MODIFYING STEREOTYPED BEHAVIORS BY
OVERCORRECTION: A CRITICAL REVIEW

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This paper critically examines overcorrection as a treatment procedure for stereotyped behaviors of retarded and autistic individuals. The theory underlying overcorrection, the effectiveness and practicality of the approach, and the methodology employed in a number of overcorrection studies are considered. It is concluded that further research comparing the technique to other procedures and presentation of additional pertinent data, including data relating to the acquisition of appropriate behavior, are required before overcorrection can be accepted as a proven, effective approach for eliminating stereotypy.

Attempts to reduce stereotyped behaviors (i.e., repetitive acts which have no apparent functional effect on the environment) by means other than shock generally have met with mixed success. For this reason, Foxx and Azrin (1973) recently proposed a new procedure, overcorrection, for the treatment of stereotyped behaviors of retarded and autistic individuals. The general rationale underlying the method is two-fold and, accordingly, there are two types of overcorrection procedures.

The first procedure, designated as restitution, is concerned with any behavior which has a destructive or disruptive effect on the subject or on the environment. It requires the subject to overcorrect the consequences of his misbehavior by restoring his person or the environment to a vastly improved state. For example, an oral hygiene overcorrection procedure is used to reduce repetitive mouthing, a stereotyped behavior which may result in self-infection. This procedure involves telling the subject "No" in a firm voice, brushing the subject's teeth and gums with a toothbrush dipped in mouthwash, and wiping the subject's lips with a washcloth dampened in mouthwash.

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The second type of overcorrection, positive practice, generally is applied only to stereotyped acts which have no adverse effect on the subject or on the environment. For example, a functional movement overcorrection procedure is used to reduce stereotyped head weaving. This procedure involves restraining the subject's head, instructing him to move while manually guiding the subject's head to a number of different positions, and holding the head at each position for 15 seconds. As the subject begins to respond to the trainer's instructions, the manual guidance is faded out.

In Foxx and Azrin's investigations of this procedure (Azrin, Kaplan, & Foxx, 1973; Foxx & Azrin, 1973) the authors reported that overcorrection not only suppresses stereotypy but also "teaches" correct forms of behavior. If this claim can be supported, overcorrection may well be the treatment of choice for decelerating such responses. Since the time of Foxx and Azrin's original studies, a number of additional investigators (Barnard, Christopherson, Altman, & Wolf, Note 1; Doke & Epstein, 1975; Epstein, Doke, Sajwaj, Sorrell, & Rimmer, 1974; Harris & Romanczuk, 1976; Herendeen, Jeffrey, & Graham, Note 2; Rollings, Baumeister, in press; Wells, Forehand, Hickey, & Green, Note 3) have examined the effectiveness of overcorrection as a treatment procedure for stereotyped behaviors. The purpose of this paper is to examine critically these overcorrection studies to determine the feasibility of overcorrection as a treatment for such behaviors. The critique is based on an examination of the theory underlying overcorrection, the effectiveness and practicality of the approach, and the methodology which has been employed.

**Theory**

It has been pointed out by a number of investigators that overcorrection is a complex procedure which includes a variety of strategies. Among these are (a) feedback, (b) timeout, (c) negative reinforcement of incompatible behaviors, (d) punishment, (e) avoidance contingencies, and (f) response prevention. It is difficult to determine which of these factors, alone or in combination, function as the active ingredient in producing the effects attributed to overcorrection. According to Foxx and Azrin (1972, 1973) overcorrection is an approach which teaches the subject responsibility for any disturbance caused by his behavior. It is also seen as an approach which requires extensive practice in correct forms of incompatible behavior. However, Epstein, Doke, Sajwaj, Sorrell, & Rimmer (1974) conducted a study in which inappropriate foot movements
and inappropriate vocalizations were reduced by a contingent application of a hand overcorrection procedure. This result seems to indicate that the overcorrection procedure need not be related to the target behavior; thus, positive practice of an incompatible behavior does not appear to be an essential ingredient in suppressing stereotyped behaviors. Foxx and Azrin (1973) have stated that positive practice overcorrection serves to "teach outward-directed activities" (p. 13); however, no data have been presented by these authors to demonstrate that overcorrection does more than suppress stereotypy. Overcorrection in this light may be nothing more than a complex punishment procedure. Indeed, since the correct form of behavior the subject is supposed to be learning is a source of the "annoying consequences" (Foxx & Azrin, 1973, p. 13) in the overcorrection procedure, appropriate behaviors may assume aversive properties. If positive reinforcement during the overcorrection procedure is minimal as recommended by Foxx and Azrin (1972), one would not expect correct behaviors to be maintained under such conditions.

**Effectiveness**

*Changes in targeted stereotypy*

In their initial study Foxx and Azrin applied a two minute, Oral Hygiene, overcorrection procedure to two retarded children who exhibited stereotyped mouthing responses. The authors compared this procedure with a variety of other procedures used in the treatment of stereotyped mouthing: punishment by intake of a distasteful solution painted on the hand, punishment by a slap, reinforcement of the nonoccurrence of mouthing (i.e., a DRO schedule), and free reinforcement. Data were presented on number of mouthings per hour for each child over the last three sessions of each condition. These data support the superiority of the overcorrection procedure as it effectively reduced to zero the self-stimulatory mouthings of both children.

In the same report, Foxx and Azrin reported a second application of the oral hygiene overcorrection procedure for mouthing to the same two children who had participated in the previous study. In addition, they applied 20- and 5-minute functional movement overcorrection procedures to a retarded girl who exhibited stereotyped head weaving and to an autistic boy who exhibited repetitive handclapping. Results of this study indicate that for each child the overcorrection procedures reduced self-stimulation to near 0% of the sampled intervals. Although the suppressive effects did not generalize from the training situation to the home environment, Foxx and Azrin reported that when overcorrection was
applied in new environments, stereotyped behaviors also were suppressed in those settings.

Other investigators have attempted to replicate the effectiveness of overcorrection with a variety of stereotyped behaviors. For example, Barnard et al. (Note 1) taught mothers to use a variation of oral hygiene overcorrection in the home treatment of four children exhibiting stereotyped mouthing and stereotyped head banging. For the two subjects who exhibited stereotyped mouthing, the overcorrection procedure reduced that target behavior from 20–30% of the sampled intervals during baseline to 2–3% during treatment and the subsequent 6 week follow-up. With one of the subjects, Barnard et al. also found a similar reduction in mouthing in an environment where the procedure had not been applied (i.e., at school). However, the treatment of head banging was less successful. Head banging decreased from 3.0 to .3 occurrences per hour in two subjects, but was not reduced in the third subject despite increasing the duration of the overcorrection procedure from 7 to 14 minutes.

In a similar attempt to deal with head banging, Harris and Romanczyk (1976) used a functional movement overcorrection procedure in treating an 8 year old retardate. Overcorrection administered at the child's school decreased headbanging from a baseline mean of 32 occurrences per day to near zero after 2 weeks of treatment in that setting. Although no changes in headbanging were observed in the home over this period, this target behavior subsequently was reduced from a baseline mean of 15 occurrences per day to zero when overcorrection was employed in that setting.

Herendeen et al. (Note 2) also achieved positive results with overcorrection in the treatment of the stereotyped rocking and mouthing behaviors of a 13 year old retardate. Each of these behaviors was reduced to mean levels of less than 2% of the sampled intervals relative to baseline means of over 30%. Rollings et al. (in press), also, found that functional movement overcorrection effectively decelerated body rocking from 45 responses per minute to almost zero in one retardate. However, for this subject, suppression of the target behavior did not occur outside of the training sessions, and at 6 month follow-up a rate of 27 rocking responses per minute was observed. For a second retarded subject, overcorrection was ineffective in suppressing stereotyped head weaving.

Epstein et al. (1974) used functional movement overcorrection procedures to decrease stereotyped hand and foot movements and inappropriate, stereotyped vocalizations in two retardates. These behaviors were suppressed to levels under 5% of the sampled intervals relative to baseline means of approximately 15 to 60%. Similar decrements in inap-
appropriate object manipulation, inappropriate hand movements, and mouthing responses were observed also in two autistic children when Wells et al. (Note 3) administered a functional movement overcorrection procedure which incorporated aspects of appropriate toy play.

Doke and Epstein (1975) also, with oral hygiene overcorrection, reduced mouthing in two retardates from means of 25 and 50% during baseline to levels under 10%. Although the actual overcorrection procedure was not applied in subsequent phases of this study, mouthing and two additional stereotyped behaviors, inappropriate body movements and object manipulations, were suppressed by means of contingent threats that overcorrection would be administered. This finding cannot be considered as indicative of the effectiveness of overcorrection alone, however, since the use of contingent warnings has been demonstrated to reduce stereotypy and other inappropriate behaviors in some cases (e.g., Baumeister & Forehand, 1972; Risley, 1968).

Changes in non-targeted stereotypy and other disruptive behaviors

Despite the apparent effectiveness of overcorrection in decelerating targeted stereotypy, a number of investigators have observed negative side effects on nontargeted behaviors associated with its use. For one of the subjects in the Epstein et al. (1974) study, stereotyped foot movements increased from a baseline mean of approximately 20% to nearly 35% when inappropriate vocalizations were suppressed using a functional movement overcorrection procedure. Herendeen et al. (Note 2) also found that overcorrection for body rocking resulted in a concurrent increase in mouthing (from 32 to 77%) for one subject; and, in a second subject effective suppression of a nonstereotyped act (out-of-seat behavior) by means of overcorrection resulted in a similar increase in mouthing (from 11 to 29%) from baseline to treatment.

Rollings et al. (in press), also, witnessed negative side effects when they employed functional movement overcorrection. These authors reported that one subject who previously had engaged in head weaving to the exclusion of other stereotypies began to exhibit new forms of stereotyped behavior (i.e. screaming, self-pinching, finger manipulations) during application of the overcorrection procedure. With a second subject, head nodding and self-hitting behaviors which had been at near zero levels during baseline, rose in frequency to over 25 responses per minute during treatment. A similar increase in inappropriate body movements from approximately 10 to 60% of sampled intervals was reported by Doke and Epstein (1975) when the authors used threats to overcorrect contingent upon mouthing.
Changes in appropriate behaviors

In one of their early studies of the effectiveness of overcorrection for stereotyped behaviors, Foxx and Azrin (1973) *anecdotally* reported a variety of positive side effects such as increased attention and responsivity to adults associated with the use of overcorrection. Indeed, that manuscript is replete with illustrations of children engaging in repetitive hand-clapping and mouthing prior to treatment and playing appropriately with toys and sitting at a table writing or drawing after treatment. However, the authors present no data with regard to the acquisition of these functional behaviors. In order to test the assertion that overcorrection "teaches" appropriate behaviors, it seems essential that investigators specify and measure change in such behaviors.

Several authors recently have undertaken this task. Epstein et al. (1974) noted an increase in appropriate play from a baseline mean of approximately 15% to a mean of nearly 35% when inappropriate hand movements were overcorrected. Harris and Romancyzyk (1976) reported post-treatment data on increased appropriate behaviors, sight reading vocabulary and attention to task, for one subject. However, in the absence of any pretreatment data on these behaviors or any attempt to control for confounding variables, a conclusion that these changes were produced by overcorrection would be tenuous at best.

A study by Wells et al. (Note 3) represents the only controlled investigation of the effects of overcorrection on the acquisition of appropriate behavior. In contrast to the relatively nonfunctional responses (e.g. head turning, arm raising) to commands typically utilized in most positive practice sequences, these authors incorporated a specific functional behavior, toy play, in their overcorrection procedure and attempted to measure its occurrence outside of the overcorrection period. They found that, despite the effectiveness of the overcorrection procedures in decelerating a variety of stereotyped responses, increases in appropriate toy play were observed for only one of the two subjects, a set of identical twins who were labeled as autistic. When overcorrection was administered, toy play for one subject increased from zero to 60% of the sampled intervals, while toy play for the second subject remained at near zero levels.

**Methodology**

The majority of the previously cited overcorrection studies (e.g. Azrin et al., 1973; Barnard et al., Note 1; Epstein et al., 1974; Foxx & Azrin, 1973) employed time sampling techniques where the dependent measure was the per cent of sampled intervals in which stereotyped acts were...
observed. However, as pointed out by Herendeen et al. (Note 2) time sampling may not be the most appropriate measurement technique for evaluating overcorrection because of the nature of the overcorrection procedure itself. The administration of overcorrection interrupts inappropriate behavior and virtually restrains the subject from further engaging in that behavior. Thus, the subject is unable to exhibit the target behavior during some of the observation intervals; and results which appear to demonstrate reductions in the target behavior may in part be an artifact of the measurement procedure. This problem is magnified in the case of high rate behaviors like stereotypy which may require a number of administrations of the overcorrection procedure. Since none of the authors who have employed time sampling procedures specify the exact method used to calculate their dependent measure, it cannot simply be assumed that they corrected for this problem.

In general, it seems that data such as frequency of occurrence of the target behavior, number of overcorrections administered per session, and the duration of these overcorrections if they are sometimes extended with resistant subjects (Azrin et al., 1973) might be more useful measures or might at least make the measures currently in use more meaningful. Foxx and Azrin (1973, study 1) did present frequency data; however, in the absence of baseline data, absence of data on the length of the various treatment procedures, and absence of data on treatment sessions other than the final three of each procedure, the frequency data in this study are relatively meaningless. Thus, along methodological lines it is essential that future studies present as much data as possible so that an unbiased evaluation of the effectiveness of overcorrection can be made.

**Practicality**

A further point to consider in evaluating overcorrection as a general method for the treatment of stereotypy is its practicality. For overcorrection to be used effectively, staff members must be thoroughly trained in the overcorrection procedures, which often are complex and time consuming; and the staff patient ratio must be small. Obviously, these requirements place considerable and perhaps impossible demands on most institutions. Since it is important that the behavior be quickly, consistently, and repeatedly interrupted to minimize self-reinforcement, one staff member conceivably could be involved exclusively with one patient for considerable periods of time.

Furthermore, many institutions which service retarded and autistic individuals are poorly equipped, understaffed, and overcrowded. The
institutional environment often is a barren one which offers neither the opportunity for alternate behaviors nor reinforcement for such behaviors. As a consequence, the type of outward-directedness that would be taught by overcorrection in such an environment probably is limited to responding to specific, direct instructions to perform certain behaviors. Although teaching and maintaining outward-directed behaviors in institutions is not a problem limited to overcorrection, the assertion that overcorrection is an effective and practical technique for accomplishing such a result would not appear warranted at this time. The ability of Foxx and Azrin's overcorrection sequences to increase nonstereotyped functional behaviors has as yet not been demonstrated. Moreover, data from Wells et al. (Note 3) indicate that even when positive practice overcorrection emphasizes a specific functional behavior, increases in that behavior may not be observed. However, these investigators did observe substantial amounts of appropriate toy play in both subjects when they administered both primary and secondary reinforcement contingent on that behavior.

**Discussion**

From the data presented, it appears that overcorrection is an effective means for decreasing targeted stereotypy although the actual degree of suppression may be overestimated at times because of measurement problems inherent in many overcorrection studies. However, reductions in targeted behaviors may be offset at times by concurrent increases in nontargeted, stereotyped behaviors or development of new forms of stereotyped or disruptive behaviors. Although increases in existing stereotyped acts might be avoided by applying overcorrection to all forms of stereotypy or by overcorrecting each behavior in a sequential manner (Wells et al., Note 3), there are little data evaluating the effectiveness of such an approach. In fact, data reported by Rollings et al. (in press) suggest that this strategy may be ineffective if new forms of stereotypy arise in each instance where a stereotyped behavior is suppressed.

Furthermore, in none of the studies reported has it been demonstrated that the overcorrection procedures developed by Foxx and Azrin promote substantial increases in appropriate behaviors. In contrast, the overcorrection strategy of Wells et al. (Note 3), which incorporates a specific appropriate response into the positive practice sequence, appears to show some promise in this regard. However, data reported by Wells et al. (Note 3) indicate (a) that even this type of procedure does not insure that stereotyped responses will be replaced by more functional behaviors, and
(b) that provisions for reinforcement of appropriate responding are necessary to accomplish this goal.

To date, only one comparison of the effectiveness of overcorrection plus reinforcement versus reinforcement procedures alone has been conducted. Azrin, Kaplan, and Foxx (1973) used a within-subjects design in which each of 32 institutionalized retarded subjects were exposed to baseline, reinforcement, return to baseline, and reinforcement plus overcorrection conditions in that order. Mean reductions in self-stimulation from 75 to 25% of sampled intervals across baseline and treatment conditions were observed for the reinforcement procedure, while reductions from 60 to 5% were observed for the reinforcement plus overcorrection condition. However, the basis for drawing conclusions about the effectiveness of the treatment procedures used in this study is limited by two problems. First, the authors provided reinforcement on an intermittent schedule with no reported attempt at prior shaping of nonstereotyped appropriate responses. Waiting for functional behaviors to be exhibited and only periodically administering reinforcement for such behaviors would not appear to be the optimal reinforcement strategy. More substantial decrements in stereotypy would be anticipated under conditions where appropriate behaviors are shaped and reinforced on a continuous schedule. Second, the investigators failed to control for possible confounds associated with order of treatment presentation that might have favored the reinforcement plus overcorrection condition. For these reasons, it would appear that the advantages of overcorrection plus reinforcement as opposed to the shaping and reinforcement of appropriate behaviors are as yet unknown. When one considers the practical restrictions involved with the use of overcorrection along with the idea that, because of their time consuming nature, overcorrection procedures actually may restrict the subject’s opportunity to engage in appropriate behavior spontaneously, (Herendeen et al., Note 2), a crucial question arises: Might the time spent overcorrecting stereotypy be used more productively in shaping and reinforcing appropriate behaviors? The efficacy of the latter approach is suggested by studies where reinforcement has been provided for behaviors incompatible with stereotypy (e.g. Repp, Dietz, & Speir, 1974).

Conclusions

The purpose of the present paper was to raise certain questions concerning overcorrection as a treatment technique for stereotyped behaviors. At least to this author the theory underlying overcorrection is un-
clear: One wonders what the effective component or components are and whether overcorrection is anything more than a complex punishment procedure. Furthermore, one is led to question whether overcorrection really is the most effective procedure for treating repetitious behaviors of the retarded and autistic. Many investigators have either failed to replicate the effectiveness of overcorrection or have found negative side effects with its use. When these findings are combined with methodological limitations and absence of critical data on the acquisition of appropriate behaviors in the majority of overcorrection studies cited, it is difficult at the present time to draw definitive conclusions concerning the overall effectiveness of overcorrection. Finally, the time demands as well as the complexity of the procedure place serious limitations on the feasibility of overcorrection as a treatment method for reducing stereotyped behaviors.

Based upon these considerations two general areas of investigation are suggested. First, studies should be conducted examining the effects of overcorrection on the acquisition of appropriate behavior. At the same time a second line of research should attempt to compare the effectiveness of overcorrection with other procedures such as the shaping and reinforcement of functional behaviors. Such future research endeavors should take into consideration practical, methodological, and data presentation issues such as those discussed in this paper. Finally, until such investigations are completed, it is suggested that overcorrection be viewed only as one potential procedure for the treatment of stereotyped behaviors rather than a proven, effective one.

REFERENCE NOTES


REFERENCES


