

*FIXED-TIME TEACHER ATTENTION TO DECREASE OFF-TASK  
BEHAVIORS OF TYPICALLY DEVELOPING THIRD GRADERS*

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Evidence to validate the use of fixed-time (FT) reinforcer delivery (i.e., noncontingent reinforcement) with typically developing populations has been relatively rare in the behavioral literature. In those studies that have provided validation, reinforcer delivery schedules appeared to be prohibitively dense for sustained implementation of procedures. This study demonstrated the efficacy of using FT reinforcer delivery to reduce off-task behavior of 2 typically developing third graders using a teacher-selected schedule (FT 4 min). Immediate reductions in off-task behavior were observed for both children. Challenges in identifying the operative mechanism of FT schedules in natural settings are discussed.

DESCRIPTORS: fixed-time reinforcement schedules, general education, noncontingent reinforcement, typically developing children

Despite the documented efficacy of time-based reinforcer delivery (i.e., noncontingent reinforcement or NCR) in the treatment of aberrant behavior in persons with developmental disabilities (Carr et al., 2000), studies validating this procedure with nondisabled populations have been relatively rare. Two notable exceptions are O'Callaghan, Allen, Powell, and Salama (2006) and Jones, Drew, and Weber (2000), who used NCR as an intervention to reduce off-task behavior of typically developing children. O'Callaghan et al. demonstrated that noncontingent escape was an effective strategy for increasing tolerance of restorative dental procedures in 4- to 7-year-olds. Further, they showed that the procedure could be implemented by the dentist with very little training. Jones et al. implemented noncontingent peer attention to reduce the off-task behavior of an 8-year-old boy with attention deficit hyperactivity disorder. However, both

studies employed relatively dense schedules of reinforcement delivery (10- to 60-s fixed-time [FT] schedules), which may be prohibitive for teachers in regular classrooms. Therefore, the purpose of the present study was to assess the effectiveness of teacher-selected FT schedules.

## METHOD

### *Participants and Setting*

Andrew and David were third-grade boys (9 and 8 years old, respectively) who had been identified by their teacher as displaying frequent off-task behavior, including calling out, getting out of their seats, and disturbing other students. Data were collected during language arts, which included both individual and group reading and writing activities. Andrew had been identified as having a specific learning disability and received 140 min of resource specialist program services weekly for reading. David was classified as a general education student and was not receiving any special education services.

### *Response Measurement and Interobserver Agreement*

*Off-task behavior* was defined as calling out or engaging in one of the following behaviors for more than 3 s: coloring or drawing not appropriate to the assigned task, talking with

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peers, taking one's eyes off the teacher or task, or getting out of one's seat. Direct observation of off-task behavior was conducted by trained undergraduate students using a 10-s partial-interval recording procedure. Each observation session lasted 40 min. Observers rotated observations between children minute by minute so that each child was observed for a total of 20 min. A second observer simultaneously but independently observed 21% of the sessions spaced across all phases of the study. Interobserver agreement was calculated by dividing agreements by the total number of intervals and multiplying by 100%. Mean agreement was 97% (range, 93% to 100%). To provide a more stringent measure of interobserver agreement, calculations for occurrences and nonoccurrences of off-task behavior also were made. Mean occurrence agreement was 82%; mean nonoccurrence agreement was 96%.

#### *Experimental Design*

An ABAB design was used with both participants. During baseline (A), the teacher interacted with the boys in her usual manner. During NCR (B), the teacher provided attention to the boys on an FT schedule.

#### *Procedure*

*Functional assessment and brief analysis.* Prior to baseline, interviews with the teacher and direct observations by the second author were conducted to form hypotheses regarding potential functions of the students' behaviors. These data were reviewed by both authors, who hypothesized that the boys' behaviors were maintained by teacher attention. Next, a series of naturalistic functional analysis conditions were implemented to test the hypothesis. In the contingent attention condition, the teacher was asked to attend to the boys when they were off task by providing a brief redirection. In the contingent escape condition, the boys were told that they could take a 20-s break from work each time they were off task. For both boys, percentage of intervals scored during the

attention conditions were higher than in the escape condition.

*Baseline.* During this phase, the teacher was asked to respond to the students in her usual manner, which typically included brief reprimands or redirections for inappropriate behavior.

*NCR.* Prior to treatment implementation, the first author briefly explained the rationale and procedures for NCR. The teacher then was asked to provide an indication of how often she believed she could provide attention to the boys without causing a disruption to her teaching schedule or ongoing classroom activities. The teacher decided that a 4-min FT schedule would be reasonable for her to implement. A Motivaider device identical to that described by O'Callaghan et al. (2006) was used to provide a vibratory cue to the teacher every 4 min. Upon receiving the cue, the teacher provided individual brief attention to each boy appropriate to the child's behavior (i.e., praise for on-task behavior and redirection for inappropriate behavior). The teacher was asked to alternate between the 2 boys with regard to which one received attention first and to ignore appropriate and inappropriate behaviors that occurred in the interim between scheduled attention delivery. No explanation of the change in contingencies was provided to the children.

David was observed in the same classroom, but with a different peer group and academic subject (mathematics) toward the end of the second NCR phase. Andrew was observed in a different classroom with a different teacher, who also was trained in the NCR procedure.

*Treatment integrity.* Trained observers collected data to monitor the delivery of teacher attention (minimum duration of 5 s) concurrently with student data, using the same 10-s partial-interval recording procedure during 100% of the observations. For each session, teacher implementation was 100% (i.e., teacher attention was delivered at least every 4 min). Errors of commission (the teacher providing

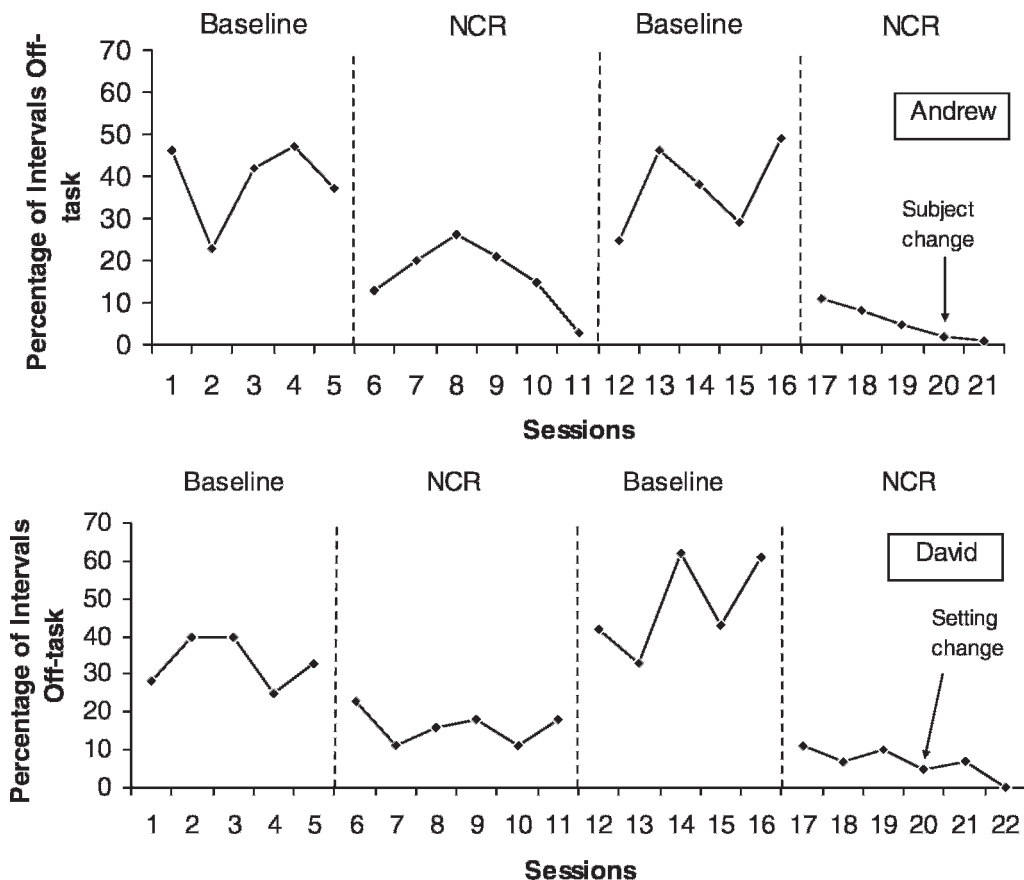


Figure 1. Percentage of intervals in which off-task behaviors were observed across conditions for Andrew (top) and David (bottom). Changes in academic subject and setting are indicated with arrows.

attention to off-task behavior during the interim of scheduled reinforcer delivery) occurred during 2% and 1% of the intervals for the first NCR phase for David and Andrew, respectively, and 0% during the second NCR phase for both children. Interobserver agreement for integrity was assessed for 30% of the sessions and was 100%.

## RESULTS AND DISCUSSION

Figure 1 displays the results for Andrew and David. Immediate and sustained reductions in the percentage of intervals with off-task behavior were observed for Andrew during the NCR schedule ( $M = 16\%$ ; range, 3% to 26%) relative to baseline ( $M = 39\%$ ; range, 23% to

47%). Levels of off-task behavior were variable during the return to baseline ( $M = 37\%$ ; range, 25% to 49%), but once again showed an immediate and sustained reduction with the second implementation of the NCR schedule ( $M = 8\%$ ; range, 5% to 11%), which was maintained across the observations conducted during mathematics ( $M = 1\%$ ; range, 1% to 2%).

For David, the percentage of intervals with off-task behavior decreased during the NCR schedule ( $M = 16\%$ ; range, 11% to 23%) relative to baseline ( $M = 33\%$ ; range, 25% to 40%). During the return to baseline, off-task behavior substantially increased ( $M = 48\%$ ; range, 33% to 62%), but immediately decreased with the reintroduction of the NCR

schedule ( $M = 9\%$ ; range, 7% to 10%). Results were maintained when the procedure was implemented in a different classroom by a different teacher ( $M = 4\%$ ; range, 0% to 7%).

These findings indicate that NCR was an effective strategy for reducing the off-task behaviors of both boys, thus bolstering support for the use of this procedure with typically developing children. This study expands on the previous literature by demonstrating effectiveness with a different behavioral function (i.e., adult attention vs. peer attention or escape), as well as by demonstrating its applicability in a general education classroom. More important, however, this study shows that the schedule of reinforcer delivery need not be prohibitively dense for treatment effects to be evident. As indicated by Jones et al. (2000), the schedule of reinforcer delivery prescribed by their procedures (i.e., 30 s of peer attention every 90 s) "would be too frequent for teachers to provide ... in a regular classroom" (p. 345). O'Callaghan et al. (2006) did not specifically assess satisfaction with their treatment procedures, so it is unclear whether the schedule was acceptable to the treatment provider.

In the present study, we allowed the treatment provider (i.e., the teacher) to select a schedule of reinforcement delivery that was reasonable to her given her other classroom obligations. This strategy could be viewed simultaneously as a weakness and strength of the current study. With regard to the former, we did not base the FT schedule on analyses of baseline response rates, as is generally recommended with NCR schedules (Tucker, Sigafos, & Bushell, 1998). However, this did not appear to affect the intervention's effectiveness adversely. Therefore, we are more inclined to view incorporating teacher preferences into intervention design as a particular strength of the current study. Specifically, we might have increased the likelihood that the teacher would find the NCR schedule acceptable. It is important to note that the teacher reported

that she liked the intervention and found it easy to implement. She also noted seeing an almost immediate improvement in both boys' behaviors, which may have contributed to the high level of integrity with which she implemented the intervention. Although not directly assessed in the current study, allowing teachers' input in deciding reinforcer delivery schedules could potentially contribute to greater treatment maintenance. However, one would need to be careful that intervention effectiveness was not compromised to maintain teacher preferences.

The robust and immediate effects of the FT reinforcement schedule used in this study pose several interesting questions regarding the mechanism responsible for the change in both children's behaviors. Perhaps the most parsimonious explanation is that extinction was the operative mechanism, given that problematic behaviors were ignored consistently during the treatment phases and scheduled attention was delivered almost exclusively for on-task behavior (with the exception of two occasions).

Although extinction via NCR is a viable explanation for the change in both boys' behaviors, other considerations warrant mention. First, the nature of the procedures inevitably raises questions regarding potential differential reinforcement effects. Specifically, because behavior resulted in a different attention response (i.e., praise for on task and redirection for off task), it is unclear what effects these differences produced on the children's behavior. It is possible that changes in behavior were a result of strengthening the association between on-task behavior and the delivery of praise. Further, one might argue that because praise was used for both boys simultaneously, the children had greater opportunities to see a peer's behavior reinforced, and this could have evoked on-task responding.

Although the results of this study are encouraging, further analyses are needed to confirm the efficacy of teacher-selected sched-

ules of reinforcement. If NCR procedures are to be disseminated widely and used in applied settings by existing treatment providers, such analyses are imperative. NCR provides an attractive alternative to procedures such as differential reinforcement because it does not require constant observation of behavior and may therefore be easier to implement. However, reinforcer delivery schedules that are too taxing on the treatment provider will likely render NCR too resource intensive to be practical.

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