

THE URGE TO OVEREAT—THE INITIAL LINK

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Summary—Five overweight adult females were exposed to a weight reduction program based on the principle of response chaining. Under this program overeating was viewed as the terminal link in a chain of stimuli and maladaptive responses. Treatment was directed at the initial behavioral link of the chain—the urge to overeat (deviate from a prescribed diet). Following each urge the subjects wrote a series of sentences describing the desired food and questioning their motivation for overeating. For all subjects the urge to overeat was almost entirely eliminated during treatment and generally did not recur during longterm follow-up periods (six months and one year). Subjects lost a mean of 26.6 lb during treatment, which represented 34.6% of their total excess of weight. At a follow-up one year later the mean weight loss had gone up to 40.2 lb.

In many treatment programs for excessive consummatory behaviors, the target behavior is viewed as the terminal link of a chain of stimuli and maladaptive responses. The basis of these programs derives from Skinner's (1938) Law of Chaining according to which responses are capable of producing eliciting or discriminative stimuli for subsequent responses. All responses in the chain are maintained by the reinforcement derived by the terminal consummatory response. Thus, early responses which are temporally isolated from reinforcement should be weaker than later responses. Based on this analysis, maladaptive consummatory responses can be eliminated by disruption of the chain at some earlier point. Ideally the therapeutic intervention should be aimed at the initial response in the chain since this response will have the lowest strength.

With few exceptions, treatment programs for obesity have failed to consider this simple principle of chaining. A large number of behavioral studies have treated scale readings as the target problem, applying contingencies to weight change rather than to behavioral change (Harmatz and Lapuc, 1968; Mann, 1972; Bellack, Schwartz and Rozensky, 1974; Hall, Hall, DeBoer and O'Kulitch, 1977). While such procedures generally lead to more rapid weight loss than procedures involving no explicit external reinforce-

ment, long term follow-up data indicate that these differences do not endure (Hall, Hall, Borden and Hanson, 1975). Other investigators have recognized the need for direct modification of maladaptive eating behaviors and Mahoney (1974) has shown that reinforcement for habit change is more effective than reinforcement for weight loss. In his study the differences between these two procedures were large at termination of treatment and at a one-year follow-up.

Of the programs which include treatment of the eating chain, the covert sensitization procedure described by Cautela (1966, 1967) attacks one of the earliest behavioral links—approaching forbidden foods. Under this procedure subjects are asked to imagine themselves starting to consume forbidden foods and then vomiting copiously. During alternate scenes the subjects imagine themselves abstaining from forbidden foods which leads to relief of nausea and the onset of pleasurable sensations. Following treatment subjects report aversion for the target foods although the effect does not generalize to other forbidden foods and weight loss does not usually endure (for a review see Abramson, 1973).

Using the technique of stimulus narrowing, some investigators have attempted to eliminate the overeating chain altogether by controlling

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antecedent stimuli (Ferster, Nurnberger and Levitt, 1962; Stuart, 1967). Under this procedure subjects are instructed to restrict their consumption of food to a very small set of stimulus conditions. In addition, food is to be kept out of sight except when eating is scheduled to occur. In this way subjects would rarely be exposed to stimuli which elicit the eating chain. While this technique is not generally used in isolation, it has frequently been included in successful treatment programs (Abramson, 1973).

The present report describes a procedure based on the Law of Chaining for the treatment of obesity. As with stimulus narrowing, the present procedure is designed to interrupt the eating chain at its earliest link. However, rather than relying on the subject never coming into contact with elicitors of the chain, our procedure treats the subject's *initial* response to a forbidden food—the urge to eat it. If the subject's urge to eat a forbidden food can be eliminated, he can reduce and maintain his weight loss in an environment which is replete with potential elicitors of eating.

Our program also included cognitive exercises designed to focus the subjects' attention on their eating problems and their solution. Unlike covert programs (Homme, 1965), no contingencies were arranged for specific thoughts; nor were subjects asked to pair thoughts of eating with aversive scenes. The cognitive exercises were included merely as potential sources of motivation for the subjects (Sachs and Ingram, 1972).

METHOD

Subjects

Five adult female subjects were chosen from a group of twelve women who had volunteered to participate in a program for weight loss. All potential subjects were asked to fill out a check list on which they reported events which typically preceded and followed occasions on which they overate. In addition, each was interviewed by a psychiatrist who also attempted to determine antecedents and consequences of overeating. The five subjects chosen were alike in several ways. They all ranged from 30 to 47 yr of age, and had at least a 20-yr history of chronic overeating which had not been controlled by medical or psychiatric intervention. Their mean weight was 200 lb and they were on the average 40% overweight, based on the Metropolitan Life Insurance Company tables of 1959. Data for individual subjects are presented in Table 1. All subjects were under the supervision of their personal physicians who provided the diets to be used in the treatment.

Procedure

The subjects attended eight weekly meetings with the first author in his office. The meetings were used to describe the treatment program and to teach self-monitoring and self-management techniques. In addition, the subjects discussed their progress and experiences with the treatment program. Follow-up contacts were made with all subjects one month, six months and one year after treatment.

The subjects were weighed twice at the beginning of treatment and after eight weeks of treatment. They were encouraged not to weigh themselves but to concentrate on the behaviors leading to overeating.

Baseline. Each subject received a wrist-counter (Ford Mfg.) which she was instructed to wear during waking hours. The counter was used to record urges to overeat, which were defined in three ways:

- (1) The urge to eat any food not included in the diet.
- (2) The urge to eat foods permitted in the diet but at a time or place not permitted.
- (3) The urge to eat portions of food greater than those prescribed in the diet.

Subjects reported the daily frequency of urges and time of rising and retiring by calling a telephone answering machine each evening. At the weekly meetings they were shown plots

Table 1. Individual subject data

Subject	Age	Duration of weight problem (yr)	Weight (lb)	Overweight (%)	lb Lost in 8-week treatment period	% Overweight lost
1	44	35	215	49	30	28
2	30	20	164	30	22	45
3	47	20	125	20	10	40
4	47	20	192	38	26	35
5	45	35	304	61	45	25
X	42.6	26	200	39.6	26.6	34.6

of their daily rates of overeating urges (urges per minute). The data were plotted on semi-log paper (3 cycles \times 150 divisions) in order to magnify small deviations from zero urges. In the later stages of treatment a single urge produced a large increment on the graph which looked to the subject like an alarming return to previous overeating behavior.

In addition to recording urges to overeat, each subject was instructed to keep a daily written diary containing any material she felt was relevant to the treatment as well as any feelings she had as a result of the treatment. Diaries were collected at the weekly meetings but the experimenter did not discuss their contents with the subjects. Subjects recorded urges and wrote diaries during the 10 days of baseline and all subsequent stages of treatment.

Intervention A. Following the baseline period the subjects were instructed in stimulus control strategies for altering eating habits and were presented with the following rules:

- (1) I must always eat in the same place when at home.
- (2) I must eat small pieces of food, chewing very

thoroughly.

(3) If I feel the need for a snack, I will drink a glass of water.

(4) I will never eat while engaging in another activity such as talking on the telephone or driving a car.

No consequences were established for adherence to these rules which remained in effect throughout the duration of the study.

The subjects were also encouraged to devote a period of time each day to thinking about overeating, its role in their lives and its effects on their bodies. Specifically, each subject was asked to remove her clothing (while alone in her bedroom) and to look in a full-length mirror and become familiar with her body. While doing this she was to imagine herself overeating for one minute, concentrating on the feelings which accompany this behavior. No contingencies were established for this exercise, but the subjects were asked to complete it daily during this and the subsequent intervention period.

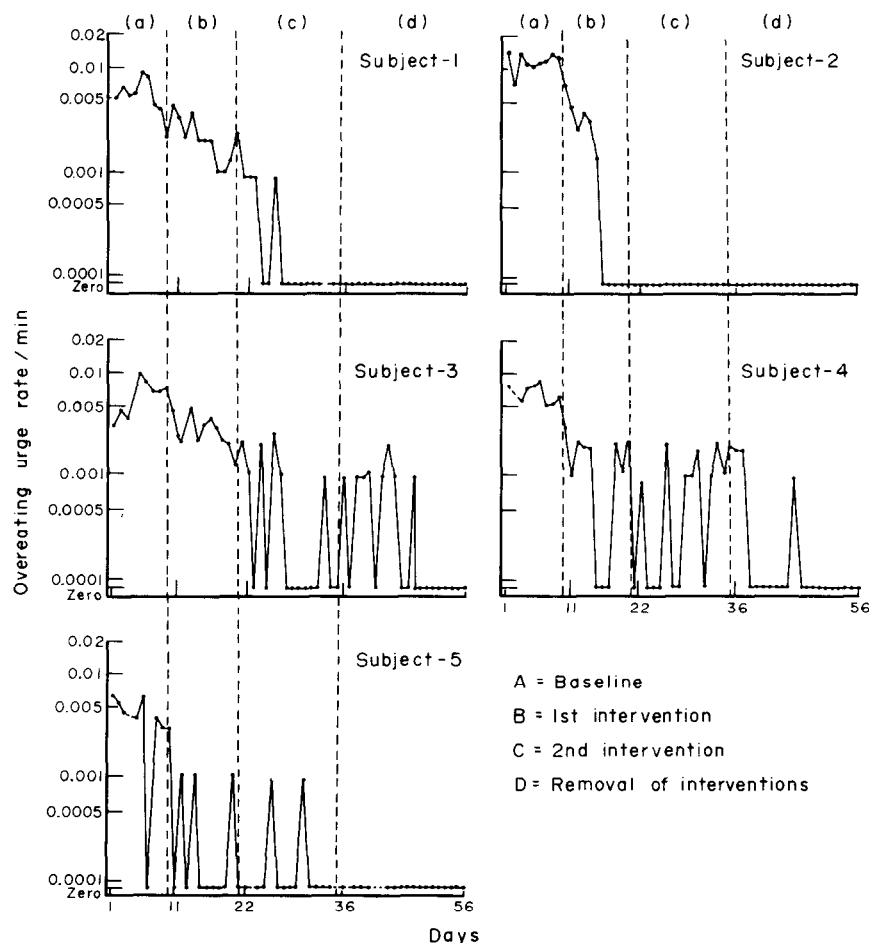


Fig. 1. Rate of urges to overeat (responses per min) for each subject as a function of stage in treatment. Data are plotted on semi-log coordinates. Missing data points are indicated by dotted lines.

Treatment for the urge to overeat was also initiated during this intervention period. Now, each time the subject experienced an urge, she was instructed immediately to write the following questions on one of the 3×5 index cards which she carried with her at all times:

- (1) Why do I want to eat this food when I entered this program to stop overeating?
- (2) Who am I fooling by eating this food?
- (3) Do I want to be overweight?

After writing these questions the subject clicked her wrist counter and consumed the food if she chose. This intervention was followed regardless of whether the food was eaten. Intervention A lasted 11 days.

Intervention B. During the second intervention, treatment for urges was modified by instructing the subject to write a full description (on 3×5 index cards) of the food she was having an urge to eat including: taste, smell, consistency and number of calories. Following this she was to write out the three questions listed above. Finally, the wrist counter was clicked. Again the subjects were instructed to carry out the full intervention regardless of whether the

food was eaten. Intervention B was continued for 15 days.

Removal of interventions. After 26 days of treatment for urges to overeat, the subjects were instructed to discontinue all interventions as well as the daily exercise. They were, however, told to continue to follow the rules for good eating habits and to record and report eating urges. They also continued to keep their diaries. The weekly meetings were conducted as usual during this 20-day period.

RESULTS

Urges to overeat

Rate of urges to overeat (urges per min) is plotted in Fig. 1 on semi-log coordinates as the subject saw it. The same data are plotted on linear coordinates in Fig. 2. Days when subjects failed to call in their data are indicated by dotted lines on the graphs. As can be seen in both figures

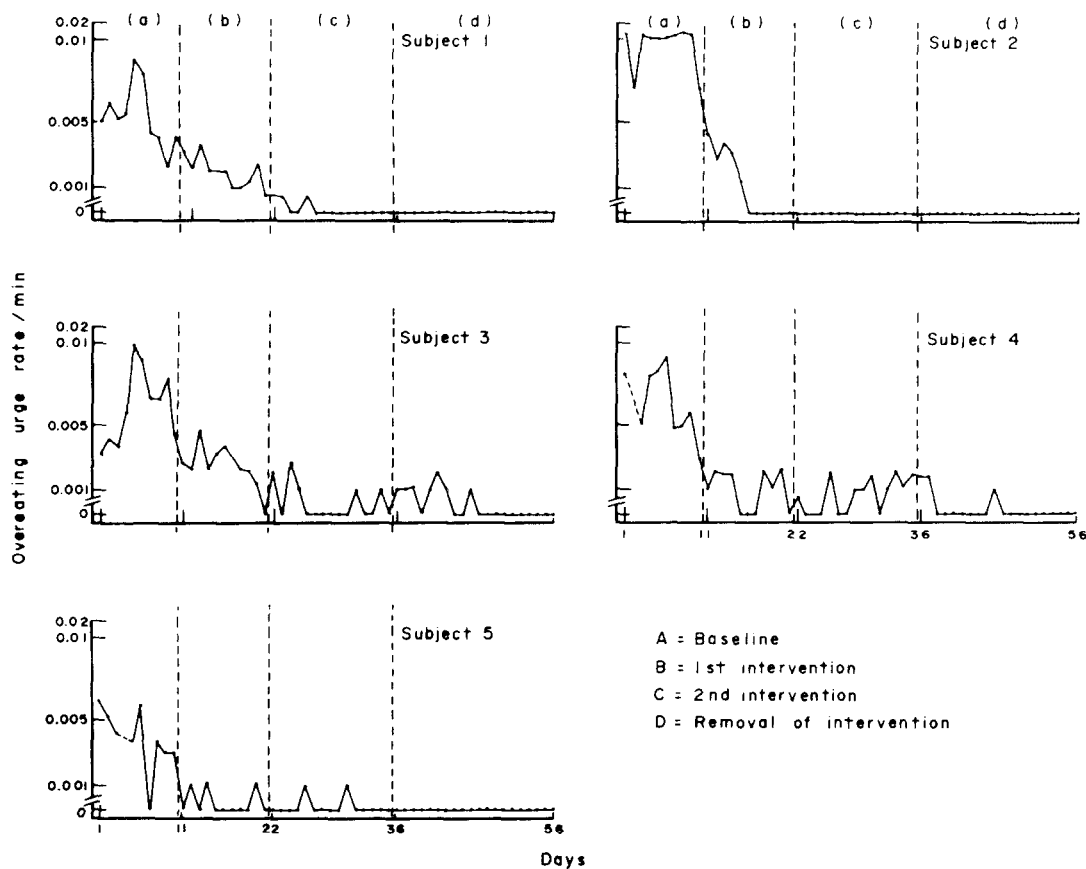


Fig. 2. Rate of urges to overeat (responses per min) for each subject as a function of treatment. Data are plotted on linear coordinates. Missing data points are indicated by dotted lines.

no consistent trends developed during the baseline period. This finding is at variance with the majority of reports on the treatment of overeating in which subjects typically show a decrease in caloric intake and/or weight during self-monitoring baselines (cf. Mahoney, 1974). Weight, however, was not recorded during baseline in the present study, so subjects may have shown some weight loss during this period even though their urges to overeat did not decrease. This speculation is made more probable by the fact that all subjects completely stopped overeating by the end of the first intervention period even though overeating urges had not been completely eliminated. As shown in Fig. 2, rate of urges to overeat decreased strongly in all subjects during the first intervention and continued to near zero during the second intervention period. When all interventions were removed, overeating urges remained at zero or one per day. All subjects reported themselves free of urges to overeat in the one month and six months follow-up contacts, but one subject reported a return of urges in her one year follow-up report. This subject treated herself for this problem by resuming the first intervention procedure. She wore the wrist counter for three days and followed each overeating urge with writing the intervention. After the first day, urges ceased to occur, but she wore the counter for two more days.

Weight loss

Since weight loss was not the primary focus of treatment, subjects were not encouraged to weigh themselves. As a result weight loss cannot be shown as a function of stage of treatment. Recall, however, that all subjects reported that they had stopped overeating by the end of Intervention A. Furthermore there were significant changes in weight by the end of the eight-week treatment period. As indicated in Table 1 subjects had lost an average of 26.6 lb by this time. This weight change is more meaningfully expressed by a "reduction quotient" for each subject based on the pounds lost divided by the number of pounds overweight. This quotient

multiplied by 100 expresses the percentage of overweight pounds lost. Subjects in this study lost an average of 35% of their overweight during the eight-week treatment period, a figure which compares favorably with other treatment programs using this metric (Mahoney, 1974). When a subject attained her desired weight, she was instructed not to change the definition of an urge to overeat but to conform with a maintenance rather than a reducing diet, to be prescribed by her physician. At a follow-up one year later the mean loss of weight had gone up to 40.2 lb (Table 2).

Table 2. Weights at one-year follow-up

Subject	Weight (lb)	Total weight lost
1	173	42
2	131	33
3	114	11
4	154	38
5	227	77

Mean loss = 40.2 lb.

Introspective data

Although no attempt was made to modify the subjects' feelings about themselves and about dieting, analysis of the diaries and follow-up interviews revealed some interesting changes. During the baseline period all subjects expressed feelings of ugliness, disgust with body and mind, feelings of having a bad character and a sense of hopelessness about losing weight. During the first intervention period the group again showed some homogeneous experiences with respect to the program and themselves. These included: feelings of possible self-control; inability at times to see a connection between their heads and bodies when gazing in the mirror; difficulty in visualizing themselves not overeating even though all subjects expressed more positive feelings when viewing their bodies. During the second intervention period subjects uniformly found: "a new sense of control", feelings that they might be successful in learning self-control", and a very noticeable positive change in their figures. When the interventions were removed

all subjects felt a firm and secure sense of control over their minds and bodies. No anxiety was evidenced when interventions were removed and during this period all subjects found it difficult to imagine themselves overeating. After the six-month and one-year follow-up all subjects reported experiencing complete control over their eating behavior and feelings of new vigor.

DISCUSSION

All subjects in this study showed significant and enduring weight loss accompanied by complete elimination of urges to overeat. In addition, all subjects reported strong positive changes in their self-concept and in self-control. These changes resulted from a treatment program which combined behavioral and cognitive interventions. While the effects of the two types of intervention could not be separately analyzed, it seems unlikely that the cognitive exercises alone contributed in any specific way to the results since, unlike covert sensitization, they did not involve reinforcement or punishment for any particular thoughts. Furthermore, as Abramson (1973) has pointed out, cognitive conditioning has shown little promise as a means of altering specific eating behaviors. Rather, its function in the present study seems to be one of motivation. By devoting a period of each day to focusing on their eating problem, the subjects may have simply increased their awareness of their eating behavior (Sachs and Ingram, 1972).

The dependent variable in this study, the urge to overeat, responded strongly to response-contingent intervention consisting of the subjects immediately writing a description of the tempting food and three questions pertaining to overeating. The subjects also recorded each instance of the target behavior. This technique interrupts the normal eating chain which is initiated by the urge to eat and terminates with eating. According to Skinner's (1938) analysis of chaining all component behaviors of a chain are maintained through the reinforcement accrued by the terminal link (the consummatory response). Behaviors

prior to the terminal link are maintained by secondary reinforcers: discriminative stimuli in the presence of which the next behavior in the chain is reinforced. The farther a behavior is removed from primary reinforcement, the weaker its response strength. In the present study the target behavior (the urge to overeat) was made more distant from the terminal behavior by insertion of the intervention behaviors (writing and recording). In this way the response strength of the urge should be decreased. The urge to overeat may have also been weakened by the punishing properties of the intervention. That is, writing and recording may have been aversive to the subjects. Thus, their presentation contingent upon an urge to overeat may have punished the urge. Of course these two potential sources of control cannot be separately evaluated.

The subjects in this study were remarkable for their enthusiasm for the treatment program. This may have resulted from the program's unique feature of treating one of the most troublesome problems of dieting—urges to cheat and the necessity of defying one's strong desires to eat forbidden foods. While stimulus narrowing procedures help eliminate this problem by reducing temptation, it is unrealistic to expect to eliminate temptation entirely or for a long period of time. If instead subjects can learn to control their urges in the face of temptation, dieting becomes a relatively painless procedure. This feature of the present program makes it potentially valuable for individuals for whom the need to eliminate certain foods from their diet (e.g. sugar, cholesterol, sodium) is chronic and mortal. It also suggests the program for other obsessive behaviors which are initiated by urges, such as nail biting or obsessive rituals. The program has, in fact, been applied successfully to a case of nail biting and a case of obsessive fanticizing. It has also been used in the successful treatment of several additional overeaters by the present author (Yodin) and by four other practicing psychologists and psychiatrists.

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