

BEHAVIOR MODIFICATION IN THE TREATMENT OF OBESITY

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## INTRODUCTION

Obesity is a major health hazard in the United States. Obesity increases the risk of coronary heart disease, hypertension, atherosclerosis, gall bladder complications, and diabetes. The etiology of obesity is not completely understood, but scientists from various disciplines have made some progress toward understanding obesity and its treatment.

Overeating is an addictive behavior leading to obesity. Food provides immediate satisfaction while the aversive effects of overeating are delayed for weeks or even years. People must eat to live. Therefore, unlike the other addictions such as alcoholism, cigarette smoking, and drugs, food cannot be given up completely. An individual attempting to modify his food habits or decrease his caloric consumption is constantly faced with temptation. In the past, failure of an obese individual to lose weight was blamed on his lack of eating control. Further study and knowledge of obesity has made health professionals aware of the influence and pressures from the environment which make change difficult for the victim.

Results of attempts to deal with the behavior of overeating have been disappointing (1). A statement by Stunkard (2) summarizes the poor results of traditional methods of treatment. "Most obese persons will not stay in treatment for obesity. Of those who stay in treatment most will not lose weight and of those who do lose weight, most will regain it." Lack of success using traditional treatment methods has led to interest and research in behavior modification techniques.

The purpose of this report is to review the effectiveness of behavior modification in the treatment of obesity.

#### ETIOLOGY OF OBESITY

Several theories have been developed to explain the complexities of obesity. Abramson (3) divided these theories into two groups, biological and psychosocial.

According to one biological theory, obesity is a function of an individual's total number of fat cells. This number, determined by heredity and early nutritional conditions, is fixed early in life and cannot be altered. Therefore, weight reduction must come from a decrement in the size of the fat cells rather than the number. Early onset obesity results in a larger number of adipose cells. In adult onset obesity, adipose cells increase in size while the number remains constant. Weight reduction for individuals with juvenile onset obesity may be more difficult than for those who became obese as adults.

Another biological theory, proposing that obesity is caused by metabolic factors, has little empirical support. In actuality, glandular abnormalities account for only a few of the total number of cases of obesity.

According to psychosocial theories, eating serves as an anxiety-reducing mechanism for the obese. Obese individuals are triggered to eat by one or several of the arousal states (e.g., happiness, anger, boredom, and excitement). The role of these emotions in the eating behavior of the obese is still unclear.



Obesity may result from an interaction of biological and psychosocial factors. Despite these underlying factors, obesity always involves consumption of more calories than are expended.

#### TRADITIONAL TREATMENTS FOR OBESITY

In order to understand the changes and new aspects that behavior modification has brought to the area of weight control, some understanding of the traditional treatment methods is necessary. Abramson (3) has reviewed a number of those methods--medication, psychotherapy, therapeutic starvation, and reducing diets. Surgical procedures have also been used.

##### Medication

Anorectic drugs have been used as appetite suppressants. They often have dangerous side effects, such as dependency and psychotic behavior. Because of their minimal, short-term assistance in weight loss and the possibilities of abuse and habituation, such drugs are not considered an acceptable treatment for obesity.

##### Psychotherapy

Psychotherapy involves attempts to uncover the conflicts that cause an individual to overeat. This therapy has not been successful because simply exposing the causative factors does not prevent overeating.

##### Therapeutic starvation

A patient treated by therapeutic starvation completely abstains from food under medical supervision. Although long-term starvation treatment does result in considerable weight

loss, negative effects such as loss of lean body mass, paranoid reactions, infantile behavior, and increased dependency often accompany it. The fasting patient also fails to learn proper food habits. Studies indicate that following treatment, weight is usually regained.

### Reducing diets

Dietary restriction involves reducing the caloric intake below the caloric expenditure level in order to cause weight loss. Nutritionally adequate diets are planned and the patient is given diet instruction. Difficulties arise from lack of commitment to the diet. Small weight losses and regaining of weight lost are common results of this treatment.

### Surgical procedures

As another approach to weight control, surgical procedures have been performed on obese individuals (4). Following jejunioileal bypass or gastric bypass surgery, patients have been successful in weight reduction. Possible complications of this type of treatment include liver failure, cardiac failure, pancreatitis, diarrhea, and hemorrhage. Hypoproteinemia, anemia, and a loss of minerals may occur as a result of diarrhea. Investigation into the long-term effects and safety of surgical methods is necessary.

### A NEW APPROACH: BEHAVIOR MODIFICATION

Levitz (5) stated that the behavior modification approach to weight loss focuses on specific, observable behavior and observable behavior change. In behavior therapy, overeating is treated as an overlearned habit. Behavior therapists view

the eating response as conditioned by both external and internal cues. These learned cues may include states of emotional arousal, loneliness, boredom, or anxiety-provoking situations (3). If food intake results in pleasure or stress reduction, the frequency of food consumption will increase. Gradually the individual unconsciously begins to associate the stimulus cue with food intake. As this relationship develops, the presence of the cue serves as a signal to eat.

Behavior modification focuses on change as a means of weight loss. Stunkard (6) found that obese individuals are more influenced than non-obese individuals by external factors such as palatability, time of day, and availability of food than the internal factors of hunger. Because of the influence exerted by the various environmental cues, eating becomes a socially controlled, biological function.

In behavior therapy, the patient becomes an active part in planning and implementing his treatment program (5). The patient keeps a detailed record of his food intake and factors influencing his eating. Together the therapist and patient use this information to define the problem and specific behaviors that should be increased, decreased, or eliminated. Those habits contributing to excessive caloric intake and decreased energy expenditure, labeled the target behaviors, are cited. A plan then is devised to eliminate or reduce the frequency of those behaviors, with weight loss as the intended consequence. From the behavioral approach, obesity is viewed as a consequence of such habits rather than

a psychological disorder. In order for the treatment to be effective, the patient must have the initiative and desire to make the necessary changes in his behavior. Emphasis is placed on self-control of habits, with intentions of creating an environment more conducive to controlling food intake.

In traditional treatment methods, failure to deal with the environment leaves the patient vulnerable to its influence. The temptations that it offers often cause him to break his diet, overeat, and continue in his seemingly hopeless situation (6). Through behavior modification techniques, the patient can begin to exert some control over his environment, and therefore, over his eating habits.

#### A BRIEF HISTORY OF BEHAVIOR MODIFICATION

Kazdin (7), in a recently published history of behavior modification, stated that behaviorism was introduced into psychology in the early 1900s. Proposed by John B. Watson, the foundation of behavior modification was developed from learning theory and research.

Since the 1900s, behavior modification has undergone changes and further development. Pavlov contributed findings from experimental work on conditioned reflexes of dogs. In the late 1930s, Skinner introduced reinforcement, the action of presenting a stimulus following a desired response, as a technique to control the consequences of a behavior. He labeled this type of behavior therapy, operant conditioning. In the late 1950s and early 1960s, laboratory research was initiated to investigate possibilities of using operant

techniques to treat human clinical disorders. Operant conditioning, which had been used primarily on animals, was found to apply to human behavior. Through operant conditioning, the behaviors of various clinical populations were studied. Eventually, operant techniques were used for therapeutic and rehabilitation purposes. In recent years, behavior therapy has been used to deal with a variety of maladaptive behaviors.

Behavior modification has been applied in the treatment of obesity only in recent years. In 1962, a study was published by Ferster et al. (8) on the self-control of overeating. In 1967, Stuart (9) applied behavior therapy to overeating by investigating a technique for systematically changing patterns of eating. His results triggered further research in the area of obesity. Since then, research in behavioral control of obesity has appeared more frequently in the literature.

#### BEHAVIORAL TECHNIQUES FOR TREATING OBESITY

Behavioral techniques are used in an attempt to increase or decrease the occurrence of various behaviors by controlling the antecedents and/or consequences of those behaviors. According to Abramson (3), the desired behaviors are learned by classical (respondent) or instrumental (operant) conditioning (Fig. 1). Classical conditioning controls the antecedent to a behavior. It involves repeatedly pairing a new or conditioned stimulus with an unconditioned stimulus. After a sufficient amount of pairing has occurred, the new stimulus will elicit the response that was previously only elicited by the unconditioned stimulus. Operant conditioning involves

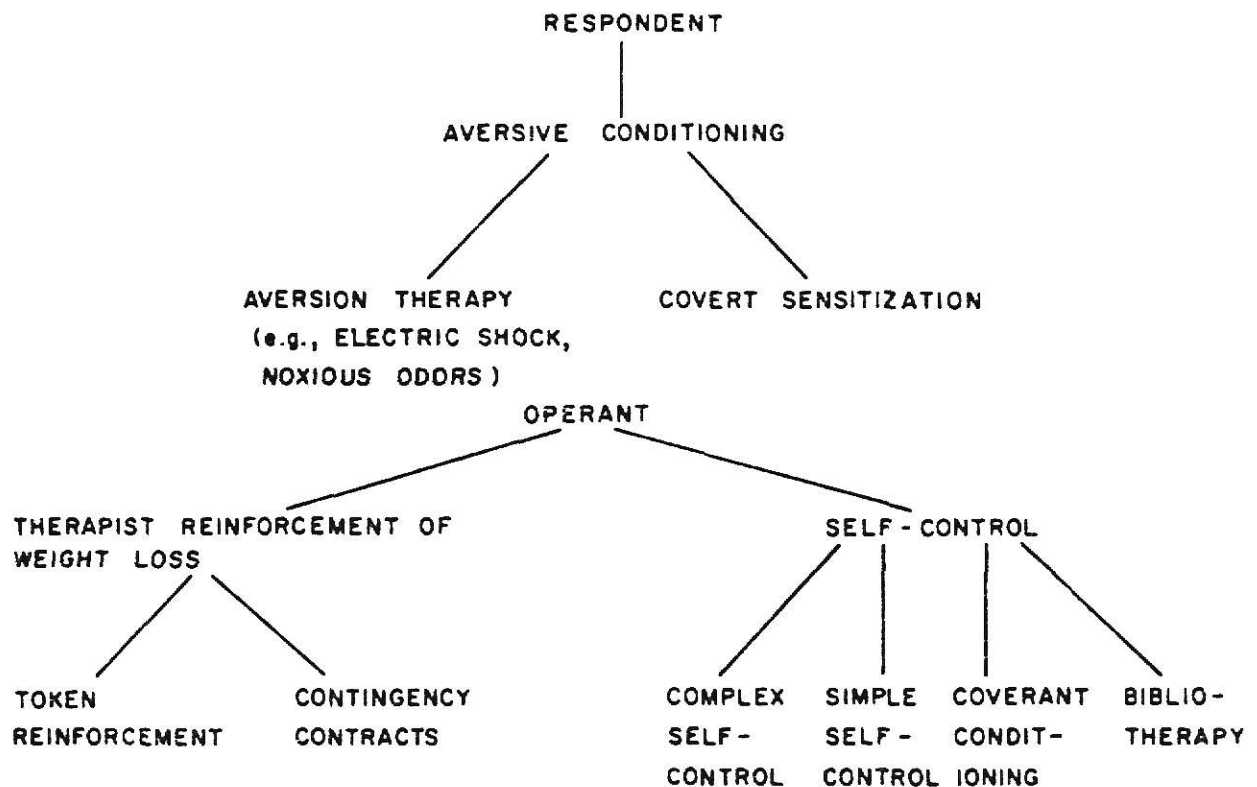


Fig. 1 Conditioning methods of behavior therapy (3).

controlling the consequences of a behavior. By the contingent presentation of certain reinforcing events following the occurrence of a specific behavior, the probability that the behavior will be repeated in the future is increased.

#### Respondent methods

Respondent methods of weight control use aversive conditioning to decrease the amount of food consumed. It involves repeated pairing of a noxious, aversive unconditioned stimulus with the undesirable behavior. This behavior is labeled the target stimulus (conditioned stimulus). The desired result is elimination or reduction of the target stimulus (10). The undesirable behaviors are decreased or eliminated with

intentions of reducing caloric intake and eventually resulting in weight loss. In aversion therapy the pairings are presented in reality. Electric shock and noxious odors have been paired with particular food items. Covert sensitization, another form of respondent conditioning, pairs food with the aversive stimulus in imagination. The patient is instructed to relax. The therapist verbally presents scenes of the patient approaching the forbidden foods, becoming nauseated and either vomiting or retreating, and immediately feeling a sense of relief (11).

Although aversive conditioning may lessen the appeal for eating problematic foods, there is little evidence indicating that it is an effective means of treatment for obesity. Because the effects are specific, the application could require the conditioning of a wide range of food items.

#### Operant methods

Operant conditioning attaches consequences to target behaviors in order to change future behavior. Operant methods can either be controlled by the therapist or self-controlled by the patient.

Therapist controlled method. In this procedure, the patient is reinforced by the therapist for appropriate behaviors. This method of treatment may be effective if the patient is in an environment of which the therapist has control (e.g. hospitals). However, therapist controlled reinforcement on outpatients has had little effect on permanent weight change after the reinforcers are withdrawn (12).

Self-control methods. Self-control techniques of behavior modification appear to hold the most promise for successful weight reduction (12). The patient identifies and controls specific events in his environment that affect his behavior. The objective of this technique is to reduce the number of environmental stimuli that trigger eating. These techniques have been divided into four groups: complex self-control, simple self-control, coverant conditioning, and bibliotherapy.

Complex self-control, which has been the most widely-used method, involves self-monitoring, self-reinforcement, and stimulus control techniques. In comparison, the simple self-control method makes use of a single technique. An example of this method is counting mouthfuls of food and swallows of caloric liquid in order to increase awareness of the act and amount of eating.

In coverant conditioning, the patient makes a list of unpleasant thoughts in relation to being obese and pleasant thoughts in relation to being slender. The patient then selects a reinforcing event, other than eating, that will occur several times each day (high probability behavior). The individual is then told that whenever he is tempted to perform this high probability behavior, he must first think one of the unpleasant thoughts and then one of the pleasant thoughts. Only after making these two coverants (low probability thoughts), would he allow himself to engage in the high probability behavior. The objective of this method is to lead



to changes in eating behavior through experiencing these coverants (10).

In bibliotherapy, the patient is given a manual outlining various behavioral principles and procedures. The patient uses the procedures on his own, without interaction with a therapist. Abramson (3) stated that a minimal level of therapist interaction might be of benefit in bibliotherapy.

#### SELF-CONTROL BEHAVIOR MODIFICATION PROGRAMS

Penick et al. (13) stated that the primary objective of a self-control behavior modification program is the development of self-control of eating; weight loss is considered a consequence of the adaptive behaviors resulting from self-control. Thus, emphasis is on change of behavior.

#### Definition of terms

Agras (14) has defined a number of terms used in behavior therapy:

**Contingency management:** In this procedure patients learn to make reinforcers in their natural environment contingent upon behavior which they wish to strengthen.

**Positive reinforcer:** An event is considered to be a positive reinforcer if the behavior that precedes it is found to have an increased probability of occurring. Many events positively reinforce human behavior, although what is positively reinforcing for one person may not be for another. Anything that an individual engages in with any regularity can be used as a positive reinforcer.

**Negative reinforcer:** An event that when removed, the behavior that preceded it tends to increase in probability of occurrence. Generally, painful stimuli such as excessive heat, electric shock, noise, and social criticism are negative reinforcers.

**Shaping:** This technique involves building up desired behavior by applying selective positive reinforcement. The subject's initial behavior is modified by reinforcing

closer and closer approximations to the desired final response.

**Extinction:** A process of eliminating undesired behavior by determining the reinforcer which is maintaining it and then removing that reinforcer. Upon removal of reinforcement, the behavior will weaken and will finally disappear.

### Setting up a program

Behavioral programs often follow four general principles:

1. Description of the behavior to be controlled. Levitz (5) stated that the first step in setting up a behavior modification program is an analysis of the individual's eating patterns. For assessment purposes, a detailed description of the types of eating habits and their frequencies, the antecedent conditions that signal the occurrence of these habits, and the consequent events that maintain the habits must be obtained from the patient. Factors important for a complete analysis include the type, quantity, and caloric value of foods eaten, as well as when, where and with whom the food is eaten. Additional information obtained includes the degree of hunger perceived by the person before and after eating, emotions influencing food intake, such as anxiety, depression, boredom, happiness, or anger, and a self-evaluation of the appropriateness of eating. The patient is asked to keep a daily record of food intake and the circumstances and emotions associated with his eating. From these records, the behaviors to be changed and the environmental contingencies supporting that behavior are defined.
2. Modification and control of the discriminatory stimuli governing eating. According to Stuart (9), the patient is

encouraged to confine his eating to one place and to make eating a pure experience, unaccompanied by any other activity such as reading or watching television. This is to prevent the association of eating with other activities. The patient may be instructed to remove all food from places in his house other than the kitchen and to keep only those foods which require preparation. This is an attempt to prevent compulsive eating. Often the obese individual is encouraged to interrupt his meal by placing his eating utensils on the table for a few minutes. The purpose of this practice is to give the patient an early experience of control over one aspect of his eating.

### 3. Development of techniques which control the act of eating.

Through assessment of the food intake and eating habit records, the behaviors which are in need of change are determined (5). Many of the behaviors or cues leading to such behaviors may be unconscious acts and not realized by the patient until he records his eating behavior.

In examining the baseline data, it is important to look for the circumstances leading to the behavior of overeating. The assessment includes analyzing factors which may contribute to weight gain such as calories, nutrients, and eating cues. The nutrient information aids in determining whether the patient is eating empty calorie foods that take the place of more nutritious foods. Levitz (5) believes that the food intake records also will indicate that the patient has some appropriate eating behaviors. Pointing this out will help the

patient realize that eating appropriately is not out of reach for him.

In developing techniques to aid in the control of eating, the patient and therapist must work together in planning the behavior modification program (9). Through patient involvement, the plan is more likely to succeed. Only the patient knows the events or objects which will provide him the necessary motivation to eat properly. If the patient leaves the therapist's office without any input into how he will modify his behavior, he may have as little intention of following the plan as he had input in the designing of it. Success of behavior therapy in achieving weight loss is dependent on the patient's desire and motivation to stick with it. By helping design his own program, the conditions will be more suited to him, and he may feel more responsible and motivated to succeed.

In developing the program, the objectives of a behavioral approach must be kept in mind. An ultimate goal is to increase the patient's awareness of his food habits and to assist him in gaining control over these habits.

4. Prompt reinforcement of behaviors and additional techniques which delay or control eating. Levitz (5) reviewed reinforcement techniques used in behavior modification. The patient receives positive or negative reinforcements according to the appropriateness or inappropriateness of his behavior. The reinforcers and their contingencies are decided upon in the planning stage. Actual treatment techniques are based on modifying the patient's environment in order to avoid events

which maintain the inappropriate behavior. The positive reinforcements chosen must be highly desired and strong motivators for the patient. The patient must cooperate and deny himself those privileges until he earns them. Different methods of reinforcement exist. In the point or token system the patient determines the ways in which he can earn or lose points through his behaviors. After accumulating a certain number of these points or tokens, the patient exchanges them for the actual reward. Several such rewards may be specified in the program. The number of points or tokens required to earn the various rewards may differ, depending on the value of the desired event or object to the patient.

Another method used is a contingency contract. It may be contingent on one behavior or on several behaviors. For the contract to be used successfully, the positive reinforcer must be meaningful to the individual and awarded soon after the appropriate behavior.

Through reinforcement of each step toward appropriate eating habits, the process of shaping takes place. With each small, incremental change that is achieved, the patient more closely approximates his final goal behavior. Programs may be planned to add one new behavior change per week. If too much change is attempted at once, the patient may become easily discouraged. In addition, a program should not be set up that causes the patient to feel overly deprived.

The success of the behavior modification program may hinge on finding a powerful reinforcer for the obese

individual. It must be something of personal value to that person. He must have enough desire for the reinforcer to be willing to give up the specific foods or food habits that need to be decreased or eliminated. Reinforcers should be satisfying to the individual. They can be social and personal in nature, such as praise, free time, or earned privileges. They must be high probability behaviors, that is, events or objects that the individual is likely to allow himself.

A problem in self-management of eating behavior is that food acts as an immediate and positive reinforcer. This fact increases the likelihood that maladaptive eating behavior will recur in the future. Therefore, the appropriate reinforcer (non-food) used for proper eating behavior must be awarded immediately following the appropriate behavior. The point or token systems have the advantage that they can be given immediately. When an actual event or object is used as the reinforcer, it may not be as easily and quickly dispensed.

Most behavior therapy for weight control is directed toward controlling food habits. Levitz (5) believes that in the same manner, the patient can be encouraged to increase his energy expenditure. The program can include requiring the patient to expend more energy before he could partake in some of his usual less energetic activities.

A self-control behavior modification program is set up on an individual basis. The program is aimed at building the patient's skills in managing his behaviors. Stuart (9) indicated that program methods gradually reinforce the patient's

success in controlling his own behavior, encourage a reduction of lack of control, and provide reassurance and guidance by the therapist. The treatment is specifically for the problem of overeating. No attempt is made to uncover the history of the obese individual's weight problem or to analyze his personality.

Levitz (5) stated that a behavioral program includes various techniques, each providing a partial solution to the obese individual's problem habits. Steps taken in devising the program include defining and measuring the behavior, analyzing what precedes and what is currently reinforcing that behavior, determining treatment techniques and reinforcers to be used, and continual evaluation of the program. The program and techniques used vary for different individuals. The main objective is to develop self-control of eating behavior. Weight loss is considered a consequence of this goal. Constant reevaluation and perhaps replanning of the program is necessary to obtain maximum progress toward program objectives.

#### RESEARCH ON BEHAVIOR MODIFICATION: SUCCESS AND MAINTENANCE

Success in the treatment of obesity is dependent on two important phases of the program: 1) reduction of body weight to within desirable limits, and 2) maintenance of the desirable weight once it is achieved (15). Weight loss is beneficial to the patient only if it is permanent. Therefore, a weight loss program that does not include and stress weight maintenance is defeating its purpose. Techniques of behavior



therapy emphasize modifying eating habits instead of merely focusing on weight loss. The patient who has lost weight because of an adaptation to more appropriate food habits, must continue his new food patterns in order to maintain his new weight. Weight loss can be permanent only if the patient permanently changes his previous eating behaviors.

### Research findings

Stuart (9) conducted a self-control behavior modification study in which he treated obese women with operant and respondent conditioning techniques. Eight out of 10 original patients remained in treatment after one year; 3 had lost more than 40 pounds and 3 more had lost more than 30 pounds. The behavioral program was obviously successful in producing weight loss. However, because a control group was not included in the research, no comparison with other forms of treatment can be made from this study. Also no information was given indicating whether patients reached their desired weight goals or if the weight loss was maintained. In follow-up interviews at 9, 32, and 52 weeks, 7 of the 8 patients reported having an increased variety of social activities and 3 of the 6 married patients reported having more satisfying relationships with their husbands. The 3 patients who were compulsive smokers at the beginning of the program reported that they had applied behavioral techniques to their smoking habits and consequently quit or decreased their smoking.

Harris (16) conducted a behavior modification study in 1969. Her program, based on Stuart's (9), involved a treatment



period of 2 1/2 months. Four months after the study began, the average weight loss of patients treated with behavior modification was 10.5 pounds. Control subjects, who had been given a calorie chart and asked to attempt to lose weight on their own, showed a weight gain of 3.6 pounds. Harris reported that subjects treated with behavior modification continued to lose weight after conclusion of the program. Following treatment, questionnaire data revealed that behavior modification treated individuals had less desire to overeat at meals, eat sweets, and eat between meals than before treatment.

Penick et al. (13) compared behavior modification in two groups and traditional therapy in two groups of individuals. The latter groups (control) received supportive psychotherapy, instruction about dieting and nutrition by an internist with long experience in the treatment of obesity, and, upon demand, appetite suppressants. Each of the two behavior modification groups lost more weight than the control groups. Results indicated that behavior modification was more effective in treating obesity than the traditional methods. The researchers concluded that behavior modification represents a significant advance in the treatment of obesity. They pointed out that the weight losses in their control groups were similar to the majority of weight losses reported in the medical literature as a result of traditional methods. Thus, the difference in weight loss between the behavior modification groups and the control groups was not due to a less effective treatment in the control groups than is typical of traditional methods.

Follow-up of the two behavior modification groups provided encouraging evidence of continuing influence of treatment on weight control.

Harris and Bruner (17) compared self-control and contract procedures of weight control. Over a 12-week treatment period, mean weight loss of subjects in the contract group was 13.4 pounds while mean weight loss of subjects in the self-control group was 7.4 pounds. In a follow-up at 10 months, a net weight gain of 2.75 pounds for the contract group and a net loss of 3.5 pounds for the self-control group was reported. Results suggested that the contract provided incentive only during the time it was in effect. Although the self-control method produced less weight loss during the treatment period than the contract method did, it was more successful in promoting maintenance of the weight lost. Participants of the self-control group commented favorably on the value of the behavior change techniques they were learning. The researchers stated that it may be best to offer a wide variety of alternative behavior modification methods in order to attract and maintain the participation of a large percentage of those individuals who need to lose weight.

Jeffrey (18) compared the effect of external-control and self-control procedures on success of weight loss and maintenance. In the external-control group, the therapist dispensed the rewards for weight lost. In the self-control group, the subjects rewarded themselves for weight lost. The average weekly loss during treatment was 0.7 pounds for the

external-control group and 0.9 pounds for the self-control group. Follow-up data showed no significant increase in weight from posttreatment to follow-up for the self-control group. Subjects in the external-control group significantly increased in weight from posttreatment to follow-up, gaining approximately 55% of their posttreatment weight loss. The findings indicate that the self-control and external-control methods were nearly equally effective in producing weight loss. However, the self-control treatment was more effective than the external-control treatment in promoting maintenance of weight lost. Jeffrey concluded that self-control methods train individuals to rely upon themselves for self-reinforcement instead of relying on others.

Weisenberg and Fray (19) reported an incidence of environmental factors influencing the success of a behavior modification program. Behavioral methods of weight loss on an ethnically and racially mixed group were studied to determine the effectiveness of these procedures on the mixed group. Black participants had the least weight loss; weight loss of Puerto Rican's was similar to that of Whites. The behavior modification treatment was more effective than the standard group treatment for the Puerto Rican and White subjects, but it was less effective for the Black subjects. A possible explanation provided by the researchers was that identification with the group and its norms is required for effective results in behavioral group therapy. They stated that the Blacks may not

have been able to identify effectively and benefit from group norms.

Brightwell (1) found in a one-year follow-up of obese subjects treated with behavior modification that at least some subjects achieved a long-term weight loss after participating in a behavior therapy program. All subjects who completed one year of treatment lost weight. However, as a group, the participants did not show weight loss following treatment. He concluded that because patients have less success with weight loss following treatment, several years of behavior therapy may be required for the severely obese to reduce to their ideal weight. However, the health benefits would definitely justify the long-term efforts. The relatively low drop out rate in his study suggested that behavior modification programs may be easier for patients to continue than the traditional dietary approaches.

Saccone and Israel (20) compared reinforcement by a significant other (a person in the patient's life such as a spouse, family member, or close friend) to reinforcement by a therapist. Those clients receiving reinforcement by a significant other for behavior change improved more than either the clients receiving reinforcement by the therapist or the clients in the control group. Clients in the control group had been taught how to monitor food intake, control individual and environmental cues to eating, establish nutritionally sound diets, and increase exercise above baseline levels.

Jeffery et al. (21) conducted a behavior therapy program with half of their subjects receiving treatment for 10 weeks and the other half for 20 weeks. Half of the lessons in the 20 week treatment group covered review and practice to help promote long-term maintenance. Mean weight loss for all clients was 11 pounds. Subjects reported a substantial change in their eating habits as a result of behavioral training. The greatest changes were made by the clients with the poorest pretreatment eating habits. Subjects in the 20 week group lost more weight (12.4 pounds) than those in the 10 week group (7.1 pounds). However, follow-up data indicated that increasing length of treatment does not promote long-term success.

In 1977, Leon (22) summarized the results of 11 recently published studies employing behavior management techniques for treating obesity in which specific information concerning weight loss, duration of treatment, and follow-up could be obtained. The mean treatment period weight loss was 1.55 pounds/week. The follow-up evaluation indicated that either the treatment period weight loss was maintained or continued weight loss occurred in 8 of the 11 studies. Leon concluded that the behavioral treatment approach appears to be more effective than other procedures (excluding jejunoileal bypass surgery) in maintaining long-term weight loss.

In the studies reviewed, behavior modification techniques, particularly self-control methods, appear to be more successful in producing weight loss than traditional methods.

However, although the reported increase in weight loss with behavior modification techniques is encouraging, the amount of weight loss is still only modest when the severity of obesity is considered (21).

#### Methodological issues

Foreyt (10) stated that along with the advances that have been made in behavior modification, there are still many unanswered questions that require investigation. He listed the following as the major problems in the research to date:

1. Lack of adequate follow-up periods. Many studies present the short-term effectiveness of various behavior modification techniques. There is a critical need to assess the effectiveness of these techniques in maintaining weight loss over extended periods. In order for the behavior therapists to make a substantial contribution to fighting obesity, they need to begin reporting long-term data regarding the maintenance of behavior change.

2. Presence of uncontrolled variables. Because of the presence of uncontrolled or poorly controlled variables, it is difficult to attribute behavioral change and weight losses in many studies to behavioral treatments. Treatment results are confounded by therapist and subject expectations and the presence of difficult to measure, nonspecific variables.

3. Inability to generalize results. Most of the behavior modification research has been done with college age, mildly overweight females. Until a number of studies are conducted

using other groups, it will be difficult to assess the effectiveness of behavior modification on other populations.

4. Failure to report attrition data. Nearly all researchers have experienced the problem of subjects who drop out before the treatment is completed or disappear during follow-up. The partial data collected on such subjects is often not reported. Such data are important for the interpretation of results and should be included, even though it will not be used in the statistical analysis. There is also a need for research into methods to reduce attrition.

5. Lack of standards for reporting results. Comparisons between studies is difficult due to the variety of ways results are presented, including number of pounds lost, percentage of weight lost, change in percentage of overweight, and rate of weight loss. Part of the problem is due to the fact that although behavior modification techniques treat specific behaviors, the results usually are reported in terms of weight change instead of behavior change. Researchers have attempted to measure behavior change in only a few studies. Investigators should report individual weight data, including pretreatment, posttreatment, and follow-up weights, pre- and posttreatment percentage overweight, along with number and length of treatment sessions.

6. Difficulty in determining effective treatment components. Because of the combination of treatments used in most treatment programs (including a variety of self-control techniques), it is difficult to determine the relative effectiveness of



each component of a program. The use of matched groups receiving different parts of a program along with a control group will aid in evaluating the roles of each component in a program.

#### PROBLEMS OF BEHAVIOR MODIFICATION

Despite the positive results obtained with behavior modification techniques in weight control programs, several problems remain unresolved. Zifferblatt and Wilbur (23) stated that while behavioral procedures can improve the chances of weight loss, it is an illusion to believe that such techniques contain a powerful magic that transforms patients into nutritionally healthy individuals. They believe that the application of behavior therapy in weight control has raised unrealistic hopes that long-term nutritional change is accomplished merely through the use of behavior modification techniques. Two assumptions underlie this impractical expectation: (1) that behavioral science research has developed several powerful behavior change techniques; and (2) that, if these techniques are acquired by the therapist, then the long-sought goal of lasting nutritional changes is just around the corner. Contrary to these assumptions, researchers have yet to demonstrate that such techniques are useful for long-term change.

Therapists have encountered problems in treating patients with behavior modification. Blake (24) listed some of the problems she encountered in a behavior modification program. These include:



- (1) The initial drop out rate (pre-payment is used by some programs as incentive).
- (2) The reward system (patients may be reluctant to reward themselves).
- (3) Incomplete records of food intake and food habits.
- (4) Because of previous experiences in dieting, some patients found it difficult to adopt behavior modification.

Abramson (12) considers the most pressing problem of behavior modification to be the wide range of response to treatment. Some individuals benefit from behavioral programs while some are not affected at all. Even in effective programs with impressive average weight losses, there are inevitably participants who do not lose weight. Although behavior modification has shown positive results and appears to have potential as a useful tool in combating obesity, it does not yet provide a complete solution (25).

#### FUTURE NEEDS

In order for the behavioral approach to weight control to become more effective, additional work is needed to perfect the techniques and to answer the questions about their use. The isolation of factors which would predict treatment success needs to be investigated (12, 21). Knowledge of these factors would allow therapists to screen potential patients and choose the appropriate treatment techniques for the individual. In addition, experimentation with groups that are representative of the total obese population in terms of socioeconomic status,

age, and degree of obesity is needed. Most studies to date have been of mildly overweight college females (12).

Levitz (5) stressed the importance of training professionals who have been traditionally involved in weight control in the use of behavior modification techniques. Behavior modification will be of little use without widespread knowledge of its application among the health professionals.

#### SUMMARY

Obesity is one of the greatest health hazards in the United States at the present time. Traditional treatment methods for obesity have included medication, psychotherapy, therapeutic starvation, and reducing diets. Lack of success in the treatment of obesity by traditional methods has led to interest in behavior modification techniques.

Behavior modification focuses on change of eating behavior as a means of weight loss. Through this method, the patient begins to exert some control over his environment, and therefore, over his eating habits. Although various methods of conditioning have been used in behavior therapy, results indicate that the self-control methods are the most successful. In self-control procedures, specific skills are taught to control eating behavior with the focus on a broad range of eating behaviors rather than specific foods or situations.

Setting up a self-control behavior modification program involves four general principles: (1) description of the behavior to be controlled; (2) modification and control of the discriminatory stimuli governing eating; (3) development of

techniques which control the act of eating; and (4) prompt reinforcement of behaviors and additional techniques which delay or control eating. These principles are based on the main objective of the program, which is developing self-control of eating behavior.

The studies reviewed have shown that behavior modification is more effective in producing weight loss during treatment and maintaining weight loss after treatment than previous methods used for obesity treatment. However, the overall results are still disappointing in terms of the amount of weight loss necessary for an effective treatment of obesity.

Although advances have been made in behavior modification, many questions remain unanswered because of methodological shortcomings in the research. Such deficiencies include: lack of adequate follow-up periods, presence of uncontrolled variables, inability to generalize results, failure to report attrition data, lack of standards for reporting results, and difficulty in determining effective treatment components.

Therapists have encountered problems in the application of behavior modification techniques. These include: the initial drop out rate, the reward system, incomplete records of food intake and food habits, patients experiencing difficulty in adopting behavior modification techniques, and the wide range of response to treatment.

Although behavior modification is a step in the right direction, it is not, as yet, a solution to the management of obesity. More work is necessary in predicting treatment

success, investigating groups that are more representative of the obese population, and training health professionals in behavioral techniques.

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BEHAVIOR MODIFICATION IN THE TREATMENT OF OBESITY

by

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AN ABSTRACT OF A MASTER'S REPORT

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Obesity is one of the greatest health hazards in the United States at the present time. Traditional treatment methods for obesity have included medication, psychotherapy, therapeutic starvation, and reducing diets. Lack of success in the treatment of obesity by traditional methods has led to interest in behavior modification techniques.

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