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MODIFICATION OF SEVERE DISRUPTIVE AND AGGRESSIVE BEHAVIOR USING BRIEF TIMEOUT AND REINFORCEMENT PROCEDURES

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Brief timeout for disruptive and aggressive behaviors and reinforcement for appropriate behaviors were used with two retarded patients in a state hospital ward setting. The procedures reduced loud vocal behavior in one patient and aggressive behavior in another to near-zero levels when first applied. The behaviors returned to previous levels when the procedures were removed and were again greatly reduced when timeout and reinforcement were reapplied. The results were significant because the behavior problems were severe and long-standing and the procedures were instituted without greatly disturbing normal ward routine.

Several techniques for the modification of deviant behaviors have been developed in recent years (Ullmann and Krasner, 1965; Ulrich, Stachnik, and Mabry, 1966). There is some evidence to suggest that one technique, timeout, which involves the temporary suspension of the subject's usual activities, often is effective in eliminating severe problem behaviors in applied settings. Wolf, Risley, and Mees (1964) demonstrated that tantrums and self-destructive behavior in an autistic child could be effectively reduced by placing him alone in a room each time the behavior occurred and removing him only when the tantrums subsided. Hamilton, Stephens, and Allen (1967) used a similar procedure by confining severely retarded patients to a timeout area for from 30 min to 2 hr after each incidence of aggressive or destructive behavior. The timeout procedure greatly reduced the aggressive and destructive behaviors of five patients. Tyler and Brown (1967) put delinquents who resided in a training cottage in timeout for 15 min for each act of misbehavior around a pool table, and demonstrated that this technique effectively reduced the undesirable behavior. Risley (1968) found, however, that confining a severely deviant girl to her room for 10 min for climbing on top of furniture and in dangerous places had no effect on her rate of climbing.

In these studies the duration of timeout ranged from 10 min to 2 hr. The present research describes the use of brief timeout (2 min) in conjunction with reinforcement for acceptable behavior to eliminate extreme disruptive and aggressive behavior in two institutionalized retarded patients. Research by Holz, Azrin, and Ayllon (1963) suggested that the simultaneous application of reinforcement for acceptable behavior may enhance the effectiveness of a timeout procedure.

The present experiments were carried out in the normal ward situation. The procedures involved each subject serving as his own control using a reversal design (Baer, Wolf, and Risley, 1968).

EXPERIMENT I

Subject and Setting

Ruth B., a 58 yr-old wheel-chair patient in a large state hospital resided in an infirmary ward with approximately 50 other nonambulatory patients. She was brought to the ex-

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perimenters' attention as a result of her loud and abusive verbal behavior which, according to the institution's records, had been a source of irritation to the staff and to the other patients for several years. The staff reported that they were forced to spend an inordinate amount of time complying with her demands and attending to nearby patients who became disruptive as a result of Ruth's excessive verbal outbursts.

The experimenters observed the patient for several hours and observed that: like most other patients, Ruth awoke at an early hour, was moved from her bed into a wheel chair, and taken to her usual place in the day room. Her cursing and verbal tirades centered around demands for various articles of clothing, favorite objects which she frequently dropped, and complaints of rough handling by the attendants. She seemed to be a particular problem at mealtimes, screaming violently until her tray was brought, until she had her second cup of coffee, or her tray was removed, and so on. Ruth posed another daily problem by frequently refusing to allow the attendant who brought her medicine to come near. If she refused medicines she had to be forcibly restrained while being given an intramuscular injection of tranquilizer to calm her. Throughout this period, the attendants were frequently observed to reason with Ruth and to reassure her of their good intentions.

Procedure

The loud vocal responses were measured by a Concord Model 330 voice-operated portable tape recorder. The volume control was set at 5.5 on a scale of 10.[3] Each above-threshold noise started the recorder and produced a distinct "blip" sound on the tape. The frequency of "blips" served as the measure of the dependent variable, *i.e.*, a vocalization was an utterance sufficiently loud to activate the tape recorder. Once activated, the recorder ran for 2 sec after the sound had dropped below threshold. Stopwatches were used to measure the length of the session, length of timeouts, and time between reinforcers. After each session the tape was reviewed and the number of "blips" counted. Reliability checks were made by two observers listening to the tape. The number of "blips" each minute was recorded independently by each observer. The per cent agreement for each of the 60 min of the session was calculated by dividing the smaller by the larger number. The 60 percentages were averaged to determine the per cent agreement for an entire session. The subject's vocalizations were sampled in the above manner during daily 1-hr sessions which began in the morning when the subject was wheeled to her favorite table in the day room, where she typically remained for the rest of the day. The only part of the recorder that remained in the subject's view was the microphone. Other patients, whose behavior might also activate the recorder, were moved to another part of the day room. The experimental design consisted of four conditions.

Baseline I. The subject received tranquilizing medications twice during the first 18 sessions of Baseline I. These were prescribed by the ward physician in an attempt to control the violent outbursts. After this period, five days were used to establish the baseline level of vocalizations without any drugs. Throughout this phase, attendants and staff were requested and observed not to alter their normal routine with respect to the subject.

Timeout + DRO I. In this phase, each time Ruth's vocalizations activated the recorder during the day, the experimenters wheeled her to a nearby corner of the day room (about 10 ft), took her out of her wheel chair, and placed her on the floor. This entire operation took approximately 10 sec to complete. She remained on the floor for a minimum of 2 min, after which a 15-sec interval of silence was required before she was placed back in her chair. If she screamed continuously through the 2-min period, she was left on the floor until she was quiet for 15 sec. If she screamed while being lifted from the floor she was placed down on the floor again and the 15-sec interval started once more. During timeout periods the timer which timed the 1-hr session was stopped. Vocalizations during the timeout periods were not counted in the total responses for that session. The session timer was not restarted until Ruth had been returned to her table.

In addition to timeout for loud vocaliza-

[3]A General Radio Co. sound level meter type 1551-C was used to ascertain noise-level readings. Ambient noise level in the experimental area was measured at approximately 55 db. With the subject located 6 ft from the recorder microphone, a noise level of 72 db was the lowest value sufficient to operate the recorder.

tions, the subject was provided with the things for which she usually screamed, only after periods of remaining quiet (*i.e.*, not activating the recorder). These reinforcers for appropriate behavior were provided on an increasing time-interval schedule; *i.e.*, if she remained quiet for the first 5 min of the session the first reinforcer was delivered. She then had to remain quiet for 10 min before the next reinforcer (*e.g.*, breakfast, second cup of coffee, or juice) was delivered. Five minutes were thus added each time a reinforcer was given, up to a maximum of 30 min. For the remainder of the day, if Ruth remained quiet she would receive some treat, favored object, or attention at least every 30 min. If she screamed or shouted during the interval before a reinforcer was delivered she was placed on the floor and that interval was reset. It was not begun again until she had been placed back in her chair and wheeled to her table. This schedule is one which differentially reinforces other behavior (DRO) than that being punished. (Because the interval between reinforcers grew by an increasing interval each time a reinforcer was delivered, it might technically be called an Escalating DRO schedule.)

This procedure was continued throughout each day (although data were taken only for the first hour) from the time the patient arose until she was put back into bed at night.

Baseline II. The attendants were instructed to interact with the subject as they had during the initial Baseline condition and were observed to do so. The subject's vocalizations were recorded as before, during the 1-hr period in the morning immediately after Ruth arose, but she received no scheduled consequences for screaming or remaining quiet. The condition was in effect for four days.

Timeout + DRO II. This was a replication of the Timeout + DRO I condition.

Results

During the Baseline condition, a tranquilizing drug (Prolixin Enanthate) was prescribed by the ward physician in an attempt to reduce Ruth's vocalizations. As shown in Fig. 1, response frequency was sharply reduced when 12.5 mg of the drug was administered just before Session 6. The patient remained stuperous for a number of days after the injection; contrary to the anticipated effects of the drug, the reduction of vocalizations was only temporary and the rate rose steadily to the highest point (Session 17). One-half the amount of the same tranquilizer was given just before Session 18 but the effect seen with the first amount was not replicated. For the last six sessions of Baseline, vocalizations averaged 86 per session.

The timeout and reinforcement procedures were employed starting with Session 24 and continued through Session 28. Figure 1 shows the gross and immediate effect of the procedures which reduced vocalizations to one in Session 28.

A return to Baseline conditions was begun with Session 29, during which 79 vocalizations occurred. The number of responses rose to 229 on the last day of Baseline II (well within the range observed during Baseline I). It thus appeared that not only could the high rate be eliminated but that reinstating previous conditions produced a corresponding increase in the undesirable yelling.

The timeout and reinforcement condition was instituted again, starting with Session 33. This time the subject came in contact with the timeout contingency only once and thus received almost all the scheduled reinforcements each day for six of the seven days. During Session 37, Ruth made no vocalizations loud enough to trip the recorder and received all the scheduled reinforcers.

Ruth learned that if she simply sat quietly, most of her needs would be met in a short while. In addition, she would occasionally raise her hand and whisper a request to an attendant. She became less of a problem at medicine time after she had been put on the floor several times for screaming at the aides who brought her medicines.

The screaming, shouting, and loud cursing, which the staff had tolerated for years thus came under control of this combination of timeout and reinforcement for appropriate behavior. The reliability of observer agreement of the number of "blips" per minute ranged from 50 to 100% and averaged 84% per session.

EXPERIMENT 2

Subject

Dennis M. was 7-yr old and had been admitted to the institution 18 months before the

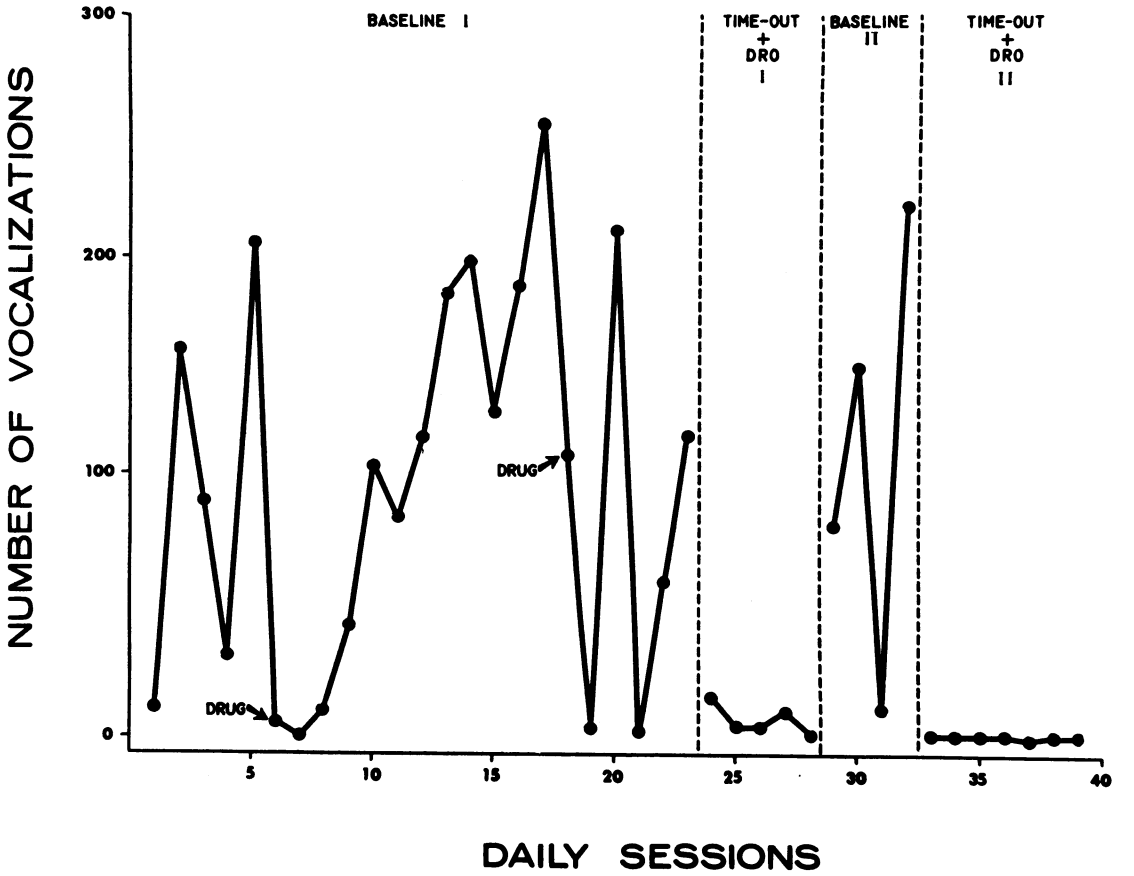

Fig. 1. Number of vocalizations per 1-hr session under Baseline and Timeout + DRO conditions.

beginning of this study. Before Dennis was admitted, he lived with his parents and two siblings. The parents reported that while at home Dennis exhibited severe disruptive behavior, such as attacking other persons and breaking furniture. The supervisor for the ward reported that in the hospital setting, Dennis was so aggressive that he could not be kept with other children in the day room or on the playground. Instead, he was tied to a door in a hallway, where he was able to strike only occasional passersby. To control Dennis' aggressive behavior, several tranquilizing drugs had been prescribed; however, at the beginning of this study none had been discovered to be very effective.

Procedure

A timeout booth, measuring 4 by 2 by 5.5 ft high and constructed of 0.5-in. plywood, was placed in a corner of the day room. A latch on the door of the timeout booth prevented the subject from escaping, but the booth was open at the top so that the subject could be observed if necessary. Milk, cookies, and carbonated drinks, which the subject had been observed to take readily, were used as reinforcers. Stopwatches, counters, and data sheets were used for recording data during each session.

The observers used record sheets marked off at 1-min intervals. Aggressive behavior was defined as any bite, hit, kick, scratch, or head butt directed against another patient or an attendant. Reliability checks were made by having two observers record the aggressive behavior independently. Agreement of the two records was measured by comparing the total number of aggressive behaviors per session (the smaller number was divided by the larger to give a per cent figure).

Each daily 30-min session began when the subject was brought from where he was customarily tied, to the day room. The day room, approximately 20 by 25 ft, was devoid of any objects except for a few chairs, a small diaper

changing table, and a television mounted 7 ft above the floor. There were usually 12 to 15 other patients of about the same age and physical size as the subject and at least one attendant in the room while sessions were being conducted. The experimental design consisted of four conditions.

Baseline I. The Baseline condition was in effect during seventeen 30-min sessions while Dennis received one or two tranquilizing drugs each day. He received neither drug in the last five days of Baseline I. The experimenter counted the number of times the subject hit, bit, kicked, scratched, or butted any other person, while he was in the day room. The attendants were requested not to alter their normal routine, and to ignore the subject if he came up to them. The experimenters observed this request to be met. At the end of the session, Dennis was re-tied in his usual place in the hall outside the supervisor's office.

Timeout + DRO I. During the timeout phase the subject was brought to the day room as usual; however, each time an aggressive response occurred he was quickly picked up and placed into the timeout booth by one of the experimenters. The total time required to put him in timeout was less than 5 sec from the moment a response occurred. Nothing was said to the subject at these times. Dennis remained in the booth for 2 min after each response. The session timer was stopped until he was released so that he was allowed the same total amount of time (30 min) in the room as during the Baseline phase. In addition to the timeout for aggressive responses, Dennis received a small amount of milk or carbonated drink, or a bite of cookie each time 2 min elapsed with no aggressive behavior regardless of what else he was doing. The attendants were again requested not to alter their normal routine in the day room and were observed to carry out the request.

Baseline II. The subject was taken to the day room and the sessions were run exactly as in Baseline I. The number of aggressive responses was recorded for 10 sessions.

Timeout + DRO II. This was a replication of the timeout and DRO condition and lasted for five sessions.

RESULTS

The number of aggressive responses varied from 4 to 57 during the first eight sessions of baseline. Just before Session 9, one of Dennis' tranquilizers (Navane) was withdrawn. As shown in Fig. 2, the number of aggressive responses did not appear to increase appreciably. Before Session 13, the other tranquilizer, Mellaril, was withdrawn and the number of aggressive responses was somewhat higher thereafter. There is presently, however, not enough data to indicate precisely what role each of the drugs played in suppressing the aggressive behavior.

As shown in Fig. 2, on the first day of the timeout and reinforcement procedure, the number of aggressive responses was reduced to 16. The frequency then declined regularly until aggressive responses were reduced to five per session on the last day of this condition.

When Baseline II was reestablished, the original high rate of aggressive behavior never completely recovered. The number of responses rose gradually to a high of 41 in Session 31 and totaled 29 for Session 33, the last session of Baseline II.

Dennis emitted seven aggressive responses during the first day of Timeout + DRO II. The rate per session fell steadily thereafter to a low of zero aggressive responses in Session 38. The reliability of observer agreement on number of aggressive responses per session ranged from 75 to 100% and averaged 92% per session.

At this point, the attendants were trained in the use of the timeout for aggressive behavior and reinforcement for appropriate behavior. Dennis was allowed to be untied for longer periods each day, starting with 3 hr the first day and building up to a full day at the end of the week. At that time he was free to interact with the other boys in the ward and on the playground all day. According to the informal report of the attendants he had to be put into timeout only two or three times per day.

DISCUSSION

The present results showed that severe and chronic behavior problems can be significantly reduced by providing consistent and immediate consequences for them. According to the institutional records, Ruth's disruptive screaming and shouting had been a problem for at least 5 yr, and Dennis' aggressive behavior (hitting, biting, *etc.*) for at least 18 months.

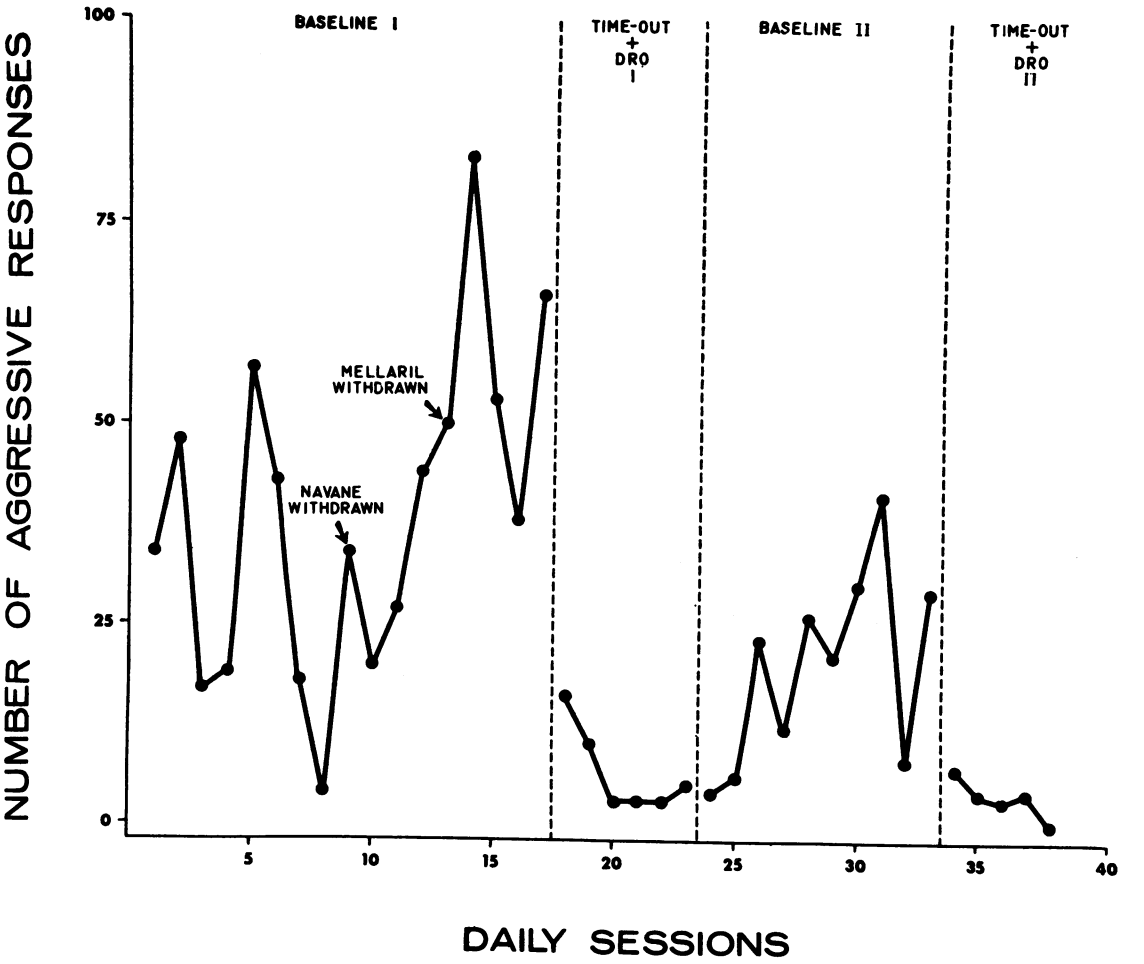

Fig. 2 Number of aggressive responses (*i.e.*, hits, bites, kicks, scratches, and head butts) per 30-min session under Baseline and Timeout + DRO conditions.

For both patients, the frequency of problem behaviors was reduced to near-zero level in less than a week when brief timeout and reinforcement procedures were applied. Furthermore, the treatment procedures were shown to have a continuing role in the management of the behaviors, since both disruptive behaviors increased when the contingencies were removed. Although no objective data were gathered, it did appear that administration of the treatment procedures could be transferred to the ward staff, thus allowing them to handle both patients without the use of drugs or restraints.

Casual observation of the social interactions of both subjects indicated that many more acceptable behaviors occurred during treatment phases than during the baseline phases. During treatment conditions of Exp. 1, one patient who had frequently been the focus of Ruth's violent verbal outbursts would move close to Ruth and show her toys and point to pages in books. Often, this patient would handle articles belonging to Ruth. Ordinarily, such interactions would have provoked outbursts from the subject; however, during treatment sessions Ruth responded by nodding and making comments such as "That's nice", or "Yes, I see it".

Dennis seemed to exhibit a similar increase in acceptable social interactions. During periods when the timeout and DRO contingency were in effect he would occasionally approach other children to hug and embrace them. The staff reported never having seen this behavior before (possibly because the opportunity was restricted by his being restrained 24 hr per day). He was not as active

as during Baseline conditions and would spend a great deal of time sitting and observing other children in the day room. Further research is needed to measure more adequately such effects and to determine those procedures which maximize these desirable "side effects".

This demonstration that brief, "non-painful", and easily administered consequences can prove to be extremely effective in reducing severe and even violent behaviors, may provide an attractive alternative to the use of electric shock for such purposes. Most hospital personnel will drug or restrain a violent or aggressive patient rather than use electric shock, even though shock has proved repeatedly to be highly effective (Lovaas, Schaeffer, and Simmons, 1965; Tate and Baroff, 1966; Whaley and Tough, 1968) and apparently to be devoid of undesirable side effects (Risley, 1968).

Timeout appears to be more acceptable because it can be of short duration (both present studies used 2-min timeouts), is not injurious to the patient, and closely resembles the rather common use of seclusion rooms as punishers in institutions. Reinforcement for desirable behavior is also readily accepted, since nursing service personnel are highly skilled at providing aid and comfort to patients and need do little more than make such personal attention contingent upon desired behavior.

The present results, showing abrupt reductions in the frequency of undesirable behaviors, are similar to those of Hamilton *et al.* (1967) and Tyler and Brown (1967). These studies used longer timeouts (varying from 10 min to 2 hr) than used here (2 min). It is difficult to compare directly the effects produced by timeout alone (Hamilton *et al.* and Tyler and Brown) and the timeout in conjunction with an alternative reinforcement schedule used in the present study. Holz, Azrin, and Ayllon (1963) observed that when an alternative response was made available for obtaining reinforcement, mild punishment was completely effective. Further research is needed to determine whether the effectiveness of the present procedure is related to the effects observed in the Holz *et al.* (1963) study. Additional research is also needed to determine the parameters of timeout that are most effective and the functional properties, if any, that distinguish an escalating DRO from the standard DRO procedure.

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