

Nonexclusionary Timeout: Maintenance of Appropriate Behavior Across Settings

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A recent paper by Foxx and Shapiro (1978) used a nonexclusionary timeout procedure to reduce inappropriate behaviors in a mentally retarded population. The present study was designed to replicate these findings, to examine the utility of modifying the basic reinforcement schedule of the original study, and to demonstrate control across settings and maladaptive behaviors using a multiple baseline design. The subject was a 19-year-old severely retarded male, and the design consisted of implementing the program sequentially across three settings. Following initial baseline in each setting, a discriminative cue was provided to the client, and a DRO schedule was instituted. Any occurrence of target disruptive behaviors resulted in removal of the discriminative cue and interruption of the reinforcement schedule. After the intervention program was implemented in each setting, inappropriate behaviors decreased to virtually zero rates of occurrence. These findings indicate that a signaled timeout can be employed successfully in more than one setting and that it can be used in conjunction with DRO reinforcement schedule. The advantages of mediating transfer of behavioral improvements with portable discriminative cues were discussed.

Antisocial behavior is a pervasive problem among the mentally retarded. A frequently used intervention procedure for reducing antisocial behavior is a timeout consequence (MacDonough & Forehand, 1973), and in many cases this

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has involved physically removing the client to another less stimulating location following the disruptive act (Mulick & Schroeder, 1980). This procedure has a definite practical disadvantage, in that previous research has demonstrated that timeout from positive reinforcement is most effective when implemented immediately following the target behavior (Clark, Rowbury, Baer, & Baer, 1973). Providing timeout immediately is often impossible due to intervening events, client behavior, or the remote location of the target setting. One approach to dealing with this problem has been to provide a bridging stimulus immediately following the inappropriate behavior, which indicates that timeout will be provided just as soon as circumstances permit the consequence to begin (Drabman & Creedon, 1979). Another approach to reducing the delay was recently described by Foxx and Shapiro (1978). In this study, colorful ribbons were placed loosely around the neck of each of five mentally retarded students after they had entered their special education classroom. As long as the students wore their ribbons, praise and edibles were provided to them frequently according to a temporally defined schedule. Thus, the minimal parameters of *time-in* were specified by the scheduled delivery of reinforcement. However, each occurrence of a specified inappropriate target behavior resulted in the removal of the ribbon and interruption of scheduled delivery of praise and edibles by immediate institution of a nonexclusionary timeout. During timeout, the student was permitted to remain seated, the reinforcement schedule was stopped, all school materials were removed, and no social attention was provided. At the time of the timeout period, the ribbon was returned indicating that positive reinforcement and normal classroom activities were again available. Since only appropriate classroom behavior was associated with reinforcement while the ribbon was worn and inappropriate behavior was immediately punished by removing the ribbon and imposing a nonexclusionary timeout, the presence of the ribbon eventually became a discriminative stimulus that seemed to control the occurrence of appropriate (unpunished) behavior in the classroom.

An interesting extension of these observations is that the effect of using the procedure over time is akin to gradually limiting the client's behavioral repertoire in the presence of the ribbon discriminative stimulus through the selective action of the response-reinforcement relations that are specified. Once the behavioral repertoire defined by the procedure itself and by setting variables (such as available materials, personnel, planned activity schedule, etc.) stabilizes, transfer of the delimited "appropriate" behavioral repertoire to similar settings should be mediated by the presence of the discriminative cue. Few *errors*, or intrusions of inappropriate behavior, would be expected in new environmental contexts having similar setting variables. However, transitions to settings with markedly different characteristics would be expected to occasion the need to renew the use of the timeout consequence to suppress inappropriate behavior that might be related to the changed routine or available social and nonsocial stimuli.

In our investigation, we employed a nonexclusionary timeout procedure se-

quentially across three settings. By using such an approach, we hoped to demonstrate that the acquired stimulus control properties of the ribbon would help to promote transfer of appropriate behaviors to different environments. Past studies have demonstrated that bringing target behaviors under the control of specific stimuli in the treatment setting is a useful tool for achieving transfer to new areas (Page, Iwata, & Neef, 1976; Rabin-Bickleman & Marholin, 1978). We investigated, therefore, whether the discriminative-stimulus component of Foxx and Shapiro's nonexclusionary timeout procedure could be utilized as a portable cue for facilitating transfer. Specifically, we brought the nondisruptive behavior of a mentally retarded male student under the control of a discriminative stimulus (a ribbon) and introduced the same (or similar) cues in other settings to see if an immediate reduction was obtained in the student's inappropriate behaviors.

An additional purpose of our investigation was to examine the utility of modifying the basic reinforcement schedule of the original study. If a signaled nonexclusionary timeout decreased target behaviors when a different reinforcement schedule was employed during time-in, the generality of Foxx and Shapiro's timeout procedure would be enhanced. Conflicting results, however, might identify a critical component of their intervention program. We chose a differential reinforcement of other behavior (DRO) schedule because of past demonstrations that DRO schedules effectively reduced antisocial behavior in retarded individuals when combined with timeout (e.g., Repp & Deitz, 1974).

METHOD

Subject

The subject was a 19-year-old severely mentally retarded male with no sensory or motor handicaps who resided in a state institution for the mentally retarded. In the year preceding the present experiment, a nonexclusionary timeout procedure combined with a DRO reinforcement schedule had been employed to reduce the frequency of the student's disruptive classroom behavior.

Settings

The study was conducted in three settings of a special education program that the student attended for approximately five hours each day, Monday through Friday. The first setting was the morning session in the student's special education homeroom. The morning session usually lasted for approximately two hours and 15 minutes. The second setting was the homeroom class during the afternoon session, which was of approximately one hour in duration. The third setting was the school gymnasium where the student participated in a physical

education program for approximately 30 minutes, Monday through Thursday. The classroom student population consisted of seven students, who were each expected to work at their own desks on separate projects. Each student was further expected to remain seated, work steadily, and to refrain from inappropriate vocalization and touching. In the gymnasium, the student participated in physical education activities with about nine other students. At this time, the students were permitted to talk freely and to walk around the gym. They could also play with objects of their choosing for the majority of the gym session. At least one organized activity, such as taking turns catching and throwing a basketball, was scheduled during each gym period. A special education instructor and classroom aide were present in the classroom settings. Two classroom aides and two physical education instructors were assigned to the gymnasium.

Response Measurement and Reliability

Target behaviors to be decreased in the first two settings were inappropriate talking out loud and inappropriate touching of others. Talking out was recorded by the classroom teacher each time the student produced verbal utterances that were not in response to a question or comment directed to him by others, or that were irrelevant to his assigned activity. Demanding a snack while working on a sorting task would be considered an inappropriate vocalization. Touching others inappropriately was defined as any physical contact that the student initiated which was not appropriate to the social context. For example, this behavior would be recorded if the student left his seat during class time and tapped another student on the head. Shaking hands, in contrast, would not be considered inappropriate touching by the classroom staff if the student used this physical contact as a form of social greeting.

Target behaviors in the gym included inappropriate touching and disruptive behavior. An occurrence of disruptive behavior was recorded each time the student emitted any of the following behaviors: banging windows and bleachers, leaving the gym obstacle course when scheduled for that activity, throwing a basketball across the gym, playing with the gym telephone, or making a loud noise with any of the recreational materials in the gym (i.e., by banging or throwing).

The classroom teacher recorded each day the total number of target behaviors in the first two settings, and the classroom aide recorded the total number of target behaviors in the third setting. A second independent observer also recorded the target behaviors in the classroom and gym settings. There were a total of 23 observer-agreement checks distributed throughout the experiment during baseline and treatment conditions and in each setting. They varied in duration from 14 to 35 minutes with the mean equal to 24 minutes. The level of interobserver agreement was determined by comparing the total number of times the occurrence of the target behavior was scored by the two observers. The percentage of

interobserver agreement was calculated by dividing the smaller observer score of target-behavior occurrences by the larger observer score and multiplying by 100. The average percentage of interobserver agreement was 95% in the home-room and 98% in the gymnasium.

Experimental Design

A multiple baseline design across settings and behaviors (Hersen & Barlow, 1976) was used to determine the effectiveness of the nonexclusionary timeout procedure. After the baseline level of the target behaviors was assessed in the first setting, the intervention program was implemented. The baseline and intervention conditions were in turn sequentially carried out for the target behaviors in the second and third settings. Probe sessions were included as described in the following.

Baseline

During baseline in the classroom and gym settings, the teachers conducted their activities in their usual manner. Any appropriate behavior that the student emitted was occasionally praised. The majority of their interactions with the student involved admonishing him for inappropriate behavior and warning him against repeating these behaviors. The typical consequence for a severe disruptive episode was requiring the student to miss the scheduled snack time. Edibles were not used at this point as positive reinforcers.

Intervention

Program in classroom. Following initial baseline in the morning and afternoon sessions, the teacher placed a large, loose ribbon around the student's neck as he entered the classroom. If the student wore his ribbon and did not emit any of the target behaviors (talking out loud or inappropriate touching), he was given an edible and socially praised every ten minutes. A 10-minute DRO schedule was possible because of the student's experience with DRO schedules the preceding school year. The DRO reinforcement schedule was later progressively increased to a 30 minute reinforcement interval (DRO 10 minutes—session 7, DRO 15 minutes—session 14, DRO 30 minutes—session 37). If any of the inappropriate behaviors did occur, the DRO reinforcement schedule was interrupted, the ribbon was removed, and the student was then in a nonexclusionary timeout for a five-minute period. During the timeout, the student remained in his seat with all school materials removed. Additionally, he was neither spoken to nor given social attention in any way. If the student behaved inappropriately at the end of the timeout period, the timeout was extended until 30 seconds of

appropriate behavior occurred. When the timeout period was completed, the teacher returned the student's ribbon, which indicated that positive reinforcement was again available. The next reinforcement interval began when the ribbon was returned to the student.

Program in gymnasium. Following baseline measurement in the gym setting, the student was given a wrist band and reinforced with edibles every five minutes provided that no target behaviors occurred. Note that this constituted a change in both the discriminative stimulus and in setting variables. If the student did exhibit any of the inappropriate behaviors, the DRO reinforcement schedule was stopped, the wrist band was removed, and the student was then in a five-minute timeout. During the timeout, the student was guided to an empty area of the gym to assume a sitting position. If the student was sitting quietly during the final 30 seconds of the timeout period, the wrist band was returned, and the reinforcement schedule was reinstated. The next reinforcement interval began when the wrist band was returned.

Probe Sessions

Three probe sessions were also conducted to determine which components of the intervention program were responsible for maintaining the low levels of inappropriate behavior. In the first probe session, the student was permitted to wear his ribbon if he emitted no target behaviors. The DRO reinforcement schedule was, however, omitted for the entire session. In the second probe session, the DRO reinforcement schedule remained in effect throughout, but the ribbon was never given to the student. In the third probe session, neither the discriminative-cue nor the reinforcement-schedule component of the intervention program were presented. The first two probe sessions were conducted in the morning classroom setting and were approximately two hours and 15 minutes in duration. The third probe session was administered in the gymnasium setting and lasted 30 minutes. All three probes were conducted after the intervention program had been employed for several months.

RESULTS

Target Behaviors in the Three Settings

Figure 1 shows the average number of target behaviors per hour observed in the three settings during baseline and intervention conditions. The target behaviors in the first setting during baseline ranged between 5.3 and 15.5 occurrences per hour with the mean equal to 10.5 per hour. When the intervention program was implemented in setting 1, the rate of inappropriate behaviors im-

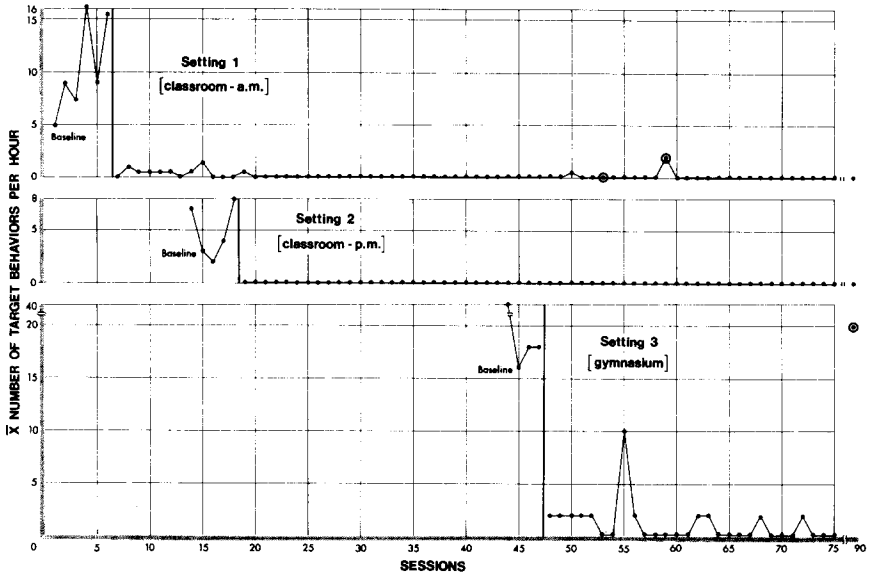


FIGURE 1. Average number of target behaviors per hour recorded in the three settings during baseline and treatment. Circled data points illustrate probe-session results.

mediately declined to virtually zero. Further, the rate of the target behavior equalled only .4 occurrences per hour in the first five sessions of the nonexclusionary timeout procedure. This low rate of responding continued during all subsequent sessions where the complete intervention program was employed. In the majority of these sessions (87%), neither of the target behaviors were reported to occur for the entire morning classroom period; consequently the student was free to participate in all regularly scheduled educational activities.

After talking out loud and touching others were occurring at a low rate in the morning classroom period (setting 1), the level of these same behaviors was measured in the afternoon session (setting 2) for a five-day period. This second baseline revealed that the target behaviors in setting 2 ranged between two and eight occurrences per hour with the overall mean equal to 4.8 per hour. When the intervention program was initiated in the second setting, the target behaviors were completely eliminated in the first session, and a zero rate was reported for all 57 sessions in which the nonexclusionary timeout procedure was used. Thus, elimination of the same target behaviors was more rapid the second time that the intervention procedure was used.

When no target behaviors had been observed for 28 consecutive sessions in setting 1 and for 29 consecutive sessions in setting 2, both of which involved

the student's homeroom, the intervention program was expanded to the gymnasium (setting 3). In this setting, the rates of one of the original target behaviors (inappropriate touching) plus a new target behavior (disruptive responses) were recorded in each session. Prior to beginning the intervention program in the gymnasium, the baseline rate of the target behaviors in a four-day period varied between 16 and 38 occurrences per hour, with a mean number of 22.5 per hour. Following implementation of the signalled nonexclusionary timeout, the student emitted an average of two target behaviors per hour during the first five sessions. Thus, the intervention program produced a large decrease in the rate of the target behaviors in a fairly brief period of time, and this rate reduction endured, with one exception (session 55), in all the remaining sessions.

Probe Session Results

Figure 2 illustrates the percent recovery of mean baseline performance obtained in three probe sessions where either one or both components of the intervention program were omitted. The first probe session, in which the discriminative cue (ribbon) was present but the reinforcement schedule terminated, was conducted in setting 1 following 46 intervention sessions in that environment. A 0% recovery of mean baseline performance was obtained in that neither target behavior occurred during the probe session. The second probe was also conducted in setting 1, and five additional intervention sessions separated it from the first probe. In this test, the reinforcement schedule remained in effect, but the ribbon was never provided to the student. The rate of the target behaviors in the second probe equalled 1.8 occurrences per hour compared to an average of 10.5 occurrences per hour during baseline. Since a 17% recovery of the mean baseline performance was observed when the ribbon was omitted but the reinforcement schedule was maintained, we believe the discriminative cue became more critical than the DRO reinforcement schedule alone in maintaining extremely low levels of inappropriate behavior. When the reinforcement schedule was omitted but the ribbon was still present, the rate of the target behaviors remained at the same zero level of occurrence that had been observed in the preceding intervention sessions.

The greatest percent recovery of mean baseline performance occurred in the third probe session during which both the discriminative cue and reinforcement schedule components of the intervention program were omitted. In this probe session, which was conducted in setting 3 following 28 intervention sessions, the student emitted an average of 22 target behaviors per hour compared to a baseline rate of 22.5. The student achieved, therefore, in the third probe a 98% recovery of the mean baseline performance observed in the same setting. Yet, Figure 1 reveals that during the same day sessions in settings 1 and 2 where both components of the behavioral program were in effect the target behaviors

PROBE SESSIONS

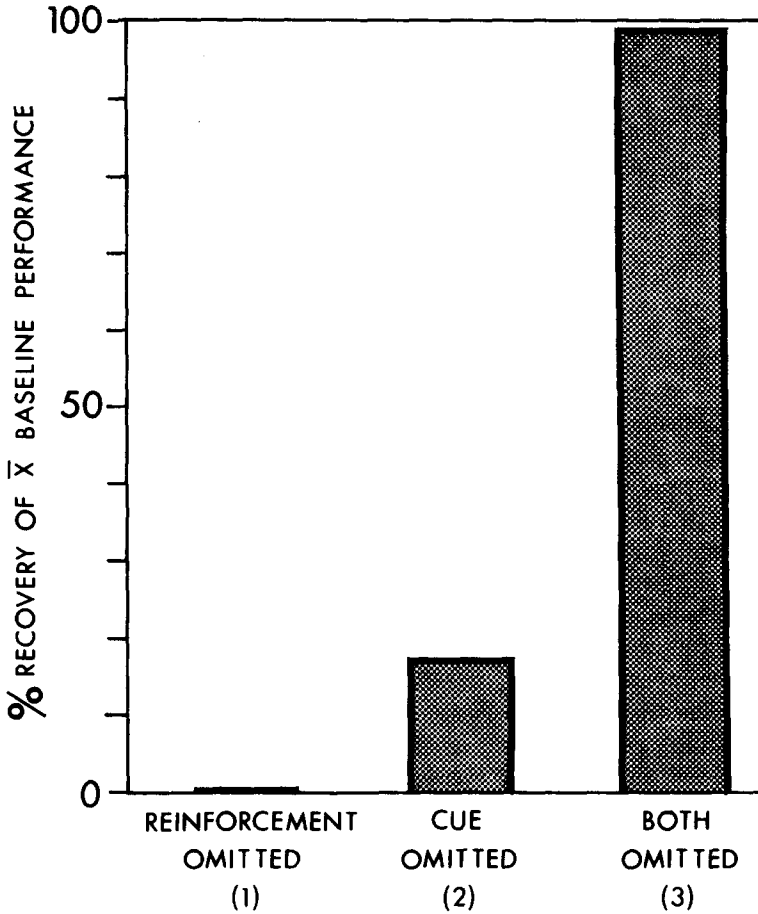


FIGURE 2. Percent recovery of mean baseline performance obtained in three probe sessions. In probe 1, the discriminative cue (ribbon) was present with the reinforcement schedule absent throughout. In probe 2, the reinforcement schedule remained in effect, but the discriminative cue was never provided. In probe 3, both the discriminative cue and reinforcement schedule were omitted.

did not occur. Although the discriminative cue eventually exerted greater control than the reinforcement schedule in maintaining appropriate behavior, as shown in the first two probes, the findings of the third probe indicate that both elements of the program contributed to producing a low rate of inappropriate target behaviors.

Follow-up Results

The intervention program and data recording procedures were continued during the summer months following termination of the regular academic school year. Little change occurred in the student's normal routine in the summer with the exception that his gymnastic activities were usually scheduled outdoors. The student at that time was still provided the same discriminative cues as in the preceding months, and a DRO 30 minute reinforcement schedule was employed in all three settings. The rate of the target behaviors remained at or near the zero level of occurrence in all settings.

DISCUSSION

The results of our study demonstrate the effectiveness of a nonexclusionary timeout procedure in eliminating inappropriate behaviors in a mentally retarded adolescent and, thus, replicate the initial findings of Foxx and Shapiro (1978). While both studies involved a specific reinforcement schedule to insure that the timeout consequence actually produced a reduced density of positive reinforcement, the type of reinforcement schedule employed in the present study differed from Foxx and Shapiro's schedule. During the time-in condition in our study, edibles were provided to the student following fixed time periods if he had not exhibited any target behavior for the entire duration of the time interval. If any of the target behaviors did occur during the time interval, the opportunity for reinforcement was cancelled, and the next time interval was initiated. In contrast, the reinforcement contingency used by Foxx and Shapiro did not require the absence of the target behaviors for the length of the entire time period, but only at the specific point when positive reinforcement was scheduled. The fact that we used a DRO schedule and Foxx and Shapiro employed a schedule similar to a fixed interval (FI) schedule of reinforcement suggests that the specific reinforcement schedule employed is not a critical feature of the intervention approach. Our results suggest that the nonexclusionary timeout procedure may prove effective when used in conjunction with a variety of reinforcement paradigms. For example, future studies might employ a conjoint requirement such that the production of setting appropriate behaviors would have to occur a specified number of times per reinforcement interval in addition to the absence of targeted inappropriate behaviors. Conjunctive fixed or variable ratio and DRO (CONJ FR/VR DRO) schedules would be particularly well suited to a sheltered workshop setting where a very narrow repertoire of production activities would be considered desirable.

Our results further indicate the utility of sequential introduction of the signaled nonexclusionary timeout across settings. The advantage of such a technique is that it not only demonstrates control by the intervention program, but the discriminative cue paired with availability of reinforcement provides a portable cue

to promote transfer of the original treatment effects. A failure to transfer recently acquired behaviors across environments is a problem frequently encountered in mentally retarded populations (e.g., Handleman, 1979; Koegel & Rincover, 1974; Murdock, Garcia, & Hardman, 1977), and it has been attributed to their behavior coming under control of only incidental aspects of the treatment setting which are not present in other areas (Rincover & Koegel, 1975). This explanation is supported by past research which indicates that some mentally retarded and autistic children often exhibit overselective attention in contrast to other children (Koegel & Wilhelm, 1973; Lovaas & Schreibman, 1971; Lovaas, Schreibman, Koegel, & Rehm, 1971; Wilhelm & Lovass, 1976).

The intervention procedure employed in the first setting insured that appropriate behavior came under the control of a specific stimulus (the ribbon). This stimulus was then easily introduced into other environments, thus, mediating transfer of behavioral gains to these settings. Evidence that this occurred in our study is indicated by the rapid reduction in the rate of the target behaviors as soon as the signaled nonexclusionary timeout procedure was initiated in the first two settings. A zero rate evident in the first session of the intervention program in setting 1 may represent transfer effects from the preceding school year when a similar procedure had been employed. Transfer effects are especially evident in the second setting, where the target behaviors never occurred when the ribbon was provided and remained at a zero level throughout treatment. Concerning setting 3, possible reasons for the slower reduction in the rate of the target behaviors in that environment could have been the use of a new discriminative cue (wrist band) to signal availability of reinforcement, the inclusion of a new target behavior, and the introduction of new setting variables. In spite of these alterations, inappropriate behavior in setting 3 dropped to relatively low levels in a brief period of time.

Further evidence of the portable cue's controlling properties is found in the probe sessions. When only the ribbon was present and the reinforcement schedule was interrupted for a 2½ hour period (Probe 1), the student did not emit any of the target behaviors. Thus, the ribbon alone was sufficient to prevent the target behaviors from occurring for a substantial period of time in spite of the fact that appropriate classroom behavior was not reinforced. In contrast, during the second probe when the ribbon was absent, target behaviors were observed even though the DRO reinforcement schedule was in effect throughout. Further, when both the discriminative cue and the reinforcement schedule were omitted in the third probe session, baseline performance levels of the target behaviors were again evident. Such high rates were not observed during probes 1 and 2, when either the portable cue or the reinforcement schedule was present. Therefore, these results indicate that although the portable cue produced initial transfer of recently acquired behaviors to a new setting due to its stimulus control properties, the reinforcement schedule was responsible for maintaining the stimulus-response relation in the new environments (Marholin & Touchette, 1979).

In summary, we found that a signalled timeout could be implemented successfully in conjunction with a DRO reinforcement schedule to eliminate the disruptive behavior of a mentally retarded student. Since the intervention program brought appropriate behavior under the control of a specific stimulus, treatment effects were transferred to another setting by using the same or similar cues to indicate availability of reinforcement in the new environments. Thus, transfer effects were achieved by narrowing the stimulus control of appropriate behavior, a technique that contrasts with other procedures designed to produce transfer by widening the control of target behaviors (e.g., Petersen, Austin, & Lang, 1979; Stokes, Baer, & Jackson, 1974).

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