

MAINTAINING PERFORMANCE OF AUTISTIC CLIENTS IN COMMUNITY SETTINGS WITH DELAYED CONTINGENCIES

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To facilitate the classroom and workshop integration of three autistic clients, we examined the feasibility of teaching them to respond appropriately without the continual presence of specially trained treatment providers. Within a multiple baseline design, a 4-step treatment process was implemented to promote durable responsive performance. Results indicated that the therapist could be removed from the treatment environment and that appropriate behavior could be successfully maintained in community settings with only infrequent and delayed contingencies.

DESCRIPTORS: maintenance, delayed contingencies, autistic children, classroom integration, reinforcement contingencies

A significant impediment to the classroom and community integration of autistic children has been reliance on the continual presence of a specially trained treatment provider (Russo & Koegel, 1977). One of the reasons for this has centered around the children's persistent self-stimulation and other off-task behaviors which appear to preclude appropriate responsiveness to environmental stimuli (Lovaas, Litrownik, & Mann, 1971; Rutter, 1978). Even when such behaviors have been brought under control in a one-to-one treatment format, the removal of the treatment provider typically results in an immediate return of the inappropriate behaviors (cf. Koegel, Egel, & Williams, 1980).

One approach to producing generalized appropriate responding involves the use of inconsistent or delayed contingencies with very thin schedules of reinforcement (Dunlap & Johnson, 1985; Koegel & Rincover, 1977; Mayhew & Anderson, 1980; Renner, 1964; Schwarz & Hawkins, 1970). However, there have as yet been no systematic reports that indicate that autistic individuals can be taught to respond in community settings under conditions of only infrequent contact with their specialized treatment provider. Therefore, the purpose of this study was to assess whether the classroom and work performance of three autistic clients could be maintained in community settings under conditions of delayed and infrequent contingencies.

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METHOD

Subjects

Three male clients, aged 6 years 9 months, 6 years 2 months, and 17 years 2 months, participated in this investigation. Each was diagnosed as autistic by two independent diagnosticians using the criteria of the U.S. National Society for Children and Adults with Autism (Ritvo & Freeman, 1978).

The clients lived at home with their parents. They were referred for participation in this experiment because placements in their respective community settings were jeopardized due to excessive self-stimulation and a failure to meet teachers' and supervisors' expectations.

Client 1 was considered untestable with standardized intelligence testing procedures. He had no functional expressive speech and very limited receptive language. He was estimated to have a social quotient of 41.4 with the Vineland Social Maturity Scale (VSMS). Clients 2 and 3 had acquired some rudimentary speech and language skills and could understand simple directions. They scored 3 years 6 months and 5 years 3 months, respectively, on the Test of Auditory Comprehension of Language and received social quotient scores of 71.6 and 37.4 (VSMS), respectively.

Settings and Tasks

Clients 1 and 2 were treated in their private school classrooms which were equipped with various table and chair arrangements, educational stimuli, and teacher stations. Students worked independently or in small groups throughout the classroom, while the teacher rotated among the children giving feedback. The teacher-child ratio ranged from 1:5 in small group activities to 2:40 with an aide or parent occasionally assisting in the larger classroom and recess activities. The children's peers were approximately 35 normal and 4 handicapped students, aged 4 to 14 years. The tasks consisted of performing geometric and geographic puzzles, coloring, beginning printing, and other preschool level tasks. For a 2-hr period, the children were required to independently choose tasks, work on a task for extended amounts of time, return the task, and choose another, with a minimum of teacher direction.

Client 3 was treated in a community workshop staffed by mildly handicapped adults. The client was seated in a room with 30 to 35 other employees and one supervisor who periodically rotated between rooms. The room had windows on two sides looking into other workshop areas. The client was

stationed at a workbench where component assembly parts were placed in bins in front of him, and he was required to assemble the parts in a prescribed sequence, placing the finished pieces in trays of 50. He was required to replace his stock of component parts when needed and to engage in other work behaviors such as clocking in before and after work periods.

None of the settings provided specialized training for severely handicapped individuals. None of the teachers or supervisors had specialized training in the areas of behavior modification or autism.

Trainers

The trainers who provided the specialized intervention were graduate and undergraduate students in Speech and Hearing and Psychology. Each had taken at least two lecture and laboratory courses in the behavior modification treatment of autistic children, and each had demonstrated proficiency in the teaching techniques described by Dunlap, Koegel, and O'Neill (1985) and Koegel, Rincover, and Egel (1982).

Sessions

Although the school or work days for the three clients were not divided into consistently delineated time periods, "session" lengths were superimposed on the data sheets in order to facilitate data management and eventual delivery of consequences in the final maintenance condition. The length of a session (30 min for Clients 1 and 2, and 2 hr for Client 3) was defined on the basis of the amount of time that the clients' peers were expected to remain on task without receiving a break or specific teacher or supervisor attention.

Dependent Variable

The primary dependent measure for all clients was on-task behavior, defined as appropriate task-related activity involving task materials or interactions with teachers, peers, or supervisors. Prolonged gazing or stereotyped repetitive behaviors, including nonproductive repetitive manipulations of task materials, were considered off-task if they

continued for more than 5 s. Any occurrence of self-stimulation or disruptive behavior was also considered off-task.

Measurement and Reliability

During each session for Clients 1 and 2, at least one observer was stationed across the room from the child so that each child was unaware of the data collection. The observer was equipped with shielded data sheets, a pen, a stopwatch, and (in the later stages of the experiment) a hidden electronic signaling device to signal the trainer if the child engaged in off-task behavior.

The observers recorded data continuously, denoting the start of the session as time zero, and marking the time of occurrence of specific child behavior and its duration. The recorders used coded symbols to represent off-task self-stimulatory behaviors. When these occurred, the observer would quickly mark the time and symbol on the time line and resume observation of the child until the behavior stopped. At that point, the observer would again note the time on the time line. These notations could be made by the observer in approximately 1 to 2 s, allowing continuous observations of the client's behavior. At the end of the day, the continuous recordings were separated into 1-min intervals. The percentage of intervals on-task was calculated by dividing the number of 1-min intervals during which the child was on task for the entire interval by the total number of intervals.

The data for Client 3 represent the average of 1-min samples taken at random intervals two to four times each 2-hr session. The samples were taken by observing through the window to see if the client remained on task for that interval. This procedure allowed observations of the client at irregular intervals throughout the session without his awareness that an observation was being conducted.

During 31% of the sessions in this experiment, a second observer independently scored on-task behaviors using a synchronized stopwatch. Both observers had to agree on the occurrence or nonoccurrence of inappropriate behavior for an interval to be scored as an agreement. Observations were

compared on an interval-by-interval basis, by dividing the number of agreements by the number of agreements plus disagreements. The reliability scores across the sessions averaged 87% agreement, with reliability of occurrences at 77% and nonoccurrences at 71%.

In addition to the dependent variable, the observers recorded all teacher and supervisor interactions that were directed to each client. These data allowed the assurance that improvements in child behavior would not be a function of increases in teacher interaction. (Teacher interaction data actually showed a decreasing trend as the clients' behavior improved over the investigation. Calculated as number of teacher-client interactions per hour, baseline data revealed rates of approximately 24, 9, and 4 for the three clients whereas data in the final maintenance phase showed interaction rates of 10, 7, and 1, respectively. Rates during the treatment phases were lower for Client 1 but were above maintenance levels for Clients 2 and 3.)

Procedures

The process included a treatment phase, which was designed to establish high rates of desirable behavior under increasingly normalized (i.e., infrequent and delayed) contingencies, and a maintenance phase, which was provided in order to maintain appropriate behavior under such contingencies. In addition, a treatment without delayed reinforcement (with the therapist still present) was included for Client 2 in order to assess the specific impact of gradually fading the therapist from the environment.

Baseline. During baseline, the teachers were asked to continue their lessons, supervision, and student/client interactions as they would normally.

Treatment. The treatment package, designed to maintain appropriate behavior without the continuous presence of a specialized treatment provider, consisted of four steps: (a) prompting and reinforcing high rates of on-task behavior and delivering immediate reprimands for off-task behavior within a one-to-one trainer-child format; (b) thinning the reinforcement schedule by increasing the

criterion duration of appropriate behavior each time the client was successful at a previous criterion duration, and decreasing the criterion when the client was unsuccessful. During the initial session, the reinforcement schedule was extended very slowly (e.g., from 10 to 12 s), with longer extensions in the later sessions (e.g., from 2 min to 2 min 30 s and, even later, from 6 to 7 min) (c) when the reinforcement schedule was thinned to at least 1 min, reprimands for inappropriate behavior were gradually delayed. Initially, the delays were almost imperceptible (e.g., 1 or 2 s), and then gradually extended. If the client's level of appropriate behavior began to decrease, the delay was reduced. In this manner, the delay was lengthened until later sessions permitted increasingly longer delays (e.g., 2, 3, 5 min). (It should be noted that even if the client was behaving appropriately at the end of the delay interval, a reprimand was still provided for the off-task behavior that occurred previously; e.g., "You should not flap your fingers like you did a while ago! Keep working"); (d) when a significant delay of reprimand had been achieved (e.g., 2 to 5 min) the trainer began increasing the physical distance from the client until the trainer was positioned at the opposite end of the room. At that point, the trainer gradually left the room, and arranged for a covert observation of the client. For Clients 1 and 2, this was arranged by the electronic signaling device (i.e., a walkie-talkie). If inappropriate behavior occurred, the trainer was signaled, would reenter the room in accordance with the delay schedule, and would deliver an appropriate reprimand. If no inappropriate behavior occurred, the therapist would enter the room and reinforce the client according to the schedule in effect at that time. For Client 3, covert observations were made through the workshop window.

Maintenance with postsession contingencies (PSC). For Clients 1 and 2, the maintenance condition began when the treatment condition had progressed to the point that the reinforcement interval had been thinned to at least 67% of the session, the delay of reprimand exceeded 5 min, and no more than two reinforcers or reprimands were required per session. At this point, the contingency was changed so that a single consequence

was delivered at the end of a session. If the level of on-task behavior represented a level comparable to that of the other children in the setting, the trainer entered the room at the end of the session and delivered enthusiastic praise and occasionally a tangible reward such as a small snack or sticker. If the level of on-task behavior did not meet criteria, a reprimand was delivered. (According to the objective measures, these levels averaged approximately 65% for Client 1 and 70% for Client 2.)

For Client 3, maintenance began when one or fewer interactions occurred (i.e., reinforcement or reprimand) between the client and trainer during a 2-hr session. For this client, the maintenance contingencies were transferred to the client's parents, allowing control over the client's appropriate behavior by an agent completely external to the treatment locale, by continuing to lengthen the delay of consequences until the client's on-task behavior was maintained for periods of up to 8 hrs without therapist reinforcer, prompt, or reprimand. His parents then delivered the consequences (i.e., access to a favored activity in the evening) based on the supervisor's evaluation of the client's work that day.

Treatment without fading the therapist from the community setting (Client 2 only). A treatment condition that did not involve fading the therapist from the environment was included for Client 2 to assess the importance of gradually delaying the reprimand and fading the trainer from the environment. This condition was identical to the first two steps of the treatment condition described earlier.

Probe (Client 2 only). Following the treatment-without-fading-the-therapist condition, a probe was introduced for Client 2 that was identical in all respects to the maintenance-with-PSC condition described above. Following the probe, Client 2 received the complete treatment package, followed by the maintenance with the PSC condition.

Design

A multiple baseline design across two children was used to demonstrate the effectiveness of the treatment package in producing durable gains in on-task behavior in these children's classrooms. Data

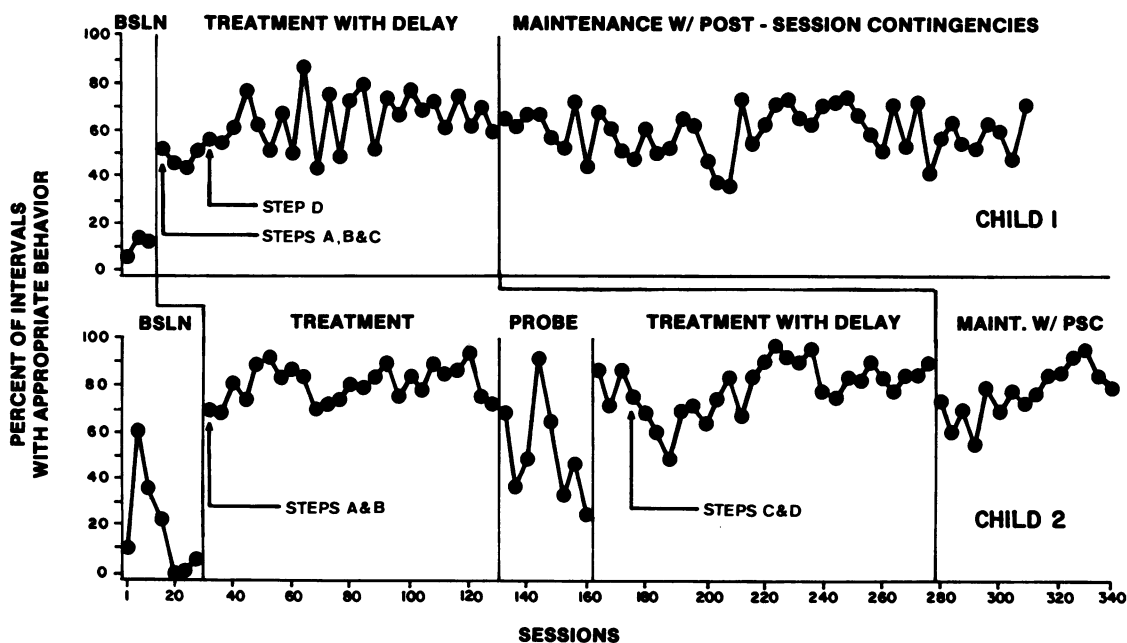


Figure 1. Appropriate responding in classroom settings for Clients 1 and 2. Sessions are plotted in blocks of four. The points at which the steps in the treatment process were initiated for each child are labeled as Steps A through D (see text).

on Client 3 are included to illustrate the application of the procedures to a work training setting, and to demonstrate the feasibility of having treatment contingencies delivered outside the treatment setting (e.g., at home) to maintain appropriate behavior in the treatment setting.

RESULTS

Results for the two children who participated in the integrated classroom settings are plotted in Figure 1. During the 12 baseline sessions for Client 1 and 28 sessions for Client 2, both children showed relatively few intervals with appropriate behavior.

Following baseline, the treatment condition for Client 1 produced increases in the child's appropriate behavior to 60% to 80%. During the maintenance condition, with contingencies applied only at the end of each 30-min session, this child's appropriate behavior continued at a high rate throughout the remaining 180 sessions of the school term.

Following baseline for Client 2, treatment procedures were implemented that did not include delayed reprimands or trainer fading. This condi-

tion produced high levels of appropriate responding; however, when the maintenance procedures (probe) were introduced, appropriate behavior declined within 30 sessions to well below 40%. After the complete treatment package was implemented, the maintenance condition produced results comparable to those of Client 1 (who had received the complete treatment package from the start).

The results for Client 3, who participated in the workshop setting, are shown in Figure 2. During baseline, he exhibited no appropriate responding. In the subsequent treatment condition, his responding improved substantially, always remaining above 50% as the delay was gradually increased to the 2-hr criterion. In the subsequent maintenance condition his appropriate behavior remained very high, with the last nine sessions remaining stable at 100% appropriate responding, even when the delayed consequences were provided solely by the client's parents at the end of the day.

DISCUSSION

Overall, these results show that infrequent and delayed contingencies implemented by a therapist

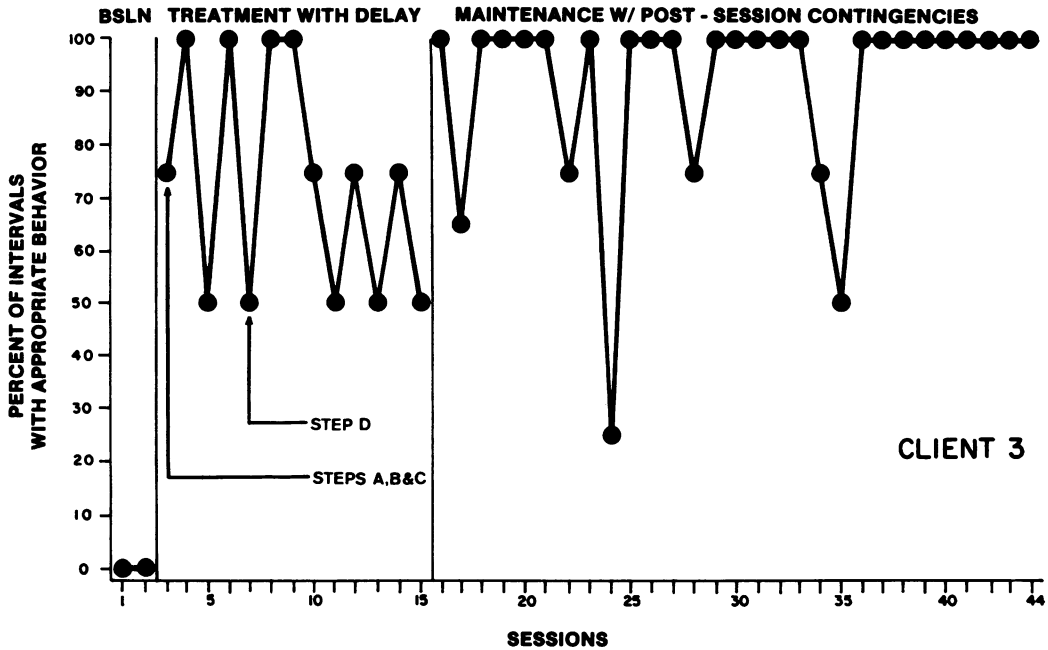


Figure 2. Appropriate responding in the workshop setting by Client 3. The points at which the steps in the treatment process were initiated are labeled as Steps A through D (see text).

who is based outside of the treatment environment can effectively maintain appropriate behavior by severely autistic individuals. These findings suggest a method for using resource specialists to promote the integration of severely handicapped people into least restrictive community settings.

The procedures used in this study included a number of techniques that have been previously demonstrated to produce durable responding (Kazdin & Esveltd-Dawson, 1981). These included intermittent reinforcement (e.g., Ferster & Skinner, 1957; Kazdin & Polster, 1973; Koegel & Rincover, 1977) and delayed contingencies (Fowler & Baer, 1981; Rolider & Van Houten, 1985; Schwarz & Hawkins, 1970). Part of the delayed contingency component, in this case, involved the gradual removal of the treatment agent from the client's visible environment. The probe for Client 2 suggests that durable appropriate responding did not occur until the contingent reprimand had been gradually delayed and the treatment agent had been removed. These findings suggest that the discriminative properties of the trainer's presence and con-

sequences may have served to impede the durability of appropriate responding (Dunlap & Johnson, 1985). When these stimuli were physically and temporally distanced, maintenance occurred.

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