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An Analysis of Overcorrection Movements: Topographic Relation and Re-Educative Function

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AN ANALYSIS OF OVERCORRECTION MOVEMENTS:
TOPOGRAPHIC RELATION AND RE-EDUCATIVE FUNCTION

by

Pamela Roberts

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
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Pamela Roberts
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INTRODUCTION

Over the past few years, overcorrection has become a widely used procedure in the reduction of a variety of undesirable behaviors: physical and verbal aggression (Foxx and Azrin, 1972; Klinge, Thrasher and Myers, 1975; Summer, Mueser, Hsu, and Morales, 1974; Webster and Azrin, 1973); out-of-seat and inappropriate talking (Azrin and Powers, 1975); theft (Azrin and Wesolowski, 1974); public disrobing (Foxx, 1976a; Webster and Azrin, 1973); stereotypic behaviors (Epstein, Doke, Sajwaj, Sorrell and Rimmer, 1974) and floor sprawling (Azrin and Wesolowski, 1975a). Efforts to decelerate self-injurious behaviors by overcorrection techniques include the following: head banging (Azrin, Gottlieb, Hughart, Wesolowski and Rahn, 1975; Harris and Romanczyk, 1976; Webster and Azrin, 1973); self stimulation (Foxx and Azrin, 1973; Freeman, Graham and Ritvo, 1975); vomiting (Azrin and Wesolowski, 1975b); soiling (Azrin and Foxx, 1971; Freeman and Pribble, 1974); and coprophagy and pica (Foxx and Martin, 1975). Other target behaviors for which overcorrection has been utilized include: nervous habits (Azrin and Nunn, 1973); class non-attendance (Foxx, 1976b) and inappropriate searching (Fusch, Close, Hops and Agosta, 1976).

Foxx and Azrin (1972) were the first to provide a detailed description of the overcorrection procedure, and outlined the following as main components of the technique: (1) re-education
via training in and extended practice of a desired response; 
(2) immediate removal of the reinforcement for the target behavior; 
(3) time-out from general positive reinforcement; and (4) an 
effort requirement which should be directly related to the target 
behavior and performed actively for an extended period of time. 

Foxx and Azrin (1973) clarified their previous description, 
distinguishing between restituational and positive practice 
overcorrection. Restituational overcorrecting requires one to 
overcorrect the environmental effects caused by the target behavior, 
while positive practice overcorrection requires one to intensively 
practice behaviors that are alternatives to the target behavior. 
Behaviors that have no effect on the environment can be treated 
only with a positive practice procedure; however, the procedure is 
assumed to contain all the previously listed components from Foxx 
and Azrin (1972). 

In the previously mentioned studies, a specific overcorrection 
procedure was designed for each target behavior. Webster and 
Azrin (1973) varied the technique slightly by using the same 
quiet training procedure to treat numerous, dissimilar behaviors. 
A more systematic examination of employing one specific over­ 
correction procedure to more than one behavior was done by Epstein 
et al. (1974). They first targeted one behavior and designed a 
topographically similar (employing the same body part, but not 
necessarily the same movements) overcorrection procedure for that 
behavior. Following the first overcorrection treatment, a second
behavior (which was not topographically similar to the first) was targeted, and the same overcorrection procedure was employed. Their results showed that the overcorrection procedure was effective on both behaviors. Therefore, although Foxx and Azrin (1972) state that the overcorrection procedure should be directly related to the target behavior, a direct topographical relation may not be necessary for successful intervention.

The necessity of the procedure employed by Epstein et al. (1974), sequencing an overcorrection procedure for a topographically dissimilar target behavior only after first employing that overcorrection procedure for a behavior to which it was topographically similar, is unclear. If one assumes that the effort requirement is a punishing aspect of overcorrection, then the intensive practice of any response immediately following a target behavior should decrease the rate of occurrence of that target behavior. The present study was designed to examine that hypothesis.

One objection to using an arbitrarily selected behavior as the overcorrection response is that overcorrection is not just punishment, but that it contains an educative component as well. Although this component has been stressed (Foxx and Azrin, 1972), it has not been adequately explained and no data have been presented in support of such a claim.

The re-educative component of overcorrection could show itself in two forms: (1) the client could increase instruction following to certain commands without needing guidance or (2) the rate of the
educative (overcorrecting) response should increase under conditions in which the subject has not been commanded to engage in the response. The present study evaluated both of these possibilities by noting when subjects responded to commands without needing physical prompts and by collecting data on the overcorrecting behavior when the subjects were not commanded to perform the response. Thus, examination was made of the changes in the overcorrection behavior due to the overcorrection procedure. It was hypothesized that the overcorrecting behavior might not come under verbal control, and might even show a decrease from its former rate of occurrence due to excessive, aversive practice (Dunlap, 1928, 1932; Yates, 1958).

Thus, the objectives of the present study were: (1) to assess the effectiveness of overcorrection procedures on topographically dissimilar behaviors, and (2) to provide data on the re-educative aspects of overcorrection. The second objective was examined in an analogue approach whereby the behavior employed as the overcorrection procedure was a response already existing in each subject's repertoire. This approach was attempted in order to assess any decelerating effects the overcorrection treatment might have on the occurrence of the response used as the overcorrecting behavior.
METHOD

Subjects and Setting

Three profoundly retarded adults, living in a private residential facility for the severely and profoundly retarded, served as subjects. Criteria for subject selection included the following: (1) enrollment in the educational program at the center sponsored by the local school district, (2) exhibition of at least two high rate behaviors, and (3) behaving in a manner that was either self-injurious or extremely annoying to staff. None of the subjects exhibited any instructional control or self-help skills.

Joan, a 26 year-old female with a number of physical deformities, was confined to a wheelchair. Behaviors she frequently engaged in included: mouthing, screaming, grabbing at objects or people, and clapping. Clapping was taught as an alternative response to mouthing in a previous study, but did not seem to be functioning as such when the present study began.

Rhoda was a 21 year-old female with major motor seizures. Confined to a wheelchair, her most frequent behaviors included: mouthing, head wagging, growling, and running material or skin between her fingers.

James was an 18 year-old male who exhibited cerebral atrophy, major motor seizures, and severe spasticity. He was confined to a wheelchair and frequently engaged in the following behaviors:
screaming, masturbating, grimacing and hitting objects around him.

Measurement

The following behaviors were observed for Joan during 20-minute daily sessions in her bedroom:

1. Mouthing--either hand touching or inside the mouth.
2. Grabbing--grasping out with one or two hands at people or objects.
3. Clapping--placing hands in contact to create a noise.

These response categories were mutually exclusive except for mouthing and grabbing, which could both be recorded in the same interval.

Rhoda was observed for 20 minutes daily in a visually restricted area of a large classroom. The behaviors observed for Rhoda were not mutually exclusive and were defined as follows:

1. Mouthing--either hand touching or inside the mouth.
2. Growling--emitting machine-like noises that were audible from three feet away.
3. Inappropriate finger movements--manipulating clothes or skin between thumb, index and second fingers.

James was observed for 10 minutes each day in an area of a large classroom adjacent to the teacher's desk. The two behaviors observed were not mutually exclusive and were defined as follows:

1. Table hitting--hitting table or tray with fingers or hand so that a noise, audible from three feet away, was made.

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2. Grimacing—stretching facial muscles tightly over teeth, then quickly drawing mouth closed.

All subjects were observed during daily sessions. The occurrence of specific behaviors was recorded during successive 10 second intervals throughout the session except when the overcorrection procedure was being applied. During treatment phases, behavior was not recorded because traditionally the target behavior and the overcorrection response have been mutually exclusive. Thus, applying the procedure would produce a decrease in the target behavior simply because the occurrence of the target behavior was prevented. Therefore, during treatment, the number of recorded intervals for each session was variable.

Reliability

Interobserver agreement was assessed for each subject across all conditions by a trained independent observer. Reliability assessments were performed on 4 occasions for Joan, 25 occasions for Rhoda, and 14 occasions for James. Reliability was calculated by dividing the number of agreements by agreements plus disagreements and multiplying by 100. This formula was used to compute agreement percentages for: (1) occurrences of responses, (2) nonoccurrences of responses, and (3) occurrences plus nonoccurrences of responses. Reliability checks across conditions yielded mean scores of 82%, 91% and 97% for occurrences, nonoccurrences, and occurrences plus nonoccurrences, respectively.
Procedures

Baseline

Data were taken on each subject's previously described behaviors. No contingencies were in effect for the subject's behaviors at that time.

Overcorrection

Overcorrection procedures for each subject followed the standard procedures of: (1) immediately calling attention to the target behavior, (2) verbally instructing the subject to engage in the overcorrection procedure, (3) manually guiding the subject through the procedure if necessary, and (4) having a pre-set time length for the overcorrection procedure. The only deviation from the standard procedure was that after observing no instances of instruction following in Joan or James, Rhoda was not verbally instructed to engage in the overcorrection procedure, but was simply guided through the training. Specific overcorrection procedures designed for each subject are described below:

1. Clapping overcorrection for Joan--when Joan mouthed, she was informed of her misbehavior (e.g., "Joan, don't mouth"), and verbally instructed to clap. If she did not clap within two seconds of instruction, the experimenter guided her hands away from her body and then back together in clapping. The instruction to clap was given each ten seconds during the two minute procedure.
2. Finger movements overcorrection for Rhoda--when Rhoda growled in one condition, or mouthed in another, she was informed of her misbehavior and guided through finger movements over-correction. This procedure was accomplished by the experimenter placing his hands over one of Rhoda's and moving her fingers similar to that of inappropriate finger movements. Rhoda's hand was guided through finger movements on four parts of her body--both shoulders and both hips. Each position was held for ten seconds. The duration of the overcorrection procedure was two minutes or until Rhoda had not exhibited the target behavior for 60 seconds after the two minute procedure was completed. Hands used in the overcorrection procedure were alternated after each two minute training procedure when the target behavior was growling. When mouthing was the target behavior, the hand not being mouthed was used for the overcorrection procedure.

3. Grimace overcorrection for James--when an instance of table hitting occurred, James was informed of his misbehavior and verbally instructed to grimace. If he did not grimace within two seconds of instruction, the experimenter guided him through two grimaces every two seconds for a period of one minute, or until he had refrained from table hitting for 60 seconds after the one minute training had been completed. Verbal instructions to grimace were given each time a grimace was required in training.
Experimental Design

The effects of overcorrection on a topographically dissimilar response were evaluated for each subject in reversal designs. In addition, data were taken on the behavior used as the overcorrection response to assess changes in that behavior during overcorrection. Such data would indicate the effects of contingent forced practice on a response already in the subject's repertoire. Thus, data were taken on both the target behavior and the response used as the overcorrection procedure for each subject throughout the study.

For Joan, the target behavior was mouthing and the overcorrecting behavior was clapping. Data were also taken on a third behavior, grabbing, to examine side effects of the treatment. Finger movements were used as the overcorrecting response for two of Rhoda's behaviors--first growling, and later mouthing. Data were taken on all three behaviors throughout the study.

The target behavior for James was table hitting. The overcorrecting behavior used for this was grimacing.
RESULTS

Figure 1 shows the percentage of intervals that mouthing, clapping, and grabbing occurred during each of Joan's sessions. The introduction of clapping overcorrection contingent on mouthing immediately decreased the occurrence of mouthing (top graph). Percent of intervals in which mouthing occurred decreased during treatment to near zero occurrences. Mouthing reversed to near baseline levels when clapping overcorrection was terminated. The occurrences of the nontarget behavior, grabbing, increased during overcorrection for mouthing and decreased during reversal (middle graph). Clapping, the overcorrecting behavior, also varied in rate across conditions, decreasing in occurrence during the overcorrection for mouthing condition, and increasing to above baseline levels during reversal (bottom graph).

The percentage of intervals in which Rhoda's growling, inappropriate finger movements and mouthing occurred is shown in Figure 2. Because of the length of the study, each data point represents the average of two successive sessions. The introduction of finger movements overcorrection for growling suppressed growling somewhat, but not to zero levels of behavior (top graph). Growling reversed when overcorrection procedures were terminated and remained at baseline levels of behavior or greater for the remainder of the study. The percent of intervals in which mouthing occurred decreased when finger movements overcorrection was
Figure 1. Percent of intervals Joan was observed engaging in mouthing, grabbing and clapping. Overcorrection was contingent on clapping. Mean occurrence values for behaviors during each condition are given and plotted with a horizontal dotted line.
JOAN

TARGET BEHAVIOR

BASELINE

OVERCORRECTION

BASELINE

80 - X

X 96

X 13

X 67

MOUTING

80 - X

X 4

X 15

X 2

PERCENT OF INTERVALS

GRABBING

OVERCORRECTING BEHAVIOR

80 - X

X 27

X 18

X 40

CLAPPING

FIGURE 1

SESSIONS

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Figure 2. Percent of intervals Rhoda was observed engaging in growling, mouthing and inappropriate finger movements. Each data point represents a consecutive pair of sessions. O'C-G represents overcorrection for growling. O'C-M represents overcorrection for mouthing. B'L represents baseline. Mean occurrence values for behaviors during each condition are given and plotted with a horizontal line.
RHODA

TARGET BEHAVIOR

B'L

0*C-G

B'L

CONSECUTIVE PAIRS OF SESSIONS

FIGURE 2
contingent on growling and reversed when overcorrection was dis-
continued (middle graph). When finger movements overcorrection
was made contingent on mouthing, mouthing decreased to near zero
occurrences. Occurrence of mouthing increased again during
reversal. The occurrence of the overcorrecting behavior,
inappropriate finger movements, was extremely variable throughout
the study (bottom graph).

Figure 3 shows the percent intervals of occurrence for James'
table hitting and grimacing each session. The introduction of
grimace overcorrection contingent on table hitting produced a
large decrease in the occurrence of table hitting (upper graph).
The occurrence of table hitting increased to baseline levels
during reversal and decreased in a second treatment condition.
The overcorrecting behavior, grimacing, slightly decreased during
the first treatment condition, although there were some days in
which the occurrence of grimacing was quite high (lower graph).
Four of the sessions during the first overcorrection condition
where grimacing occurred in a large number of intervals followed
weekends, when there was no training. A fifth high occurrence
session immediately followed a three day absence by the experi-
menter. The occurrence of grimacing appeared to increase slightly
during reversal. There is no clear effect on grimacing during the
last overcorrection condition.
Figure 3. Percent of intervals James was observed hitting the table and grimacing. Overcorrection was contingent on hitting the table. Mean occurrence values for behaviors during each condition are given and plotted with a horizontal line. B'L represents baseline. O'C represents overcorrection.
DISCUSSION

Much recent research has shown overcorrection to be an effective behavior deceleration procedure. However, no lengthy comparison of overcorrection with well known mechanisms of behavior change has emerged from these studies. One such comparison that might be examined is the hypothesis that overcorrection can be explained as the inverse of the Premack principle (Premack, 1965), (e.g. decelerating a high frequency behavior by making a low frequency behavior contingent on it) and that the relationships between behaviors involved might be similar for both procedures. Also, specific functions of many main component parts (e.g. immediate removal of reinforcement for the target behavior, an effort requirement directly related to the target behavior, re-education through extended practice) and standard procedures (e.g. verbal instructions during treatment and graduated guidance) of overcorrection have not been systematically examined.

Present results support previous findings in that deceleration of target behaviors was achieved by making extended practice of a response contingent on the occurrence of the target behavior. In the present study, however, the target behaviors of two subjects were decelerated without employing overcorrection procedures that were topographically similar to the target behaviors. Because the target behaviors and overcorrecting responses were not topographically similar, target behaviors (and the reinforcement for them)
were not necessarily interrupted during treatment. Grimace overcorrection for table hitting and finger movements overcorrection for growling never directly stopped the target behavior, although overcorrection continued until the target behavior had not occurred for 60 seconds. Finger movements overcorrection for mouthing did not stop mouthing directly because the hand not being mouthed by Rhoda was always chosen for the overcorrection procedure. Thus, contingent practice of the overcorrecting response was effective in reducing the rate of the target behavior in each case although two of the several main components outlined by Foxx and Azrin (1972) were missing.

The re-educative function of overcorrection was examined in the present study by (1) noting the frequency of instruction following by subjects and (2) collecting data during each session on the overcorrecting behaviors for all subjects. No instances of instruction following by James, and one instance of instruction following by Joan were noted. Changes in the overcorrecting responses across conditions varied for each subject: Rhoda's inappropriate finger movements showed no specific trends, but there was a clear deceleration of Joan's clapping and a slight deceleration of James' grimacing during overcorrection.

Thus, neither of the two types of re-education mentioned were observed in the present study. It is not surprising that re-education did not occur because re-education is not an explicit part of the overcorrection procedure as it is currently employed.
If one of the procedural goals is to teach instruction following, then a detailed procedure to fade prompts may be needed (Striefel, Bryan and Aikins, 1974). If it is desired that the client engage in the overcorrecting response appropriately without prompts, it may be necessary to select overcorrecting responses that will be highly reinforced in other situations. Re-education can not be recognized as an important, distinguishing component of over-correction until it has been specifically programmed into the procedure and documented. A useful form of documentation would include data collection on the occurrences of the overcorrecting behavior within and outside the experimental setting.

Side effects of the clapping overcorrection procedure were noted for Joan's grabbing behavior. The rate of grabbing increased during the overcorrection for clapping condition, and decreased during reversal. This finding is similar to that of Rollings, Baumeister and Baumeister (1977) who found an increase in the rate of head nodding and the severity of self-hitting during an over-correction procedure for rocking. Rollings et al. labeled this emotional behavior, and demonstrated that there was a direct relation between closer proximity of the trainer to the subject and increases in emotional behavior (the inverse was true for the targeted response). Emotional side effects were also noted by Epstein et al. (1974) for one subject who exhibited more inappropriate vocalizations when the rate of inappropriate foot movements was decreased through overcorrection. These findings suggest that
those who employ overcorrection should examine other nontargeted behaviors for possible side effects. Further research is needed on the suppression of these effects concurrent with the use of the overcorrection procedure.

While the data on Rhoda's mouthing as a nontargeted behavior might be examined for side effects, it may be more appropriate to regard the decrease in mouthing during overcorrection for growling as the effect of intermittent punishment of mouthing. Since the finger movements overcorrection for growling procedure consisted of switching the hand employed for each successive overcorrection, any mouthing occurring at the same time was often punished. Therefore, since mouthing was a high rate behavior which was often punished by the arbitrary nature of the overcorrection for growling procedure, the changes in the rate of mouthing were directly manipulated by the experimenter and probably should not be labeled as side effects.

The results of the present study add to the growing number of questions about the overcorrection package procedure. These findings however, need validation in further research using adaptive behaviors as the overcorrecting responses. It is possible that adaptive behaviors, because they have a high probability of being reinforced outside the experimental situation, might increase in frequency as a result of such reinforcement (despite the aversive practice during treatment). Negative side effects have only been reported when the overcorrection responses were
not likely to produce reinforcement outside the experimental situation. Thus, further research is needed on the effects of overcorrection procedures on other behaviors.

While it is not disputed that overcorrection is often very effective in decelerating a target behavior, the rationale for employing overcorrection instead of alternative deceleration techniques is unclear. Popular appeal may be one argument favoring the use of overcorrection procedures. The fact that a stated goal of the overcorrection procedure is to re-educate and not simply punish the client, regardless of the lack of data supporting that claim, may make the use of overcorrection more acceptable to the public than other treatments. It is the responsibility of the scientific community, however, to see that this claim is substantiated. In light of the present results, it is evident that re-education should be defined, programmed into the procedure, and documented if overcorrection is to be employed.
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