REDUCTION OF SELF-STIMULATORY BEHAVIOR
BY OVERCORRECTION AND DIFFERENTIAL
REINFORCEMENT OF OTHER BEHAVIORS

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Abstract

This study investigated the effects of a combination of overcorrection and differential reinforcement of omission of behavior on the self-stimulation exhibited by a mentally retarded child. The treatment procedures were implemented by the classroom teacher during thirty-minute daily training sessions. The training period was divided into thirty equal intervals. The teacher observed the girl, and recorded whether or not the target behavior occurred. If the self-stimulatory behavior occurred, the child was immediately required to sit in a chair in a corner of the classroom and face the wall for three minutes. If the child refrained from self-stimulation during the next interval, she was reinforced by the teacher. A simple AB design was employed to evaluate the effectiveness of the treatment package. The results indicated that the behavior change procedures used were effective in suppressing self-stimulation and that the changes were maintained when the treatment program was withdrawn.

Introduction

Mental retardation is defined as a significant subaverage general intellectual functioning associated with deficits in adaptive behavior, and manifested during the developmental period (Birnbrauer, 1976). The etiology of mental retardation is not well understood in many cases. However, numerous causes have been identified: infections and nutritional disturbances, gross brain disorders, prenatal influences, chromosomal abnormalities, and gestational disorders (Heward & Orlansky, 1980).

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Mentally retarded children are an extremely heterogeneous group which is classified into four levels: mild, moderate, severe, and profound (Birnbrauer, 1976). Those in the severely and profoundly retarded groups are noticeably different from others. They exhibit a variety of maladaptive behaviors. One type of these behaviors is the so-called self-stimulation. This abnormal behavior is frequently observed in mentally retarded children. Berkson and Deavenport (1962) conducted a comprehensive study of institutionalized mentally retarded individuals and found that about two-thirds of observed subjects exhibited this type of aberrant behavior. Similar findings were reported by other investigators (Kaufman & Levitt, 1965). However, it should be noted that self-stimulatory behavior is not limited to mentally retarded populations. Rather, it is also prevalent among other handicapped groups (LaGrow & Repp, 1984).

The term self-stimulatory behavior refers to repetitious motor or posturing behaviors with invariant topography and no apparent function. (LaGrow & Repp, 1984). This behavior might include: (a) repetitious body movements such as body rocking or head weaving; (b) repetitious and meaningless manipulation of objects such as banging or staring at toys; and (c) repetitious vocalizations including screaming or excessive laughing (Renzaglia & Bates, 1983).

Self-stimulatory behaviors have been shown to interfere significantly with learning and responsiveness to the environment (Luiselli, 1974). This has prompted researchers to search for effective treatment for the suppression of these behaviors. In their comprehensive review of the literature, LaGrow and Repp (1984) identified a variety of treatment techniques. A brief discussion of these techniques follows.

One treatment strategy involves the manipulation of settings or antecedent events. This strategy takes different forms such as increasing the level of opportunity for social and environmental interaction, or assigning tasks and providing instructions for the subject not to engage in self-stimulation. This strategy also includes the use of tranquillizing drugs such as thorazine or thoridazine. This method has been successful in treating self-stimulation (Savie & Dickie, 1979). However, drugs frequently have negative side effects which restrict their use.

Aversive methods, such as physical punishment (delivered in the form of a slap or a vigorous shaking) and verbal punishment (a loud "no") also have been used on a wide-
scale basis to manage self-stimulation as well as other maladaptive behaviors (LaGrow & Repp, 1984). These procedures, although effective in suppressing inappropriate behaviors, have limited utility because of ethical constraints. Other studies have used different aversive consequences, such as electric shock which has proved to be one of the most effective treatment procedures (LaGrow & Repp, 1984) and aversive music which was used in treating body rocking exhibited by a blind boy (Greene, Hoates, & Hornick, 1970). Still, other studies have demonstrated the effectiveness of physical restraint of different durations in reducing self-stimulatory behaviors (Luiselli, Reisman, Helfen, & Pemberton, 1976).

In addition, the special education experimental literature demonstrates the efficacy of several behavior modification procedures in treating self-stimulation (LaGrow & Repp, 1984). For example, many researchers have suggested that self-stimulation may be maintained by positive reinforcement. Reinforcement could take the form of response contingent attention provided to the handicapped child by significant others when the behavior occurs, or it may be the sensory stimulation that naturally results from the behavior. This has led researchers to use extinction procedures in the treatment of self-stimulation. Both sensory and social extinction have been used successfully in suppressing various types of self-stimulatory behaviors (LaGrow & Repp, 1984).

Time-out from positive reinforcement, a procedure in which access to reinforcement is removed temporarily contingent upon the emission of inappropriate behavior, has been shown to be powerful in the treatment of maladaptive behaviors exhibited by handicapped children (Gast & Nelson, 1977). However, this method is usually inappropriate for treating self-stimulatory behaviors since these behaviors can occur freely during the time-out period (Luiselli, 1984).

An alternative behavioral method used effectively to treat self-stimulation is overcorrection. This procedure was developed by Foxx and Azrin (1972) and involves: (a) correcting the environmental effects of the inappropriate behavior (restitution), and (b) intensively practicing correct forms of relevant behavior (positive practice).

Foxx and Azrin (1973) found that overcorrection effectively reduced several categories of self-stimulatory behaviors including head weaving, hand clapping, and mouthing
objects. These authors also reported that overcorrection was more effective than physical punishment or social and edible reinforcement.

Dickie and Finegan (1980) eliminated self-stimulation (talking to self, picking fingers, and mouthing objects) exhibited by three handicapped children using overcorrection. The overcorrection procedure involved requiring the children to run in place contingent on the occurrence of the target behaviors.

Azrin, Kaplan, and Foxx (1973) used positive practice overcorrection (20 minute duration) for reducing self-stimulation in nine mentally retarded adults. A large decrease in the target behavior was observed in 12 days.

Luiselli (1984) evaluated the effects of very brief overcorrection on self-stimulation by two mentally retarded students. Self-stimulatory behaviors included finger sucking and tongue protrusion. The treatment consisted of requiring the child to cleanse and dry her fingers and hands each time finger sucking occurred, and to wipe lips/mouth with a tissue immediately after tongue protrusion. These techniques were found to be very effective.

Many other studies have demonstrated the effectiveness of overcorrection as a reductive technique for self-stimulatory behaviors (e.g., Denny, 1980; Epstein, Doke, Sajwaj, Sorrell, & Rimmer, 1974; Harris & Wolchik, 1979; Luiselli, Pemberton, & Helfen, 1978; Marholin & Townsend, 1978; Matson, Ollendick, & Martin, 1979; Matson, & Martin, 1978; Roberts, Iwata, McSween, & Desmond, 1978; Savie & Dickie, 1979; Shajpiro, Borrett, & Ollendick, 1980; Wells, Forehand, Mickey, & Greene, 1977).

Overcorrection has also been found to be effective in reducing a wide range of inappropriate behaviors of different handicapped populations, such as aggression, self-injury, disruptive behaviors, thumbsucking, and toileting accidents, among others (Miltenberger & Fuqua, 1981).

The behavioral approach to the treatment of inappropriate behaviors, including self-stimulation, usually involves a dual-component treatment package consisting of some form of punishment of the self-stimulatory behavior and reinforcement of alternative
behaviors (Luiselli, 1984). One constructive approach that involves the use of reinforcement-based reductive techniques is referred to as differential reinforcement of omission of behavior or differential reinforcement of other behaviors (DRO). This procedure involves delivering reinforcement if the unwanted behavior (e.g., self-stimulation) is omitted for a specified time interval (LaGrow & Repp, 1984). The success of reinforcement of omission of behavior depends on identifying strong external reinforcers that overpower the intrinsic reinforcement inherent in the self-stimulatory behavior itself (Renzaglia & Bates, 1983). Since this is not an easy task in many cases, researchers typically use this procedure in combination with other reductive techniques.

Repp, Deitz, and Speir (1974) found that reinforcement of omission of behavior plus several reprimands reduced self-stimulatory behavior of three severely retarded persons. Also, Ball, McGrady, and Teixera (1978) completely eliminated self-stimulation through the use of reinforcement of omission of behavior.

Unfortunately, the researcher was unable to find any similar Arabic studies. The only study which the researcher was able to locate was one conducted in a special school in Lebanon, by Moracco and Fasheh (1978), in which the academic achievement and classroom behavior of a group of 11 mentally retarded Arab children were effectively improved through the use of reinforcement procedures.

The present study attempted to determine whether or not positive practice overcorrection plus differential reinforcement of omission of behavior would be effective in suppressing self-stimulatory behavior emitted by a severely mentally retarded girl.

**Method**

**Child and Setting**

The participant was a seven-year old girl attending a special school for the mentally retarded in the city of Amman. She was diagnosed as having severe mental retardation. The girl's family consisted of her father, mother, and two older "normal" brothers. Her mother was a bank employee. The girl had been in attendance at the school for approximately six months prior to the onset of the present study.

The treatment program was initiated upon the request of the classroom teacher and the child's parents. The teacher reported that the child exhibited several problem behaviors...
including inappropriate eating behaviors, aggressive behaviors, disruptive behaviors, and self-stimulation. Among these behaviors, self-stimulatory behavior was judged to be the most problematic since it occurred very frequently and prevented the child from being on-task and from following instructions. Self-stimulation took the form of hand clapping. Before initiating the treatment program, the researcher conducted several observations of the child's self-stimulation. It was found that the child exhibited a very high rate of hand clapping (some times this behavior occurred more than 25 times per minute). Hand clapping was audible and stereotypic. The child's mother reported that this behavior had been occurring for more than a year, and that it was some times accompanied by hand biting, spitting, and shouting. However, these behaviors were not targeted for modification since they were very rarely observed in the school.

At the time of the study, there were seven mentally retarded children and a special education teacher in the classroom. The child's individualized educational program emphasized self-help skills, activities of daily living, and pre-academic skills.

Data Collection Procedures

The dependent variable measured in the present study was the number of intervals the child was observed as engaging in hand clapping. Observational data were collected during thirty-minute morning sessions. Observation was conducted by the classroom teacher who was trained by the researcher. The teacher employed an interval recording procedure (Cooper, 1981). This procedure involved dividing the total observation period (thirty minutes) into brief (one minute) intervals. Every minute the teacher observed the child and recorded whether or not she was engaged in the stereotypic behavior. The researcher used interval recording because it is more practical in a classroom setting and because the target behavior was occurring at a very high rate (Cooper, 1981). During treatment, a corresponding number of minutes spent in overcorrection was added to the observation period.

Research Design

An AB design (Cooper, 1981) was employed to evaluate the effects of the treatment package. Following baseline, the treatment program combining positive practice overcorrection and differential reinforcement of omission of behavior was applied.
**Procedure**

Treatment sessions were conducted from 9:30 to 10:00 A.M., Saturday through Thursday. The child began each session seated at a work table. The teacher sat at the table with the child, and gave her verbal instructions to engage in educational tasks.

**Baseline:** During this phase of the study, the student's hand clapping was observed. Using a paper, a pencil, and a stopwatch, the teacher recorded whether or not hand clapping occurred during each of the thirty intervals. This condition was in effect for a total of twelve school days. No systematic consequences were presented for stereotypic behavior during this phase. Rather, the teacher was requested to handle this behavior in the traditional way, i.e. by ignoring self-stimulation, or verbal reprimands.

**Treatment**

The researcher provided the classroom teacher with necessary training in the correct use of the treatment procedures. The training program involved the use of verbal and written instructions, modeling, and feedback. Training took place in the classroom and was provided during two 30-minute sessions. Minimal consultation was required during the intervention phase of the study.

Under this condition, which was in effect for a total of ten school days, overcorrection and differential reinforcement of omission of behavior were implemented. Whenever the student exhibited hand clapping, the teacher said, "No! Don't clapp your hand." The student then was immediately removed from ongoing activities to a chair in the corner of the classroom. She was instructed to sit on her hand facing the wall for three minutes. During overcorrection time, the teacher refrained from interaction with the child. At the end of the three-minute period, the student was instructed to return to the work table. The teacher physically guided the child whenever she failed to follow instructions.

Observation was continued, and if no stereotypic behaviors occurred during the next interval, the student was reinforced. Various reinforcers were used including verbal praise, a pat on the back, juice, an M&M, among others. Reinforcement preferences were indentified through direct observation of the child in the classroom, and through an informal conference held with the child's parents and teacher.
The treatment program was implemented only during the thirty minute morning sessions.

Results

To establish reliability of observational data, a second observer, who was trained by the investigator using verbal and written instructions, was requested to conduct periodic observations using the same procedure. The reliability assessor (a student in the Department of Psychology at the University of Jordan) independently and simultaneously observed the child.

For each interval, an agreement was counted if both observers recorded (√) or if both recorded (___). A disagreement was counted if one observer recorded (√) while the other recorded (___). The percentage of agreement was then calculated using the following formula:

\[
\text{Percent Agreement} = \frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100
\]

Interobserver agreement ranged from 80% to 100%, with a mean of 87%.

Figure 1. Percentage Of Intervals Of Self-Stimulatory Behavior During Each Phase Of The Study.
REDUCTION OF SELF-STIMULATORY BEHAVIOR

Figure I shows the percent of intervals the child engaged in hand clapping during the experimental phases of the study. As shown in figure I, during baseline hand clapping ranged from 7% to 97%, with a mean of 63%. When overcorrection and differential reinforcement of omission of behavior were introduced, hand clapping decreased immediately to an average of 13%, within a range of 3% to 23%.

Post checks made two weeks after the termination of formal treatment sessions revealed that behavioral suppression was maintained. During this phase, hand clapping ranged from 10% to 13%, with a mean of 12%.

Discussion

This study evaluated the effects of a combination of positive practice overcorrection and differential reinforcement of omission of behavior on self-stimulation displayed by a severely mentally retarded girl. The data indicated that overcorrection and reinforcement of omission of behavior can be effective procedures for reducing self-stimulatory behaviors. The results of this study are consistent with findings obtained by previous researchers; i.e., Dickie and Finegan (1980), and Savie and Dickie (1979), who demonstrated that relatively brief applications of overcorrection can yield significant suppression of self-stimulatory behaviors.

The treatment program employed in this study is characterized by the following features:

1. The target behavior was measured directly and repeatedly during the experimental phases of the study.
2. The treatment program involved changing the target behavior by systematically changing its consequences. Reinforcement was provided contingent upon the omission of the inappropriate behavior, and negative consequences were presented following its occurrence.
3. The intervention techniques were carried out by the classroom teacher.

The data have important implications for special education practitioners. First, the findings suggest that much can be achieved without intensive intervention.

The total time required for treating the target behavior was five hours. This demonstrated that it is possible for special education teachers to manage maladaptive
behaviors of mentally retarded children using relatively simple techniques. Moreover, behavior modification procedures such as those employed in the present study provide teachers with a systematic, empirical methodology for changing student behavior. As Nelson and Polsgrove (1984) noted, behavior modification "not only provides practitioners with a powerful technology, but also allows them to continually evaluate their efforts, rather than rely on trial and error or empirically unverified interventions". (p.14). Differential reinforcement of omission of behavior was used in combination with overcorrection because it has been shown that doing so produces more rapid response reduction (Repp & Deitz, 1974). However, the treatment procedures reduced the self-stimulatory behavior but did not eliminate it. This may have been due to several factors. One such factor might be the possibility that overcorrection was not aversive enough for the student. Overcorrection (a type I punishment procedure) has been criticized for producing negative side effects (Axelord, Brantner, & Meddock, 1978). However, the findings of this study showed that no noticeable side effects had occurred. One probable reason for this might be the short duration of the overcorrection procedure. In fact, an interesting finding of this study was the suppression of some untreated behavior problems. For example, the teacher reported that the treatment procedures resulted in reduction in such inappropriate behaviors as aggression and disruptions. These changes in untreated behaviors were observed during the intervention phase as well as the follow-up phase.

Two issues pertaining to the research design employed in the present study need to be addressed. First, the design does not permit examination of the strengths of each procedure since both overcorrection and differential reinforcement of omission of behavior were applied simultaneously. However, this was not the intent of the present study. Rather, the purpose was to treat the problem behavior in a relatively short period of time since this behavior interfered significantly with the child's responsiveness to the learning environment. Second, the research design (the AB design) used in this study is not a true experimental design (Campbell & Stanely, 1963). This design is subject to threats to both internal and external validity. No attempt was made to use a more extensive single-subject research design (i.e., ABAB design) for ethical considerations.

A final issue which warrants some attention concerns the generality of the findings of this study. Although the data are encouraging, they are limited since they were
obtained from a single student. Obviously, replication studies need to be conducted with different groups of mentally retarded children.

In summary, the present study confirms the efficacy of overcorrection and differential reinforcement of omission of behavior of mentally retarded children. The study also suggests that classroom teachers can be taught to implement behavior modification techniques effectively and efficiently.
References


