDRO schedules were moderately effective in reducing the percentage of intervals of disruptive behaviors when tangible reinforcers were used. However, when edible reinforcers were
used with mDRO schedules, the percentage of intervals of disruptive behavior decreased significantly. Interestingly, the number of children engaging in disruptive behavior per interval decreased markedly from baseline with the first mDRO phase, but did not change substantially across the different mDRO and wDRO phases. Across momentary and
whole DRO using tangible and edible reinforcers, when disruptive behavior occurred in an interval, there was typically just one child engaging in the disruptive behavior compared to almost 3 children per interval on average during baseline.

This study replicates prior research by Barton et al. (1986) and Repp et al. (1983) in showing the modest effect of mDRO schedules and extends prior research as it shows that wDRO schedules can be effective with large numbers of young children in a classroom setting. This is the first evaluation of DRO schedules on a class-wide basis and shows that DRO can be effective in a class of 22 preschool children.

The relative superiority of edible reinforcers over tangible reinforcers in the wDRO phases highlights the importance of identifying the most effective reinforcers for use in DRO schedules.

There are two limitations in the present study that warrant comment. First, it is not clear whether mDRO would have been more effective initially had edible reinforcers been used. Because we compared mDRO and wDRO with tangible reinforcers but not with edible reinforcers, we do not know whether mDRO with edibles would have been equally as effective as wDRO with edibles. Future research should investigate this issue.

Second, the DRO interval was increased to only 4 min. To enhance the practicality of this procedure, the interval would need to be increased to 10-15 min so that teachers can implement the procedure in the classroom without too much disruption of ongoing activities. Unfortunately, the school year ended and we were unable to increase the interval further. Further research should evaluate the effectiveness of longer, more practical DRO intervals in class-wide applications of DRO.

REFERENCES


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