

## MULTIFACETED BEHAVIOR THERAPY OF SELF-INJURIOUS BEHAVIOR

JOSEPH R. CAUTELA\*

Boston College

and

MARY GRACE BARON

Boston State Hospital

**Summary**—Learning principles were used to overcome the severe self-injurious behavior (eye-poking and lip- and tongue-biting) of a 20-yr-old male, diagnosed as schizophrenic. In individual treatment sessions, relaxation, thought-stopping and desensitization were used to render stimuli antecedent to self-injurious behavior ineffective. Withdrawal of reinforcement and covert sensitization were used directly to diminish self-injurious behavior. Reinforcement (overt and covert) and instruction were employed to teach appropriate behaviors. Three shifts of ward staff were instructed and monitored in the application of reinforcement principles. Self-injury ceased after 3 months. Nine months later the patient was discharged. A 2-yr follow-up indicates no recurrence of the maladaptive behavior and a normal adjustment.

THE DEVELOPMENT of self-injurious behavior has been examined in operant laboratories. Conditions are established so that a stimulus which is ordinarily aversive (e.g. shock, white noise) is made to be reinforcing (Ayllon and Azrin, 1966; Brown, 1965; Hendry, 1969, p. 358; Honig, 1966, p. 418; Sandler and Quagliano, 1964). In such cases, the aversive stimulus is presented only when a reinforcer is also presented, so that the aversive stimulus becomes a discriminative stimulus associated with reinforcement. The presentation of the aversive stimulus then does not result in avoidance behavior but may lead to increase of response frequency. Anyone observing these subjects administering aversive stimuli to themselves would call the behavior "masochistic" were he not aware of the conditioning history. These studies support the behavioral analysis of cases of self-injurious behavior.

Behavior therapy efforts to deal with self-injurious behavior have usually centered upon a punishment paradigm in which strong aversive

shock is made contingent upon the occurrence of self-injurious behavior (Marks, Rachman and Gelder, 1965; Tate and Baroff, 1966). Other studies (Bucher and Lovaas, 1968; Lovaas *et al.*, 1965; Risley, 1968) have demonstrated that the withdrawal of social reinforcement (when self-injurious behavior occurs) combined with the administration of electric shock (when the behavior occurs) more effectively decreases it.

This paper describes the application of behavior therapy techniques to the treatment of a severe case of self-injurious behavior (eye-poking and lip- and tongue-biting). This case was unique because of the combination of the following features:

(1) The patient was hospitalized and diagnosed as "schizophrenic" by previous therapists. "Schizophrenic" was also the diagnostic label used by the staff in the hospital in which the treatment occurred.

(2) The senior author was informed that if the self-injury continued, the patient would be dead in 3 months.

\*Requests for reprints should be addressed to Joseph R. Cautela, 10 Phillips Road, Sudbury, Massachusetts 01776.

(3) A number of other therapeutic attempts (including insight therapy and a methodologically inappropriate reinforcement therapy) had failed to modify the patient's behavior.

(4) Usually with severe cases of self-injurious behavior aversive electric current is used. Rather a wide gamut of procedures (e.g. covert sensitization, thought-stopping, desensitization, reinforcement sampling) were employed not only to control the self-injury, but also to reinstate appropriate social behaviors.

(5) Treatment techniques were taught to and applied by a number of personnel in the therapeutic environment of the patient.

(6) The notoriety of the case invited close public examination and following of the progress of therapy.

(7) It has been well over 2½ yr since the patient has engaged in inappropriate behavior and he seems well-adjusted.

### CASE HISTORY

When our treatment began, this single, 20-year-old, white, male college student had been engaging in eye-poking for 16 months and lip-and tongue-biting for 6 months. A description of early history and family relations is not included here for reasons of privacy and because this information in no way determined our treatment procedures. Two years before treatment, the patient had withdrawn from school because he was failing his courses and found life at the university meaningless. He had worn contact lenses for a number of years, but claimed he had never become fully adjusted to them and had to remove them 3 or 4 times a day. His eyes had begun to irritate him, so that he began to rub them continuously. The irritation persisted, and after a team of ophthalmologists had found no cause for the irritation, the patient announced to the doctors and to his mother that he nevertheless had urges to rub his eyes very hard. During the next few weeks, he would often retire to his room and reappear before his mother with his eyes red and swollen. Eventually, he began jabbing his eyes with his thumb.

At this time, the mother sought psychiatric treatment for him.

For the first 3 months during which he exhibited eye-poking, the patient was seen in private therapy and diagnosed as obsessive-compulsive. His self-injurious behavior increased, however, and he was then hospitalized for 1 month for a series of electro-shock treatments. The frequency and severity of poking further increased, and he was transferred to another private hospital where he was placed under constant observation and was seen by a psychiatrist 2 or 3 times a week.

During an 11-month stay at this hospital, the self-injurious behavior increased and his admission diagnosis of "borderline state with psychotic decomposition" became "schizo-affective". Attempts to suppress poking by putting the patient in arm restraints resulted in the new self-injurious behavior of biting the lips and tongue. A wide variety of drugs (Chloralhydrate, Thorazine, Artane, Elavil, Mellaril, Librium, Paraldehyde and Stelzaine) were administered, often in large doses, but self-injurious behavior continued at a high rate.

Financial pressures necessitated transfer of the patient to a state hospital. Even though he was again on constant observation and in weekly private therapy, his first 2 months there were marked by increased biting and poking. In the third month, the patient was transferred to a surgical ward for sleep therapy. After 2 weeks of this, he exhibited some "grogginess" but continued poking, causing further damage to his eyes. The patient's eyes were then stitched shut to prevent further damage. He was kept almost constantly in arm restraints, with a tongue-blade depressor in his mouth securely tied to his head.

At the time of our intervention, the patient had been diagnosed as "schizophrenic" by the psychiatrist in charge of the case. He was poking and/or biting almost daily. He had completely lost the sight of one eye and inflammation of the other eye prevented a definite assessment of its status. He had completely bitten off some lower lip tissue and a considerable portion of the

upper lip. Resultant scar-tissue formation had reduced the size of his mouth opening to one-half. He displayed swelling and bleeding of the eyes and face, dripping of saliva from the mouth, and nearly continuous shaking or jerking of his body. The hospital staff reported that all dealings with him were highly unpleasant. His increasing self-injury and lack of responsiveness to treatment created a common opinion among the staff that any further therapeutic attempts would be futile.

### PLANNING THE TREATMENT PROGRAM

By the time we started treatment, the patient was completely blind. The damage was later shown to be so extensive that even corneal transplants could not restore vision. The main aim of our treatment program was to eliminate the self-injurious behaviors of poking and removing particles of his eyes and biting off lip and tongue tissue. Another goal was to have the patient discharged and able to lead a "happy", fruitful life.

In designing treatment we assumed that: 1. Particular stimuli elicited the self-injury; and 2. The consequences of self-injury maintained the behavior. Effective treatment would have to render the controlling stimuli ineffective and decrease the frequency of self-injury by removing all observable maintaining consequences (e.g. social reinforcement).

The senior therapist would meet the patient weekly in his private office away from the hospital grounds. Here he would introduce the self-control techniques (Cautela, 1969), assess treatment progress and adjust the program as needed. The co-therapist would meet the patient in his hospital room twice a day, 3 days per week, to practice the self-control procedures. She would also be available on the ward to direct staff behavior in a manner consistent with reinforcement principles.

The hospital administration and staff agreed to waive their usual treatment procedures and support the implementation of the behavior therapy program. Medical personnel (ophthal-

mologist, ward doctor, nurses) examined the patient periodically to assess his general health and to note any changes due to self-injury. The nursing staff on all three shifts recorded previously identified classes of the patient's behavior, e.g. social interactions, disruptive episodes.

### TREATMENT

The incidence of self-injurious behavior (i.e. the number of days on which such behavior was reported by the staff) shows three relatively distinct phases. During the first 2½ months (Phase I) both threatened and actual self-injurious behavior occurred at a high rate. During the 5

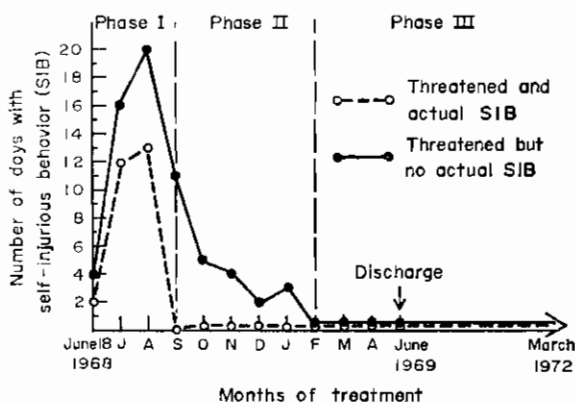


FIG. 1. Frequency of threatened and actual self-injurious behavior during treatment and follow-up (2½ yr after termination of treatment).

months of Phase II, there was no self-injurious behavior, and threats of self-injury decreased. No self-injury either occurred or was threatened in the final phase (5 months).

### PHASE I

During this phase, treatment focused on diminishing self-injurious behavior. The stimulus conditions of self-injury were so varied and pervasive that episodes were reported in the day, at night, in social situations, during inactive periods, and at times when the patient reported feeling tense and restless. The behavior itself, however, was always preceded by an "urge", i.e. a thought or feeling that he must poke (or bite) immediately. The behavior varied little in form or duration, but invariably resulted in bleeding, loud protests of pain from the patient, which

would move the staff or other patients to intervene.

#### *Individual treatment sessions*

*Rationale.* The patient was told that the authors did not regard him as "schizophrenic" or "psychotic", but rather as someone who was engaging in certain inappropriate behaviors which led to and maintained his removal from society. Also, it was explained to him that he engaged in self-injurious behavior not because he was a "masochist" or enjoyed the pain, but that his self-injurious responses were strong, learned habits that he needed to unlearn. The patient thought the rationale was logical and agreed to try to practice the techniques. He warned, however, that we should not be too optimistic, for "nothing seems to work on me".

*Relaxation and thought-stopping.* In order to weaken the association between the antecedents of poking (e.g. having an "urge", being restless), and actual self-injurious behavior, the patient was taught relaxation and instructed to use it whenever he had an "urge" or felt tense. Thought-stopping (Wolpe, 1969) was demonstrated by stopping the thought, "I've got to poke", and the accompanying behavior of lifting his right arm toward his eye. The patient was urged to practice these techniques as often as he could, and particularly whenever he felt tense or nervous.

*Covert sensitization.* Covert sensitization (Cautela, 1969) was used to decrease the actual self-injurious behavior. For example, the patient was instructed to imagine a sequence of events leading up to biting his lips. As soon as he reported he could clearly imagine having an "urge" to bite, he imagined that he felt sick to his stomach. The covert sensitization trials were alternated with trials in which he imagined a sequence of events leading up to the injurious behavior, but in which he resisted the "urge" and felt good.

*Strengthening behaviors incompatible with self-injurious behavior.* Since feeling calm and relaxed was a desirable behavior, *covert reinforcement* (Cautela, 1970) was used to increase its

probability. Reinforcers listed by the patient on the Reinforcement Survey Schedule (Cautela and Kastenbaum, 1967) included items inaccessible to him because he was confined to a hospital (e.g. dating) or because of his physical condition (e.g. eating fried chicken). *Reinforcement sampling*, a technique recommended by Ayllon and Azrin (1969, pp. 75-122) to increase familiarity with potential reinforcers, was also done in imagination. *Covert reinforcement sampling* was continued throughout all treatment phases.

*Contracting* (Homme, 1970) was used to insure that the patient practiced his assigned homework, e.g. if he reported practicing each technique 10 times, a session with the co-therapist could be spent discussing only pleasant scenes or in conversation. Also a contract was drawn up stating that when a 2-month period with no self-injurious behavior had occurred, plans for plastic surgery of the lips would be initiated.

While discussing the fear-producing situations in his life, the patient reported that because of his appearance and his inability to see, he was very much afraid to meet new people. *Systematic desensitization* was employed to combat this fear. After 2 weeks, when he reported he could imagine the top item in the hierarchy and not feel anxious and he said he was comfortable in social situations, desensitization was discontinued.

#### *Participation by the ward staff*

Since it was important to decrease the probability of social reinforcement for the self-injurious behavior, the co-therapist instructed the ward staff in: (1) the experimental analysis of the patient's behavior, which soon led them to view the self-injurious behavior as an operant, (2) the self-control techniques being taught to the patient in the individual sessions which demonstrated that the same rationale was the basis for individual treatment and ward programs, and (3) appropriate ways of responding to self-injurious and disruptive behavior.

For example, a particularly disruptive behavior was the patient's yelling in loud, excited tones for "help to keep from biting". Usually in this situation, all staff and even some patients would drop anything they were doing and go to his assistance. They were now instructed to quietly approach the patient and escort him back to his room, reminding him to use his self-control techniques and contracting to come and spend time with him when he was in control. Figure 2 shows the number of loud requests for staff aid before and during the proposed treatment. With the removal of some of the social reinforcement, the number of demands temporarily increased (the "extinction effect" (Reynolds, 1968, p. 28)). On the fourth day of extinction, the behavior did not occur. However, reinforcement by one staff member on the fifth day temporarily increased the behavior. After 7 more days of extinction the behavior decreased to zero and never re-appeared.

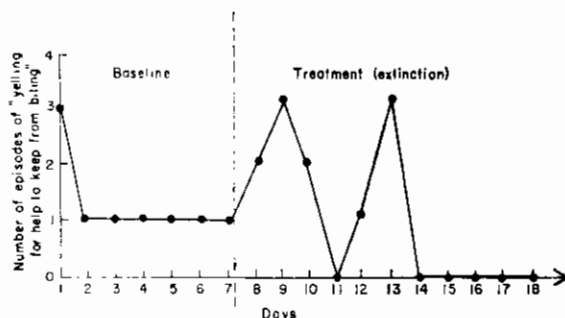


FIG. 2. Baseline and extinction frequencies of loud requests for staff aid.

### Treatment effects

At the end of Phase I, threatened self-injurious behavior continued at a high rate (see Fig. 2) and the patient continued to report constant "urges" to poke or bite. However, the actual behavior ceased, and the amount of shaking, jerking, fidgeting behavior was greatly reduced. The staff reported that the patient seemed calm in social interactions, but he was still very

demanding, disruptive and "spoiled".

In order to combat the general sluggish behavior of the patient and to increase the probability of mobility and alertness, and, in general, to facilitate learning, the patient's Thorazine was reduced from 300 to 50 mg twice daily.

## PHASE II

This 5-month phase emphasized more practice in self-control techniques. On September 1 the physician reported no new lacerations of the patient's tongue since the last weekly exam. However, many convulsive-like behaviors that characteristically preceded and accompanied self-injurious behavior endured. Such behaviors were sufficiently similar to self-injurious behavior to be labelled by the staff as self-injury and are charted in Fig. 1 as "threatened but not actual self-injurious behavior". The continuance of these behaviors, though not self-injurious, increased the ward staff's aversion to the patient, and thus increased the danger of reconditioning of the self-injurious behavior. Therefore, we planned the elimination of these disruptive behaviors by thought-stopping and covert sensitization. Incompatible behaviors (e.g. sitting calmly, playing the guitar) would be reinforced by therapists and staff.

### Individual treatment sessions

Thought-stopping and covert sensitization were applied to the antecedent behaviors of "feeling miserable" and having an "urge" to bite or poke. Whenever the patient said he had done his homework and the staff reported a decreased number of "urges", the rest of a session was spent in pleasurable practice—relaxation and covert reinforcement.

These sessions also focused on analysis of ward problems arising from the patient's demanding behavior or from the behavior of some of the staff. *Behavioral rehearsals* were done to teach the patient how to handle these social problems, e.g. asking for something diplomatically. *Reinforcement sampling* was con-

tinued to strengthen behaviors incompatible with self-injury. For example, recorded books and a record player were loaned from the local library for the blind; an instructor of the techniques of daily-living for the newly blinded was recruited; and the patient's own clothes and a guitar were brought from his home.

#### *Participation of the ward staff*

The staff were quite consistent in removing all reinforcement for his convulsive-like behaviors, and in engaging him in conversation or somehow paying attention to him whenever his behavior was appropriate. He was assigned a daily ward job and was highly reinforced by the staff for carrying it out.

#### *Treatment effects*

Throughout Phase II, the physicians reported no new injury to eyes or mouth. The number of convulsive-like episodes decreased, and the patient reported only occasional "urges" to "just touch my eye or tongue, but not to poke or bite". The staff reported that the patient was much easier to deal with, more friendly, and more interesting.

### PHASE III

No destructive or disruptive behaviors were reported by the patient, the ward staff, or the physicians from the ninth month of treatment until discharge. Treatment concentrated on: (a) eliminating any maladaptive thoughts reported by the patient, (b) sampling of reinforcers outside the hospital, and (c) arranging corrective plastic surgery.

#### *Individual treatment sessions*

The patient often wondered whether he might sometime poke again even though he no longer had urges to do so. A *thought-stopping* session dealing with these thoughts was tape-recorded and the patient played the tape whenever he had the thoughts. *Reinforcement sampling* included renewing old acquaintances, exploring career choices and eating in restaurants. All medica-

tions were eliminated and never again reintroduced. In keeping with the original *contract* (i.e. plastic surgery of the lips after 2 months without self-injurious behavior), plans were drawn up for surgery during the eleventh month (even though the psychiatric staff prognosticated that as soon as plastic repair was completed the patient would probably again mutilate his lips). The operation was performed under local anesthesia. The patient recuperated on the surgical ward and was enthused at the prospect of increased eating, talking, and singing abilities, and at his improved appearance.

#### *Participation by ward staff*

The staff gave minimal reinforcement to any verbalizations about "disturbing" thoughts and continued to reinforce with attention and approval any appropriate behaviors of the patient, e.g. good grooming, friendly conversation.

#### *Treatment effects*

During this phase no self-injurious behavior was exhibited or even threatened. Disturbing thoughts were eliminated and the patient's appearance and social manner improved markedly. He remarked more frequently that he would like to be out of the hospital for good.

Throughout treatment, he was given the hope that a corneal transplant might restore vision to his one eye. However, the consulting ophthalmologists pronounced his eye damage as irreversible.

After working (without pay) as a receptionist in the medical building for 1 month, he was discharged in June, 1969 (1 yr after treatment began), with instructions to contact us if any problem behaviors developed. Three months after discharge, he began a 16-week rehabilitation program for adjustment to blindness. During his stay at the rehabilitation center, the staff reported that he was well-adjusted. Upon completion of the program, he was interviewed and accepted by a major university to continue his undergraduate studies. Recently he married. The authors attended the wedding, and the

patient, his wife, and his mother all reported that he was enthusiastic about the future and very happy.

### DISCUSSION

This case illustrates how, in clinical practice, a wide variety of procedures can, and often must, be employed. Of course, this makes it impossible to assess the overall effects of any one procedure.

A clear lesson that emerges from this case is the extent to which the treatment of a hospitalized patient depends upon the co-operation of ward personnel. Another lesson is that labelling such cases as "hopeless" and "schizophrenic" should not deter therapists from applying behavior modification procedures.

An unusual feature of this treatment was that electrical aversion therapy was not used. When the therapist can arrange it, covert sensitization is probably preferable since it entails features of self-control. A drawback, however, is that covert sensitization may require more time and greater numbers of trials. In some cases, it may be necessary immediately to use electrical aversion to prevent permanent injury or death.

Though we received a great deal of co-operation throughout the entire hospital, the effects of the program would have been maximized if it had been conducted in a behavior modification ward. However, the favourable outcome demonstrates the practicality of behavior modification even within a non-behaviorally oriented institution.

### REFERENCES

- AYLLON T. and AZRIN N. H. (1966) Punishment as a discriminative conditioned reinforcer with humans, *J. exp. Analysis Behav.* 9, 411-49.
- AYLLON T. and AZRIN N. (1969) *The Token Economy*, Appleton-Century-Crofts, New York.
- BROWN J. S. (1965) Theoretical note: A behavioral analysis of masochism, *J. exper. Res. Person.* 1, 65-70.
- BUCHER B. and LOVAAS O. I. (1968) Use of aversive stimulation in behavior modification, *Miami Symposium on the Prediction of Behavior, 1967: Aversive Stimulation* (Edited by JONES M. R.), pp. 77-145, University of Miami Press, Coral Gables, Florida.
- CAUTELA J. R. (1969) Behavior therapy and self-control: Techniques and implications, *Behavior Therapy: Appraisal and Status* (Edited by FRANKS C.), pp. 323-340, McGraw-Hill, New York.
- CAUTELA J. R. (1970) Covert reinforcement, *Behav. Therapy*, 1, 33-50.
- CAUTELA J. R. (1971) Covert conditioning, *The Psychology of Private Events* (Edited by JACOBS A. and SACHS L. B.), Academic Press, New York.
- CAUTELA J. R. and KASTENBAUM R. (1967) A Reinforcement Survey Schedule for use in therapy, training and research, *Psychol. Rep.* 20, 1115-1130.
- HENDRY D. (1969) *Conditioned Reinforcement*, Dorsey Press, Homewood, Illinois.
- HOMME L. (1970) *How to Use Contingency Contracting in the Classroom*, Research Press, Champaign, Illinois.
- HONIG W. (1966) *Operant Behavior*, Appleton-Century-Crofts, New York.
- LOVAAS O. I., FREITAG G., GOLD V. J. and KASSORLA I. C. (1965) Experimental studies in childhood schizophrenia: Analysis of self-destructive behavior, *J. exp. Child Psychol.* 2, 67-84.
- MARKS I. M., RACHMAN S. and GELDER M. G. (1965) Methods for assessment of aversion treatment in fetishism with masochism, *Behav. Res. & Therapy* 3, 253-258.
- REYNOLDS G. (1968) *A Primer of Operant Conditioning*, Scott-Foresman, Atlanta.
- RISLEY T. R. (1968) The effect and side-effect of punishing the autistic behaviors of a deviant child, *J. appl. Behav. Anal.* 1, 21-34.
- SANDLER J. and QUAGLIANO J. (1964) *Punishment in a signal avoidance situation*. Paper read at the Southeastern Psychological Association Meeting, Gatlinburg, Tennessee.
- TATE B. G. and BAROFF G. S. (1966) Aversive control of self-injurious behaviour in a psychotic boy, *Behav. Res. & Therapy*, 4 281-287.
- WOLPE J. (1969) *The Practice of Behavior Therapy*, Pergamon Press, New York.

(First received 16 June 1971; in revised form 6 February 1973)