

## BEHAVIORAL CONTROL OF OVEREATING

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(Received 12 May 1967)

**Summary**—A behavioral treatment for overeating, utilizing operant and respondent conditioning techniques, is described. To date, all eight patients with whom this treatment has been employed have been successfully treated and no negative secondary reactions have been observed.

OBESITY is well-recognized as a major health hazard. Only two common characteristics have been observed in obese persons: a tendency to overeat and a tendency to under-exercise (U.S. Public Health Service, undated). While obesity has been ascribed to various causes (Bychowski, 1950; Hamburger, 1951; Deri, 1955; Stunkard, 1959; Mendelson, 1966), the treatment of overeating has been successful when it is based solely upon a functional analysis of the maladaptive response (Ferster *et al.*, 1962). The present paper presents Ferster's approach in somewhat modified form and reports upon the clinical results to date.

### SELF-CONTROL

Man clearly controls his own behavior so as to achieve his own objectives. The source of this control is commonly ascribed to central adaptive mechanisms ranging from the ego to the conscience. From a behavioral point of view, self-control is an inference drawn from the functional relationships among observable responses (Bijou and Baer, 1961). The behavioral processes involved in a person's control of himself are the same as those one would use in controlling the behavior of others (Skinner, 1953).

The first step in self-control is a precise analysis of the response to be controlled and its antecedent and consequent conditions. An analysis of overeating would naturally include a precise description of the topography of the response, the conditions under which it occurs, and its consequences. The second step is the identification of behavior which facilitates eating a proper amount of food (including behavior which interferes with overeating). The third step is the identification of positive or negative reinforcers which control these behavior patterns. A reinforcer can be identified for every response, using Premack's principle ("Of any two responses, the more probable response will reinforce the less probable one;" Premack, 1965). Thus a reinforcer is always available for any desired response, independent of the topography of that response. The fourth step requires the application of the reinforcement to alter the probability of the preselected response (Homme, 1965). The outcome of self-control can be termed "contingency management" and is designed to increase the frequency of desired overt or covert responses while decreasing the frequency of undesired responses.

## STRUCTURE OF TREATMENT

Treatment sessions are scheduled three times per week, usually last for approximately 30 min, and extend over a 4- to 5-week period. Subsequent sessions occur as needed, but usually at intervals of 2 weeks for the next 12 weeks. "Maintenance" sessions are scheduled as needed, while follow-up sessions occur on a planned monthly basis. The logic of scheduling frequent sessions at the start of treatment is that it is assumed that learning can occur most efficiently when teaching occurs in massed trials. As sessions become less frequent, more relevant experience is accumulated than can be fully discussed, and too much irrelevant or competing experience is accumulated. Massed sessions at the start also increase the opportunity for monitoring the patient's performance, which helps to make success more likely. It is essential that the patient encounter immediate success, for "if the self-contingency manager does not get reinforced for self-management, extinction will occur" (Homme 1965).

## INITIAL INTERVIEW

The initial interview combines the processes of behavioral assessment with the establishment of a working therapeutic contract. All techniques utilized in each session are explained to the patient, along with a discussion of their rationale. In this way, the patient is able to focus his attention upon a particular routine and can work with the therapist in finding ways of achieving greater success. He is also trained in a new method of describing his own behavior. "Rather than telling him to modify them (something which he may have already told himself), he is trained in the experimental analysis of behavior, and also in the variables which maintain it, or which he can recruit to modify it" (Goldiamond, 1965). No diagnostic formulations are entertained unless they are relevant to the current therapeutic contract, and all such formulations are communicated to the patient. A record is kept of all phases of the treatment, and this record is reviewed by the patient periodically. In addition to an anecdotal record of the treatment maintained by the therapist, two daily records are kept by the patient throughout therapy.

### 1. *Food Data Sheets*

These records account the time, nature, quantity and circumstance of all food and drink intake. Time is important as a means of determining the pattern of between-meal eating as well as the duration of scheduled meals. The nature and quantity of food consumed is important because of its obvious bearing upon weight gain. This entry includes the mode of preparation, e.g. broiled, fried, etc., often as much a source of unnecessary weight gain as the nature of the foodstuffs themselves. Describing the precise weight or volume of foods is useful not only as a monitoring procedure, but because it requires a slight interruption in the normal chain of eating responses. Finally, knowledge of the circumstances under which eating occurs provides clues to the ways in which it can be controlled, through identification of the current controlling conditions. Such factors as tension, solitude, cleaning up, reading or watching television are commonly associated with excessive eating. When this is known, it is possible to take steps to change the responses to these stimuli.

### 2. *Weight Range Sheets*

The patient's weight range is important because it consists of a running record of fluctuations in gross body weight. Weight is to be recorded before breakfast, after breakfast, after lunch, and before bedtime. There is a natural reduction of weight during the night as

energy is expended in maintaining body functions such as breathing, temperature regulation and heartbeat, while food and liquid consumption are almost nil. This weight is gradually regained during the day as caloric intake exceeds caloric expenditure. Obesity occurs because the amount of food consumed is in excess over that which is needed for energy. This gross weight is the target of the therapeutic program. Having the patient weigh himself four times daily serves as four daily reminders of the therapeutic program. In addition, the patient is provided with direct evidence of the effect of food and drink intake upon his weight. This serves as a periodic, mildly aversive stimulus associated with overeating.

*Additional data* is gathered in two areas. First, the patient is asked to list high probability behavior patterns, free operant responses which occur with high frequency and which, by implication, are positively reinforcing. For some patients, activities such as reading, talking to friends, watching television or reading the newspaper are readily available. For other patients, those suffering from a "behavioral depression," eating may be the only readily available high probability behavior. It may be necessary to help the patient to cultivate a reservoir of positively reinforcing responses. For example, two patients were helped to develop intense interests in caged birds and growing African violets. While these responses are not to be used until the fifth step in the treatment, it is essential to gather the necessary information at the beginning to allow time for the development of new interests. A second type of data, with the same eventual application, deals with the patient's most urgent, weight-related fears. For some patients, these fears concern ultimate physical consequences of overeating, such as cardiovascular disease or death from infection because surgery is impossible. For other patients, these fears concern social consequences, such as the loss of a mate or the total cessation of sexual experiences.

A weight-loss goal of from 1 or 2 lb/week is set during the initial interview. Greater loss of weight poses certain physiological hazards and creates the risk of food deprivation, while loss of less than 1 lb/week is not sufficiently reinforcing and is relatively ineffective. Finally, treatment recommendations are made in the first as well as all subsequent sessions, as needed.

*Behavioral curriculum—Step One.* Behavioral therapy, as an action therapy, emphasizes patient activity as a means of goal attainment. The first step in treatment, following introduction of the recording procedures, requires the patient to interrupt his meal for a predetermined period of time, usually 2 or 3 min which is gradually increased to 5 min. He is instructed to put down his utensils and merely sit in his place at the table for a specified period of time.

*Rationale.* The logic of this maneuver is that the patient is given an early experience of control over one aspect of his eating, however small, and learns that eating is a response which can be broken down into components which can be successively mastered. The reinforcement for success is immediate, and consists of the knowledge that the patient has taken his first step toward overcoming his compulsion. It is important that the patient be successful in his first step, and he is instructed to telephone the therapist if he encounters any difficulty. In such instances, the interval would be reduced to the point at which the patient can meet with success. The therapist is available by telephone at all times, in order to guard against any failure by the patient which might adversely affect his expectation of success.

## SECOND INTERVIEW

Each interview following the first has the same general format: The Food Data and Weight Range Sheets are discussed; the patient's progress with the behavioral curriculum

is discussed with abundant praise for success; and new steps are planned and put into operation with the patient's full participation. Patients are asked to anticipate any forthcoming stressful events in their lives, and this is followed by planning how to minimize the possibility of compensatory overeating.

As the Food Data Sheets are reviewed, the patient is asked if he sees any obvious changes which might be made. There are often suggestions for changing the mode of food preparation or for the substitution of a less-fattening substance for a particularly harmful one, such as sherbet in place of ice-cream. Changes are rarely suggested by the therapist, as *self-dosing* is an important prerequisite for complete self-control. At times, patients have been cautioned to be more temperate in their deletion of foods so as to reduce the possibility of deprivation.

*Behavioral curriculum—Step Two.* The patient is instructed to remove food from all places in the house, other than the kitchen. He is also instructed to keep in the house only those foods which require preparation, other than salad greens and the like, and he is instructed to prepare only one portion at a time.

*Rationale.* Much compulsive eating is "automatic," in the sense that the patient may be unaware of the fact that he is eating. If a series of actions is required prior to eating, the patient is forced to become aware of his behavior. Therefore, a trip to the kitchen and the task of food preparation are both reminders that eating is about to occur. This may be an effective deterrent. If not, the need for preparation of individual portions may serve as an effort which outweighs the reward of eating.

*Behavioral curriculum—Step Three.* The patient is instructed to make eating a "pure experience," that is, he is instructed to pair eating with no other activity, such as reading, listening to the radio, watching television or talking on the telephone or with friends.

*Rationale.* If the patient reads while he eats, he is most likely to want to eat while he reads, etc. If eating can be held separate from other behavior, it will not continue as a conditioned response to the occurrence of this other behavior.

Confinement of the food to the kitchen and the elimination of other responses associated with eating are means of promoting stimulus control of the response. These are stimuli which set the occasion for eating. Additional steps, such as controlling the interval during eating, are designed to promote control of the proprioceptive or mediating stimuli inherent in the complex response of eating.

It should be noted that despite the rigors of steps two and three, no direct limitation of the type or quantity of food has been suggested. The goal of these steps is not the immediate reduction of food intake. Instead, it is to so manipulate the eating response as to make it more readily self-controlled, first by bringing it to awareness and then by disrupting its chaining to other behavioral responses.

### THIRD INTERVIEW

No new steps are suggested in the third interview, to avoid "overloading" the patient with behavioral prescriptions. Instead, following a review of his experiences, the patient's help is elicited in refining the steps which have been taken.

### FOURTH INTERVIEW

The first week of treatment will have been accomplished by this time. The Weight Record is therefore reviewed, and the first entry is made on a chart recording weekly weight changes. This chart is retained by the patient and serves as a reminder of progress. It should be noted that weight loss may be greater during the first 2 weeks of treatment than it

will be subsequently. This is probably related to the "honeymoon effect" of treatment and to the fact that the patient has a greater amount of voluble fat which is convertible to energy during this time. Accordingly, the patient is forewarned to anticipate a more gradual weight loss of between 1 and 2 lb weekly.

*Behavioral curriculum—Step Four.* Obese patients have been observed to eat very rapidly whenever they eat, so that large quantities of food are consumed in very brief periods. To slow the process of ingestion, the patient is instructed to put a small amount of food in his mouth, and to replace his utensils on the table until he has swallowed.

*Rationale.* This step is aimed directly at manipulation of the eating response, and success with this step is tantamount to direct control over the response. In addition to its control value, this step also helps the patient to derive more enjoyment from his food so that he can replace quantity with quality in his eating. Rapid eating not only leads to indigestion, but it also obviates the possibility for full enjoyment of the taste and aroma of food. By eating more slowly, the patient can improve his digestion and learn to savor his food. He may eventually achieve a normal state of satiation with less food intake. This step is easily followed at all meals, including those eaten socially, and has the added value of making the patient a more tolerable eating companion.

#### FIFTH INTERVIEW

Following all of the the normal interview procedures, the therapist enlists the patient's aid in identifying "danger periods" of between-meal eating. These are times of high arousal when "the probability of the most practiced response appearing is increased" (Pyke *et al.*, 1966). As eating is the most practiced response, it is highly likely to occur at these times. Training the patient in controlling eating under high arousal circumstances is tantamount to training him in temporal control of eating.

*Behavioral curriculum—Step Five.* The patient is instructed to engage in one of the previously identified high probability behaviors at times when he would normally eat. This is analogous to a procedure developed for the control of smoking: "If a response other than smoking can be conditioned to stimuli which ordinarily lead to smoking and the link between these stimuli and the response of smoking weakened, then it should become easier for the individual smoker to cut down his consumption or to quit entirely. That is, the smoker now has at his disposal an alternative response to smoking" (Pyke *et al.*, 1966). The patient is instructed to read the newspaper or to call a friendly neighbor at exactly 10:00 a.m. if eating occurs consistently at this hour. Similar alternative responses are planned for other times of the day which have been identified as periods of high arousal. Before embarking upon the substitute behavior, the patient is instructed to repeat the phrase: "I can control my eating by engaging in other activities which I enjoy."

*Rationale.* Between-meal eating is understood to be an important source of positive reinforcement for patients who overeat. They cannot be expected to forego this reinforcement without a substitute. The substitute has inherent reinforcing value (it is a high probability behavior) and it implies the occurrence of self-control which is reinforcing. Specifically, the patient learns a new response to stimuli which previously set the occasion for eating. In order to set the occasion for the emission of the alternate response, the patient is trained to verbalize the rationale for the procedure. Since this behavior is in the service of the patient's goal attainment, following the prescription adds a measure of reinforcement for the new behavior.

## SIXTH INTERVIEW

This session, like the fourth, is used to consolidate gains made to date. There is considerable discussion of ways of refining behavioral steps so as to maximize their effectiveness. By this time, patients are often active in planning their own curricula and have been ingenious in devising procedures of great value to themselves. For most patients, the behavioral curriculum is complete at this point, with subsequent sessions being devoted to refinement of the program, and with patient decisions about dietary changes. At the request of one patient, the service of a dietitian was contracted for an hour in which professional advice was obtained in careful food selection. This service is of help, but not essential.

## SEVENTH THROUGH TWELFTH INTERVIEWS

These sessions further refine the curriculum and reinforce progress. Two patients who encountered difficulty with the control of between-meal eating were offered one additional therapeutic step.

*Behavioral curriculum—Step Six.* Joseph Cautela (1966) has described the process of "coverant sensitization" in which the patient is trained to relax, then to imagine that he is about to indulge in a compulsion, then to imagine the occurrence of an aversive event.\* One patient found considerable difficulty in controlling the eating of a particular kind of cookie at specific times during the day. She was first trained in vivid imagery and then instructed to imagine eating her favorite cookie (taking it from the package, bringing it to her lips, hearing her teeth crunch as the cookie crumbles, tasting its sweetness, etc.), and she was finally instructed to immediately switch to the detailed image of her husband in the process of seducing another woman—a great fear which she had identified during the initial interview. This process proved highly successful in both instances of its use (requiring one session with one patient and two with the other) in reducing between-meal eating, without any disturbance of normal food intake. In short, it proved highly specific and powerful in its effect.

*Rationale.* In this treatment, the image of a forbidden object (CS) is paired with the image of an aversive stimulus (also a CS). The imagined aversive CS then forestalls the occurrence of the forbidden CS and ultimately interferes with eating. Two aspects of this procedure are of note. First, the patient demands the occurrence of a thought, or coverant (Homme, 1965). The reinforcement for the occurrence of the thought is the removal of the aversive stimulus. Second, salivation and the so-called "gustatory responses" are respondent behaviors. In this treatment, operant behavior (a thought) elicits fear which, in turn, prevents the elicitation of salivation.

## DISCUSSION

There are several differences between the approach described by Ferster and his associates and the procedure which has been presented here. Ferster's treatment is a purely operant procedure, while this treatment combines operant and respondent techniques. Ferster worked with his patients in groups, while the treatment described here is conducted

\* In the original work done with the patients discussed in this report, patients were told to imagine that they were actually tasting the forbidden food before then being told to imagine the aversive condition. In a personal communication, Dr. Cautela correctly labeled this a punishment procedure. It lacks the forward conditioning advantage of an escape or avoidance conditioning procedure in which the aversive condition is applied *before* commission of the compulsive act.

entirely on an individual basis. Finally, Ferster stressed the ultimate aversive consequences of obesity, while reference to these consequences was only incidental in the treatment described here.

The treatment is aimed at building the skill of the patient in being his own contingency manager. This is a self-control procedure which is reinforced through the patient's experience of success in the control of his own behavior, the reduction of the aversive consequences of a lack of self-control, and through considerable reassurance by the therapist. More occurred in the interaction between therapist and patients than the presentation of the curriculum and a review of progress. Reassurance was given as an antecedent to each new step and praise was given for success. More tightly controlled research is needed in order to isolate the contribution of the nonspecific interaction effect to total therapeutic outcome.

There are two essential features of this approach. First, treatment is offered specifically for the problem of overeating. No effort is made to distinguish the historical antecedents of the problem and no assumptions are made about the personality of the overeater. This is comparable to the treatment of anorexia described by others (Ayllon *et al.*, 1964; Bachrach *et al.*, 1965). Second, the specific format of the approach is based upon verbal behavioral assignments to be followed by the patient. These assignments can be translated into techniques of self-control because the patient receives both didactic discussion of the rationale and training in the analysis of his own behavior so that he can discern opportunities for the subsequent application of the techniques.

### TREATMENT RESULTS

This report covers all eight patients who received the therapy for whom 12 month follow-up data is available. Long-term data is a necessity, for the essential therapeutic problem is not the reduction of overeating but the stabilization of a reduced level of eating. Two patients began but did not complete treatment, and they have been excluded from this report. One woman became pregnant while the other, a probable psychotic, wanted another type of therapy and was dropped from this project following the second session. In general, all of these patients can be classified at the least disturbed points along the continua proposed by Mendelson (1966) and Hamburger (1951).

All of the patients are women, six of whom are married (see Table 1). Of the married patients, two have children. All are voluntary patients who were referred for private treatment. The patients initially weighed from a low of 172 to a high of 224 lb, and all were judged by their physicians to be obese.

Figure 1 presents the data covering the gross weight for each patient during the 12 months for which data is available. While the figures present an almost linear line of decrease, it should be noted that the time intervals cover 4-week periods during which fluctuations were common. In actuality, weight loss varied from as little as 6 oz to as much as 5 lb/week for individual patients. Most patients showed either diminished weight loss or slight weight gains during the weeks prior to menstruation and slightly exaggerated weight losses following menstruation. This is probably attributable to water retention associated with menstrual periods. An average overall weight loss of somewhat less than 1 lb/week was accomplished, and this is regarded as a reasonable expectation.

TABLE 1. AGE, MARITAL STATUS, WEIGHT LOSS AND NUMBER OF THERAPEUTIC SESSIONS OF EIGHT FEMALE PATIENTS RECEIVING BEHAVIOR THERAPY FOR OVEREATING

Patient	Age	Marital status	Weight loss over 12 months	Therapeutic sessions to date
1	37	M	46	19
2	21	S	38	24
3	41	S	29	30†
4	30	M	26	28
5	24	M	35	16
6	28	M	35	21‡
7	43	M	46	30
8	30	M*	47	41

\* Divorced during treatment.

† One covert sensitization session.

‡ Two covert sensitization sessions.

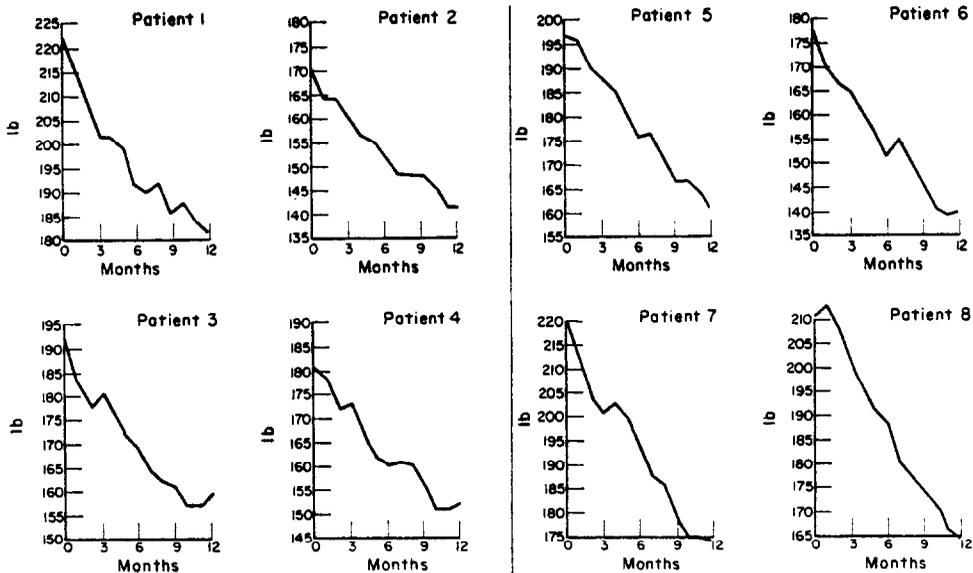


FIG. 1. Weight profile of eight women undergoing behavior therapy for overeating.

During the follow-up interviews at 9, 32 and 52 weeks, patients were asked to describe their current situations. Only one unusual situation was noted, one patient having obtained a divorce for which procedures were begun 1 yr prior to the start of treatment. Seven of the eight patients reported having an increased range of social activities, and three of the six married patients reported more satisfying relationships with their husbands. Three of the eight who were also compulsive smokers reported that they had self-applied the same general curriculum to smoking and either substantially reduced or eliminated smoking. While this evidence is in no sense conclusive, it suggests that "symptom substitution" has not occurred. Follow-up sessions were scheduled well in advance and undoubtedly served both as monitoring experiences and as added reinforcement for continuing the program. All patients knew of their inclusion in this clinical-research sample.

### REFERENCES

- AYLON T., HAUGHTON E. and OSMOND H. O. (1964) Chronic anorexia: a behavior problem. *Can. psychiat. Ass. J.* 9, 147-154.
- BACHRACH A. J., ERWIN W. J. and MOHR J. P. (1965) The control of anorexia by operant conditioning techniques. In *Case Studies in Behavior Modification* (Eds. ULLMANN L. P. and KRASNER L.). Holt, Rinehart & Winston, New York.
- BUJOU S. and BAER D. (1961) *Child Development I: A Systematic and Empirical Theory*, p. 80. Appleton-Century-Crofts, New York.
- BYCHOWSKI G. (1950) On neurotic obesity. *Psychoanal. Rev.* 37, 301-319.
- CAUTELA J. R. (1966) Treatment of compulsive behavior by covert sensitization. *Psychol. Rec.* 16, 33-41.
- DERI S. K. (1955) A problem in obesity. In *Clinical Studies of Personality* (Eds. BURTON A. and HARRIS R. E.). Harper, New York.
- FERSTER C. B., NURENBERGER J. I. and LEVITT E. B. (1962) The control of eating. *J. Math.* 1, 87-109.
- GOLDIAMDOND I. (1965) Stuttering and fluency as manipulatable operant response classes. In *Research in Behavior Modification* (Eds. KRASNER L. and ULLMANN L.), p. 153. Holt, Rinehart & Winston, New York.
- HAMBURGER W. W. (1951) Emotional aspects of obesity. *Med. Clin. N. Am.* 35, 483-499.
- HOMME L. E. (1965) Perspectives in psychology: XXIV control of coverants, the operants of the mind. *Psychol. Rec.* 15, 501-511.
- MENDELSON M. (1966) Psychological aspects of obesity. *Int. J. Psychiat.* 2, 599-610.
- PREMACK D. (1965) Reinforcement theory. In *Nebraska Symposium on Motivation* (Ed. LEVINE D.), p. 132. University of Nebraska Press, Lincoln.
- PYKE S., AGNEW N. M. and KOPPERUD J. (1966) Modification of an overlearned response through a re-learning program: a pilot study on smoking. *Behav. Res. & Therapy* 4, 197-203.
- SKINNER B. F. (1953) *Science and Human Behavior*. Macmillan, New York.
- STUNKARD A. J. (1959) Eating patterns and obesity. *Psychiat. Quart.* 33, 284-295.
- U.S. Public Health Service (undated) *Obesity and Health*. Public Health Service Publication Number 1485, Washington, D.C.