MSU
LIBRARIES

RETURNING MATERIALS:
Place in book drop to remove this checkout from your record. FINES will be charged if book is returned after the date stamped below.

JAN 25 199[illegible]

THE ROLE OF PATIENT PREFERENCE FOR TREATMENT TYPE IN THE MODIFICATION OF WEIGHT LOSS BEHAVIOR

By

Thomas C. Fuller

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

School of Health Education, Counseling Psychology
and Human Performance

1988

ABSTRACT

THE ROLE OF PATIENT PREFERENCE FOR TREATMENT TYPE IN THE MODIFICATION OF WEIGHT LOSS BEHAVIOR

By

Thomas C. Fuller

The purpose of this study was to determine the role of treatment choice in modifying outcomes in weight reduction programs. Three treatment types (nutritional education, behavior management, and exercise training) were utilized in a ten week weight loss program offered to a sample of overweight adults. The subjects were randomly assigned to two treatment choice conditions: half received an informed choice of treatment type, half were randomly assigned to treatments.

The dependent variables of interest were body weight change, attrition, attendance, adherence, treatment efficacy perceptions, program satisfaction and reactance, and self-efficacy. Research assessments were gathered by questionnaires at pre-program, mid-program, and post-program sessions. The major hypotheses involved comparisons between

assigned subjects and subjects receiving a choice of treatments on the eight outcome variables.

Results indicated that subjects receiving a choice of treatments had a significantly lower attrition rate and higher adherence ratings, whereas subjects assigned to treatments had greater weight loss. There were no significant differences between subjects choosing treatments and assigned subjects on attendance, perceptions of treatment efficacy, program satisfaction, reactance, or self-efficacy.

Theories of self-efficacy, reactance, and decision making provided a basis for explaining the results. Treatment choice was seen as promoting a perception of restricted freedom, which generated psychological reactance. Outcomes were consequently undermined for subjects receiving a treatment choice relative to assigned subjects.

Additional exploratory hypotheses revealed that: 1) desirability of control did not interact significantly with choice to affect outcomes, 2) weight locus of control was unrelated to attendance and weight loss, 3) subjects choosing exercise training had a non-significant tendency toward internal locus of control relative to subjects choosing the other treatments, and 4) history of prior weight loss efforts had a small, significant and negative relationship with pre-test and mid-program self-efficacy, mid-program reactance, and adherence.

ACKNOWLEDGEMENTS

By design, a doctoral dissertation is a solo effort. Conceived, developed, implemented, analyzed, described --- the dissertation is an accomplishment of the student alone. In theory, at least. In reality, many people contribute in many ways throughout the process of conducting and completing a research study of any size and scope. I owe much to those "many people" who contributed in so many ways to this research study, and to my doctoral education. They are deserving of acknowledgement.

Dr. Bertram Stoffelmayr has played an integral part in all aspects of this research study. He participated in the initial conceptalization of this study and arranged for important logistical support from the Department of Psychiatry during the weight reduction program. In addition, he has provided me with ongoing conceptual stimulation and personal encouragement throughout the dissertation process.

Dr. Robert Lent also participated in the initial conceptualization of this study and it was his encouragement that led me to make it my dissertation. More importantly, Bob has been ever-available and accessible with his resourcefulness and advisement on issues ranging from the empirical to the personal. In Bob I have found a friend and a model to follow.

It was in Dr. Richard Johnson's research class that I first explored weight loss research. Dr. Johnson rekindled my spirit for treatment outcome research --- something few students want to do anymore. Dr. Johnson made me aware of the multiple facets of treatment outcome research, and this made my actual work much easier.

Dr. William Hinds has been a mentor and guide --- a guardian angel --- throughout my doctoral education. Dr. Hinds provided me with most of the opportunities that shaped my professional identity as a health psychologist. He has trusted me, and allowed me a free-hand in making my education what I wanted it to be. In the process, he came through with vital support at critical junctures. It simply would not have been the same without him.

These four individuals, my doctoral committee, have respected my abilities and contributed to my integrity by trusting me to do so much on my own. The quality of my work has been driven by a desire to uphold their trust. Thus, they have truly been a "guidance" committee.

Dr. Mary Noell and Tom Custer, both of the Michigan Dairy Council, provided the informational and logistical support necessary to deliver the nutritional education treatments. Susan Dougherty's enthusiasm and interest in the study made the exercise training treatments a learning experience for me, as well as for the subjects.

Dr. Elizabeth Becker and Roy Feber were valuable resources during the statistical analysis of the data. Mr. David Harley, always the resource person, also provided statistical guidance. In addition, Dave's tolerance of my dissertation anxieties helped free-up my occasional paralyses and set me back on the road to clear thinking.

Dr. Brian Mavis contributed more to this study than can be mentioned here. His dissertation paved the way for my research and provided a constant guide for preparing the final draft of this document. Brian provided support for this research on all fronts --- finances, contracts, policies and procedures, program resources, program materials, and knowledge of delivering weight reduction programs, were only a few of his contributions. His personal support has been most meaningful to me. When and where it counted, Brian was there. The friendship and comaraderie that has developed between us is beyond measure.

Finally, but by no means least, my wife, Mary, deserves acknowledgement. Her understanding, patience, and tolerance of the many ups and downs, and highs and lows of the dissertation process have pulled me through it all. Mary was always there, always supportive, and always loving. She has kept me balanced (emotionally and financially!). In the lonely process of dissertation research, Mary has taught me

that the best things aren't accomplished alone, but rather together.

To all of these "many people" who have helped me accomplish so much --- not alone, but together --- I owe my gratitude.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF NOMENCLATURE AND ABBREVIATIONS

Throughout the text, tables, and figures of this document several terms are used with sufficient frequency to warrant their abbreviation. These terms and abbreviations are presented below to assist the reader.

Choice factor, choice condition, factor A:

The terms "choice factor", "choice condition", and "factor A" refer to the primary independent variable of the current study. This factor has two levels: choice of treatment type and random assignment to treatment type.

Treatment factor, treatment type, factor B:

The terms "treatment factor", "treatment type" and "factor B" refer to the secondary independent variable of the current study. This variable has three levels: nutritional education, behavior management, and exercise training.

NE : The abbreviation "NE" refers to level one of factor B, the nutritional education treatment.

BM : The abbreviation "BM" refers to level two of factor B, the behavior management treatment.

ET : The abbreviation "ET" refers to level three of factor B, the exercise training treatment.

BMI : The abbreviation "BMI" refers to Body Mass Index, one of the dependent measures of body weight.

CHAPTER I

INTRODUCTION

In recent years, psychologists have been playing an increasing role in the study and treatment of health and illness within the context of medical settings (Gatchel and Baum, 1983). In particular, psychologists have devoted considerable attention to enhancing treatment efficacy for alcoholism, drug abuse, smoking, and obesity (Gatchel and Baum, 1983). The present study and discussion is offered as a contribution to the psychologist's role as service provider in the treatment of overweight and obesity.

The National Health and Nutrition Examination Survey I (NHANESI), conducted between 1971 - 1974, found that 18.4% of men and 24.1% of women between the ages of 20 - 74 were 20% or more above their ideal weights. The National Health and Nutrition Examination Survey II (NHANESII), conducted between 1976 - 1980, found that similar proportions of the United States population were 20% or more above their ideal weights. Using somewhat different criteria, the National Center for Health Statistics found that 19.3% of males and 27.6% of females were obese (Abraham, 1983). Similar findings have been reported by VanItallie and Abraham

(1985), Piziak (1983), Brownell (1982), and Simopoulos (1985). In general, reported findings suggest that between 30 million and 40 million Americans are overweight (as defined by the 20% over ideal weight criteria). In response to these population overweight statistics, the United States Public Health Service has recommended that by 1990 the prevalence of overweight in the U.S. adult population should be decreased to 10% of men and 17% of women, and that 50% of the current overweight population should have adopted weight loss regimens (Dwyer, 1985).

Recommendations for weight loss amongst obese persons are based upon more than a popular image of physical attractiveness. There are serious health risks associated with having a greater than "normal" degree of body fat. Body weight of 120% or more than desirable weight (as defined by the 1983 Metropolitan Life Insurance Tables) is significantly associated with hypertension, hypercholesterolemia, hypertriglyceridemia, and hyperlipidemia --- all risk factors for coronary heart disease (Berchtold, Berger, Greiser, Dohse, Irmscher, Gries, and Zimmerman, 1977; Blackburn and Read, 1984; Ducimetiere, Richard, and Cambien, 1986; Piziak, 1983; Truswell, 1985). A body weight greater than 20% over ideal weight increases the risks for developing adult onset diabetes, pulmonary problems, renal problems, cerebrovascular disease, gallstones, arthritis, and even an increased incidence of accidents (Brownell, 1982; Burton, Foster, and VanItallie, 1985; Larsson and Bjorntorp, 1981; Truswell, 1985; Van Itallie and Abraham, 1985). Surgical risks, complications of pregnancy, and increased incidence of cancer of the breast and colon have also been associated with a body weight of 20% or more over ideal weight (Blackburn and Read, 1984; Brownell, 1982; Truswell, 1985). Further, Brownell (1982) and Harris (1983) have documented social hazards associated with obesity, including discrimination, blame, rejection, and negative attitudes of others. Finally, the mortality ratio (number of deaths observed/number of deaths expected) increases with degree of overweight (Burton et al., 1985; Sankey, 1984; Bray, 1979; VanItallie and Abraham, 1985). Sankey (1984), reporting data from the 1979 Build and Blood Pressure Study, has said that actual mortality in overweight individuals is significantly more than what should be expected for the following causes: diabetes mellitus, cerebrovascular disease, coronary artery disease, and hypertensive heart disease. Thus, being overweight or obese is associated with sufficient risks to justify clinical intervention (Burton et al.,1985).

A related issue is the growing trend towards consumerism and movement away from the traditional medical model practice of professionally prescribed treatments (Krantz, Baum, and Wideman, 1980). Several guidebooks have been published in the past ten years encouraging patients to become more active and informed participants in the health care process generally, and the weight loss process specifically (Vickery and Fries, 1976; Schaller and Carroll, 1976; Miller and Schildkraut, 1983; Consumer's Union of the United States, 1980). This trend has both positive and problematic aspects.

Research has begun to demonstrate that medical outcomes (such as weight loss) can be determined, in part, by the patient's degree of participation and perceived control in the health care process (Krantz et al., 1980; Marston, 1970). For some patients, increased participation and perceived control enhances treatment outcomes (Krantz et al., 1980; Averill, 1973; Langer and Rodin, 1976). The relationship between participation, control, and outcomes is, however, complex. Research has been initiated to assess the effects of providing choice and control over some aspects of treatment in medical settings, yet relatively little is known about the effects of treatment choice on treatment outcomes (Krantz and Deckel, 1983; Krantz et al., 1980).

Additionally, while most weight loss treatments are generally effective in producing weight loss, all treatments are not equally effective with all individuals (Bray, 1979). At the present time there are no recognized methods for a priori prediction of which overweight individuals will be most successfully treated with which weight loss strategies.

Bray (1979) has suggested that the highest priority in weight loss research is developing techniques to predict and enhance patient-treatment matching so that both professionals and consumers can be guided in the task of making accurate differential diagnoses and treatment selections.

Need for the Study

Given the prevalance of overweight in the United States, the substantial health risks associated with being overweight, and the inadequate knowledge base regarding differential prescription of weight loss treatments, research into the determinants of successful patient-treatment matching is needed. Further, the growing trend toward consumerism in the health care industry means that overweight people are choosing their own treatments. The aspect of patient choice of weight loss strategy needs to be investigated.

A number of comprehensive reviews of weight loss treatments are available in the literature (Brownell, 1982, 1985; Wilson, 1980, 1985; Jeffery, Wing, and Stunkard, 1978; Stunkard and Penick, 1979; Stunkard, 1975, 1978; Wing and Jeffery, 1979; Bellack, 1975; Hirsch, 1985a; Dwyer, 1985; VanItallie, 1978; Blondell, 1984; Porcello, 1985). Based upon these reviews, several major weight loss treatments are currently in use in the United States: surgery, jaw-fixation, medication, psychotherapy, support groups, exercise, dieting and nutritional management, and behavior modification. While surgical interventions are still in use for the severely obese, the use of diet pills has decreased in recent years due to negative side-effects associated with the medications used (Bray, 1979). Porcello (1985) reviewed forty-two professional weight control programs and reported that all professional programs offer some combination of nutritional, behavioral, and exercise interventions. The most common forms of weight reduction treatments are behavior modification, nutritional management, exercise, and social support (Brownell, 1982, 1985; Jeffery et al.,1978; Stunkard, 1975, 1978).

The most significant problems plaguing weight loss programs have been attrition and adherence (Wing and Jeffery, 1979; Wilson, 1980, 1985). The attrition rate in medically based weight loss programs has traditionally been quite high, often up to 80% (Wilson, 1985). Since attendance is significantly linked to success at weight loss, attrition is a significant problem (Jeffery, Bjornson-Benson, Rosenthal, Lindquist, Kurth, and Johnson, 1984). The use of behavior modification principles in weight loss programs has substantially and reliably reduced attrition rates to an average of 13% or less (Wilson, 1980, 1985; Stunkard et al., 1978; Wing and Jeffery, 1979). Contingency-based monetary incentive schemes have proven useful in increasing attendance in weight loss programs

(Perri, McAdoo, McAllister, Lauer, and Yancey, 1986; Wilson, 1985; Mahoney, 1974; Mavis, 1987). Adherence to prescribed treatment methods is significantly associated with successful weight loss (Sandifer and Buchanan, 1983; Wilson, 1985). Unfortunately, little work has been done in the area of increasing subject adherence to treatment behaviors (Wilson, 1985). Wing and Jeffery (1979) have suggested that finding means to increase adherence in weight control programs is a matter of high priority.

One method to increase both attendance and adherence (as well as other outcome variables, such as treatment satisfaction, self-efficacy, and absolute weight loss) may be to offer patients a choice of effective treatments when more than one treatment exists. Enhancing patient participation and perceived control through offering a choice of treatment (or some aspect of treatment) has been found to enhance medical outcomes with stroke and heart attack victims (Krantz et al., 1980; Krantz and Deckel, 1983), and also in geriatric residential programs (Langer and Rodin, 1976). Giving patients a choice of treatments has also been found to be successful in reducing fear levels in snake phobic subjects (Devine and Fernald, 1973). Patient choice of treatment strategy has been most widely used in alcohol treatment studies, where freedom to choose treatments has been associated with increased attendance, compliance, satisfaction with treatment, and reductions in drinking (Thornton, Gottheil, Gellens, and Alterman, 1977; Vanicelli, 1979; Sanchez-Craig, 1980; Costello, 1975; Kissin, Platz, and Su, 1971; Parker, Winstead, and Willi, 1979a, 1979b; Miller and Hester, 1986).

Giving patients a choice of treatment has not been adequately tested in weight loss programs. Bjorvell, Edman, Rossner, and Schalling (1985) offered a group of overweight Swedes a choice between in-patient behavior therapy and surgical jaw-fixation. Unfortunately, this study did not involve a control group of overweight subjects who did not receive a choice of treatments (ie, a randomly assigned group). Further, the Bjorvell et al (1985) study did not adequately assess differences in weight loss, but rather focused on personality differences between subjects choosing the two forms of treatment. Murray (1976) offered a group of overweight women a choice between self-control training and a support group as strategies for weight loss and failed to find a significant effect for choice on weight loss. Murray's (1976) experimental design was quite poor however; a close analysis of his methods reveals that subjects were given a choice of "time" of treatment rather than a choice of "type" of treatment, and that this difference was confounded in his analysis and discussion. Further, Murray's (1976) study included only twelve subjects, a sample far too small to detect possible significant effects. No other studies offering patients a choice of treatments in the area of weight loss could be located. Thus, given the beneficial effects of choice-of-treatment that are beginning to appear in other areas of health care research, and the paucity of such studies in the weight control literature, an investigation into the role of treatment choice for weight loss efforts would be worth pursuing.

The present study will contribute knowledge to the weight loss literature regarding treatment preferences, participation, choice, and perceived control in the treatment of the overweight. This study will contribute to the knowledge base of obesity treatment research by providing an empirical analysis of the role of choice-of-treatment in a weight loss program.

Purpose of the Study

Since there are a number of weight loss strategies of apparently equivalent effectiveness available to the overweight consumer of weight reduction programs, and since overweight individuals respond differentially (but by unknown parameters) to these treatments, the purpose of this study is to investigate the role of giving overweight participants in a weight reduction program an informed choice of non-medical treatments. Specifically, the purpose of this study is to investigate the effect of choice of treatment type on attrition, weight loss, program attendance, treatment adherence, program satisfaction, program reactance, perceptions of treatment efficacy, and perceptions of self-efficacy in weight loss efforts.

General Hypotheses of the Study

The primary hypotheses of this study revolve around the effects on treatment outcome derived from giving overweight subjects a choice of either exercise, nutritional education, or behavior modification as treatment strategies for losing weight. A second level of hypotheses are exploratory, regarding the roles of two variables of perceptions of personal control (desirability of control and locus of control) in enhancing predictions of treatment outcomes when choice of treatment type is given or withheld. An additional exploratory hypothesis regarding the role of past efforts at losing weight is also examined. The third level of hypothesis regards differences between the three treatment types offered. In general terms, the research hypotheses are as follows:

1. Having a choice of exercise, nutritional education, or behavior modification as weight loss strategies will affect the following treatment outcomes in a desirable direction:

    a. program attrition
    b. weight lost in the program
    c. attendance at program meetings
    d. adherence to weight loss strategies prescribed within the chosen treatment type
    e. perceptions of the chosen treatment's efficacy

f. perceptions of self-efficacy for one's ability to maintain the use of weight loss strategies in weight-relevant stressful situations

g. satisfaction with treatment

h. reactance to treatment.

2. There will be no significant differences in outcome variables between the three treatment strategies offered other than those attributable to the effects of having a choice.

3. The locus of control and the desirability of control will interact meaningfully with the condition of choice to enhance prediction of outcomes.

Theory

The regulation of body fat and obesity occurs by two major influences: 1) the biochemical system of the body which tends to store fat in adipose tissue, a result of adaptive evolutionary forces which created a human body efficient in energy storage, and 2) the psychosocial and environmental influences which lead us to aquire and store quantities of energy, including food-seeking behaviors, the availability and attractiveness of food, eating behaviors, and all events and behaviors which lead to the expenditure of energy (Hirsch, 1985a). Obesity or overweight are conditions which result from a larger than average number of adipose cells (hyperplasia), or an enlargement of existing cells (hypertrophy) which may be average in number, or both.

Some evidence suggests that juvenile-onset obesity results from a genetically determined excess of adipose cells, while adult-onset obesity results from enlargement of adipose cells in a body with a "normal" number of these cells (Brownell, 1982). The distinction between hyperplastic and hypertrophic obesity may be regulated by other factors as well, and the difference between juvenile-onset and adult-onset obesity is not always due to hyperplasia (Brownell, 1982; Hirsch, 1985a; Piziak, 1983). It should be noted that adipose cell size can be increased or decreased, but that cell number can only be increased and not decreased (the exception being the surgical removal of adipose tissue). Further, as Brownell (1982) has discussed, the size of fat cells may set the biological limit to weight gain and loss, but the number of fat cells may set the weight at which these limits occur.

Hirsch (1985b) reviews evidence indicating that body weight, in the general population, is essentially normally distributed, but with a marked skewing toward upper levels of body weight. The explanation for this, Hirsch (1985b) suggests, is that there exists a subset of people who control their body weight around a higher weight than the average weight for an entire population. Keesey (1980) is most commonly associated with suggesting that body weight, like other physiological dimensions, is intrinsically regulated around a "set-point".

A body weight set-point is generally considered to be a product of metabolic adaptive mechanisms, probably governed by the hypothalamus (Piziak, 1983; Hirsch, 1985a, 1985b). That is, the hypothalamus modulates appetite and satiety to preserve a biological body weight reference point in response to short-term underfeeding or overfeeding (Piziak, 1983). Piziak (1983) has noted, however, that gradual changes in energy intake/output may alter the biological set-point for body weight regulation, as in the gradual increases in body fat associated with normal aging.

Hirsch (1985a) has proposed a theory of body weight regulation, based upon a model of homeostasis. Weight change (in either direction) is said to meet resistive and restorative forces which oppose alteration in body weight. The human body possesses regulatory systems that work to maintain an equilibrium. Regulatory forces in this process might be dietary thermogenesis, carbohydrate tolerance, or adipose cell size, as well as cognitive, affective, and social influences. Hirsch (1985a) suggests that obesity results from regulatory defects which reduce the resistive and restorative forces. Thus, obesity represents an adaptive re-equilibration, at a higher weight level, in compensation for regulatory defects. Weight loss treatments, then, work to repair regulatory defects, restoring equilibrium at a lower weight level (Hirsch, 1985a).

The question remains as to whether the principle source of regulatory defects in human obesity is biological or psychological and environmental. While biological factors clearly are intimately involved in body weight regulation, Piziak (1983) suggests that only 1% - 2% of obese patients are overweight due to endocrine dysfunctions, hypothalamic tumors, or hereditary disorders. Both Piziak (1983) and Hirsch (1985a) agree that for obesity to occur there must ultimately be an imbalance between caloric energy input and caloric energy output. This suggests that inappropriate behavior is always a requisite for producing and maintaining obesity.

The behavioral conceptualization of body weight regulation rests upon the assumption that energy input and output are forms of behavior, and as such have been established over many years, and are under the control of antecedent and consequent stimuli (Blundell, 1984; Bellack, 1975; Wilson, 1980). That is, levels of eating behavior or activity levels exist as habitual response patterns and always occur in the presence of particular stimuli and consequences. Viewing body weight regulation as a learned mechanism (at least in part) means that learning based change strategies can be developed to alter habitual styles of body weight regulation (Wilson, 1980). Nutritional management, exercise regimens, and behavior modification are three primary strategies for altering body weight and its regulation based upon a model incorporating behavioral assumptions (Stalonas, Johnson, and Crist, 1978; Coates, 1977; Wing and Jeffery, 1979). As Coates (1977) has stated: "one person's (weight problem) may be maintained by ignorance of nutrition, another individual may be extremely sedentary, while the third may be under inappropriate stimulus control..." (p.99). In a sense, then, there may well be different obesities that will respond differently to different types of treatment methods (Wilson, 1980). Within a broadly behavioral conceptualization of body weight regulation the issue then becomes one of differential diagnosis and treatment choice.

In a review of the literature regarding patient autonomy and choice of treatment in the rehabilitation of alcoholism, Parker et al. (1979a) found that no single treatment was uniformly effective and that all treatment approaches appear to be generally helpful. Parker et al. (1979a) conclude that a substantial amount of evidence supports the use of an ecclectic approach to alcohol rehabilitation. Parker et al. (1979b) suggest that the need to engage the patient in treatment, the need to provide a treatment to which the patient can respond, and the need to reduce attrition (because attendance predicts success), all indicate the desirability of offering the patient a choice of effective treatments. Much the same situation is true for the area of weight control. The general population of obese persons is heterogeneous with regard to the etiology of obesity, the nature of obesity, personality variables, and past experience with weight loss efforts (Wilson, 1985; Weiss, 1977; Bray, 1979). Further, the three major weight loss treatments (nutritional management, exercise, and behavior modification) are all more or less equivalently effective, yet individuals respond differentially to these treatments (Wing and Jeffery, 1979; Miller and Sims, 1981; Porcello, 1985). In concert with the Parker et al. (1979a, 1979b) findings from the alcohol rehabilitation literature, it would stand to reason that in weight control treatment, offering patients a choice of treatment type would result in a greater overall success rate and a clearer picture of important differential diagnostic variables.

In a review of the factor of personal control in relationship to stress and coping, Averill (1973) identified three distinct types of control: 1) behavioral (involving direct action upon the environment), 2) cognitive (interpretation of events and information), and 3) decisional (having a choice among alternative courses of action). While all three forms of control are relevant to weight regulation, it is the decisional aspects of control that are pertinent to the present discussion. Decision theory has a rich tradition within the field of psychology and health care (Janis and Mann, 1977; Mann and Janis, 1982; Orford, 1985; Permuter and Monty, 1979; Brehm and Brehm, 1981). For an extensive review of this subject the reader is referred to Permuter and Monty (1979) and Orford (1985).

With regard to weight loss (and other health behaviors), Janis and Mann's decision theory addresses primarily the issue of initial decisions to change a behavior --- for example, the decision to quit smoking, the decision to quit drinking, the decision to lose weight --- and focuses on the psychological stress of decisional conflict and how it influences initial and subsequent choices to engage in a behavior (Janis and Mann, 1977; Orford, 1985). As Marlatt and Gordon (1985) have commented, this makes Janis and Mann's model a theory of decision making rather than of choice behavior. In other words, Janis and Mann's decision theory relates more directly to initial decisions to change a problem behavior than it does to choices regarding which change strategy to use ("should I try to lose weight" versus "should I choose dieting, exercise or behavior modification to lose weight").

Mann and Janis (1982) do, however, discuss cognitive processes within the context of choice that may be applied to choices between treatments --- specifically, cognitive reattributions following choice. Mann and Janis (1982) have identified five decisional coping patterns: 1) unconflicted adherence (continuing a present course of action), 2) unconflicted change (making an uncritical change to a new course of action), 3) defensive avoidance (a form of escape via procrastination, rationalizations, or shifting responsibility to others), 4) hypervigilance (impulsive searching for, and seizure of, a new alternative), and 5) vigilance (a careful appraisal of alternatives followed by a rational choice). Of particular interest to the purposes of the present study are the mechanisms of defensive avoidance: procrastination, projecting responsibility, and rationalized "bolstering" of alternatives. Bolstering is a cognitive dissonance-relieving process that involves distorting the value of a decision's outcome, or the probability of the outcome (Mann and Janis, 1982). Specifically, bolstering can involve exaggeration (playing up the value of a choice), minimization (playing down the losses associated with a choice), or denying the long range negative outcomes of a choice while focusing on the immediate positive outcomes (Mann and Janis, 1982). This conceptualization of decisional process is highly similar to the concept of reactance, as proposed by Brehm and Brehm (1981).

In discussing choice and perceived control in behavior therapy, Perlmuter and Monty (1979) suggested that providing patients a choice among alternative therapeutic prescriptions may act to reduce the psychological reactance associated with treatment. The theory of psychological reactance holds that a loss of (or threat to) freedom will motivate the person to attempt to regain that freedom through behavioral or cognitive mechanisms (Brehm and Brehm, 1981). An integration of Mann and Janis (1982) and Brehm and Brehm (1981) yields hypotheses relevant to the decisional situation contained within the present study. When an individual chooses or is assigned to one treatment condition, and he/she is aware that alternative treatments exist, psychological reactance may occur if the individual perceives a loss of freedom. An individual may reactively respond to the perceived loss of freedom by 1) attempting to engage in an eliminated behavior (eg, a member of a nutrional education group may start exercising), 2) experiencing reduced satisfaction with the treatment strategy he/she is being trained in and an increased desire for lost options, or 3) experiencing negative feelings toward the person perceived as responsible for the loss of freedom (Brehm and Brehm, 1981; Mann and Janis, 1982). Brehm and Brehm (1981) suggest that reactance is aroused maximally when freedom is eliminated altogether, indicating that reactance should be stronger, in the present study, for subjects randomly assigned to treatments. However, three other factors may mediate this conclusion. Firstly, reactance may well be stronger for individuals who choose a treatment once they begin to experience the consequences of their choice (eg, "exercise is harder than I thought, I wish I had chosen nutritional education"). Secondly, other cognitive mechanisms, particularly bolstering, may counteract reactance effects (Mann and Janis, 1982).

Thirdly, individuals may differ in their relative desire for control over situations (Burger and Cooper, 1979). Burger and Cooper (1979) have, in fact, demonstrated that individuals low in the desire for control actually prefer that decisions are made for them by others, while individuals high in the desire for control prefer to make their own decisions. Thus, while reactance is a relevant variable in a study of treatment choice as a mediator of outcomes, a priori prediction of decisional reactance based upon theory is less than straightforward. The present study will investigate the relationship between choice, reactance, and the desirability of control in relation to treatment outcomes.

Rosenstock's (1966) Health Belief Model represents an attempt to incorporate decision theory into the study of health and illness behaviors. Both Janis and Mann's (1977) decision theory and the Health Belief Model assume that people base decisions upon values and subjective probabilities (Sjoberg, 1985). Value domains relevant to health care decisions might include ideas about health, illness, and the consequences of accepting or refusing treatment; relevant areas of subjective probabilities would include perceptions of treatment efficacy and perceptions of one's ability to comply with treatment (Sjoberg, 1985). The Health Belief Model holds that compliance/adherence with treatment is affected by two factors: 1) the patient's perceptions of whether or not he/she is ill, and the degree and severity of the illness, and 2) the patient's perceptions of the efficacy of the treatment (Rosenstock, 1966; Gatchel and Baum, 1983). The present study of treatment choice in weight reduction may provide an assessment of the second component of the Health Belief Model. That is, having a choice of weight loss strategy may affect perceptions of the efficacy of the treatment which may, in turn, affect adherence with treatment prescriptions.

A final theoretical issue pertinent to a study on the effects of treatment choice in weight reduction programs is whether short-term or long-term weight losses are of most importance (Brownell, 1982). Some major reviews of weight loss treatments suggest that it is the long-term maintenance of weight loss that we should be attending to in current empirical studies (Jeffery, Wing, and Stunkard, 1978; Wing and Jeffery, 1979; Stunkard and Penick, 1979). Clearly, the long-term maintenance of weight loss is of the utmost importance to the overweight patient, and from a practical standpoint it is also highly important to health care professionals. Brownell (1982), Colvin and Crist (1983), and Coates (1977) have all questioned, however, whether the maintenance of weight loss is really the most important theoretical issue at the present stage of obesity treatment research. Colvin and Crist (1983) strongly state that long-term follow-up studies on obesity treatments are almost useless, for two important reasons: 1) we don't yet have a truly powerful weight loss treatment to begin with, and 2) we have inadequate data collection devices to draw causal relationships over periods of time ranging from six months to five years (which are reasonable time periods for asessing weight loss maintenance). Colvin and Crist (1983), as well as Coates (1977), suggest that current research should be directed toward subject-treatment assignments and flexibility in program design. Brownell (1982) makes perhaps the strongest case for devoting effort toward short-term studies that investigate new innovations. Brownell (1982) lists six problems with requiring researchers to conduct long-term follow-ups in weight loss research: 1) long-term studies ignore the liklihood that very different processes influence initial change and the maintenance of change, 2) innovative and effective short-term approaches will be ignored if maintenance does not occur, 3) causal inference simply may not be possible after long periods of time due to numerous uncontrolled intervening variables, 4) researchers should not be required to do long and costly follow-ups of new procedures if short-term results are poor, 5) mandatory long-term study may discourage researchers from studying obesity, and 6) a focus on maintenance assumes that the treatment losses obtained are worth maintaining, and often times they are not. Brownell (1982) suggests that research energies can be well spent in studies that attempt to maximize the effectiveness of current treatment methods.

Overview of Remaining Chapters

In Chapter II, the relevant literature is reviewed in the following areas: non-medical weight loss treatments, choice of treatments, the locus of control, the desirability of control, self-efficacy, attendance and adherence issues, personal and demographic variables associated with weight reduction efforts, and measures and definitions of body weight and weight change. The research design and procedures are presented in Chapter III. In Chapter IV, the results and analyses of results are presented. Summary and conclusions of the research are presented in Chapter V, along with recommendations for future research.

CHAPTER II

REVIEW OF THE LITERATURE

In this chapter, the following areas of relevant theory and research are reviewed: definitions and measurements of body weight and weight change, personal and demographic variables associated with body weight and weight reduction, non-medical treatments for weight reduction, attendance and adherence issues in weight reduction programs, patient choice of treatments, locus of control in weight loss research, desirability of control, and self-efficacy expectations in weight reduction.

Definitions and Measures of Body Weight

The terms overweight and obese refer to the situation when fat tissues make up a greater than "normal" fraction of total body weight (Bray, 1978). In the average (and normal weight) American male, 15% - 20% of body weight is fat tissue; in the average American female, 20% - 25% of body weight is fat tissue (Bray, 1978; Blundell, 1984). While there is a normative increase in body fat with age, obesity or overweight is generally defined as a body fat content (ie, percent of body consisting of fat) greater than 25% for men and greater than 30% for women (Bray, 1978; Blundell, 1984). It should be noted that obtaining a physiologically precise measure of percent body fat is quite difficult without sophisticated biophysical or biochemical equipment. A number of more easily attainable indices of body weight have been developed, and will be discussed below. A technical distinction has been made between the terms "obesity" and "overweight" (Bray, 1978, 1979). Obesity technically refers to a surplus of body fat, whereas overweight refers to an excess of body weight relative to standards of height as indexed in actuarial tables (Bray, 1978, 1979). For practical purposes, the two terms may be used synonymously and interchangeably.

Colliver, Frank, and Frank (1983) conducted a correlational and factor analytic analysis of six weight indices used in the obesity literature. Based upon measures of 951 adults who were 20% or more above their ideal weights (relative to the 1959 Metropolitan Life Tables), Colliver et al. (1983) examined the following measures of body weight:

1) relative weight - ratio of observed weight to ideal weight
2) weight-height ratio - weight divided by height
3) body mass index - weight divided by height-squared
4) ponderal index - weight divided by height-cubed
5) Sheldon's ponderal index - height divided by the cubed root of weight

6) Benn's index - weight divided by height, where height is raised to a power based upon a regresion coefficient of weight and height relative to mean population values.

Colliver et al. (1983) found that the mean intercorrelation between these weight indices was $\underline{r}$ = .96, with a range of .87 to 1.0. Factor analyses revealed that all six indices measure the same factor (obesity), with this factor accounting for 97% of the variance between the six indices. Colliver et al. (1983) concluded that while the first three indices were the easiest to construct and interpret, it makes little difference from an empirical standpoint which of the indices is used.

In a comprehensive review of weight reduction treatment studies, Brownell (1982) discussed six commonly reported measures of weight change. Brownell (1982) concluded that absolute weight (measured in pounds or kilograms) was easy to understand, but did not account for individual differences in height, frame size, or degree of obesity; body mass index relates more closely to actual degree of body fat; the ponderal index is not easily understood; a weight reduction quotient is generally confusing to interpret; categorical weight loss (ie, listing subjects who have lost 20, 30, 40 pounds, etc.) is subject to the same limitations as absolute weight measures; and percent-overweight is easily understood and accounts for frame size, but does not reflect percentage of body fat. Brownell (1982) recommends using several indices of weight change in reported results, specifically absolute weight, percent overweight, and body mass index.

The body mass index (weight divided by height-squared) is considered to be the best single indicator of body fat and is widely recommended as a useful measure (Burton, Foster, VanItallie, 1985; Bray, 1979; Annual report of the National Institutes of Health program in biomedical and behavioral nutrition research and training, FY1982, 1985). Burton et al. (1985) provide an excellent discussion of the body mass index and a useful nomogram for determining body mass index (BMI) based upon the 1983 Metropolitan tables. Adult American men have an ideal weight (relative to height, based upon the 1983 Metropolitan tables) that is represented by a BMI of 22.7. A BMI of 27.2 represents an adult male who is 20% over his ideal weight, whereas a BMI of 31.8 represents a body that is 40% over its ideal weight. By the same criteria, adult American women have an ideal weight represented by a BMI of 22.4, a 20% overweight level represented by a BMI of 26.9, and 40% over ideal weight represented by a BMI of 31.4. Thus, Blundell (1984) has recommended that we use a BMI of 25 -30 to define mild obesity and a BMI of 30 - 40 to define moderate obesity.

Johnson, Stalonas, and Christ (1978) reported results of a weight reduction program using "percent of excess weight lost". While not a widely used measure, this index gives a useful indicator of the direct benefits to the program participant.

The health risks associated with excess body weight (as reviewed in Chapter I) are generally considered to become significant when an individual reaches a body weight 20% or more over his/her ideal weight. Burton et al. (1985) suggest that the 20%-or-more over ideal weight figure is arbitrary, but useful in prescribing clinical intervention. Bray (1978) suggests that 25%-or-more over ideal weight is the point where significant health risks begin (BMI = 25).

In summary, the most widely used and recommended indices of body weight and weight change are absolute weight, body mass index, and percent overweight. An individual may be considered overweight or obese when a more than normal percentage of body weight is fat. For men, obesity and its risks begin somewhere between 20% -25% over ideal weight. For women, obesity and its risks begin at about 30% over ideal weight.

Personal Variables Associated with Weight Reduction

In this section, literature pertaining to non-program variables associated with obesity and weight reduction will be reviewed. Specifically, literature will be reviewed regarding personality factors, demographic variables, genetic factors, and historical events.

Several authors, reviewing large numbers of studies on obese individuals, have reported that there is no evidence to support the existence of a specific pattern of personality in overweight individuals (Storlie, 1984; Weiss, 1977; Wilson, 1985; Stunkard, 1978). Similar results have been reported regarding overweight individuals who have been successful in weight reduction programs: global personality patterns do not predict who will be successful in weight reduction efforts (Weiss, 1977; Stunkard, 1978; Wilson, 1985). Two studies with converging results, however, contradict this general finding (Bjorvell, Edman, Rossner, and Schalling, 1985; Lauer, Wampler, Lantz, and Romine, 1979).

In Sweden, Bjorvell et al. (1985) administered the Karolinska Scales of Personality to 107 obese subjects and a randomly sampled control group. Bjorvell et al. (1985) found that the obese subjects evidenced a distinct Impulsiveness Syndrome, characterized by irresponsibility, acting-out, and failure to use insight. This pattern was noted to be highly similar to personality patterns found in alcoholics and drug addicts. In the U.S., Lauer et al. (1979) found similar results administering a battery of personality tests to 58 adult women averaging 92% overweight. Lauer et al. (1979) administered the Minnesota

Multiphasic Personality Inventory, the Tennessee Self-Concept Scale, and the Edwards Personal Preference Schedule to their subjects and found that the obese women had a significant (p <.05) personality pattern of addictive potential similar to alcoholics. Lauer et al.'s (1979) obese women were characterized by having a low endurance drive, a need to dominate others, a tendency to avoid closeness in relationships, and traditional sex-role orientations. Thus, in contrast to the majority of research indicating that no reliable personality pattern for obese individuals exists, two studies have found a pattern of addictive potential in overweight persons.

Lowe and Fisher (1983) and Strain and Strain (1979) have suggested that overweight individuals are more emotionally reactive and more likely to engage in emotionally-cued eating than normal weight people. Lowe and Fisher (1983) assessed this empirically with 17 individuals who averaged 31% overweight and 30 individuals of normal weight. Their results suggested that emotional eating was associated with the degree of overweight (r = .46, p <.05). Emotional binge eating has been associated with relapse from weight control efforts (Wilson, 1985; Stunkard, 1978; Herman and Polivy, 1975). Herman and Polivy (1975) have identified "restrained eaters" and "unrestrained eaters" with the use of their Restrained Eating Scale. Individuals scoring high on restrained eating are more emotionally reactive, show signs of a stress-deprivation syndrome, are more distractible, and more likely to cease weight loss strategies and eat large quantities of food in the face of emotional stress (Coates, 1977; Harris, 1983; Wilson, 1985; Herman and Polivy, 1975). Unrestrained eaters are more likely to persist in their weight loss efforts under emotional stress. Coates (1977) has characterized the "restrained eater" as prone to experience breakdowns in self-control due to poorly learned and haphazardly applied self-regulatory strategies. The Restrained Eating Scale is providing robust findings, but the interpretation of these findings and the meaning of the restrained eating concept are not as yet clear in the weight loss literature (Wilson, 1985).

Rotter's (1966) locus of control construct is a personality variable that has been associated with weight loss efforts. The research pertaining to the locus of control construct in weight loss will be reviewed in a separate section.

Demographic variables have also been studied with regard to obesity and weight control. A greater percentage of women than men are overweight (Bray, 1979; Annual Report/NIH, 1985). Women are four times more likely to participate in a weight reduction program than men (Wilson, 1985), but tend to lose less weight and reduce at slower rates than men (Weiss, 1977; Wilson, 1985). Gender differences in amount and rate of weight loss are, however, highly equivocal findings. When percent body fat, initial weight, and age are statistically controlled, gender differences in weight loss success disappear (Weiss, 1977; Wilson, 1985).

Socioeconomic status, race, and ethnicity have been associated with obesity but not with success in weight reduction efforts (Weiss, 1977; Brownell, 1985; Bray, 1979). Obesity has been shown to follow socioeconomic status gradients, with obesity being most common for low income women and median income men (Annual Report/NIH, 1985). While Bray (1979) found that black women were more likely to be overweight than white women, other evidence suggests that racial differences in body weight disappear when income and education have been controlled (Annual Report/NIH, 1985). No evidence indicates that race, SES, or ethnicity are associated with success or failure in weight reduction programs (Weiss, 1977).

Evidence drawn from a large number of studies indicates that the age-at-onset of obesity may be a factor relevant to success/failure in weight reduction efforts (Wilson, 1985; Weiss, 1977; Hoiberg et al., 1984). Weiss (1977) and Hoiberg et al. (1984) suggest that the evidence, though not unequivocal, supports the statement that juvenile-onset obesity is more resistant to treatment than adult-onset obesity. Stunkard (1978), reviewing 21 studies of behavioral treatments for obesity, concluded that adult-onset and juvenile-onset overweight individuals respond equivalently to treatment. Wilson (1985) has more recently concluded that the evidence supporting a better treatment response for adult-onset overweight persons is not very strong, and that age-at-onset may be more significant in long-term success of weight maintenance than short term ability to produce a weight loss. Research on the age-at-onset hypothesis has used widely varying criteria and measures for success, making conclusions tenuous (Wilson, 1985).

Based on evidence derived from social epidemiological research, it is difficult to separate genetic contributions from social learning. However, a child of two obese parents has a 300% chance of being an obese adult, as well as of being 300% fatter than a comparable child of lean parents (Annual Report/NIH, 1985). Further, one overweight sibling is likely to have an overweight sibling 40% of the time (Annual Report/NIH, 1985). While individuals with weight-relevant hereditary disorders constitute only a very small percentage of the overweight population (Piziak, 1983), many obese individuals have a genetically based surplus of fat cells, or hyperplasia (Brownell, 1982). Hyperplastically obese individuals may also be those that develop overweight problems early in life but, independent of age-at-onset, there is no evidence to support the contention that hyperplastically obese persons have more difficulty losing weight. Number of fat cells, however, may determine how much weight can ultimately be lost (Brownell, 1982).

Personal history of weight loss efforts is another factor that has been studied with relation to success in weight loss programs. Gormally et al. (1980) studied a sample of 40 adult women who averaged 23.8% over their ideal weights and found that a previous history of dieting and weight loss was significantly correlated with success in initial weight loss efforts in a behavioral program (r = .42, p <.05). In contrast, however, Jeffery et al. (1984), Jeffery et al. (1985), and Hoiberg et al. (1984) found an inverse correlation between previous weight loss attempts and success in weight loss programs. Weiss (1977) and Wilson (1985) suggest that the issue of previous efforts to lose weight is not clearly related to treatment outcome. Weiss (1977) reviewed four studies reporting results on previous dieting attempts and found one study relating a negative relationship to weight loss and three studies revealing no relationship. Wilson (1985) has concluded that weight loss history has not been proven effective as a predictor of future weight loss success. Wilson (1985) notes that there are two contradictory arguments on this issue. One argument is that each time a new diet is begun, the biological adaptation to restricted energy occurs at a faster pace, making it harder to lose weight. The other argument is that each time a person tries to accomplish a weight-relevant behavior change, the greater are his/her chances of success. Currently, no conclusive statements can be made regarding previous history of weight loss efforts and chances for success in subsequent efforts.

Wilson (1985) has reviewed evidence indicating that even when the best six predictors of weight loss treatment outcome are combined, only 25% - 50% of the variance is accounted for, and only a small proportion of this is due to non-program variables. As Stunkard (1978) has noted, there is a great deal of variability in individual responses to weight loss efforts that has not been accounted for.

Weight Reduction Treatments

Porcello (1985) surveyed forty-two professional weight reduction programs to determine the characteristics of weight loss treatments available to consumers in the marketplace. The sample included thirteen nationally based programs, eleven regionally based programs, twelve hospital weight loss programs, and six university based research programs. Porcello (1985) found that the average duration of a commercially available weight loss program was between 8 and 16 weeks. The average weekly weight loss, for both men and women, was 2 - 3 pounds; the average cumulative weight loss was 36 - 40 pounds for men and 26 - 30 pounds for women (Porcello, 1985). The mean weekly cost of a professional weight loss program was found to be $35.50; the range of weekly costs was from zero dollars to $200. Porcello's (1985) survey revealed that nutritional counseling, behavioral counseling, and exercise regimens were offered in all professional programs.

Several authors have noted the use of nutritional education, behavior modification, and exercise, alone or in combination, as primary treatment strategies for weight reduction (Brownell, 1982; Stalonas et al., 1978; Miller and Sims, 1981; Wing and Jeffery, 1979; Coates, 1977; Frankle, 1985). In a review of 145 weight loss research studies published between 1966 and 1977, Wing and Jeffery (1979) concluded that nutritional education, behavior modification, and exercise were the prevailing non-medical weight loss treatments. Wing and Jeffery (1979) discovered that the average weekly weight loss in behavior therapy treatments was 1.04 pounds, and that subjects lost an average of 11.2 pounds during the course of behavioral weight loss programs. Similarly, subjects in nutritional education treatments lost an average of 18.4 pounds, at the rate of 1.87 pounds per week. Subjects in exercise programs lost an average of 8.3 pounds at a rate of 0.50 pounds per week. Wing and Jeffery (1979) noted that the small apparent differences in these three treatment strategies disappear when gender and length of treatment are controlled. Exercise, as a weight reduction strategy, tends to produce a slower rate of weight loss in the initial weeks of treatment, whereas behavioral and nutritional management approaches tend to produce faster weight losses early in treatment; yet, over time, these differences equalize (Wing and Jeffery, 1979).

Since each of the three major weight reduction treatment strategies --- nutritional education, behavior modification, and exercise --- generally occur together in some combination (and to varying degrees of emphasis), separating the relative contributions of each treatment is difficult. Nevertheless, each treatment will be described and reviewed separately below in so far as is possible.

Hall, Veale, Horne, and Watts (1984) have reviewed evidence suggesting that severely obese individuals possess a poor level of knowledge regarding nutrition and dietary management. While this finding is open to question, nutritional education and dieting have been traditional approaches to weight loss (as reviewed above). In a comprehensive review of nutritional approaches to weight loss, VanItallie (1978) distinguished two primary types of diets: 1) diets that overtly restrict calories, and 2) diets that manipulate the circumstances of eating and attempt to induce spontaneous changes in calorie intake. Diets that overtly restrict caloric intake can be balanced (providing a conventional distribution of protein, carbohydrate, and fat) or unbalanced (eg, low-carbohydrate, high-protein, etc.). Diets that manipulate eating or food characteristics may attempt to alter the novelty, palatability, or taste of foods, or may make use of behavioral principles to narrow the range of food choices or eating times.

The median recommended dietary allowance for maintaining body weight in adults between the ages of 23 and 50 years of age is 2700 kcal/day for men and 2000 kcal/day for women (Dwyer, 1985). The amount of calorie restriction per day necessary for weight reduction varies depending upon how fast a rate of weight loss is desired (Dwyer, 1985; James, 1984; Frankle, 1985; Snetselaar, 1983). James (1984) suggests that a reduction of caloric intake of about 1000 kcal per day is necessary to produce a 2 lb./week rate of weight loss. Dwyer (1985) suggests that it is not necessary to reduce daily calorie intake below about 1200 kcal for weight reduction.

Dwyer (1985) reviewed 39 popular diets available in the marketplace and currently in use by American consumers. Many diet plans do not make use of the reasonable rate-of-weight-loss approach described above. Specifically, Very Low Calorie Diets (VLC) recommending 500 or fewer calories per day have produced dramatic weight losses, but are associated with serious risks to the dieter's health (Dwyer, 1985; Hirsch, 1985b; Vertes, 1984; VanItallie and Abraham, 1985; Annual Report/NIH, 1985). VLC diets have been noted to produce gastrointestinal disturbances, fatigue, dizziness, hair loss, muscle cramps, insomnia, mood disturbances, amenorrhea, and even sudden death (VanItallie and Abraham, 1985; Vertes, 1984). Further, weight loss maintenance has been noted to be very poor with VLC diets (Vertes, 1984). Vertes (1984) and the National Institute of Health (Annual Report/NIH, 1985) have recommended that VLC diets be used only under the close supervision of a physician and that they be followed with longer-term behavioral and exercise interventions.

Hirsch (1985b) also has reviewed popular diets and concluded that such diets select foods and eating principles arbitrarily to provide simplicity and monotony in the hope of spontaneously lowering food intake and producing rapid (but unstable) weight losses. Hirsch (1985b) suggests that the popularity of fad diets is based upon misinformation about obesity and nutrition. Dwyer (1985), Frankle (1985), Hirsch (1985b), Snetselaar (1983), and the National Dairy Council (1985) have recommended the use of weight reduction diets that are nutritionally balanced and provide for a slow rate of stable weight loss. Frankle (1985), Snetselaar (1983), and the National Dairy Council (1985) provide excellent discussions of reasonable nutritional approaches to weight loss and offer a variety of dieting plans that can be tailored to individual needs. Frankle, the director of nutrition for Weight Watchers International, suggests that a nutritional management approach to weight loss alone can produce clinically significant reductions in body weight (Frankle, 1985).

Behavior modification is another widely used method to induce reductions in body weight. Miller and Sims (1981), Wilson (1980), Bellack (1975), and Blundell (1984) have discussed the assumptions underlying a behavioral approach to weight control. Within a behavioral paradigm, calorie intake (eating) and calorie expenditure (activity) are considered to be classes of behavior. A person's weight control behaviors have been established over many years and exist as habitual response patterns (Blundell, 1984). Further, these weight control behaviors always take place within the context of antecedent and consequent stimuli (Blundell, 1984; Bellack, 1975; Miller and Sims, 1981; Wilson, 1980). Individuals with weight problems persist in habitual weight control behaviors despite the many aversive consequences of such behaviors (Bellack, 1975). Bellack (1975) suggests that there are two factors relevant to this situation: 1) the immediate positive reinforcing consequences of weight-relevant behaviors have greater control over the behavior than delayed aversive consequences, and 2) weight control behaviors are also under the control of external antecedent stimuli. The task of behavior therapy for obesity, then, is to analyze the network of antecedent and consequent stimuli and adjust the components to eliminate maladaptive responses and develop productive behaviors for weight control (Blundell, 1984; Miller and Sims, 1981).

The primary strategies for affecting consequent control over weight relevant behaviors are initiating aversive consequences for inappropriate weight control behaviors or adding positive consequences for appropriate behaviors (Bellack, 1975). The primary strategy for antecedent control has been to bring weight control behaviors under the control of conscious internal cues and to disrupt the stimulus-response sequences in habitual behavior patterns (Bellack, 1975). Thus, in contrast to a nutritional education approach to overeating, for instance, a behavior modification strategy would not focus on what a person eats but rather upon how eating occurs (Blundell, 1984).

The primary "targets" in behavior therapy for obesity are eating behaviors and activity behaviors (Miller and Sims, 1981; Wilson, 1980; Sandifer and Buchanan, 1983). The methods used to achieve habit changes in these target behaviors are adapted from standard behavior therapy approaches, and include stimulus control training, self-monitoring, self-reward schedules, contingency contracting, graphing, social skills training, stress management training, and cognitive restructuring (Mahoney, 1974; Sandifer and Buchanan, 1983; Bellack, 1975; Miller and Sims, 1981). Bellack (1975) provides a review of 22 stimulus control techniques used in behavioral weight reduction programs.

Sandifer and Buchanan (1983) trained 21 subjects averaging 57% overweight in behavioral methods for weight reduction and found that 11 behaviors predicted 87.5% of the variance in weight lost during their program. Examples of behavioral methods (and their correlations with the weight reduction index) employed by Sandifer and Buchanan (1983) include: taking a two-minute pause during a meal ($r = .78$, $p < .001$), eating only in a designated food area ($r = .45$, $p < .01$), monitoring calorie intake ($r = .62$, $p < .005$), limiting intake to one serving of each food ($r = .67$, $p < .001$), refraining from other activities during a meal ($r = .60$, $p < .005$), recording all food intake ($r = .57$, $p < .01$), and inhibiting urges to snack with aversive imagery ($r = .59$, $p < .005$).

Miller and Sims (1983) trained 67 subjects averaging 48.1% overweight in behavior strategies that included methods for stimulus control while shopping in supermarkets, use of a daily self-monitoring record booklet, modification of eating behaviors, and social skills training to increase social support. The average weight loss in Miller and Sims' (1983) study was 17.2 pounds (over a four week period). Using stringent criteria for "success", Miller and Sims (1983) found that changes in eating behaviors and social skills training were among the variables that predicted success at a one year follow-up.

Jeffery, Wing, and Stunkard (1978) have used behavior therapies for weight reduction at the Stanford Eating Disorders Clinic. Their therapy package includes self-monitoring of weight and other selected target behaviors, stimulus control training, alternate response training, dietary planning, and problem-solving skill development. A sample of 125 adult subjects at the Stanford Clinic were treated for overweight problems with Jeffery et al.'s (1978) behavioral method. The female subjects averaged 67% overweight, while the male subjects averaged 78% overweight at the beginning of the program; across subjects, the average initial weight was 215.9 pounds. Thirty-two subjects participated in a ten week program and lost an average of 7.2 pounds, while 93 subjects participated in a 20 week program and lost an average of 12.4 pounds. The average weight loss using behavior modification at the Stanford Eating Disorders Clinic has typically been between ten and fifteen pounds (Jeffery, et al., 1978).

Stalonas, Johnson, and Christ (1978) have also found that behavior therapy is effective in weight reduction efforts. Stalonas et al. (1978) trained adult subjects who averaged 40.2% overweight in a basic behavioral package that included stimulus control training, monitoring and graphing of target behaviors, and nutritional advice. The subjects, initially weighing an average of 181.1 pounds (range: 130-275 lbs.), lost an average of 10 pounds by the tenth week of the program (p <.001). Stalonas et al. (1978) also found that adding a contingency training component to the behavioral package did not significantly increase the effectiveness of the program, but that encouraging subjects to exercise was effective (p <.001) in producing additional weight loss and superior maintenance of weight loss at one year.

Currey, Malcolm, Riddle, and Schachte (1977) used a behavioral weight loss treatment with 165 adult women (average initial weight = 185 pounds) who had been overweight for more than 20 years. In addition, 76% of the subjects in Currey et al.'s (1977) study were receiving treatment for medical conditions, including hypertension, diabetes, cardiovascular disease and degenerative joint disease. Even with this medically ill and chronically obese group of subjects, behavior therapy was effective in producing significant (p <.01) weight loss. Currey et al (1977) report that 28% of their subjects lost between 11 and 19.8 pounds in the ten week program, and 23% lost more than 19.8 pounds (including 6% who lost more than 39.6 lbs.). Given that Currey et al. (1977) worked with an unusually "tough" population, these results indicate that behavior therapy for weight reduction is an effective treatment.

Several major reviews of behavioral weight loss treatments suggest similar results: behavior modification methods produce a consistent 1 - 2 pound per week weight loss, and an average loss of 11.5 pounds over the course of a ten week program (Brownell, 1982; Wilson, 1980; Stunkard and Penick, 1979; Blundell, 1984; Stunkard, 1975; Stunkard, 1978). It is also worth noting that behavior therapy has been associated with the lowest attrition rates of all weight reduction methods (Brownell, 1982; Stunkard, 1975, 1978; Blundell, 1984). Based upon reviews of more than 100 studies of behavioral weight loss programs, Brownell (1982) and Wilson (1980) conclude that behavior modification is effective in producing weight loss on a short-term basis, that subjects often do not continue to lose weight after the termination of the program, and that maintenance of weight loss at one year follow-up is quite good.

Physical exercise is another method that has proven effective in producing weight loss. Exercise leads to a reduction of body weight by increasing caloric expenditure and mobilizing the metabolism of fat (Brownell, 1982; Blundell, 1984; Perri et al., 1986; Piziak, 1983). Physical exercise works directly to decrease the size of adipose cells (Blundell, 1984; Holm, Jacobsson, Holm, Bjorntorp, and Smith, 1977).

In addition to providing a reduction in fat cell size and percent body fat, exercise yields other benefits.

Physical exercise has been found to increase cardiovascular fitness and produce a reduction in the risk factors associated with obesity (Brownell, 1982; Blundell, 1984; Stalonas et al., 1978;Perri et al., 1986; Bjorntorp, 1978). Most importantly, physical exercise counteracts some of the negative aspects of dieting. Specifically, exercise works to minimize the loss of lean body tissue that occurs with dieting (Brownell, 1982; Blundell, 1984; Perri et al., 1986), and increases the basal metabolic rate which ordinarily decrease during dieting (Brownell, 1982; Holm et al. ,1977; Perri et al., 1986; Lennon, Nagle, Stratman, Shrago, and Dennis, 1985; Tremblay, Fontaine, Poehlman, Mitchell, Perron, and Bouchard, 1986). The increase in basal metabolic rate, lasting for hours after exercise is terminated, provides the major source of weight reduction in this weight loss strategy (Brownell, 1982; Perri et al., 1986; Tremblay et al., 1986). Physical exercise has also been shown to produce beneficial effects in self-concept, mood, and sense of well-being (Blundell, 1984).

Bjorntorp (1978) has suggested that physical exercise may be a more effective weight loss strategy for mildly and moderately obese individuals than severely obese individuals, noting that severely obese persons may experience more discomfort while exercising. Bjorntorp (1978) also suggests, however, that exercise may be a better weight loss strategy for persons unwilling to deprive themselves with dietary restrictions. This concept parallels Blundell's (1984) suggestion that it is easier to introduce new active components into a person's behavioral repetoire than to displace longstanding habits.

A variety of studies have found that physical exercise can significantly reduce body weight even in the absence of any dietary changes in women (Dahlkoetter, Callahan, and Linton, 1979; Duddleston and Bennion, 1970; Franklin, Buskirk, Hodgson, Gahagan, Kollias, and Mendez, 1979; Gwinup, 1975; Zuti and Goldberg, 1976) and in men (Dempsey, 1964; Leon, Conrad, Hunninghake, and Serfass, 1979; Oscai and Williams, 1968). The amount of weight lost, however, depends upon the intensity, frequency, and duration of the exercise regimen (Blundell, 1984).

Though Bjorntorp et al. (1973) failed to produce a significant weight loss in five of eight severely and hyperplastically obese persons using exercise only, the majority of studies using exercise as a weight reduction method have reported successful results. Leon et al. (1979) trained young adult men whose BMI was 1-2 standard deviations above the population mean in a walking program. Leon et al.'s (1979) subjects walked for 90 minutes per day on a treadmill at a slow pace; they walked five days per week for 16 weeks. The subjects lost an average of 12.5 pounds, reducing their body fat content from 23.3% to 17.4%.

This reduction brought Leon et al.'s (1979) subjects below the range at which obesity related health risks occur.

Oscai and Williams (1968) used a graduated exercise program with five adult men who averaged 194 pounds and were at least 15% over ideal weight (a matched control group of sedentary subjects was also employed). Oscai and Williams' (1968) subjects engaged in light walking/jogging for 15-30 minutes per day, three days per week. The subjects experienced a weight loss of 10 pounds over the 16 week program ($p < .05$). No dieting strategies were employed by the subjects. Dempsey (1964) reported similar results using a program of vigorous exercise with seven obese men.

Franklin et al. (1979) made successful use of exercise (without dieting) to reduce weight in 23 obese adult women whose mean initial weight was 167 +/- 20 pounds. Franklin et al.'s (1979) subjects walked or jogged at 75% capacity four days per week for twelve weeks, generally averaging 15-20 minutes per day. The subjects lost an average of 5.6 pounds and reduced percent of body fat significantly ($p < .05$). Similar results for a comparable program were reported by Gwinup (1975).

Several studies have compared exercise with dieting as weight loss strategies used alone or in combination. Duddleston and Bennion (1970) assigned 12 adult women who averaged 198 pounds and were at least 40% over ideal weight to one of four groups: dieting (1200 kcal/day), exercise

(1 hour treadmill walking or bicycling 4 days per week), dieting plus exercising, and a no-treatment control group. Over the course of the six week program, exercisers lost an average of 3.5 pounds; when combined with dieting, exercisers lost 15.3 pounds. Zuti and Goldberg (1976) also compared dieting, exercise, and a combination of the two treatments on 25 adult women who were 20-40 pounds over their ideal weights. Over the 16 week program, dieters lost 11.7 pounds, exercisers lost 10.6 pounds, and the combined treatment subjects lost 12 pounds (all significant at $p < .01$). The differences between the Duddleston and Bennion (1970) exercise subjects and the Zuti and Goldberg (1976) subjects in terms of weight lost during the programs is most likely due to the length of the two programs. The rate of weight loss through exercise strategies is somewhat slower during initial weeks of training, increasing over time (Bjorntorp, 1978).

Pi-Sunyer (1985), as well as Zuti and Goldberg (1976) kept close measures of caloric intake on overweight subjects who were exercising to lose weight. Results indicate that exercise does not increase appetite or calorie intake, and in many cases actually suppresses appetite. Thus, Pi-Sunyer (1985) concludes that exercise alone can induce a loss of body weight even in the absence of dieting. Also of note are studies reporting significant weight losses with the use of quite moderate, or submaximal, exercise regimens

(Tremblay et al., 1986; Gwinup, 1975; McKeen et al., 1983; Lennon et al., 1985; Franklin et al., 1979; Holm et al., 1977). Moderate exercise, such as walking, walk-jogging, stationary cycling, or slow swimming produce significant and stable weight losses in overweight persons. Walking as little as 20 minutes per day on an every-other-day basis, at only a 50%-75% level of intensity, produces weight losses comparable to intense high-frequency aerobic programs when results are examined over periods of time sufficient to factor-out short-term weight loss due to depletion of body fluids (Tremblay et al., 1986; MacKeen et al., 1983; Lennon et al., 1985; Gwinup, 1975; Holm et al., 1977).

A major problem with exercise programs (for any group of subjects, but particularly the obese) is the high rate of attrition (Bjorntorp, 1978; Brownell, 1982; Dishman, 1982). Brownell (1982), reviewing a large number of weight loss studies, concluded that up to 30% of obese persons who enter exercise programs will drop-out. Bjorntorp (1978) suggests the average attrition rate for exercise programs designed for overweight persons is 25% or more. Since exercise produces a slower rate of weight loss than other weight reduction strategies, obese subjects may get discouraged with the lack of apparent pay-off for their exercise efforts during the intial weeks of a program (Bjorntorp, 1978). Based upon a review of ten studies examining exercise treatments for obese persons, Bjorntorp (1978) sugggests the following strategies for reducing attrition and increasing adherence in exercise programs: start at a slow pace, use a skillful and energetic group leader, avoid injuries, exercise in pleasant surroundings, give physiological feedback to participants, and encourage making exercise a part of routine daily living. Dishman (1982) and Franklin (1984), reviewing the exercise compliance literature, also suggest that exercise programs should use realistic and flexible goals that are set by participants, offer a variety of exercise activities, demand only moderately intense energy output, and offer the programs at convenient times and locations.

Perri et al. (1986) reported impressive results in a combined behavior therapy and exercise weight loss program, with 80% of their subjects exceeding their target weight loss goals. Perri et al. (1986) conclude that the success of their program was due to the use of an exercise regimen that consisted of simple activities, included a warm-up routine, did not involve excessive pain or stress, and used regular heart rate monitoring to allow participants to gauge their own progress. Stalonas et al. (1978) also recommend using simple exercise activities with obese subjects, starting at a slow pace and increasing gradually the intensity of exercise, and making ample use of self-monitoring. Dahlkoetter et al. (1979) attributed their 0% attrition rate to the use of a buddy-system in exercise regimens for overweight people, a finding also reported by Stalonas et al. (1978).

In summary, there are three widely used non-medical approaches to the reduction of body weight: nutritional management, behavior modification, and physical exercise. These weight loss strategies have been used separately or in combination. Nutritional management and behavior modification produce a minimum average rate of weight loss equal to approximately one pound per week while physical exercise produces a somewhat slower minimum average rate of weight loss of approximately 0.60 - 0.75 pounds per week. Over time, the three weight loss methods produce similar reductions in body weight if the treatment-specific strategies are adhered to. Behavior modification and exercise are associated with greater long-term maintenance of weight loss. Exercise is associated with continued weight loss following program termination. Exercise programs generally show the highest attrition rate while behavior modification programs have demonstrated low attrition rates. The average length of a weight loss program (not including maintenance programs) is about 10 weeks, ranging from 8 - 16 weeks. The average weight loss obtained in a non-medical weight reduction program ranges between 10 and 15 pounds per person.

Attrition, Attendance, and Adherence

Subject attendance at program meetings and subject adherence to strategies prescribed in weight loss treatments are issues that have plagued weight reduction programs, as has been the case in many health related treatments (Wilson, 1985). Since attendance at program meetings and adherence to prescribed behaviors are strongly associated with success in weight loss efforts (Jeffery et al., 1984; Wilson, 1985), methods for increasing attendance and adherence in weight loss programs have been a priority issue for behavioral scientists working in the area of weight loss (Wing and Jeffery, 1979; Wilson, 1985).

Several studies have reported a strong association between attendance at program meetings and success in weight loss efforts (Holmes et al., 1984; Jeffery et al., 1984; Stuart and Guire, 1978; Dahlkoetter et al., 1979; Eufemia and Wesolowski, 1985; Perri et al., 1984). Medically based weight loss programs (eg, medication) have been shown to have attrition rates as high as 80%, greatly compromising the utility of such programs (Wilson, 1985). The major contribution of behavioral strategies to weight reduction programs has been to reduce attrition rates to 10%-15% (Stunkard, 1975; Stunkard, 1978; Wilson, 1985; Brownell, 1982). Stunkard (1978), in a review of 21 representative studies of behavioral approaches to weight reduction, found that the average drop-out rate for subjects in these programs was less than 10%. In other reviews of weight loss treatments, Brownell (1982) and Wilson (1985) reported that behavioral weight loss programs have a mean attrition rate of 13.5%. The exact mechanism by which behavioral weight loss strategies reduce attrition has not been clearly specified, though the use of contingent monetary incentives appears to play an important role (Brownell, 1982; Wilson, 1985).

In a review of 17 studies using attendance-contingent monetary incentives, Wilson (1985) reported that the average attrition rate in weight loss programs using monetary incentives was 9.5%, compared with an average attrition rate of 19.3% in behavioral treatments not using monetary contingencies. Brownell (1982) reported similar results. The "schemes" for contingencies and pay-offs have varied considerably in the literature. Stalonas et al. (1978) had subjects deposit $10.00 and returned $1.00 each week contingent upon attendance. Mahoney (1974) required a $35.00 deposit and fined his subjects $5.00 for each absence from a program meeting. In a meta-analytic review of attrition in 97 behavioral weight loss studies conducted between 1967 and 1984, Eufemia and Wesolowski (1985) found strong support for the contention that monetary deposits reduce subject attrition. Eufemia and Wesolowski (1985) found that deposits of less than $23.50 resulted in significantly higher attrition (26.11%) than did deposits of more than $23.50 (14.12%).

In an unpublished doctoral dissertation, Mavis (1987) assessed the relative efficacy of various monetary incentive conditions in a behavioral weight reduction program. Mavis' (1987) subjects were 118 adults, averaging 35.9% overweight (mean initial weight = 205.6 pounds). Each participant deposited $40.00, which was matched with equal funds from a research grant, and was assigned to one of six incentive conditions offering equivalent behavioral weight reduction treatments. Members of the weight-contingent monetary reward group were credited with $8.00 each week they reached their weekly weight loss goal. The weight-contingent monetary response cost group fined members each week that their goals were not met. Two lottery payback conditions, parallel to the monetary conditions (ie, credit vs. fine), rewarded members with a chance in a lottery each week that they met their weight loss goals. Money was pooled in the lottery groups, and a drawing was held at the last treatment session for a $1000 first prize, $400 second prize, and $200 third prize. The attendance-contingent group awarded members $8.00 each week that they attended the program, regardless of weight. Finally, there was a no-incentive group which was free of charge or deposit.

Mavis' (1987) results indicate that the use of monetary incentives is effective in reducing attrition and in increasing perceptions of treatment effectiveness in weight reduction programs. Using the no-incentive group as a baseline for attrition (65%), the weight-contingent incentives (excluding the monetary response cost group) reduced attrition by 52%. The weight-contingent monetary response cost condition produced a high rate of attrition (55%). Attendance-based incentives reduced attrition to 20%. Subjects in the no-incentive group rated the weight loss program as less effective than subjects in the other groups, suggesting that the use of incentives is associated with perceptions of program efficacy. When asked to rate the appeal of the various incentive schemes, 46% of the subjects preferred the monetary reward incentive, 25% preferred the lottery scheme, and 17% liked the attendance-contingent reward. Only 12% of the subjects chose one of the response cost procedures. Finally, while all of the incentive conditions produced significantly greater weight loss than the no-incentive condition, the weight-contingent incentives were superior to the attendance-contingent condition in promoting weight loss (Mavis, 1987).

Wing and Jeffery (1979), reviewing 145 studies of weight reduction programs, concluded that exercise approaches to weight loss produce the highest attrition rates. This finding is consistent with the exercise compliance literature generally, which suggests that exercise programs have high drop-out rates (Dishman, 1982;

Franklin, 1984; Perri et al., 1986). Brownell (1982) reports that exercise programs for obese persons will typically yield at least a 30% attrition rate. Several reasons for the high attrition rate in exercise programs have been offered. Franklin (1984) found that simply being overweight was a predictor of drop-out in exercise programs. Wilson (1985) found that individuals who experience a slow rate of weight loss are more likely to drop out of programs and, as reviewed above, exercise-based weight reduction programs tend to yield slower rates of weight loss. Wilson (1985) found that up to 57% of subjects who dropped out of weight reduction programs reported that their reason for doing so was dissatisfaction with the slow rate of weight loss.

In addition to monetary incentive schemes, other factors helpful in reducing attrition and increasing attendance in exercise-based weight loss programs have been suggested. Stalonas et al. (1978) suggest that designing exercise programs for the overweight which start at low levels of physical exertion and build gradually to higher levels of intensity will decrease the aversiveness of exercise and thus reduce attrition. Perri et al. (1986) suggest that their relatively low attrition rate in an exercise program for obese persons was due to the use of simple activities that did not involve excessive pain or stress and the use of regular heart rate monitoring as a feedback device for subjects to gauge their own progress. Dahlkoetter et al. (1979) attribute their 0% attrition in an exercise program for weight loss to the use of a buddy-system, where participants exercised in pairs.

Pekarik et al. (1984) analysed the attrition patterns of subjects in a behavioral weight reduction program, separating subjects who dropped out early in the program from those who dropped out late in the program. Pekarik et al. (1984) used 52 adult subjects (50 were female) who averaged 38.8% over ideal weight; 83% had participated in weight reduction programs prior to Pekarik et al.'s program. There were no differences between early drop-outs, late drop-outs, and program completers on socioeconomic status, education, marital status, age of obesity onset, prior participation in weight loss programs, or evaluations of prior weight loss programs. A key finding, however, was that early drop-outs differed from late drop-outs and program completers on the degree of personal responsibility assumed for their weight loss efforts (Pekarik et al., 1984). Methods that enhance attributions of personal responsibility in weight loss efforts might reduce attrition in weight loss programs and are in need of development.

Adherence to prescribed program methods and behaviors has also been associated with success in weight loss (Sandifer and Buchanan, 1983; Wilson, 1985; Dubbert and Wilson, 1984; Holmes et al., 1984). In a study of 21 adults, averaging 57% overweight, who participated in a behavioral weight loss program, Sandifer and Buchanan (1983) found that adherence to prescribed behaviors predicted the amount of weight lost in the program. In a multicomponent study using behavior modification, exercise, and dieting, Stalonas et al. (1978) reported an 82% rate of adherence to program behaviors and a corresponding significant reduction in body weight (mean weight loss = 10.7 pounds in ten weeks, $p < .001$).

Wilson (1985) notes that very little research has been conducted assessing the reasons why overweight individuals adhere to, or fail to adhere to, treatment prescriptions. Similarly, little research has been conducted to assess methods for increasing adherence in weight loss programs. Monetary incentives, contingent upon adherence to prescribed behaviors, represent the only scientific effort to increase adherence in weight loss programs. A number of studies have used monetary incentive schemes contingent upon adherence in weight loss programs (Dahlkoetter et al., 1979; Perri et al., 1986; Perri et al., 1984; Jeffery et al., 1976). These studies have all demonstrated that monetary incentives, contingent upon adherence to program behaviors, are effective in increasing adherence and promoting weight loss.

Methods for measuring adherence in weight loss programs have varied considerably, with self-report being the most common approach. Stalonas et al. (1978) and Perri et al.

(1986) have reported a technique for evaluating adherence that allows for at least some objectivity in adherence ratings, though the approach still represents a self-report method. The technique used by Stalonas et al. (1978) and Perri et al. (1986) involves assigning an adherence score to subjects on a weekly basis, using a three-point scale of adherence. At each program meeting subjects present a self-monitoring record to the therapist at the weigh-in. The record kept by the overweight subject is based upon the behaviors prescribed in the weight loss method he/she is learning (eg, graphs of eating behaviors for behavior modification subjects, record of number of minutes or days of exercise for subjects in exercise conditions, caloric intake record for subjects in a nutritional management program, etc.). The therapist then assigns a score to rate the degree of adherence: two-points representing full adherence, one-point representing partial adherence, and zero points representing nonadherence. While far from perfect, this method of assessing the degree of subject adherence to prescribed program behaviors appears to be acceptable in the current status of weight loss research (Wilson,1985).

In summary, both attendance and adherence are important issues in weight reduction programs and related research. Both attendance at program meetings and adherence with prescribed program behaviors are associated with success in weight loss efforts. Apart from the use of monetary incentives to increase attendance and adherence, little attention has been given to developing methods for enhancing program conditions that might increase attendance and adherence in weight loss programs.

Patient Choice of Treatment Type

The central hypotheses in the present study, regarding the effects of choice of treatment on treatment outcomes, has moderate support in the health care literature (Krantz et al., 1980; Marston, 1970). While only two studies could be located that directly assessed the role of treatment choice in weight reduction (Bjorvell et al., 1985; Murray, 1976), a review of the alcohol treatment literature revealed six studies assessing the role of choice of treatment in alcohol rehabilitation programs (Sanchez-Craig, 1980; Thornton et al., 1977; Vannicelli, 1979; Kissin et al.,1971; Costello, 1975; Parker et al., 1979b) and four discussions of the role of choice of treatments in alcohol rehabilitation (Appel, 1986; Ewing, 1977; Miller and Hester, 1986; Parker et al., 1979a). In addition, four studies were located that assessed the role of treatment choice in recovery from myocardial infarction (Krantz and Deckel, 1983), academic performance (Perlmuter and Monty, 1979), adjustment to nursing home mileu (Langer and Rodin, 1976), and fear reduction in snake phobias (Devine and Fernald, 1973). These studies, and their implications for weight reduction research, are reviewed below.

Kissin et al. (1971) assigned alcoholic patients at random to be offered three, two, one, or no alternative treatments for alcoholism. At a twelve month follow-up, results indicated that giving patients a choice of alcohol rehabilitation treatment resulted in greater acceptance of the treatment and superior recovery rates. In addition, success in treatment increased directly with the number of alternatives available to the subject. In a study of 100 alcoholic adults, Vannicelli (1979) found that giving patients a choice regarding the goals and nature of treatment led to improved outcomes and greater program satisfaction. Parker et al. (1979b) review an alcohol rehabilitation program in a U.S. Army hospital that used a choice-based "smorgasboard" approach to treatment. Parker et al. (1979b) report that this program evidences a 0% attrition rate, though factors unique to the military culture may account for this finding.

The treatment choices available to alcohol rehabilitation patients are not necessarily equivalent to the types of choices available to weight loss subjects, however. The choices Sanchez-Craig (1980) and Thornton et al. (1977) made available to alcoholic patients were between total abstinence and controlled-drinking. While patients in these two studies were assessed as having higher rates of compliance and improved treatment outcomes (relative to no-choice controls) the results were somewhat weak. Further, in Sanchez-Craig's (1980) study, since all of the subjects ended up engaging in some alcohol use, the stronger compliance rating given to subjects who were allowed to set their own controlled-drinking goals may not reflect a clinically significant improvement. Parker et al. (1979b) report the use of a wider range of alcohol treatment choices, including individual counseling, group counseling, didactic classes, physical conditioning, relaxation training, disulfiram, Alcoholics Anonymous, and significant other involvement.

In a review of 58 alcohol treatment program evaluations conducted between 1951 and 1973 (that included 11,022 patients), Costello (1975) concluded that offering patients a choice of alcohol rehabilitation treatments has significant benefits, including: reducing reactance or resistance to treatment, increasing the motivation for attendance and adherence, enhancing stable self-management, and increasing the success rate with high-risk/poor-prognostic cases. In another large scale alcohol treatment review, Parker et al. (1979a) conclude that giving patients a choice of treatments enhances outcomes in the following ways: 1) it decreases the aversive stigma of treatments associated with a loss of control by giving some control to the patient, 2) as treatment is seen as less aversive, referrals increase, 3) it reduces attrition, 4) it reduces resistance and reactance, and 5) facilitates more global life style changes by enhancing intrinsic motivation. Parker et al. (1979a, 1979b) and Ewing (1977), noting that the etiological factors in alcoholism are still basically unknown, suggest that there is no justification in advocating a monotherapeutic approach to alcohol rehabilitation. Several authors, therefore, recommend giving alcoholic patients a choice of treatments to increase treatment compliance, attendance, satisfaction, and recovery from alcoholism (Miller and Hester, 1986; Appel, 1986; Ewing, 1977; Parker et al., 1979a). Miller and Hester (1986) even suggest that, given adequate information regarding alternative treatments, patients may be better than professionally trained therapists at selecting optimal treatments for themselves.

The role of treatment choice has also been assessed in other areas. Permulter and Monty (1979) provide a review of choice of instructional procedures in academic settings. Though the data are difficult to interpet directly, Perlmuter and Monty (1979) conclude that giving students a choice of instructional procedures leads to a situation where students work harder, faster, and have a more positive reaction to assigned tasks. Langer and Rodin (1976) allowed some aged nursing home residents greater choice and decision-making power in their institutional milieu and found that these subjects showed greater happiness and a longer life span than the subjects who were not given choice and decision-making power.

Devine and Fernald (1973) gave 48 snake-phobic undergraduate students a choice between four standard phobia treatments. The subjects, who had extreme fear of snakes, were shown a videotape demonstrating and describing four treatments, including systematic desensitization, encounter therapy, rational emotive therapy, and a combination of modeling and rehearsal. The subjects were then asked to rate the treatments in order of their preferences. Four treatment groups were devised, each containing four subjects who were receiving their preferred treatment, four subjects who were randomly assigned, and four subjects who were receiving a treatment they had indicated they strongly did not want. Devine and Fernald (1973) found that subjects who received their preferred form of treatment experienced significantly more fear reduction than did subjects who were randomly assigned or who received their non-preferred treatment (p <.01). Devine and Fernald (1973) offered some possible explanations for their results: 1) preferred treatments might have been more effective because subjects expected that it would be so (ie, enhanced treatment-efficacy expectancies), 2) subjects intuitively know what the best treatment "fit" is for themselves and their preference reflected this, or 3) cognitive bolstering amongst subjects worked to enhance effort in subjects who received their preferred treatment, while subjects who received non-preferred treatments derogated their treatments and put forth less effort.

In a review of literature regarding the role of perceived control in recovery from myocardial infarction, Krantz and Deckel (1983) suggest that general medical outcomes improve as patients perceive control over treatment when given choices in their health care. Krantz and Deckel (1983) discuss variables that might confound this situation, however. Perceived control, and hence outcomes, may fluctuate depending upon the personal meaning a patient gives to various treatment choices. Unkown individual difference factors may mediate the relative effect of perceived control. Some individuals do not desire control over treatments or outcomes, thus reducing (or even reversing) the effects of choice for those individuals. Thus, the relationship between treatment choice and treatment outcomes is not necessarily straightforward, and may be mediated by personal factors (Krantz and Deckel, 1983).

Two studies using treatment choice have been reported in the weight loss literature, and both studies are plagued with methodological problems. Bjorvell et al. (1985) offered 107 obese Swedes a choice between in-patient behavioral treatment and outpatient jaw-fixation. Several problems exist with this study. First, the two treatment alternatives each involve a possibly great loss of freedom, thus compromising the value of having a choice and reducing any perceived freedom or control that might accrue from having a choice. Second, no control group of overweight subjects not receiving a treatment choice was used. Finally, since the principal purpose of the study was to assess personality patterns in obese persons, adequate data on weight losses were not reported. Thus, the Bjorvell et al. (1985) study does not provide an assessment of the role of treatment choice on weight reduction program outcomes.

Murray (1976) offers the only direct assessment of the role of treatment choice in a weight loss program. A confounding of choice for time of treatment and choice for type of treatment compromises Murray's (1976) study, however. Of the 27 overweight female subjects that Murray (1976) initially selected, only 12 remained after scheduling conflicts appeared. Murray's (1976) remaining subjects were between 23 and 43 years old (mean = 34.5 yrs.) and weighed an average of 213.4 pounds. Murray's (1976) original plan was to assign half of the subjects to their preferred treatment and randomly assign the other half. This strategy was compromised, however, by Murray's effort to give subjects their preferred day/time of treatment. The two treatments offered were 1) "self-control training", using a popular approach to changing eating habits, and 2) "determination-raising", a support group with the goal of raising subjects' determination to change eating behaviors.

Six subjects preferred determination-raising and were paired on initial weight by Murray (1976). One member of each pair had a preferred day/time for treatment and was given his/her preferred treatment at the preferred time; the other pair members were assigned to the non-preferred treatment. The six subjects preferring self-control training were split on the basis of availability for one of the time slots and on the basis of their initial weight in an effort to keep equivalent weight levels between the two preference conditions and the two treatments.

Over the course of the nine week (10 session) treatment subjects who received their preferred treatment lost an average of 11.6 pounds and subjects who received their non-preferred treatment lost an average of 11.4 pounds (Murray, 1976). While both preferred treatment and non-preferred treatment subjects lost significant amounts of weight (p <.01), there was not a significant difference between the conditions. The results at a three-month follow-up were similar, with the preferred treatment subjects regaining less weight than the non-preferred treatment subjects, but not significantly so. Subjects receiving the determination-raising treatment lost more weight (mean = -13.3 pounds) than subjects receiving self-control training (mean = -9.7 pounds), but not significantly. There were no interactions between the type of treatment received and preference for the treatment received.

Murray's (1976) failure to find a significant outcome effect for offering overweight subjects a choice of treatment type may result from defects in his experimental design. In addition to confounding choice of treatment type with choice of treatment time, Murray's (1976) study included only 12 subjects. This small sample size may have masked the magnitude of the effects of treatment choice in the statistical analysis. Further, the choice of treatments offered to Murray's (1976) subjects does not adequately reflect the types of weight reduction strategies currently in use in weight loss programs. A wider range of choices more representative of the currently used weight loss methods may provide results different from those reported by Murray (1976).

Krantz and Deckel's (1983) findings that personal individual difference factors mediate the role of treatment choice in affecting alcohol rehabilitation outcomes may also apply to the role of treatment choice in weight reduction. For instance, O'Leary (1985), in a review of self-efficacy and health care, noted that judgements of perceived self-efficacy will determine choice behavior. Self-efficacy judgements may work to determine which activities will be attempted and which will be avoided, as well as affecting the amount of effort and persistance devoted to health care activities (O'Leary, 1985; Bandura, 1977, 1982). Similarly, Goldney and Cameron (1981), reviewing the role of locus of control in weight management, suggest that an overweight person's locus of control beliefs may determine the type of weight loss strategy chosen. It is suggested that internal locus of control beliefs will more likely lead to a choice of exercise as a weight loss strategy (an active, self-directed activity) and that external locus of control beliefs will more likely lead to a choice of passive, therapist-directed weight loss strategies such as social support groups, medication, or nutritional education (Goldney and Cameron, 1981). Further, the degree to which someone desires having control may mediate the role of treatment choice on weight reduction outcomes (cf. Burger and Cooper, 1979). The relative desirability of having control may impact the personal value of any perceived increase in personal control accrued through having a choice of treatment type. Thus, there exist relevant individual difference factors that may interact with choice of treatment in a weight reduction program. These factors are reviewed in more detail in subsequent sections.

In summary, offering patients a choice of treatment types has moderate support as an outcome-enhancing technique in the health care literature. Treatment choice has been associated with increases in treatment satisfaction, compliance, and recovery rates in alcohol rehabilitation.

Treatment choice has also been associated with improved outcomes in the treatment of snake phobias, recovery from myocardial infarction, academic performance, and adjustment to nursing home milieu. Two studies of the role of treatment choice in weight loss programs were so compromised with methodological problems that they did not provide an adequate assessment of the thesis. Finally, individual difference factors such as self-efficacy, locus of control, and the desirability of control may mediate the role of treatment choice in improving outcomes of weight reduction programs.

Locus of Control in Weight Reduction

The effort to reduce one's body weight represents a self-regulation process that may be mediated, in part, by generalized expectancies concerning the nature and locus of personal control over outcomes (Bellack, 1975). Further, to the extent that choice of treatment alternatives influences perceived control, beliefs about control may also mediate the choice process. Literature regarding the locus of control construct in weight loss is reviewed in this section.

Rotter (1966) introduced the construct of locus of control as a theoretical device to describe individual differences in beliefs regarding generalized outcome expectancies. When a person perceives that events (eg, reinforcements, outcomes) are contingent upon his/her own behavior or personal characteristics, he/she is said to have a belief that control is internally located; when outcomes are perceived as resulting from factors not related to one's behavior (eg, luck, chance, fate, the behavior of others), the individual is said to have a belief in an external locus of control (Rotter, 1966, 1975). Rotter (1966) defines locus of control beliefs as expectancies that particular behaviors will be followed by reinforcements. A person's history of reinforcement will determine his/her locus of control expectancies.

Bellack (1975) has suggested that external locus of control beliefs represent a self-regulation deficit. He suggests that individuals with an external locus of control belief system are unable to evaluate their own behavior adequately in the absence of external input, and thus do not make effective use of self-reinforcement in behavior change efforts (Bellack, 1975). Piziak (1983) and Hirsch (1985a) have suggested that obesity represents an inadequate self-regulatory system. By extension, locus of control beliefs may describe problems with body weight regulation.

Garner et al. (1976) studied body-image disturbances in 16 adults with juvenile-onset obesity who ranged from 25% to 75% overweight. Garner et al. (1976) found that the obese group was significantly more external on Rotter's (1966) locus of control scale ($p < .025$) than were three groups of normal weight controls. Garner et al. (1976) speculated that obese persons experience little self-control and have an overall sense of ineffectiveness with regard to efforts to master their bodies. While this finding has not been replicated, evidence does suggest that locus of control beliefs are related to weight loss efforts.

Using an ill-defined sample of mildly overweight adults, Weinberg et al. (1984) found that internality correlated with weight loss in a comprehensive weight loss program (r = .44, p <.01). Weiss (1977) reviewed seven studies that assessed locus of control in relation to weight loss and found that persons with an internal locus of control lose more weight in weight reduction programs than do external locus of control overweight persons. It may be more accurate to say, however, that overweight persons who are more external in locus of control beliefs are more likely to participate in weight reduction programs, but of this population it is the more internal locus of control subjects who will lose the most weight (Wallston and Wallston, 1978; Weiss, 1977; Goldney and Cameron, 1981). Based upon a closer examination of available data, it appears that the type of treatment offered in a weight reduction program has a differential effect on internal and external locus of control individuals. Specifically, persons with an internal locus of control lose more weight in self-directed programs while persons with an external locus of control lose more weight in therapist-directed group programs and programs that use monetary incentives (Weiss, 1977; Wallston and Wallston, 1978; Saltzer, 1978).

Several authors have suggested that a locus of control measure may provide a diagnostic tool for prescribing weight loss treatments congruent with a person's cognitive syle (Weiss, 1977; Saltzer, 1978; Balch and Ross, 1975; Wallston et al., 1976; Wallston and Wallston, 1978). Wallston et al.(1976) matched subjects for locus of control scores and type of weight reduction treatment to assess whether the locus of control was a useful differential diagnosis construct. Thirty-four adult women, averaging 32.4 pounds overweight, were paired on the basis of their locus of control scores, using the Health Locus of Control Inventory of Wallston et al. (1976). Subjects were then randomly assigned to either a self-directed weight control treatment or a weight loss support group for eight weeks. As predicted, internals who received the self-directed treatment lost more weight and were more satisfied with their treatment than were internals who received the support group treatment ($p < .01$). Similarly, externals who received the support group treatment lost more weight and were more satisfied with their treatment than were externals who received the self-directed treatment. In other words, subjects who were matched with treatments congruent with their cognitive styles lost more weight and were more satisfied with treatment (Wallston et al., 1976). Balch and

Ross (1975) found similar results with 34 adult women, averaging 35% overweight, who participated in a nine session self-control weight loss program: there were significant correlations between internal locus of control beliefs and both completion and success in the program.

Goldney and Cameron (1981), reviewing the literature on locus of control and weight loss, suggest that locus of control may predict the type of weight loss strategies chosen by overweight people when they select treatments. Specifically, Goldney and Cameron (1981) predict that only those overweight persons with an internal locus of control are likely to freely choose exercise as a weight loss strategy. Obese persons with more external locus of control attributions are predicted to be more likely to select weight loss strategies that they believe will require less self-direction, such as educational and supportive programs or medical treatments. This hypothesis has not been directly assessed.

Research regarding the locus of control construct and weight loss is not unequivocal. Using Rotter's (1966) scale, several authors have failed to find support for the locus of control construct as a predictor of response to weight reduction programs (Rodin, Bray, Atkinson, Dahms, Greenway, Hamilton, and Molich, 1977; Lauer et al., 1979; Wallston et al., 1976), while others have found support for the use of Rotter's (1966) scale as a diagnostic and prescriptive tool (Balch and Ross, 1975; Weinberg et al., 1984; Chambliss and Murray, 1979). This situation may represent a lack of specificity in Rotter's (1966) scale for measuring locus of control beliefs relevant to weight loss efforts. Rotter (1975) recommended that researchers use situation-specific expectancy measures when attempting to predict behaviors in specific situations, noting that his 1966 Locus of Control Scale measures only generalized expectancies. At least three efforts have been made to develop locus of control scales specific to the weight reduction situation (Wallston et al., 1976; Saltzer, 1982; Tobias and MacDonald, 1977).

Wallston et al. (1976) developed the Health Locus of Control (HLC) Scale for use in diagnostic and predictive studies on health related behaviors. As discussed above, Wallston et al. (1976) used the HLC inventory in an investigation of matching overweight persons with weight loss treatments on the basis of cognitive style. In a review of three studies that used the Wallston et al. (1976) HLC scale, Winefield (1982) concluded that the HLC scale was inadequate as a predictor of health behaviors. Saltzer (1978, 1982) also presents evidence suggesting that Wallston et al.'s (1976) scale is not the best available locus of control scale for weight loss research.

Tobias and MacDonald (1977) developed an internal-external control of weight scale. On a sample of 27 normal weight undergraduate students, Tobias and MacDonald found that their five item locus of control scale (consisting of ten items in five forced-choice pairs) had a test-retest reliability of .52; Rotter's (1966) scale had a test-retest reliability of .76 with the same sample. With a group of 100 undergraduate women who averaged 33.1% overweight, Tobias and MacDonald (1977) found that locus of control atributions changed over the course of a weight reduction treatment (p <.05). More specifically, subjects who participated in a self-determination raising group became more internal in their locus of control attributions while subjects in behavioral contracting group became more external in their control attributions (Tobias and MacDonald, 1977).

Saltzer (1978, 1982) developed a four item Weight Locus of Control (WLOC) Scale. Saltzer (1978) reports that the WLOC is a better predictor of intention to lose weight than either Rotter's (1966) I-E scale or Wallston et al.'s (1976) HLC scale, supporting Rotter's (1975) suggestion that a behavior-specific expectancy scale will prove more useful in practical applications of the locus of control concept. Using 110 undergraduates, Saltzer (1982) administered the Rotter (1966) I-E scale, two versions of Wallston et al.'s (1976) HLC scale, the WLOC scale, and the Crowne-Marlow social desirability scale, in an effort to establish psychometric properties of the WLOC. After a 24 day post-test, the WLOC had a test-retest reliability of .67 (p <.001). Using Cronbach's alpha, the WLOC was found to have an internal consistency of .58. The WLOC correlated moderately with Rotter's (1966) I-E scale (r = .32, p <.001) and correlated mildly with Wallston et al.'s (1976) HLC scale (r = .21, p <.02), suggesting that the WLOC is related but not identical to these scales and posseses some convergent validity. The WLOC was not significantly correlated with the social desirability scale (r = -.03, n.s.), suggesting that the WLOC is not biased by a social desirability response set. While not a psychometrically strong scale, the WLOC appears to be a measure of locus of control more relevant to weight loss research than Rotter's (1966) I-E scale, Wallston et al.'s (1976) HLC scale, or Tobias and MacDonald's (1977) I-E scale of weight control.

Returning to Bellack's (1975) suggestion that external locus of control individuals fail to adequately reinforce themselves, several authors have suggested that there is a relationship between locus of control and self-evaluation (Chambliss and Murray, 1979; Kaplan, Atkins, and Reinsch, 1984; Weiss, 1977). In a study of locus of control, weight loss, and self-efficacy attributions, Chambliss and Murray (1979) found that while higher efficacy attributions for weight loss appeared to increase a person's ability to lose weight, this was only true for individuals who were internal in locus of control. Kaplan et al. (1984) found similar results in an exercise program for patients with chronic obstructive pulmonary disease: correlations between self-efficacy judgments and exercise compliance criteria were significant for persons with internal locus of control but not for externals. This apparent interaction between self-efficacy attributions and locus of control expectancies should not be surprising. Self-efficacy attributions refer to a person's perceived ability to produce a behavior (Bandura, 1977), while locus of control expectancies refer to a perceived relationship between a behavior and an outcome (Rotter, 1966). Self-efficacy and locus of control are, then, related constructs. If an overweight person has confidence that he/she can produce a certain weight reduction behavior (high self-efficacy), but no confidence that such a behavior will lead to weight loss (external locus of control), then locus of control will be a better predictor of weight loss than self-efficacy. On the other hand, if a person has confidence that certain weight reduction behaviors will lead to weight loss (internal locus of control), but no confidence in his/her ability to produce the behaviors (low self-efficacy), then self-efficacy will be a better predictor of weight loss.

In summary, available evidence suggests that locus of control attributions are relevant to weight loss. While weight loss programs tend to attract individuals with relatively external locus of control orientations, individuals within programs that are more internal tend to lose more weight. Overweight persons with internal locus of control attributions have been found to respond more favorably to self-directed programs, while overweight persons with external locus of control attributions have been found to respond more favorably to therapist-directed group programs. Assertions regarding locus of control and choice of treatments have not been directly tested. Four locus of control scales have been used in the weight loss literature, though none are fully acceptable. Saltzer's (1982) Weight Locus of Control Scale appears to provide the most direct assessment of weight-relevant locus of control at the present time.

The Desirability of Control

In a review of coping processes following coronary heart disease and stroke, Krantz and Deckel (1983) conclude that general treatment outcomes improve when patients perceive that they have some control over treatment. Krantz and Deckel (1983) note, however, that several factors may mediate this situation, including the possibility that some individuals may not desire to have control over treatment. In the present study regarding the effect of treatment choice on weight reduction outcomes, the relative desirability of control may also play a role in patient perceptions, though this hypothesis has never been directly assessed.

Burger and Cooper (1979) presented a scale to measure the desirability of control. The Desirability of Control Scale is a 20-item measure of the degree to which the respondent desires having personal control, and is scored on a seven point likert scale (Burger and Cooper, 1979). Using a norming sample of 453 undergraduate psychology students, Burger and Cooper (1979) found the desirability of control scale to possess an internal consistency coefficient of .80; an internal consistency of .81 was found on a second sample of 98 undergraduates as well. Thirty-one of the 453 undergraduates were readministered the scale at a six week re-testing, and a test-retest reliability coefficient of .75 was obtained. The Desirability of Control Scale had a weak relationship with Rotter's (1966) I-E scale ($\underline{r} = -.19$), indicating that while internality and desirability of control are related, the constructs are independent. The Desirability of Control Scale was not significantly correlated with responses on the Marlowe-Crowne social desirability index ($\underline{r} = .11$, n.s.), indicating that desirability of control does not represent a response set of social desirability.

Dembroski, MacDougall, and Musante (1984) also found that the Desirability of Control Scale was not significantly related to the Rotter (1966) I-E scale in a group of 67 male undergraduate students ($\underline{r} = -.11$, n.s.). Demobroski et al. (1984) state that despite conceptual similarity, locus of control and desirabilty of control have little overlap, noting that the latter may tap actual preferences for control while the former may reflect an ideology regarding the nature of control.

Burger and Cooper (1979) have characterized the person with a high desirability for control as being assertive, decisive, and active. The high desirability of control individual is a leader, seeks to influence others, and avoids unpleasantness with manipulation. In contrast, the person with a low desirability of control is characterized as nonassertive, passive, indecisive, and not likely to try to influence others. The low desirability of control individual prefers that decisions be made by others. Burger and Cooper (1979) suggest that differences in the desire to control events should help account for variations in observed behavior.

Burger and Cooper (1979) speculate that a desire for control may be related to learned helplessness, and that a person with a high desire for control may be more reactive to uncontrollable situations. This hypothesis has not been directly assessed. If true, however, this hypothesis may imply that overweight individuals who are high in the desirability of control, and who do not receive a choice of weight loss treatments, may exhibit more reactance. Further, there may be some relationship between the desirability for control and a person's past history of weight loss efforts in a treatment choice study.

In summary, the desirability of control is an individual difference factor that may prove relevant to a study of outcomes following treatment choice, though this hypothesis has not been directly assessed. A person with a relatively high degree of desire for control will prefer to make his/her own choices and decisions, whereas a person low in desire for control will prefer that decisions be made for him/her by others. Burger and Cooper (1979) have presented a scale for measuring the desirability of control that possesses acceptable psychometric properties. The desirability of control construct is distinct from the locus of control construct.

Self-Efficacy

Bandura (1977, 1982) postulates that a critical determinant of behavior is not so much the person's perception of the relationship between a behavior and an outcome, but the individual's expectancies regarding his/her ability to successfully implement the behavior. This relates to the results of Gormally et al. (1980) which indicate that subjects who sustain weight losses report greater confidence in their ability to maintain weight loss strategies than weight-regainers. O'Leary (1985) and Sternberg (1985) have reviewed evidence that reveals a direct relationship between a person's internal self-statements and his/her ability to carry-out weight reduction procedures and produce a weight loss. Judgements about one's ability to initiate and sustain weight loss efforts are referred to as self-efficacy expectations (O'Leary, 1985; Bandura, 1977, 1982).

Bandura (1977, 1982) has discussed the concept of self-efficacy, a cognitive mediator of behavior. Self-efficacy refers to the individual's perceived ability to perform a coping response, an active behavior to deal effectively with a specific situation. Bandura (1977) has differentiated efficacy expectations from outcome expectations. An outcome expectancy is defined as a person's estimate that a given behavior will lead to certain outcomes. An efficacy expectation is the person's conviction that he/she can successfully execute the behavior. Self-efficacy, then, is a form of self-referent thought that mediates the relationship between knowledge and action.

Bandura (1977, 1982) also differentiates self-efficacy from related constructs such as self-esteem and self-concept, noting that self-efficacy refers to perceived performance competency in specific situations, whereas self-concept and self-esteem refer to global self-image across a wide variety of situations.

Self-efficacy judgements, whether accurate or inaccurate, influence the individual's choice of activities and environmental settings (Bandura, 1977, 1982).

Judgements of self-efficacy also determine how much effort a person will expend, and how long he/she will persist, in the face of obstacles or aversive experiences.

With regard to weight loss efforts, self-efficacy relates to the overweight person's sense of control or subjective sense of mastery over temptations or urges in weight loss relevant high-risk situations (Marlatt and Gordon, 1985; Sternberg, 1985; O'Leary, 1985). According to both Marlatt and Gordon's (1985) Relapse Prevention Model and Bandura's (1977) self-efficacy theory, it is assumed that when an overweight person is following a set of treatment strategies governing nutrition, exercise, or behavior modification, he/she experiences a sense of personal control (self-efficacy) over these behaviors. The perception of self-efficacy continues until the overweight person encounters what Marlatt and Gordon (1985) call a high-risk situation. If the individual persists with weight loss strategies in the high-risk situation, his/her sense of self-efficacy is enhanced; alternatively, a strong sense of self-efficacy in the high-risk situation will yield persistance behaviors (Sternberg, 1985). Conversely, relapse in high-risk situations is associated with lower self-efficacy attributions. The demoralizing effects of relapse and reduced self-efficacy, and the consequent decrease in future persistance in high-risk situations, represents what Marlatt and Gordon (1985) have referred to as the Abstinence Violation Effect.

The probability that an obese person will fail to maintain the use of his/her weight loss strategies decreases significantly, then, when the individual has a high level of self-efficacy for performing the specific weight loss strategies in the specific high-risk situation (Sternberg, 1985; O'Leary, 1985). The probability of relapse increases when the overweight person has low self-efficacy expectations of his/her ability to perform weight loss strategies in specific high-risk situations. Past experiences with weight loss efforts will play a role in the overweight person's self-efficacy judgements regarding his/her ability to perform specific weight control coping responses. Past success, according to Bandura's (1977, 1982) theory, will enhance self-efficacy attributions, while past failures will tend to lower self-efficacy attributions. Thus, the overweight person's previous experiences with weight control efforts may well impact his/her self-efficacy judgements regarding which types of weight control behaviors can be successfully used in specific high-risk situations. The individual's past history of weight control efforts may also determine which type of weight loss strategy an overweight person will choose to learn if given a choice. The relationship between past weight loss efforts, self-efficacy judgments, and preferred weight loss strategies has not been directly examined.

In a review of self-efficacy and health behaviors, O'Leary (1985) concluded that the obese person's self-efficacy judgments regarding ability to manage body weight are typically low. O'Leary (1985) suggests that low self-efficacy attributions may explain why overweight persons fail to utilize effective self-regulatory measures in the control of body weight. Unfortunately, few studies have been conducted applying the self-efficacy construct to weight control efforts. Chambliss and Murray (1979) manipulated self-efficacy attributions in obese subjects during a weight reduction program. Sixty-eight adult women, averaging 31% overweight, were given a placebo medication described as a metabolic stimulant. After two weeks, half the subjects were told that the drug was inert and were encouraged to attribute success in weight loss to their own efforts and ability. Results indicated that for individuals who were internal in locus of control, attributions of self-efficacy increased ability to lose weight ($p < .01$). It should be noted that self-efficacy was not measured in this study, and its manipulation was assumed. Further, the results suggest an interaction between self-efficacy and locus of control (Chambliss and Murray, 1979).

Weinberg et al. (1984) divided 44 overweight adults into high and low self-efficacy groups based upon pre-existing levels of self-efficacy. Self-efficacy was also manipulated in this study by telling a portion of the subjects that they had been specially selected for their self-control capacities; these subjects were encouraged to make attributions to self-control efforts for their successes. Weinberg et al. (1984) found that individuals with high pre-existing levels of self-efficacy lost more weight than individuals with low pre-existing levels of self-efficacy (mean loss of 8 pounds vs. mean loss of 3 pounds, $p < .01$). Further, individuals with high levels of manipulated self-efficacy lost more weight than individuals who were not subject to self-efficacy manipulation (mean loss of 7 pounds vs. mean loss of 2 pounds, $p < .01$).

Hartigan, Baker-Strauch, and Morris (1982) found support for the utility of self-efficacy theory in weight reduction research. Hartigan et al. (1982) examined perceptions of the causes of obesity and treatment outcome in the context of Weiner's attribution theory. Four areas of causal attribution for goal attainment in weight loss efforts were assessed: personal ability, expended effort, task difficulty, and random factors (eg, luck). Hartigan et al. (1982) randomly assigned 27 adult subjects, averaging 36% overweight, to one of three treatment conditions: standard behavior therapy plus a nutritionally sound diet, dieting alone, and a delayed-treatment control. After seven weeks of treatment, only the behavior therapy group had lost a significant amount of weight (mean=-10.55 pounds, $p<.01$). Of Weiner's four attributional areas, only perceptions of a lack of ability were associated with pre-treatment weight ($r=.43, p<.05$). During the course of the study, only those subjects who received a treatment increased their ability attributions. Subjects who attributed treatment outcomes to task difficulty (ie, "it's too difficult to lose weight") were less likely to attribute their weight status to personal ability factors ($r=-.38$, $p<.02$). Subjects who felt personally or socially victimized in their obesity were less likely to attribute treatment outcomes to ability ($r=-.32, p<.05$). Hartigan et al. (1982) conclude that successful weight loss is more a function of perceived ability than effort expended. The authors recommend that weight loss programs be designed to enhance ability attributions in subjects, increase a sense of personal responsibility, decrease feelings of vicitimization, and offer opportunity for simple task-mastery.

A dissertation study by VanKoten-Chappell (1982) found evidence contradictory to the majority of self-efficacy and weight loss research. In VanKoten-Chappell's (1982) study, individuals with low self-efficacy and unsupportive families lost more weight than subjects with high self-efficacy attributions and ample family support. The results may have been due to an interaction between self-efficacy, other subject personality characteristics, and the treatment offered. Subjects received a hospital-based fasting treatment with protein supplements. Subjects who were low in self-efficacy were also measured as having dependent personalities. VanKoten-Chappell (1982) argues that dependent subjects with low self-efficacy may normally respond better under medical structure and that the high self-efficacy subjects may have been so supported (and unchallenged) by their families that they were unmotivated to lose weight.

While there is some empirical support for the utility of self-efficacy theory in weight loss research, there are difficulties associated with the measurement of self-efficacy. Self-efficacy is not a global, cross-situational construct like locus of control, but rather refers to a person's judgments about his/her ability to cope with a specific situation (Bandura, 1977). Thus, self-efficacy is a "state" measure, not a "trait" measure, making its assessment somewhat more difficult than more global contructs. Further, the assessment of self-efficacy is a relatively new endeavor, and the development of specific measures for self-efficacy expectancies is an ongoing effort in the psychological literature (Marlatt and Gordon, 1985).

The goal of assessing self-efficacy is to provide the client with a list of potentially stressful or high-risk situations that are likely to be encountered, and to evaluate the client's judgments about his/her ability to emit the necessary coping responses in those situations. In the field of addictive behaviors, self-efficacy measures have been used in smoking cessation programs, alcohol treatment programs, and weight reduction programs (Marlatt and Gordon, 1985; O'Leary, 1985; DiClemente, 1981).

According to Bandura (1977, 1982), self-efficacy can be assessed along three dimensions: level, strength, and generality. Level refers to a discrete yes/no judgment made by the client regarding whether he/she has the ability to perform the target behavior. Strength refers to the degree of confidence the client has regarding his/her judgment. Generality refers to the strength of the judgment across varying situations. Self-efficacy questionaires used in weight loss research typically involve presenting the subject with a list of high-risk situations relevant to weight control, and asking the subject to rate how much confidence he/she has in his/her ability to perform weight reduction strategies in those specific situations. Bandura (1977, 1982) has recommended using a rating scale from 0% to 100% confidence, expressed in 10-point intervals.

Kaplan et al. (1984) have noted that there are serious problems associated with establishing the reliability of self-efficacy scales. The use of test-retest reliability coefficients may not be appropriate because self-efficacy is conceptualized as being a dynamic construct, changing over time. Kaplan et al. (1984) also suggest that, since efficacy attributions pertain only to specific situations, internal consistency measures of reliability may not be appropriate either. That is, each specific efficacy scale is a single item, and a reliability estimate based on the average intercorrelation between items may be an inappropriate use of the psychometric model. Kaplan et al. (1984) suggest that indirect evidence for the reliability of self-efficacy scales can be obtained from correlations between self-efficacy measures and other variables.

Few of the studies regarding self-efficacy and weight loss reviewed above presented the measure of self-efficacy employed. While Weinberg et al. (1984) did report their self-efficacy measure, it apparently consisted of only one item. VanKoten-Chappell (1982) reported the measure used in her dissertation study, but failed to conduct any psychometric analyses on the self-efficacy scale. Mavis (1987) used VanKoten-Chappell's scale in his dissertation and, following extensive psychometric analysis, found the scale to possess acceptable psychometric properties.

Mavis (1987) reduced VanKoten-Chappell's (1982) self-efficacy scale from 49 items to 30 items, and used the scale in a weight reduction program with 118 overweight adults. Cluster analyses of the self-efficacy scale revealed four factors. The factors and their respective internal consistency coefficients are as follows: emotional cues (alpha=.92), situational cues (alpha=.83), social anxiety (alpha=.82), and appetitive (alpha=.63). Low internal consistency for the appetitive factor is undoubtedly due to the fact that the cluster consisted of only two items. A composite internal consistency coefficient for the entire 30 item scale was alpha = .91. Test-retest reliability coefficients for the self-efficacy scale factors, based upon the responses of 15 subjects retested after two weeks, were also established: emotional cues (.91), situational (.71), appetitive (.80), and social anxiety (.55). Thus, Mavis' (1987) revision of VanKoten-Chappell's (1982) self-efficacy scale possesses acceptable reliability for use in weight loss research.

In summary, there is some support for the application of Bandura's (1977) self-efficacy construct to weight loss research. Self-efficacy is defined as an individual's perceptions of his/her ability to execute a coping response in a stressful situation. A person's self-efficacy expectations work to determine the amount of effort and persistance that will be put forth in the face of obstacles. Higher levels of self-efficacy have been associated with success in weight loss efforts and with the ability to maintain weight loss strategies in weight relevant high-risk situations. Self-efficacy attributions may also determine a person's choice of activities. An individual's past history of situation-specific outcomes may determine future self-efficacy expectancies in similar situations. The assessment of self-efficacy is a relatively new endeavor in the field of psychology and problems exist with creating reliable standardized measures. Mavis' (1987) revision of VanKoten-Chappell's (1982) self-efficacy scale possesses acceptable psychometric properties for use in weight loss research until such time that a better scale is developed.

Summary

Relevant theory and research was reviewed in the following areas: definitions and measurements of body weight and weight change, personal and demographic variables associated with body weight and weight reduction, non-medical treatments for weight reduction, attendance and adherence issues in weight reduction programs, patient choice of treatment type, locus of control in weight loss research, desirability of control, and self-efficacy expectations in weight reduction efforts.

An individual may be considered overweight or obese when a greater than normal percentage of body weight is fat. For men, obesity and its risks begin when body weight reaches a level somewhere between 20%-25% over ideal weight (Body Mass Index = 27.2) as indexed by the 1983 Metropolitan Life Insurance Tables. For women, obesity and its risks begin at about 30% over ideal weight (BMI = 29.15). The most widely used and recommended indices of body weight and weight change are absolute weight (in pounds or kilograms), body mass index, and percent overweight.

Global personality patterns have not been found to predict obesity or response to weight reduction programs. Two studies were located that reported a personality pattern of addictive potential in overweight persons, similar to that found in alcoholics. These studies stand alone in the weight loss literature.

A greater percentage of women than men are overweight, and women outnumber men in weight reduction programs by a ratio of 4:1. Apparent gender differences in the rate of weight loss during the course of weight reduction programs, favoring men, disappear when age, percent body fat, and initial weight are controlled. Obesity does appear to follow socioeconomic gradients, with lower socioeconomic status being associated with higher levels of body weight. Apparent racial differences in body weight disappear when income and education are controlled.

Evidence suggests, though not unequivocally, that juvenile-onset obesity is more resistant to treatment than adult-onset obesity. Age-at-onset may be a more important factor in the maintenance of weight loss than in short-term treatment response. Genetic factors may determine hyperplastic obesity, but no evidence exists indicating that hyperplastically obese individuals have more difficulty losing weight.

Personal history of weight loss efforts has not proven effective as a predictor of future success in weight loss efforts. Two contradictory arguments exist on this issue: one suggesting that past weight loss attempts make future success less likely because of biological adaptations, the other suggesting that past weight loss attempts make future success more likely due to learning factors.

There are three widely used non-medical approaches to the reduction of body weight: nutritional management, behavior modification, and physical exercise. These weight loss strategies have been used separately or in combination, and produce roughly equivalent results in body weight reduction. Nutritional management and behavior modification produce a minimum average rate of weight loss equal to approximately one pound per week while exercise produces a somewhat slower minimum average rate of weight loss of approximately 0.60 - 0.70 pounds per week. Over time, the three weight loss methods produce equivalent reductions in body weight if the treatment-specific strategies are adhered to. Behavior modification and exercise are associated with greater long-term maintenance of weight loss. Exercise is associated with continued weight loss following program termination. Exercise programs generally show the highest attrition rate while behavior modification programs have demonstrated low attrition rates. The average length of a weight reduction program (not including maintenance programs) is about ten weeks, ranging from 8 - 16 weeks. The average weight loss obtained in non-medical weight reduction programs ranges between 10 and 15 pounds per person.

Attendance and adherence are important issues in weight reduction programs and related research. Both attendance at program meetings and adherence with prescribed program behaviors are associated with success in weight loss efforts. The use of monetary incentives, contingent upon weight loss or attendance, has been found effective in reducing attrition. Apart from the use of monetary incentives, little attention has been given to developing methods for enhancing program conditions that might increase attendance and adherence in weight loss programs.

Offering patients a choice of treatment types has moderate support as an outcome-enhancing technique in the health care literature. Treatment choice has been associated with increases in treatment satisfaction, compliance, and recovery rates in alcohol rehabilitation. Treatment choice has also been associated with improved outcomes in the treatment of snake phobias, recovery from myocardial infarction, academic performance, and adjustment to nursing home milieu. Two studies of the role of treatment choice in weight loss programs were so compromised with methodological problems that they did not provide an adequate assessment of the thesis. Individual difference factors such as self-efficacy, locus of control, and the desirability of control may mediate the role of treatment choice in improving outcomes of weight reduction programs.

Available evidence suggests that locus of control attributions are relevant to weight loss efforts. While weight loss programs tend to attract individuals with relatively external locus of control orientations, individuals within programs that make relatively more internal locus of control attributions will lose more weight. Overweight persons with internal locus of control attributions have been found to respond more favorably to self-directed programs, while overweight persons with external locus of control attributions have been found to respond more favorably to therapist-directed group programs. Assertions regarding locus of control and choice of treatments have not been directly tested. Four locus of control scales have been used in the weight loss literature. Though none of the locus of control measures have fully acceptable psychometric properties, Saltzer's (1982) Weight Locus of Control Scale appears to be the most useful at the present time.

The desirability of control is an individual difference factor that may prove relevant to a study of outcomes following treatment choice, though this hypothesis has not been directly tested. A person with a relatively high degree of desire for control will prefer to make his/her own choices and decisions, whereas a person low in the desire for control will prefer that decisions be made for him/her by others. Burger and Cooper (1979) have presented a scale for measuring the desirability of control that possesses acceptable psychometric properties.

There is some support for the application of Bandura's (1977) self-efficacy construct to weight loss research. Self-efficacy is defined as an individual's perceptions of his/her ability to execute a coping response in a stressful situation. A person's self-efficacy expectations work to determine the amount of effort and persistance that will be put forth in the face of obstacles. Higher levels of self-efficacy have been associated with success in weight loss efforts and with the ability to maintain weight loss strategies in weight-relevant high-risk situations. Self-efficacy attributions may also determine a person's choice of activities. An individual's past history of situation-specific outcomes may determine future self-efficacy expectancies in similar situations. The assessment of self-efficacy is a relatively new endeavor in the field of psychology and problems exist with creating reliable standardized measures. Mavis' (1987) revision of VanKoten-Chappell's (1982) self-efficacy scale possesses acceptable psychometric properties for use in weight loss research until such time that a better scale is developed.

CHAPTER III

METHODOLOGY

A plan for the design and implementation of the research procedures to investigate the hypotheses generated in Chapter I is presented in this chapter. The population of interest is defined and sampling techniques are described. The measures used in the study are described and procedures for scoring the assessment devices are presented. The design of the study and testable hypotheses are delineated, and procedures for analytic treatment of the data are outlined.

Population

The population of interest for this study consists of overweight adults who freely respond to weight control program advertisements. One possible limitation to the generalization of research findings based on a sample of this population is that not all overweight adults who engage in efforts to lose weight participate in organized weight reduction programs. That is, many overweight adults attempt to lose weight on their own, without the aid of a structured group program. This population of individuals has not been adequately studied and, hence, results derived from an organized group weight reduction program may not apply to this population.

Sample

The study sample consisted of 118 overweight male and female adults who responded to a newspaper advertisement for a weight reduction program placed in The Lansing State Journal during February, 1987. Procedures for the selection of subjects and their assignment to treatment groups is described in the "Procedures" section below. Attrition is described in Chapter IV. Based upon data obtained from the initial research questionnaire administered at the first program meeting, the sample can be characterized as follows:

1. The age ranged from 24 to 65 years of age, with a mean of 42.2 years and a standard deviation of 9.65 years.
2. 15.8% of the subjects were male; 84.2% were female.
3. Marital status indicated that 11.6% were single, 63.2% were married, 21.1% were divorced, and 4.2% were widowed.
4. 86.4% of the subjects were White, 9.5% were Black, 4.2% were Hispanic.
5. The mean number of years of education was 15.2, with a range of 11 to 22 years.
6. 71.6% of the subjects were employed full-time outside their home, 13.7% were employed part-time outside their home, 8.4% classified themselves as homemakers, 4.2% were unemployed, and 2.1% were full-time students.

7. Based upon self-reported age-at-onset of obesity, the range was from infancy to 50 years, with a mean of 21.4 years and a median of 22.5 years. 38.9% of the sample was obese before the age of 18 years.
8. 33.7% of the subjects had made between 1 and 5 previous attempts at losing weight, 27.4% had made between 6 and 10 previous attempts, 9.5% had made between 11 and 15 previous attempts, and 29.5% had made more than 15 prior attempts at losing weight. The average subject had used about four different methods for losing weight, with a range of 1 to 11.
9. At the first weigh-in, the subjects' weights ranged from 134 to 343 pounds, with a mean of 197.6 and a standard deviation of 41.5. The subjects ranged from 1.1 to 145.0 percent overweight, with a mean of 44.36 and standard deviation of 27.35. Body Mass Index ranged from 22.5 to 53.5, with a mean of 32.4 and a standard deviation of 6.02.

Procedures

Subject selection. The sample under study in the present investigation was drawn from a population of males and females residing in the Lansing, Michigan metropolitan area. The research subjects were recruited through an advertisement placed in the Lansing State Journal (February, 1987) for Mavis' (1987) weight loss research study. As Mavis' advertisement yielded far more respondents than were necessary for his study, a waiting list of potential weight loss program participants was created and these individuals were notified that they would be eligible for the next program offered. In June, 1987, three hundred (300) wait-list subjects were contacted through the mail to 1) ensure their willingness to participate in the entire ten week program, 2) to provide information regarding further contact and assignment to a weight reduction treatment condition, and 3) to begin the physical risk factor screening process.

Through a form letter, the 300 subjects were asked to refrain from participating in the weight loss program if they were pregnant, had diabetes, or were under medical care for hypertension. In addition, the Physical Activity Readiness Questionaire (PARQ), used by the American Heart Association (1984a), was included in the mailing to identify and screen out individuals who might be at high risk for participation in this study. The PARQ can be found in Appendix A.

The rationale for screening out potential subjects who may have possessed physical health risks for participating in exercise prior to actual selection of subjects was to help prevent differential exclusion or attrition after randomization. Individuals who, on the PARQ, indicated the existence of potential risk factors for participating in physical exercise were excluded from participation in the study. The only exceptions to this were individuals who marked only item #7 on the PARQ, indicating they were men over the age of 45 or women over the age of 50 and had no other potential health risk factors. These individuals were asked to provide written consent from their personal physicians prior to being invited to participate in the study. Individuals who did not indicate risk factors on the PARQ, and who were men under the age of 45 or women under the age of 50, were considered to be at minimal risk and were allowed to participate in the study without further screening. Note that subjects in the exercise training conditions received an additional assessment for physical fitness and potential health risks (see outline of Exercise Training treatments in Appendix D).

Subject assignment. Of the 300 potential subjects contacted by mail, about 200 returned the PARQ and expressed interest in participating in the study. One hundred forty (140) individuals were eligible for participation in the study.

One hundred twenty (120) subjects were selected and randomly assigned to two groups of sixty subjects, comprising the two levels of factor A (choice of treatment type versus random assignment to treatment type).

The sixty subjects who were to receive a choice of treatment type (Group A.1) were contacted through the mail and asked to attend a meeting where the three weight loss methods (ie, nutritional education, behavior management, and exercise) would be described. The sixty subjects in group A.2 were randomly assigned to one of the three treatment types and were mailed instructions regarding the date, time, and place of the first meeting for their assigned treatment. One subject from each level of factor A failed to show up for the first scheduled meeting (and could not be reached by phone), leaving 59 subjects in each level of factor A (118 subjects overall).

Following a description of the treatments and the overall program at the pre-program meeting, the subjects in group A.1 were asked to choose the one treatment method in which they desired to receive training during the course of the ten week program. Subjects in group A.1 were then assigned to their treatment of choice and informed of the date, time, and place of the first program meetings. No changes in choice of treatment were allowed at that time. Subjects in group A.2 were not offered a choice of treatment type and were not informed that subjects in group A.1 were offered a treatment choice until the end of the program.

The description of treatment alternatives offered to subjects in group A.1 was constructed to reflect the available research data on the three major weight loss strategies. The treatments were described as roughly equivalent in their effectiveness for promoting weight loss, though known treatment differences were highlighted. Each subject was encouraged to select the treatment strategy that he/she evaluated as appropriate for him/her at the present time. The description of treatments and instructions to subjects can be found in Appendix B, along with the results of a pilot study conducted to demonstrate equivalence of the treatment descriptions.

The description of treatments was offered to subjects in group A.2 at the first program meeting, though the opportunity for choice of treatment type was not addressed at that time. Subjects in group A.2 were informed of the experimental design at the last treatment session during the debriefing discussion, as were subjects in group A.1.

All subjects were encouraged to view the weight reduction strategy assigned as a means to _initiate_ weight reduction. All subjects were informed that they would be offered a weight loss maintenance program following the ten week program and were strongly encouraged to participate in the maintenance program. Subjects were instructed that weight loss (and its maintenance) is a long term process and that the present program was merely a means to begin the process of weight reduction with thorough training in a proven method for weight control.

Monetary Incentives and Costs. All subjects were required to deposit $45.00 with the experimenter at the beginning of the program. Five dollars from each subject's deposit was used to defray costs of the program associated with photocopying expenses for program handouts and treatment manuals. The remaining forty dollars from each participant's deposit was placed in an account with the Department of Psychiatry at Michigan State University. The pool of deposited money was used in a monetary incentive scheme for weight loss program participants.

The monetary incentive scheme used in this study was based upon a similar strategy used by Mavis (1987). Each subject received a raffle credit, contingent upon attendance, at each program meeting. At the tenth program meeting, a raffle for monetary prizes was held in each treatment group. The prize amounts were based upon a total raffle fund of $3750.00 deposited by the 95 active program participants. The pooled monetary deposits were divided evenly among the six treatment groups ($625.00 per group) to ensure equivalent incentive strength for all participants. Each treatment group raffle offered three prizes: 1st prize = $350, 2nd prize = $175, 3rd prize = $100. It should be noted that a $45.00 "fee" for a ten week weight loss program is substantially less than the average cost of $385.00 for similar programs in the commercial marketplace (Porcello, 1985).

Informed Consent. Only those subjects who provided informed consent were accepted into the study. Subjects were provided with an Informed Consent Form (see Appendix C) after they received a description of the three treatment conditions and had knowledge of which particular treatment strategy they had been assigned to. For subjects in group A.1, distribution of the Informed Consent Form occured at the organizational meeting where treatments were described and a choice of treatment type was offered. For subjects in group A.2, distribution of Informed Consent Forms occured in the first program meeting following a description of the treatments. Participants in group A.2 were told that they had been randomly assigned to a treatment condition. All participants were told prior to providing informed consent that a full disclosure of the specific nature of the research would be explained in the last treatment session.

Weight Loss Treatment Conditions. Three weight reduction strategies were offered to subjects in this study: nutritional education, behavior management, and exercise training. Each treatment was based upon an established weight reduction method drawn from the weight reduction literature. Identical programs were conducted for each of the major treatment conditions: one each for subjects in group A.1 receiving a choice of treatment and one each for subjects in group A.2 randomly assigned to treatments. Outlines for each ten week treatment program are presented in Appendix D.

The nutritional education and nutritional management treatment program offered to subjects in this study was based upon the weight management plan published by the National Dairy Council (1985). Lifesteps:Your Personal Plan for Weight Management (National Dairy Council, 1985) contains extensive information regarding caloric values in common foods, shopping and meal planning, suggested menus, guidelines for restaurant eating, and educational materials regarding the nutritional requirements of the human body. Lifesteps provides a method for personalizing dietary plans to fit individual needs. Behavior modification methods contained within the National Dairy Council program were included in the present program, but not emphasized.

The behavior management treatment offered to subjects in this study was based upon behavioral treatment methods widely reported in the weight loss literature (Bellack, 1975; Stalonas et al., 1978; Sandifer and Buchanan, 1983; Brownell, 1979). Subjects were trained to identify weight-relevant behaviors, to specify and set personal behavioral goals, to monitor personal behaviors, to graph target behaviors, to develop alternative coping behaviors, to develop contingency contracts with significant others, to identify behavioral relapse cues, to develop stimulus control strategies, and to monitor and alter internal self-dialogue. Subjects were also offered training in assertiveness and stress management. The subjects in the behavior modification treatments were given a modified version of Brownell's (1979) weight control manual. The manual was supplemented with additional written handouts on behavior management methods drawn from various sources in the weight reduction research literature. The Brownell (1979) manual contains information on nutrition and exercise that was included in the program but not emphasized.

The exercise training program offered to subjects in this study was based upon the work of Perri et al. (1986), the American Heart Association (1984a, 1984b, 1984c, 1984d), and Bjorntorp (1978). Subjects were educated regarding the role of exercise in weight reduction and trained in safe aerobic physical activities. Subjects received written handouts on aerobic exercise, caloric expenditure associated with various physical activities, and forms to aid in monitoring progress in physical conditioning. The exercise program consisted of submaximal physical exercise, which has been shown to promote significant weight loss and is associated with minimal injury (MacKeen et al., 1983; Tremblay et al., 1986; Lennon et al., 1985; Holm et al., 1977; Franklin et al., 1979; Gwinup, 1975). Submaximal physical exercise generally consists of physical activity at 50%-75% of aerobic capacity. Subjects received information on a variety of methods of moderate physical exercise, though brisk walking was the primary exercise strategy emphasized. Each program meeting involved therapist-led demonstrations, a warm-up routine, an exercise routine, and a cool-down period. Exercise intensity began at low levels and was gradually increased to moderate levels. Individual exercise between program meetings was strongly encouraged.

Exercise training subjects also received the Brownell (1979) manual as an informational resource to supplement their exercise training, though the behavioral and nutritional aspects of the manual were not emphasized.

Thus, each of three treatment conditions offered to subjects in the present study was based upon a rational and documented strategy of weight loss. Each weight reduction method was taught as a separate strategy, though some overlap existed between the methods. Two identical programs were conducted for each treatment condition: one each for subjects in group A.1 receiving a choice of treatment and one each for subjects in group A.2 randomly assigned to treatments. All subjects were assigned weekly homework assignments, relevant to each treatment condition, which were monitored by the program leader. Specific information pertaining to each treatment program can be found in Appendix D and in the treatment manuals referenced above.

Treatment Providers. Each treatment strategy was taught by an individual with expertise specific to the intervention, as described below. The principal investigator was present at each treatment session for all groups and acted as program leader. The principal investigator also collected data at the appropriate times.

The two nutritional education treatments were taught by a nutritional consultant employed by the Dairy Council of Michigan, volunteering his time to this study in exchange for advanced training credit with his employer. The nutrition education group leader had just over four years of experience providing nutritional education, and was familiar with the treatment manual used in this study. The nutrition management group leader had a master's degree in human nutrition and was a registered dietician.

The exercise training groups were led by an exercise physiologist. She held a master's degree in exercise physiology, and had just over four years of experience leading exercise and health promotion programs. She had previous experience developing and leading exercise programs for weight loss. The exercise instructor was paid $350.00 for her involvement in the study; $300.00 was contributed by the Department of Psychiatry at Michigan State University and the investigator contributed the remaining $50.00.

The two behavioral management treatments were led by the principal investigator, a doctoral candidate in counseling psychology. The behavioral management instructor holds a master's degree in clinical mental health counseling and had over four years of experience in the provision of behavior management interventions.

Thus, all three treatment providers in the present study held master's degrees in their respective fields and had just over four years of experience in their specialty areas. While the three treatment providers were not "equated" for education and experience, they possessed roughly equivalent levels of expertise.

Measurement Schedule. Appendix E contains the measures used in this study; specific information about the measures is contained below in the section entitled Instrumentation.

Body weight, attendance, and adherence were measured at each program meeting. A demographic questionaire was administered at the first program meeting, as were the Desirability of Control Scale and the Weight Locus of Control Scale. Measures of perceptions of treatment efficacy and self-efficacy were administered at the first treatment session, the fifth treatment session (mid-program measure), and at the last treatment session. A measure of treatment satisfaction and reactance was administered at the fifth program meeting and the final program meeting.

A separate questionaire was mailed to subjects who dropped out of the study during the course of the program, assessing their reasons for dropping out. A 62% return rate was obtained on the first mailing of this questionaire, and a 0% return rate was obtained on the second mailing. Subjects who dropped out at the first program meeting were called on the telephone, read the drop-out questionaire, and asked to supply the reason for their decision to refrain from participation in the program. As attrition is an outcome of this study, results relating to drop-out are contained in Chapter IV. Longer term follow-up assessments were not planned as a part of the study, as the primary research questions were about short-term outcomes.

Debriefing and Follow-up. Full disclosure of the research design, fundamental research questions explored in this study, and available results were explained to subjects at the final program meeting.

All subjects were offered a weight loss maintenance program immediately following the study. Subjects were informed of this program at the beginning of the study and strongly encouraged to participate in the maintenance program throughout the ten week training program.

Instrumentation

Eleven areas of measurement are included in this study. Body weight, attendance, attrition, adherence, program satisfaction, program reactance, perceptions of self-efficacy, and perceptions of treatment efficacy are outcome variables. The desirability of control, locus of control, and a variety of demographic factors were measured as potential predictor variables. The assessment devices used in this study can be found in Appendix D.

Body weight. Body weight was measured at weekly program meetings for all subjects using the same scale. Body weight was measured in pounds. Body weight data will also be discussed in terms of Body Mass Index (BMI) and percent over ideal weight (as defined in Chapter II).

Attendance. Attendance records for each subject were kept, using the weekly weight records as the data source. Attendance data are reported as total attendance figures for for each subject for the entire program (10 sessions).

Attrition. Data regarding attrition from the program were drawn from the weekly weight records and the mid- and post-program questionaires. Individuals who did not complete the pre-test questionaires were considered drop-outs; individuals who did not complete the final program questionaire were also considered to be drop outs.

Adherence. Adherence to prescribed program behaviors was assessed for all subjects using the method described by Perri et al. (1986) and Stalonas et al. (1978). Each subject in each treatment condition received weekly homework assignments relevant to his/her specific treatment condition. At each weekly weigh-in, the experimenter inquired of each subject whether the homework was completed. The experimenter assigned an adherence score to each subject's homework self-report. A score of two points was used to indicate full adherence, a score of one point indicated partial adherence, and a score of zero points indicated nonadherence. Adherence data are analyzed and reported in terms of total adherence scores for the entire program (possible range = 0 to 18, for nine sessions).

Subjects were informed that the experimenter was evaluating adherence, though no contingencies were associated with subject adherence ratings.

Self-efficacy. Perceptions of self-efficacy for one's ability to maintain weight loss strategies in the face of weight control relevant stress were assessed using the "Self-Confidence" scale. The self-efficacy scale used in this study was developed by VanKoten-Chappell (1982) and revised by Mavis (1987). Using 118 obese subjects in a weight loss program, Mavis found the self-efficacy scale to possess an internal consistency reliability coefficient (alpha) of .91 (Mavis, 1987). The internal consistency of the self-efficacy scale obtained in the present study was .93 (Cronbach's alpha).

The thirty-item measure is scored by the testee on an eleven point response gradient (0 - 10), reflecting the strength of the subject's degree of self-confidence for his/her ability to maintain weight loss strategies in each situation described. Data are reported in terms of each subject's average score for each test period.

Perceptions of Treatment Efficacy. Subjects' perceptions of the efficacy of their assigned treatment method was assessed using the "Perceptions of Your Weight Loss Method" questionaire. This measure consists of three items, scored on a five point scale (0 -4) for agreement with the item statement. Data are reported in terms of the average score of the three items.

Items #2 and #3 were drawn from Mavis' (1987) weight reduction program questionaire. They possessed an internal consistency coefficient of .79 for Mavis' (1987) sample. Item #1 was taken from Borkovec and Nau (1972), and did not have a reported reliability coefficient. The internal consistency reliability estimate for the three item perceptions of treatment efficacy scale used in the present study, obtained from the sample in the present study, was alpha = .61.

Item four, asking which of the treatment methods offered in the present study was believed to be the most effective, is analyzed separately. A score of one (1) was assigned to item #4 if the treatment checked was the same as the subject's treatment assignment; a score of zero was assigned if the response differed from the subject's treatment assignment. Item #4 responses were included in the analyses in various ways, but were not included as part of the perceptions of treatment efficacy measure's analysis.

Program Satisfaction. Satisfaction with the program was assessed using the "Program Acceptance" questionaire. Items #1 - #11 were designed to measure program satisfaction. The items were drawn from Mavis (1987). Only those items with a cluster analysis coefficient of .40 or above in Mavis' (1987) analysis were chosen for the present study. The eleven items were found by Mavis to have an internal consistency coefficient of alpha = .86. The internal consistency of the program satisfaction scale obtained with the present sample was alpha = .83.

The eleven program satisfaction items were scored on a five point response scale (0 - 4). Data are reported as average responses to the eleven items.

Program Reactance. Psychological reactance to the study was assessed using items #12 - #15 on the "Program Acceptance" questionaire. These items were drawn from Mavis (1987), having met the criteria of possessing a cluster analysis coefficient of .40 or above in Mavis' analysis. The four items were found to have an internal consistency of .79 with Mavis' (1987) sample. Analysis of the reactance scale with the sample in the present study yielded an internal consistency alpha of .57.

The reactance items were scored on a five point response scale. Data are reported as average responses to the four items.

Desirability of Control. The relative desire for control was assessed in this study using the "Personal Preferences" questionaire. This questionaire is the Desirability of Control Scale of Burger and Cooper (1979). Using 453 undergraduate students, Burger and Cooper (1979) found the Desirability of Control Scale to possess an internal consistency of .80. Thirty-one subjects were retested at six weeks, yielding a test-restest reliability coefficient of .75. The responses of Burger and Cooper's (1979) norming group subjects had a low (r = .11) and insignificant correlation with a social desirability response set. The internal consistency estimate of reliability for the Desirability of Control Scale obtained with the sample in the present study was alpha = .81.

The twenty item questionnaire is scored on a seven-point Likert type response scale (1 = doesn't apply to me at all to 7 = always applies to me). The questionnaire is scored in the direction of desire for control. Items #7, #10, #16, #19, and #20 are reversed for scoring. Data are reported as total scores for the entire scale.

Weight Locus of Control. Weight loss relevant locus of control attributions were assessed using the "Beliefs about Weight Loss" questionaire. This questionaire is the Weight Locus of Control Scale presented by Saltzer (1982). Using a group of 110 college undergraduates, Saltzer (1982) found a test-restest reliability of .67 (p < .01) for the WLOC scale at a twenty-four day posttest. The internal consistency of the WLOC scale was measured by Saltzer (1982) as alpha = .58. The WLOC scale has a small and insignificant correlation (r = -.03) with a social desirability response set (Saltzer, 1982). Using the sample in the present study, the WLOC scale was found to possess an internal consistency estimate of reliability of alpha = .69.

Items #1 and #4 are internally worded while items #2 and #3 are externally worded. The scale is scored in the external direction with each item ranging from 1 (strongly disagree) to 6 (strongly agree) for the externally worded items and reverse scored for the internally worded items. Data are presented in terms of the total scale score.

Demographic Descriptive and Predictor Variables. Demographic data were assessed in the present study using the "Personal Information" questionaire. Items #1 through #6 assessed the subject's age, sex, marital status, educational level, occupational status, and ethnicity. Item #8 assessed the age-at-onset for obesity. Item #10 assessed the subjects' family weight history; each question within item #10 was scored as either 0 = not overweight or 1 = overweight.

Item #11 was designed to assess perceived social support. The items within question #11 were drawn from Mavis (1987) and selected for meeting the criteria of having a cluster analysis coefficient of .40 or above.

Items #9 and #12 were designed to assess the subjects' prior history of weight loss efforts. Item #9 asked the subject about the frequency of past attempts at weight reduction while item #12 asked the subject about the types of weight reduction methods used in his/her past efforts.

Experimental Design

Overall, the present study represents a 2 X 3 Analysis of Variance Design. Factor A has two levels: choice of treatment (choice) versus random assignment to treatment (assigned). Factor B has three levels: nutritional education (NE), behavior management (BM), and exercise training (ET). Subjects were randomly assigned to levels of factor A. Within level 1 of factor A, subjects were allowed to choose the level of factor B for their weight loss treatment. Within level 2 of factor A, subjects were randomly assigned to levels of factor B.

The primary research hypotheses (1 - 8), regarding the role of choice of treatments, reflect the 2 X 3 ANOVA design in a straightforward manner. The secondary level hypotheses are highly exploratory in nature and represent deviations from the basic model. Hypothesis nine adds a third factor to the model: desirability of control is added in a categorical fashion (high vs. low scores, split at the median), rendering a 2 X 3 X 2 design. Hypothesis ten, concerned only with subjects within level one of factor A, represents a single factor design with three treatment levels. Finally, hypotheses eleven and thirteen are not concerned with the effects of either factor A or factor B, but represent correlational analyses across all subjects regardless of experimental condition.

Research Hypotheses

1. Attrition.

Null: There will be no difference in attrition rates between subjects in level one of Factor A and level two of Factor A.

Alternative: There will be a difference in attrition rates between subjects in levels one and two of factor A.

Symbolically: H_0: $\pi_{1.} - \pi_{2.} = 0$

H_1: $\pi_{1.} - \pi_{2.} \neq 0$

where $_{1.}$ = the proportion of subjects dropping out of level one of factor A and $_{2.}$ = the proportion of subjects dropping out of level two of factor B.

2. Weight Loss.

Null: There will be no difference in weight loss between subjects in level one of factor A and level two of factor A at the end of the program.

Alternative: There will be a mean difference in weight loss between subjects in levels of factor A at the end of the program.

Symbolically: H_0: $u_{1.} - u_{2.} = 0$

H_1: $u_{1.} - u_{2.} \neq 0$

where $u_{1.}$ = mean weight loss of subjects in level one of factor A, and $u_{2.}$ = mean weight loss of subjects in level two of factor A.

3. Attendance.

Null: There will be no difference between subjects in level one and level two of factor A on attendance.

Alternative: There will be a difference in attendance between subjects in level one and level two of factor A.

Symbolically: H_0: $u_{1.} - u_{2.} = 0$

H_1: $u_{1.} - u_{2.} \neq 0$

where $u_{1.}$ = mean attendance for subjects in level one of factor A, and $u_{2.}$ = mean attendance for subjects in level two of factor A.

4. Adherence.

Null: There will be no difference on post-program adherence scores between subjects in level one of factor A and level two of factor A.

Alternative: There will be a difference on adherence between subjects in levels one and two of factor A.

Symbolically: H_0: $u_{1.} - u_{2.} = 0$

H_1: $u_{1.} - u_{2.} \neq 0$

where $u_{1.}$ = mean adherence score for subjects in level one of factor A, and $u_{2.}$ = mean adherence score for subjects in level two of factor A.

5. Perceptions of treatment efficacy.

Null: There will be no difference on measures of perceptions of treatment efficacy between subjects in level one of factor A and subjects in level two of factor A.

Alternative: There will be a difference on the measure of perceptions of treatment efficacy between subjects in levels one and two of factor A.

Symbolically: H_0: $u_{1.} - u_{2.} = 0$

H_1: $u_{1.} - u_{2.} \neq 0$

where $u_{1.}$ = mean perceptions of treatment efficacy score for subjects in level one of factor A, and $u_{2.}$ = mean perceptions of treatment efficacy score for subjects in level two of factor A.

6. Program satisfaction.

Null: There will be no difference on measures of program satisfaction between subjects in level one of factor A and level two of factor A.

Alternative: There will be a difference in program satisfaction between subjects in levels one and two of factor A.

Symbolically: H_0: $u_{1.} - u_{2.} = 0$

H_1: $u_{1.} - u_{2.} \neq 0$

where $u_{1.}$= mean program satisfaction scores for subjects on level one of factor A, and $u_{2.}$= mean program satisfaction for subjects in level two of factor A.

7. Reactance.

Null: There will be no difference on the measure of reactance between subjects in level one of factor A and level two of factor A.

Alternative: There will be a difference in program reactance scores between subjects in levels one and two of factor A.

Symbolically: H_0: $u_{1.} - u_{2.} = 0$

H_1: $u_{1.} - u_{2.} \neq 0$

where $u_{1.}$ = the mean program reactance score for subjects in level one of factor A, and $u_{2.}$ = the mean program reactance score for subjects in level two of factor A.

8. Self-efficacy.

Null: There will be no differences on self-efficacy scores between subjects in level one of factor A and level two of factor A.

Alternative: There will be a difference in self-efficacy scores between subjects in levels one and two of factor A.

Symbolically: H_0: $u_{1.} - u_{2.} = 0$

H_1: $u_{1.} - u_{2.} \neq 0$

where $u_{1.}$ = the mean self-efficacy score for subjects in level one of factor A, and $u_{2.}$= the mean self-efficacy score for subjects in level two of factor A.

9. Desirability of Control.

Null: There will be no interaction between scores on the Desirability of Control Scale and membership in levels of factor A for the outcome variables assessed in hypotheses two through eight.

Alternative: There will be an interaction between Desirability of Control and levels of factor A for the outcomes assessed in hypotheses two through eight.

Symbolically: H_0: $(\alpha\gamma)_{jl} = 0$

H_1: $(\alpha\gamma)_{jl} \neq 0$

where j = levels of factor A, and l = levels of the Desirability of Control factor.

10. Weight Locus of Control.

Null: For subjects in level one of factor A, there will be no difference on locus of control scores between subjects in the three levels of factor B.

Alternative: Locus of control will interact with the type of weight loss strategy chosen for subjects in level one of factor A. Specifically, subjects who choose exercise training will be significantly more internal than subjects who choose other treatments.

Symbolically: H_0: $1/2(u_{11} + u_{12}) - u_{13} = 0$

H_1: $1/2(u_{11} + u_{12}) - u_{13} \neq 0$

where u_{11} = mean locus of control score for nutritional education subjects in level one of factor A, u_{12} = mean locus of control score for behavior management subjects in level one of factor A, and u_{13} = mean locus of control score for exercise training subjects in level one of factor A.

11. Weight Locus of Control.

Null: There will be no relationship between weight locus of control scores and outcome measures of attendance and weight loss.

Alternative: Internality on the weight locus of control measure will be positively related to attendance and body weight change across all subjects.

Symbolically: H_0: $\rho = 0$

H_1: $\rho \neq 0$

where p = the correlations of weight locus of control with attendance and the body weight change measures.

12. Treatment Type.

Null: There will be no significant differences in weight loss between subjects in levels of factor B.

Alternative: There will be differences in weight loss between subjects in levels of factor B.

Symbolically: H_0: $u_{.1} - u_{.2} - u_{.3} = 0$

H_1: $u_{.1} - u_{.2} - u_{.3} \neq 0$

where $u_{.1}$ = mean weight loss for subjects in the nutritional education treatments, $u_{.2}$ = mean weight loss for subjects in the behavior management treatments, and $u_{.3}$ = mean weight loss for subjects in the exercise training treatments.

13. History of weight loss efforts.

Null: Past experience with weight loss efforts will not be related to scores on treatment outcome measures.

Alternative: The frequency of past efforts in weight reduction will be related to scores on treatment outcome measures across all subjects.

Symbolically: H_0: $\rho = 0$

H_1: $\rho \neq 0$

where p = the correlations between frequency of past weight loss efforts and the outcome measures.

Analysis of the Data

Categorical outcome data associated with hypothesis one are analyzed with chi-square tests of association and Marascuilo post-hoc multiple comparisons (Glass and Hopkins, 1984).

The 2 X 3 factorial nature of the research design for hypotheses two through eight, with multiple outcome measures, lends itself readily to a multivariate analysis of variance (MANOVA) analytic approach (Hand and Taylor, 1987; Bray and Maxwell, 1982). As Bray and Maxwell (1982) indicate, when the research questions relate to the effects of treatments on several criterion variables, significant MANOVA tests are followed by univariate analyses of variance (ANOVAs) which, in turn, are followed by multiple comparison tests. Thus, the overall strategy for analytic treatment of the data for hypotheses two through eight and hypothesis twelve is as follows: (1) MANOVA tests, followed by (2) ANOVA tests, and (3) multiple comparison tests.

MANOVA tests are grouped by the time of assessment: post-program measures, mid-program measures, and pre-program measures are analyzed separately. A similar strategy is used for testing hypothesis nine on the same group of outcomes, within the 2 X 3 X 2 model of that hypothesis. While other strategies for grouping or clustering measures may be possible, there is no a priori theory or evidence that would guide such alternative analytic strategies.

Hypotheses regarding variables with repeated measures are subsequently analyzed with the repeated measures analysis of variance procedure for the univariate tests (Glass and Hopkins, 1984). Multiple comparisons between treatment types are analyzed with the Scheffe post-hoc comparison method (Glass and Hopkins, 1984). Since the primary questions of interest in the present study relate to factor A, the lack of random assignment to levels of factor B for subjects in A.1 will not affect the analysis of the data for hypotheses regarding the role of choice of treatment type. Comparisons between levels of factor B will be compromised by the lack of random assignment for subjects in level #1 of factor A.

The use of correlational and multiple regression procedures are used sparingly in the analysis of the data from the current study to illuminate relationships among the data that could not otherwise be seen with the analysis of variance procedure. Specifically, a simple multiple regression model is used in the analysis of hypothesis two, and correlational data are reported for hypotheses eleven and thirteen.

The significance level of alpha = .05 is used for all hypothesis tests in the data analysis. As all the hypotheses are highly speculative, two-tailed tests of significance were used.

CHAPTER IV

RESULTS

The results of the current research are presented in two sections: (a) a determination of the comparability of the groups at the beginning of the experiment and, (b) tests of the hypotheses stated in Chapter III.

Comparability of the Groups

The initial research assessment questionaire, administered at the first program meeting, was used to determine the similarity among experimental groups. The questionaire gathered background and demographic information, data regarding prior attempts at losing weight, perceived self-efficacy, perceptions of treatment efficacy, weight locus of control, and the desirability of control. A summary of group comparisons based on analysis of variance (ANOVA) are presented in Table 1; similar comparisons based on Chi-square analyses are shown in Table 2.

Although full random assignment was constrained due to the nature of the experimental design, only four significant differences were discovered. A significant difference between subjects in the three treatment types was found for number of overweight family members (F [2,89] = 3.09, p <

TABLE 1

Pretest Means and F Ratios by Experimental Condition

	Condition						F Ratios		
	Choice			Assigned				Factor	
Variable	NE	BM	ET	NE	BM	ET	Choice	Treatment	Interaction
Age	44.6	40.7	42.2	43.2	45.7	40.7	0.31	0.40	1.43
Education (yrs)	15.6	14.2	15.2	16.5	15.7	14.5	1.20	1.92	1.33
Age at Onset of Obesity	22.2	18.4	24.5	23.3	21.9	18.5	0.01	0.52	1.27
Number of Overweight Family Members	1.18	1.17	1.74	1.00	1.67	1.46	0.77	3.09*	0.06
Social Support	2.67	2.59	2.85	2.87	2.46	2.75	0.38	3.22*	0.53
Variety of Previous Weight Loss Efforts	4.64	3.68	3.37	4.60	5.53	3.85	2.82	1.35	1.22
Body Weight (lbs)	196.1	196.8	195.6	201.2	192.0	205.3	0.10	0.12	0.25
Body Mass Index	33.1	32.4	32.2	32.1	31.8	33.2	0.02	0.05	0.22
Percent Overweight	47.1	44.6	44.1	41.7	41.1	48.9	0.04	0.09	0.28
Self Efficacy	4.11	4.90	5.23	4.25	4.87	5.99	0.74	5.63**	0.57
Perceptions of Treatment Efficacy	3.00	3.09	3.17	2.89	3.09	3.20	0.04	1.80	0.16

* $p < .05$
** $p < .01$

TABLE 1 (CONTINUED)

Pretest Means and F Ratios by Experimental Condition

	Condition						F Ratios		
	Choice			Assigned			Factor		
Variable	NE	BM	ET	NE	BM	ET	Choice	Treatment	Interaction
Desirability of Control	93.5	99.5	101.0	101.1	101.4	98.9	2.11	0.05	2.84
Weight Locus of Control	9.09	7.59	6.63	7.20	6.80	7.00	1.02	1.14	0.80

TABLE 2

Chi-Square Tests on Pre-Program Measures by Experimental Condition

	Condition					
	Choice			Assigned		
Variable	NE	BM	ET	NE	BM	ET
Gender (χ^2 = 1.65, *df* = 5, *p* = .90)						
Female	10 91%	18 82%	17 90%	12 80%	13 87%	10 77%
Male	1 9%	4 18%	2 10%	3 20%	2 13%	3 23%
Marital Status (χ^2 = 9.15, *df* =5, *p* = .10)						
Married	5 45%	18 82%	8 42%	11 73%	10 67%	8 62%
Not Married	6 55%	4 18%	11 58%	4 27%	5 33%	5 38%
Ethnic Background (χ^2 = 2.87, *df* = 5, *p* = .72)						
White	10 91%	18 82%	16 84%	14 93%	14 93%	10 77%
Non-White	1 9%	4 18%	3 16%	1 7%	1 7%	3 23%

TABLE 2 (CONTINUED)

Chi-Square Tests on Pre-Program Measures by Experimental Conditions

Variable	Choice NE	Choice BM	Choice ET	Assigned NE	Assigned BM	Assigned ET
Number of Previous Weight Loss Attempts ($\underline{X}^2$ = 22.65, $\underline{df}$ = 15, $\underline{p}$ = .092)						
1 - 5	4 36%	11 50%	9 48%	5 33%	1 7%	2 15%
6 - 10	2 18%	1 4%	5 26%	5 33%	7 47%	6 46%
11 - 15	0 0%	3 14%	0 0%	2 14%	3 20%	1 8%
Over 15	5 46%	7 32%	5 26%	3 20%	4 27%	4 31%
Approval of Assignment ($\underline{X}^2$ = 35.17, $\underline{df}$ = 5, $\underline{p}$ = .000)						
No	4 36%	1 5%	6 32%	10 67%	1 7%	11 85%
Yes	7 64%	21 95%	13 68%	5 33%	14 93%	2 15%

0.05), degree of social support ($\underline{F}$ [2,89] = 3.22, $\underline{p}$ < 0.05), and self-efficacy ($\underline{F}$ [2,89] = 5.63, $\underline{p}$ < 0.01). Subjects in the nutritional education groups had a slightly lower number of overweight family members (mean = 1.08) than did subjects in the behavior management groups (mean = 1.73) or the exercise training groups (mean = 1.63). Subjects in the behavior management groups had a mean social support rating of 2.54, which was significantly lower than the rating for subjects in the nutritional education groups ($\underline{M}$ = 2.73) and subjects in the exercise training groups ($\underline{M}$ = 2.81). The nutritional education groups had an initial mean self-efficacy score of 4.19, which was significantly lower than the scores for the exercise training groups ($\underline{M}$ = 5.54) or the behavior management groups ($\underline{M}$ = 4.89).

An additional pre-test difference between the experimental groups was found on subjects' approval of their treatment type assignment. Sixty-four percent of the subjects who chose nutritional education and 68% of the subjects who chose exercise training thought that their treatment type was the most effective means for them to lose weight. These percentages were nearly reversed for subjects who were assigned to treatment type: 67% of the assigned nutritional education subjects and 85% of the assigned exercise subjects did not think their assigned treatment was the most effective means for them to lose weight. This pattern of reversal on approval of treatment assignment did not hold true for subjects in the behavior management treatments. Ninety-five percent of the subjects choosing behavior management and 93% of the subjects assigned to behavior management thought their treatment type was the most effective means for them to lose weight.

The likelihood of obtaining four significant results over a series of 44 comparisons at a probability level of .05 is approximately 20% (Sakoda, Cohen, and Beall, 1954). Given that the chances of these findings did not reach the .05 level of significance, there is some likelihood that the differences identified between experimental groups at the first program measure are due to chance. Further, the differences found on number of overweight family members, social support, and self-efficacy were between treatment types and not between the levels of factor A (choice condition); hence, they do not affect the primary research hypotheses. The differences found regarding approval of treatment type assignment may have more interpretive significance and are discussed elsewhere.

Testing the Hypotheses

A probability level of .05 was used as the criteria for significance for each of the hypotheses tested. Statistics and statistical tests were calculated using SPSS programs. Sample sizes used in the hypothesis tests vary according to the number of subjects remaining in the program at the time relevant assessments were made.

Tests relevant to attrition are presented first as attrition patterns affect the remaining hypothesis tests, and because these tests are Chi-square analyses while the majority of remaining tests are ANOVAs. Following an analysis of the attrition data, MANOVA results pertaining to hypotheses two through eight are presented as a group. Subsequent follow-up ANOVA and multiple comparison tests, as well as other pertinent analyses, are presented for each hypothesis separately in order of their listing in Chapter III.

Hypothesis One

The first hypothesis stated that subjects who receive a choice of weight loss treatment types will differ significantly from subjects who were assigned to a type of weight loss treatment on rate of attrition.

Attrition in the current study occured at two levels or times: subjects who dropped out of the program at the first program meeting and subjects who dropped out sometime after the first program meeting during the course of the ten week program. Subjects who dropped out at the first program meeting did not fill out the initial research questionaire, but were contacted by phone and verbally administered the questionaire regarding reasons for dropping out. Subjects who remained in the program following the first meeting were defined as drop outs if they did not attend the last program meeting and complete the final research assessment questionnaire. These subjects were contacted by mail and asked to return the questionnaire assessing reasons for dropping out.

Analyses are presented separately for attrition at the first program meeting and attrition during the course of the program, and then combined for an analysis of total program-related attrition.

The distribution of drop outs among the experimental groups is shown in Table 3. A total of 23 subjects dropped out of the program at the first program meeting, for an attrition rate of 19.5%. A total of 22 subjects dropped out during the course of the program, or 23.2% of the 95 subjects remaining in the program after the first program meeting. The total program-related attrition was 45 subjects, for an overall attrition rate of 38.1%. To determine if the attrition patterns were related to the independent variables Chi-square tests were used.

Attrition rates at the first program meeting differed significantly between subjects receiving a choice of treatments and subjects assigned to treatments ($\underline{X}^2 = 4.34$, $\underline{df}=1$, $\underline{p} < .05$). The attrition rate was 11.9% for the choice condition and 27.1% for the assigned condition. Attrition rates did not significantly differ at the first program meeting for the three treatment types ($\underline{X}^2 = 0.587$, $\underline{df}=2$, $\underline{p} >$

TABLE 3

Chi-Square Analysis of Attrition at the First Program Meeting, During the Course of the Program, and Total Program - Related Attrition

Variable		Choice NE	Choice BM	Choice ET	Assigned NE	Assigned BM	Assigned ET
At First Meeting	Choice Factor ($\underline{X}^2 = 4.34^*$, $\underline{df} = 1$) Treatment Factor ($\underline{X}^2 = .587$, $\underline{df} = 2$)						
N =		2	2	3	5	5	6
% =		15.4	8.3	13.6	25.0	25.0	31.6
During the Program	Choice Factor ($\underline{X}^2 = 1.01$, $\underline{df} = 1$) Treatment Factor ($\underline{X}^2 = 7.67^*$, $\underline{df} = 2$)						
N =		4	3	3	7	2	3
% =		36.4	13.6	15.8	46.7	13.3	23.1
Total Attrition	Choice Factor ($\underline{X}^2 = 4.38^*$, $\underline{df} = 1$) Treatment Factor ($\underline{X}^2 = 5.98^*$, $\underline{df} = 1$)						
N =		6	5	6	12	7	9
% =		46.2	21.0	27.3	60.0	35.0	47.4

* $p < .05$

.05). The attrition rates for the nutritional education, behavior management, and exercise training treatments were 21.2%, 15.9%, and 22.0%, respectively.

Rates of attrition during the course of the program did not differ significantly between subjects receiving a choice of treatments and subjects assigned to treatments ($\underline{X}^2$ = 1.01, $\underline{df}$=1, $\underline{p}$ > .05). The attrition rate during the course of the program was 19.2% for the choice condition and 27.9% for the assigned condition. Rates of attrition during the course of the program did significantly differ between the three treatment types ($\underline{X}^2$ = 7.67, $\underline{df}$=2, $\underline{p}$ < .05). The attrition rates for the nutritional education, behavior management, and exercise training treatments during the course of the program were 42.3%, 13.5%, and 18.8%, respectively. The nutritional education treatment clearly lost the greater percentage of subjects.

Total program-related attrition was significantly different between subjects receiving a choice of treatment and subjects assigned to treatment ($\underline{X}^2$ = 4.38, $\underline{df}$=1, $\underline{p}$ < .05), as well as between the three treatment types ($\underline{X}^2$ = 5.98, $\underline{df}$=2, $\underline{p}$ < .05). The total (combined) attrition rate for subjects receiving a choice of treatments was 28.8%, whereas the total attrition rate for subjects assigned to treatments was 47.5%. The total attrition rates for the nutritional education, behavior management, and exercise training treatments were 54.5%, 27.3%, and 36.6%

respectively. A graphic presentation of total attrition in the experiment can be found in Figure 1.

Comparisons between treatment types on attrition during the course of the program and total program-related attrition are presented in Table 4. The statistical method for the multiple comparisons regarding attrition was the Marascuilo method, as suggested by Glass and Hopkins (1984). The nutritional education treatment had a significantly greater attrition rate than did behavior management both during the program ($\underline{X}^2 = 6.58$, $\underline{df}=2$, $\underline{p} < .05$) and for total attrition ($\underline{X}^2 = 6.17$, $\underline{df}=2$, $\underline{p} < .05$). The nutritional education treatment's attrition was also greater than the average of the other treatments during the course of the program ($\underline{X}^2 = 6.00$, $\underline{df}=2$, $\underline{p} < .05$). The attrition rate of the nutritional education treatment was not significantly different from the exercise training treatment, nor was the difference between behavior management and exercise training significant.

Table 5 presents a summary of the reasons given for dropping out of the program at the first meeting (N = 23). While 56.5% of the program attrition at the first meeting was due to schedule conflicts, 84.6% of the subjects dropping out because of schedule conflicts were in the randomly assigned groups. 34.8% of the subjects dropping out at the first program meeting did so because of unhappiness with the monetary incentive scheme.

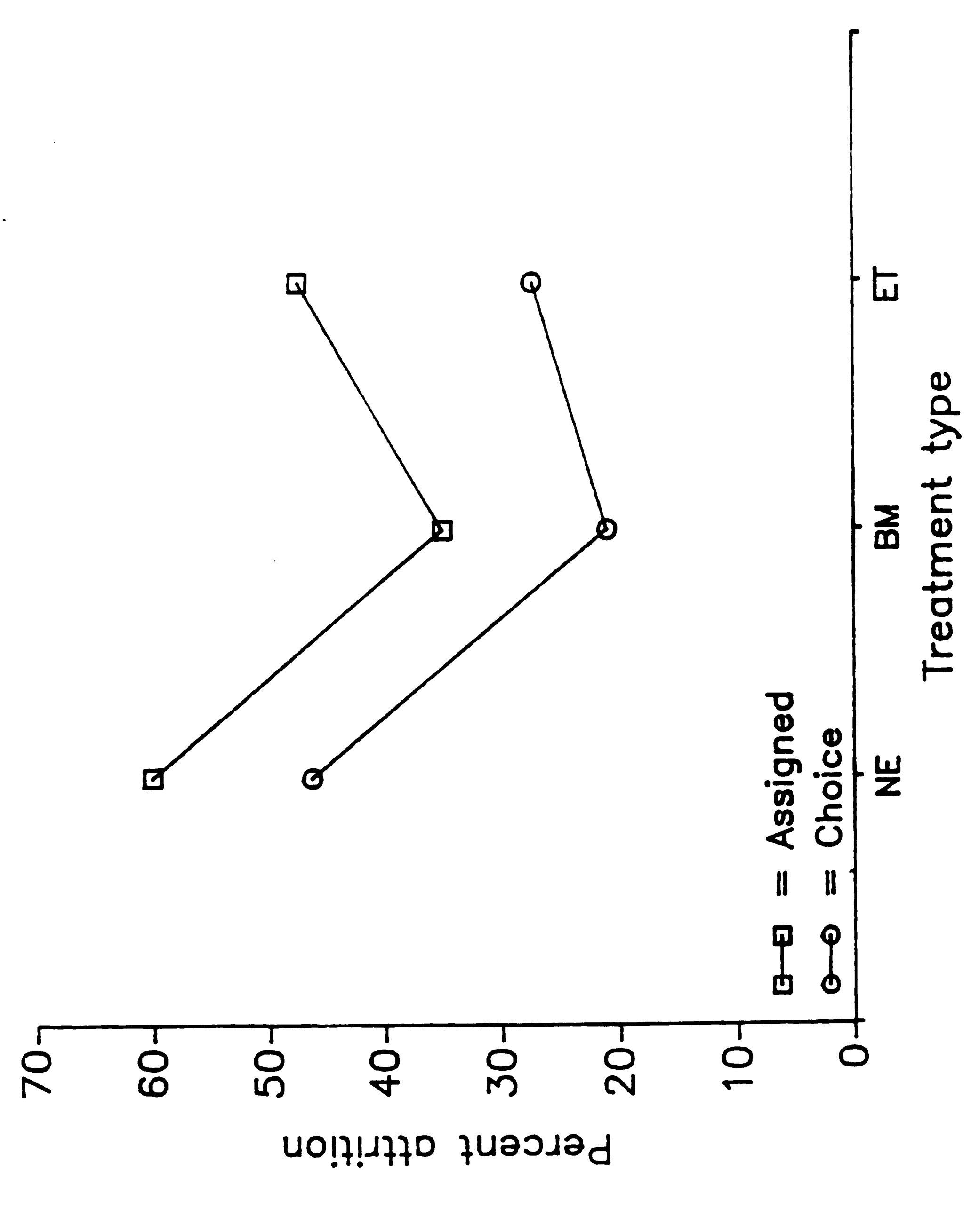

Figure 1: Mean program attrition by condition

TABLE 4

Multiple Comparisons of Attrition Between Weight Loss Methods During the Course of the Program and Total Attrition

Contrast	Chi-Square Value During the Program	Chi-Square Value Total Attrition
NE - ET	3.89	2.43
NE - BM	6.58*	6.17*
BM - ET	0.35	0.86
NE - ½ BM - ½ ET	6.00*	5.09

* $p < .05$

TABLE 5

Reasons for Attrition at the First Program Meeting

Reason	Choice	Assigned	Percent of Attrition
Did not like type of program	0	2	8.7
Schedule conflicts	2	11	56.5
Monetary incentive scheme	5	3	34.8

TABLE 6

Reasons for Attrition During the Program

Reason	Choice	Assigned	Percent of Attrition
Did not like type of program	0	0	0
Did not like program leader	0	0	0
Program was not helping	1	0	4.8
Schedule problems	2	5	33.3
Unanticipated life events	6	2	38.1
Not ready to lose weight	2	0	9.5
Other	1	2	14.3

After two mailings, 62% of the subjects dropping out during the course of the program returned their assessments: 70% of the subjects receiving a choice of treatments and 50% of the subjects who were assigned to treatments returned the questionaire. Table 6 presents a summary of the reasons given for dropping out during the course of the program. Over 70% of the respondents indicated that schedule problems or unanticipated life events precipitated their dropping out. Two individuals felt they were not personally ready to lose weight and one individual felt the program was not helping her to lose weight. Three individuals used the "other" category to indicate their reasons for dropping out. Two of these subjects dropped out because they moved out of town, and one subject said she "was picking up the bad habits people were talking about." A comparison of all subjects dropping out of the program at any time because of schedule conflicts versus subjects dropping out for all other reasons combined was not significant ($\underline{X}^2$ = 4.85, $\underline{df}$=2, $\underline{p}$ >.05).

Subjects who remained as participants in the program were contrasted with the subjects who dropped out during the program on available demographic and outcome measures. A summary of these comparisons can be found in Table 7 and Table 8. Subjects who remained as participants in the program had significantly more overweight family members

TABLE 7

Means, Standard Deviations, and T-Tests for Participants Vs. Drop-Outs During the Program

Variable	Means (S.D.) Drop-Outs N = 22		Participants N = 73		T*	Sig. of T
Age	42.6	(8.8)	42.6	(8.9)	0.02	.98
Education (yrs)	16.1	(2.7)	14.9	(2.6)	-1.78	.08
Age at Onset	20.5	(12.1)	21.7	(12.4)	0.37	.71
Number of Overweight Family Members	0.68	(0.95)	1.8	(0.91)	4.88	.00
Social Support	2.74	(0.35)	2.66	(0.50)	-0.68	.50
Variety of Previous Weight Loss Attempts	4.18	(2.9)	4.19	(2.4)	0.02	.99
Attendance	3.1	(1.5)	9.0	(1.1)	19.87	.00
Adherence	2.9	(2.4)	11.6	(3.8)	10.07	.00
Self-Efficacy Pre	4.2	(1.4)	5.1	(1.6)	2.41	.02
Desirability of Control	102.9	(14.7)	100.0	(13.6)	-0.87	.39
Weight Locus of Control	7.8	(3.2)	7.15	(3.4)	-0.82	.41
Perceptions of Treatment Efficacy: Pre	3.1	(0.59)	3.1	(0.46)	0.05	.96
Program Satisfaction: MID**	3.35	(0.47)	3.43	(0.46)	0.44	.66
Program Reactance: MID**	1.32	(1.3)	0.69	(0.68)	-2.14	.04

* df = 93

** Drop-out N = 7, df = 78

TABLE 8

Chi-Square Analyses of Participants Vs. Drop-Outs

Variable	Percent of Participants	Percent of Drop-Outs
Gender ($\underline{X}^2$ = 1.83, $\underline{df}$ = 1, $\underline{p}$ = .18)		
Female	87.7	72.7
Male	12.3	27.3
Marital Status ($\underline{X}^2$ = 1.46, $\underline{df}$ = 1, $\underline{p}$ = .23)		
Married	67.1	50.0
Not Married	32.9	50.0
Ethnic Group ($\underline{X}^2$ = 1.11, $\underline{df}$ = 1, $\underline{p}$ = .29)		
White	89.0	77.3
Non-White	11.0	22.7
Number of Previous Weight Loss Attempts ($\underline{X}^2$ = 3.79, $\underline{df}$ = 3, $\underline{p}$ = .29)		
1 - 5	35.6	27.3
6 - 10	28.8	22.7
11 - 15	11.0	4.5
Over 15	24.7	45.5
Approval of Treatment Assignment ($\underline{X}^2$ = .00, $\underline{df}$ = 1, $\underline{p}$ = 1.0)		
No	34.2	36.4
Yes	65.8	63.6

than did drop outs (T = 4.88, df=93, p <.01). In addition, participants had higher scores on the self-efficacy pre-test (T = 2.41, df=93, p =.02) and lower scores on the program reactance mid-program measure (T = -2.14, df=78, p =.04). The participants also had higher means on attendance and adherence measures, however these differences represent a measurement artifact. It is also important to note that there were no differences between participants and drop outs on whether or not they approved of their particular treatment method (X^2 = 0.00, df=1, p = 1.0).

In conclusion, with regard to total program-related attrition, subjects who received a choice of treatment type were less likely to drop out of the program than were subjects randomly assigned to treatment type. The differences were larger than would be expected by chance. Thus, hypothesis one, regarding the effect of the choice condition in affecting attrition rates, was supported.

Multivariate Analyses

The dependent variables associated with hypotheses two through eight were tested simultaneously with the multivariate analysis of variance (MANOVA) procedure prior to univariate analyses (Hand and Taylor, 1987; Bray and Maxwell, 1982). Separate MANOVA tests were conducted for (1) the seven post-test dependent measures (body weight change, attendance, adherence, self-efficacy, perceptions of treatment efficacy, program satisfaction, and program reactance), (2) the four mid-program dependent measures (self-efficacy, perceptions of treatment efficacy, program satisfaction, and program reactance), and (3) the two pre-test dependent measures (self-efficacy and perceptions of treatment efficacy). Only one of the three body weight change indices was used in the MANOVA test (pounds lost) to reduce redundancy and artifactual clustering in the data.

The MANOVA procedure aggregates properties of the multiple dependent measures by combining them into a linear composite. MANOVA is similar to an ANOVA, but analyzes multiple outcome measures simultaneously as a group composite. Four common test statistics are used for reporting MANOVA results: the Pillai-Bartlett trace, Wilk's lambda, the Hotelling trace, and Roy's largest eigenvalue (Hand and Taylor, 1987). The four test statistics are highly interrelated and there is insufficient evidence to make statements about their relative power (Hand and Taylor, 1987). The Hotelling F-ratio is used to present the results of the current analyses, though it should be noted that the probability values for the other test statistics did not differ significantly from those associated with the Hotelling F.

Table 9 presents a summary of the MANOVA tests for the seven post-test outcome measures. There was a significant difference on the group of post-test outcome measures between subjects receiving a choice of treatment type and

TABLE 9

Multivariate Analysis of Variance on Post-Program Measures

Source	df	Hotellings F	Sig. of F
Choice Factor (A)	7,60	6.90	.000
Treatment Factor (B)	14,118	1.20	.288
A x B Interaction	14,118	1.21	.277

TABLE 10

Multivariate Analysis of Variance on Mid-Program Measures

Source	df	Hotellings F	Sig. of F
Choice Factor (A)	4,71	2.01	.102
Treatment Factor (B)	8,140	1.46	.178
A x B Interaction	8,140	1.58	.137

TABLE 11

Multivariate Analysis of Variance on Pre-Program Measures

Source	df	Hotellings F	Sig. of F
Choice Factor (A)	2,88	0.42	.660
Treatment Factor (B)	4,174	3.71	.006
A x B Interaction	4,174	0.36	.839

subjects assigned to treatment type (F_H = 6.90 [7,60], p<.001). The MANOVA was not significant for treatment type differences (p =.288) or a treatment type by choice condition interaction (p = .277).

Table 10 presents a summary of the MANOVA tests for the four mid-program outcome measures. No significant differences were found on the group of mid-program measures for the choice factor (p = .102), the treatment type factor (p = .178), or their interaction (p = .137). Table 11 presents a summary of the MANOVA tests for the two pre-test outcome measures. While there were no significant differences on the group of pre-test measures between levels of factor A (p = .660) or for the factor A by factor B interaction (p = .839), the treatment types did differ significantly from each other on this group of measures (F_H = 3.71 [4,174], p = .006). As can be seen in Table 1, the treatment groups differed in their initial self-efficacy scores.

The results of the MANOVA analyses warrant further exploration of the differences between levels of the choice versus random assigned factor as well as between levels of the treatment type factor.

Hypothesis Two

The second hypothesis stated that there would be a significant difference in weight loss between subjects receiving a choice of treatments and subjects assigned to treatment types. Three measure of body weight were used in the current research: pounds, body mass index (kg/cm^2), and percent over ideal body weight. Correlations of the three measures, using the initial body weights obtained at the first program meeting, suggest that the three measures are highly interrelated. The correlation between pounds and body mass index (BMI) is r = .84, r = .89 between pounds and percent overweight, and r = .99 between BMI and percent overweight. Results are presented in terms of all three indices of body weight.

Table 12 presents the cell means and standard deviations for the three body weight indices at the pre-test measure, the post-test measure, and for the mean change between pre- and post-test measures. Tables 13, 14, and 15 present summaries of the ANOVAs on body weight change for pounds change, BMI change, and percent overweight change, respectively. The overall results are highly similar for each of the three body weight change indices. In each case, the subjects who were randomly assigned to treatment types lost more weight by the end of the program than did subjects who had a choice of weight loss treatments. Figure 2 presents a graphic representation of weight loss trends (for factor A) as measured in pounds. The probabilities associated with the F-ratios differed slightly between the three indices, with $p < .05$ for pounds and percent overweight and $p = .054$ for BMI. For subjects receiving a

TABLE 12

Cell Means of Body Weight Measures at Pre-Test, Post-Test, and Change at the End of the Program

	Condition					
		Choice			Assigned	
Measure	NE	BM	ET	NE	BM	ET
Pounds						
Pre	196.1 (19.1)*	196.8 (37.7)	195.6 (44.9)	201.2 (48.8)	192.0 (40.7)	205.3 (53.4)
Post	197.9 (20.6)	187.5 (32.3)	184.1 (42.0)	185.5 (53.0)	183.2 (40.1)	195.0 (51.0)
Change	+ 0.14 (5.2)	- 5.8 (4.1)	- 5.1 (4.0)	- 7.5 (9.3)	- 8.4 (5.2)	- 5.9 (7.5)
Body Mass Index						
Pre	33.1 (4.3)	33.4 (5.7)	32.2 (6.0)	32.1 (5.9)	31.8 (6.7)	33.2 (7.8)
Post	32.9 (2.9)	31.1 (5.3)	30.7 (5.5)	28.6 (3.8)	29.3 (4.9)	31.9 (7.3)
Change	- 0.01 (.87)	- 0.97 (.72)	- 0.88 (.67)	- 1.10 (1.41)	- 1.3 (.89)	- 1.0 (1.3)
Percent Over Ideal Weight						
Pre	47.1 (17.4)	44.6 (25.6)	44.1 (28.2)	41.7 (27.4)	41.1 (28.3)	48.9 (37.5)
Post	47.6 (15.5)	38.6 (22.6)	37.1 (25.6)	25.3 (17.8)	31.7 (24.0)	42.6 (35.1)
Change	- 0.07 (3.9)	- 4.3 (3.2)	- 3.9 (3.1)	- 5.2 (6.5)	- 6.0 (3.6)	- 4.4 (5.3)

* Standard Deviation in Parentheses

TABLE 13

Analysis of Variance for Body Weight Change in Pounds

Source	df	Mean Square	F	Sig. of F
Choice Factor (A)	1	165.0	5.16	.026
Treatment Factor (B)	2	56.7	1.77	.177
A x B Interaction	2	54.7	1.71	.188
Error	67	31.9		

TABLE 14

Analysis of Variance on Body Mass Index Change

Source	df	Mean Square	F	Sig. of F
Choice Factor (A)	1	3.41	3.85	.054
Treatment Factor (B)	2	1.77	1.99	.144
A x B Interaction	2	1.15	1.30	.281
Error	67	0.89		

TABLE 15

Analysis of Variance on Percent Over Ideal Weight Change

Source	df	Mean Square	F	Sig. of F
Choice Factor (A)	1	73.6	4.41	.039
Treatment Factor (B)	2	29.9	1.79	.175
A x B Interaction	2	25.6	1.53	.224
Error	67	16.7		

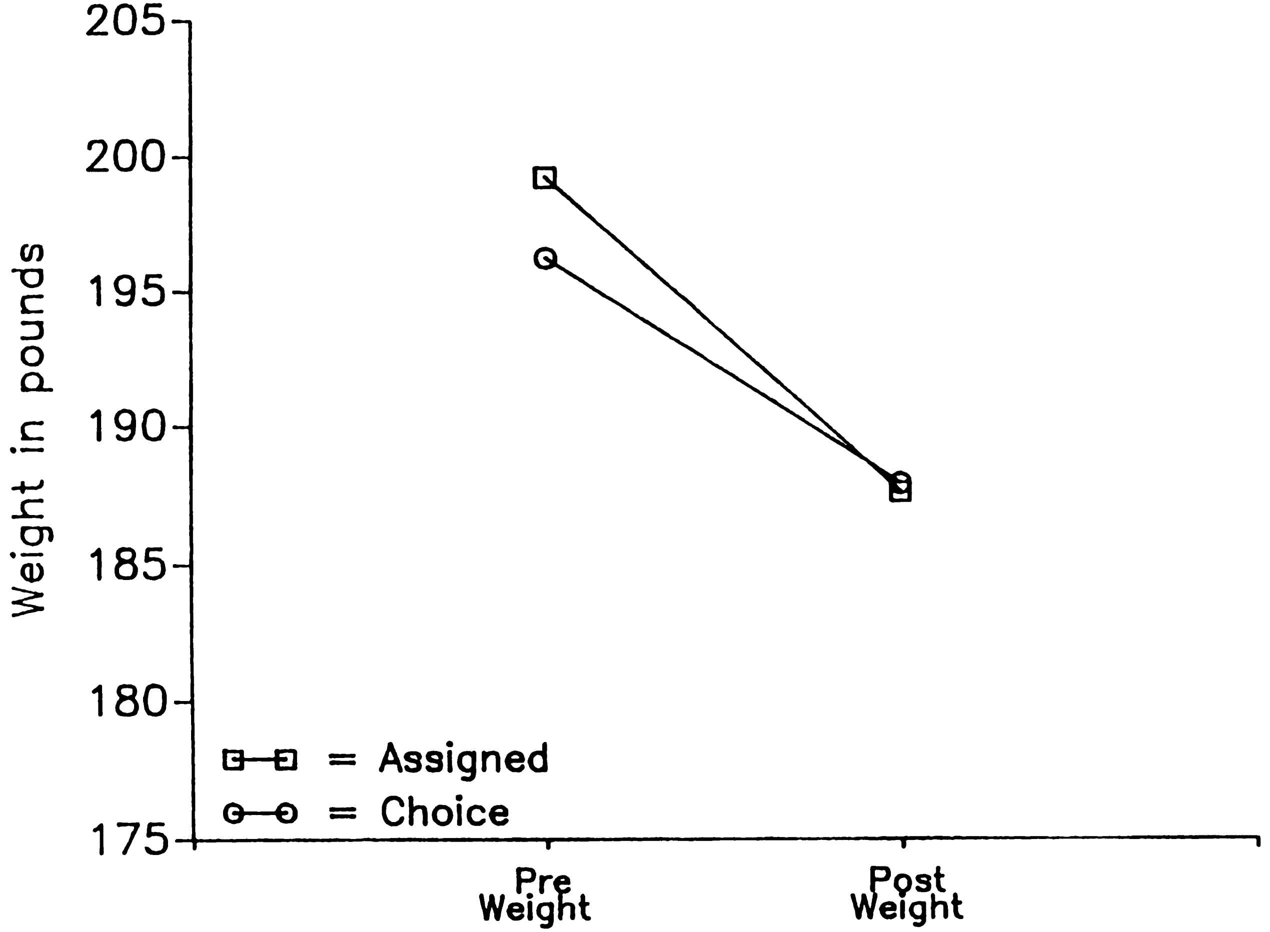

Figure 2: Mean weight in pounds at pre– and post–program for choice vs. assigned groups

choice of treatments, the means for pounds change, BMI change, and percent overweight change are -4.5, -0.77, and -3.4, respectively. For subjects assigned to treatment types, the means for pounds change, BMI change, and percent overweight change are -7.4, -1.17, and -5.3, respectively. There is, however, a tremendous amount of variation in the data. As can be seen in Table 12, the standard deviations of the body weight change measures are generally as big as, and sometimes bigger than, the means.

The nutritional education groups lost fewer pounds (M = -3.9, s.d. = 8.4) than did the behavior managment groups (M = -6.8, s.d. = 4.7) or the exercise training groups (M = -5.4, s.d. = 5.5). Similarly, the nutritional education groups had a smaller BMI change (M = -0.58) than did the behavior management groups (M = -1.1) or the exercise training groups (M = -0.93). The nutritional education groups also showed a smaller change in percent overweight (M = -2.8) than did the behavior management groups (M = -5.0) or the exercise training groups (M = -4.1). As seen in Tables 13, 14, and 15, however, the F-tests for differences between treatment types (factor B) were not significant for pounds change (p = .177), BMI change (p = .144), or percent overweight change (p = .175). The choice factor by treatment type factor interactions were also not significant for pounds change, BMI change, and percent overweight change (p = .188, p = .281, and p = .224, respectively).

The weight change data were also analyzed within a multiple regression format to control for differences in initial body weight. Table 1 reveals that there were differences between the treatment groups' means on the body weight measures at the pre-test assessment, even though these difference were not significant. Specifically, the subjects receiving a choice of treatment types had a mean pre-weight of 3.05 pounds less than the subjects who were assigned to treatments. Conversely, however, the mean pre-BMI and pre-percent overweight was slightly higher for the subjects receiving a choice of treatments (the differences were 0.16 and 1.25, respectively). This suggests that the subjects receiving a choice of treatments were slightly more obese than were the subjects who were randomly assigned to treatment types. Differences in initial body weight also existed between the three treatment types. Subjects in the behavior management treatment had a mean pre-weight of 194.8 pounds, while the subjects in the nutritional education treatments had a mean pre-weight of 199.03 pounds and the exercise training subjects had a mean pre-weight of 199.5 pounds. The mean initial BMI and percent overweight scores, respectively, for the three treatment types were: nutritional education (32.5, 44.0), behavior management (32.1, 43.2), and exercise training (32.6, 46.1).

The multiple regression analyses on body weight change, conducted to control for initial body weight, used the "forced" method of entering variables in a specified order. Summaries of the results of the multiple regression analyses controlling for the initial body weight measures are presented in Tables 16, 17, and 18 for pounds, BMI, and percent overweight, respectively. As can be seen, the results indicate that the body weight pre-measures did account for a significant amount of variance when pounds and BMI were the measures (though not when percent overweight was the measure), but that the basic pattern of results was consistent with the ANOVA procedure.

Specifically, the pre-measure accounted for 6.5% of the variance with pounds as the measure ($p = .03$), 5.8% of the variance with BMI as the measure ($p = .04$), but only 3.7% of the variance when percent overweight was the measure ($p = .102$). Adding treatment type to the model accounted for only an additional 3.9% of the variance when pounds was the measure ($p = .228$), 4.2% of the variance when BMI was the measure ($p = .21$), and 3.6% of the variance when percent overweight was the measure ($p = .269$). Thus, treatment type played a less significant role in the final weight change than did initial weight, at least when pounds and BMI were the measures. When the two levels of the choice factor were entered into the equations, the regression models improved significantly. When added to the pre-weight and treatment

TABLE 16

Summary of Multiple Regression Analysis with Change in Body Weight (Pounds) as Criterion Variable and Pre-Weight, Choice Factor, and Treatment Factor as Predictor Variables

Variable	Multiple R	R^2	R^2 Change	Sig. of R^2 Change	Overall F	df	Sig. of F
Pounds-pre	.253	.065	.065	.030	4.93	1,71	.030
Treatment Factor	.323	.104	.039	.228	2.67	3,69	.054
Choice Factor	.408	.166	.062	.028	3.39	4,68	.014

TABLE 17

Summary of Multiple Regression Analysis with Change in Body Mass Index as Criterion Variable and Pre-BMI, Treatment Factor, and Choice Factor as Predictors

Variable	Multiple R	R^2	R^2 Change	Sig. of R^2 Change	Overall F	df	Sig. of F
BMI-pre	.241	.058	.058	.040	4.39	1,71	.040
Treatment Factor	.316	.100	.042	.210	2.55	3,69	.063
Choice Factor	.398	.159	.059	.033	3.21	4,68	.018

TABLE 18

Summary of Multiple Regression Analysis with Change in Percent Overweight as Criterion Variable and Pre-Percent Overweight, Treatment Factor and Choice Factor as Predictor Variables

Variable	Multiple R	R^2	R^2 Change	Sig. of R^2 Change	Overall F	df	Sig. of F
Percent Overweight:							
Pre	.193	.037	.037	.102	2.75	1,71	.102
Treatment Factor	.271	.073	.036	.269	1.82	3,69	.152
Choice Factor	.371	.137	.064	.028	2.71	4,68	.037

type variables, the choice condition accounted for an additional 6.2% of the variance when pounds was the measure (p = .028), 5.9% of the variance when BMI was the measure (p = .033), and 6.4% of the variance when percent overweight was the measure (p = .028).

Although there were not significant results for the treatment type factor (factor B) in either the ANOVA or the multiple regression analyses, Table 19 summarizes multiple comparisons between the treatment types for each body weight measure. This data is presented for further elucidation of the data and to provide support for tests regarding hypothesis twelve. Figure 3 presents the relationships between the treatment types on pre-test and post-test body weight with pounds as the unit of measurement. As can be seen in Table 19, there are no significant differences between treatment types on any of the weight loss outcome measures. The nutritional education versus behavior management contrast is very close to significance on all three measures, providing further support for the evidence suggesting that the nutritional education treatment was the least effective in promoting weight loss.

In conclusion, the majority of the data suggests that the level of factor A did significantly affect weight loss in the program. Subjects randomly assigned to treatments lost significantly more body weight than did subjects who had a choice of treatments. Thus, hypothesis two,

TABLE 19

Multiple Comparisons for Treatment Types on Body Weight Change Measures

Measure and Comparison	Contrast	S.E.	T	Sig. of T
Lbs. Change				
NE - BM	-6.86	3.56	-1.93	.058
NE - ET	-3.62	3.71	-0.98	.332
BM - ET	3.24	3.05	1.06	.293
BMI Change				
NE - BM	-1.21	0.59	-2.04	.045
NE - ET	-0.81	0.62	-1.31	.195
BM - ET	0.40	0.51	0.79	.433
% Overweight Change				
NE - BM	-5.00	2.57	-1.94	.056
NE - ET	-2.93	2.68	-1.09	.278
BM - ET	2.07	2.21	0.94	.351

df = 67, for all contrasts

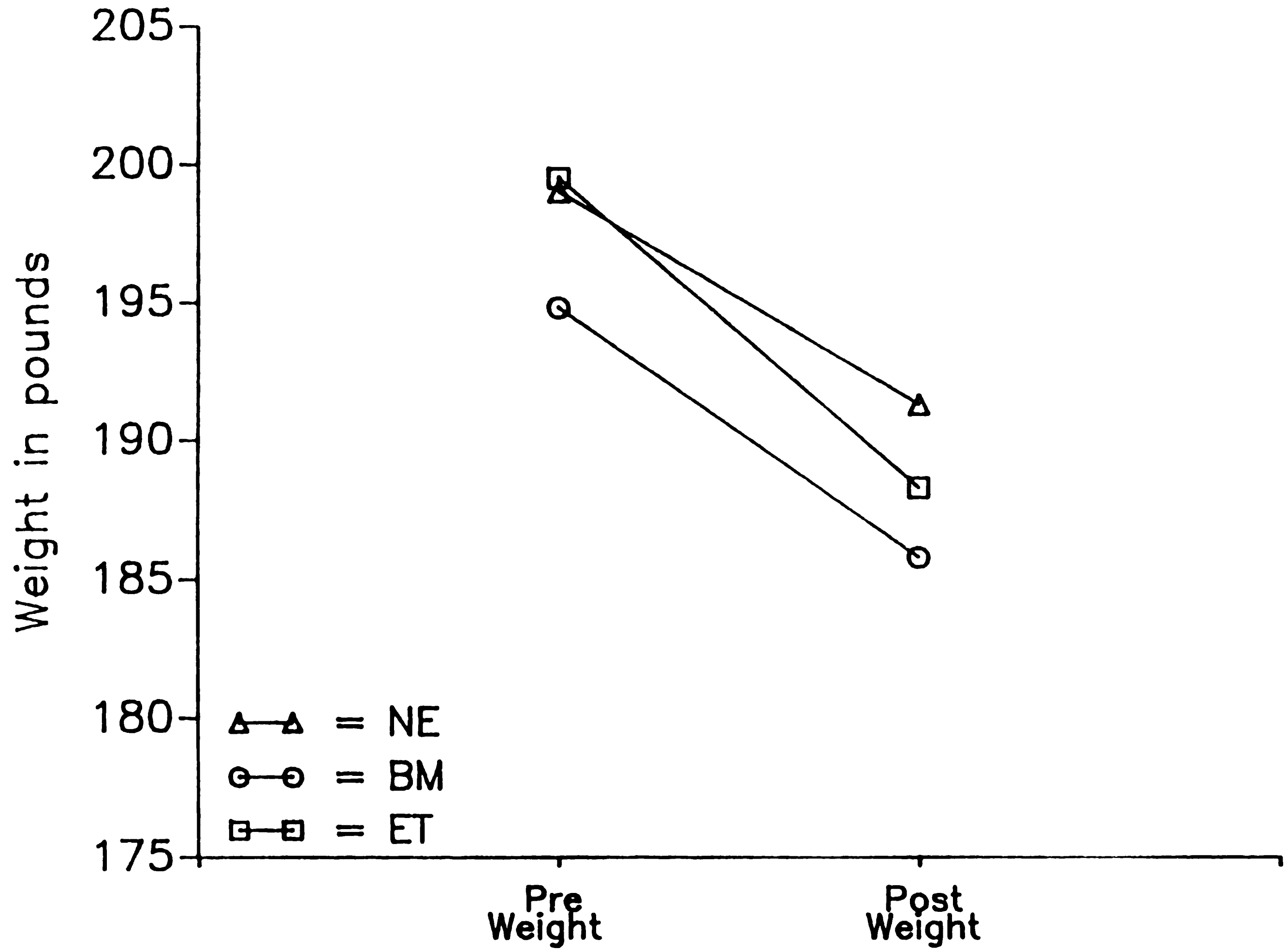

Figure 3: Mean weight in pounds at pre– and post–program measures for treatment types

postulating that the level of factor A would affect weight loss, was supported.

Hypothesis Three

Hypothesis three stated that subjects receiving a choice of treatment types would have significantly different attendance ratings for the program than subjects who were randomly assigned to treatment types. The possible range of attendance was from 2 to 10 sessions, and the overall program mean for attendance was 7.61 sessions (standard deviation = 2.77). Attendance data were analyzed only for subjects completing the program to control for differential attrition. Table 20 summarizes the results of the analysis of variance on attendance and the cell means and standard deviations are presented in Table 21. Attendance patterns for the 2 X 3 design are graphically presented in Figure 4.

The mean attendance for subjects choosing their treatment type was 8.98 sessions (*s.d.* = 1.07) and the mean attendance for subjects assigned to their treatment type was 8.97 (*s.d.* = 1.22). This difference was not significant (F = 0.01 [1,67], p = .929).

Differences between levels of factor B were not significant in the ANOVA F-test (p = .436). The attendance totals were lower for the nutritional education groups (M = 8.67, *s.d.* = 1.23) than for the behavior management groups (M = 9.13, *s.d.* = 1.13) or the exercise training groups (M = 8.96, *s.d* = 1.08). The factor A by factor B interaction was

TABLE 20

Analysis of Variance on Attendance

Source	df	M.S.	F	Sig. of F
Choice Factor (A)	1	0.01	0.01	.929
Treatment Factor (B)	2	1.08	0.84	.436
A x B Interaction	2	1.84	1.43	.247
Error	67	1.29		

TABLE 21

Cell Means and Standard Deviations on Attendance and Adherence

		Means (S.D.)	
Condition	N	Attendance	Adherence
Choice			
NE	7	8.6 (0.79)	10.9 (1.77)
BM	19	9.3 (1.00)	13.7 (3.07)
ET	16	8.8 (1.18)	13.3 (3.30)
Assigned			
NE	8	8.8 (1.58)	9.0 (4.34)
BM	13	8.9 (1.28)	8.5 (3.69)
ET	10	9.3 (0.82)	11.4 (3.31)

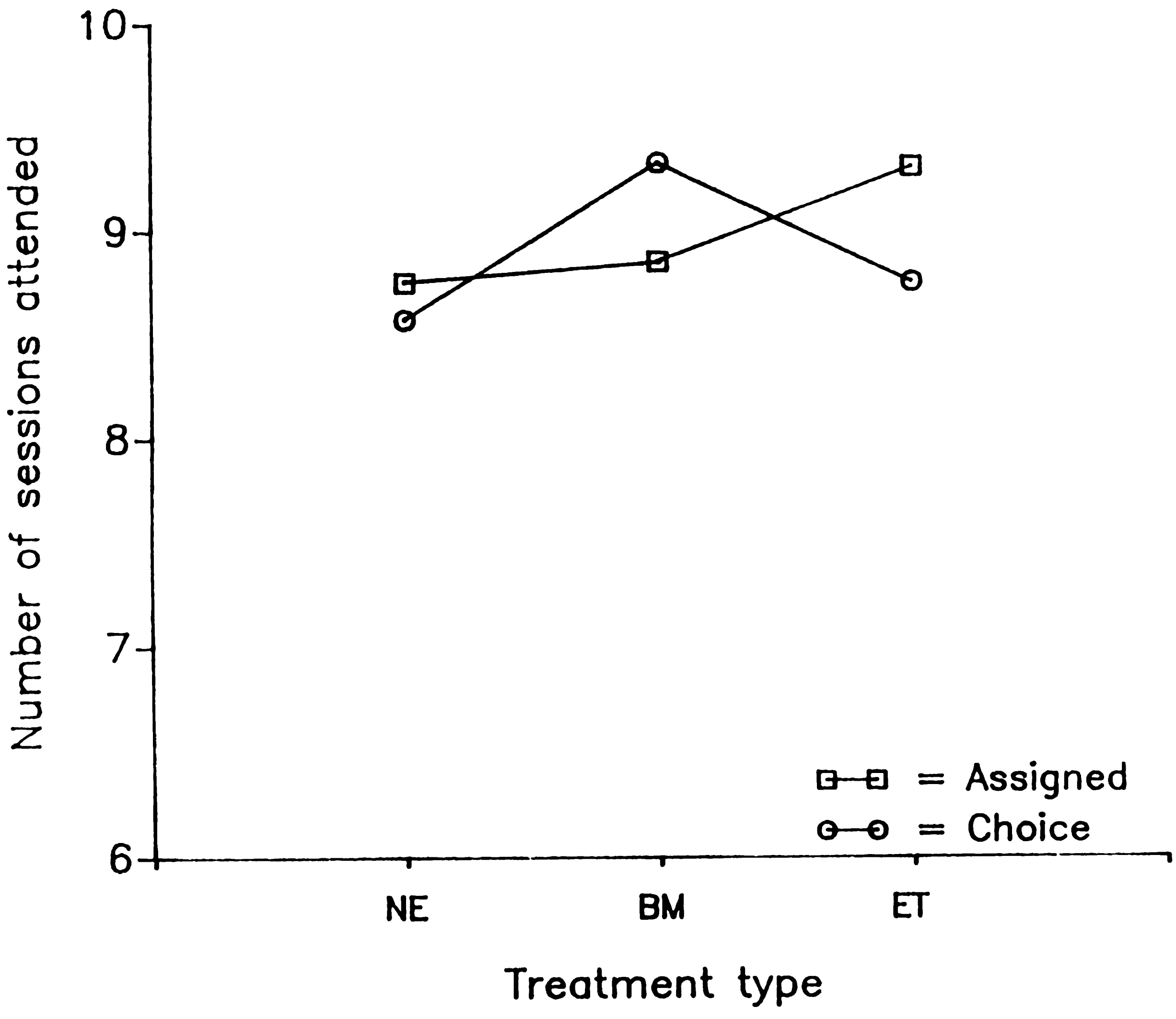

Figure 4: Mean attendance by condition

not significant (p = .814), despite the appearance created by the scale employed in Figure 4.

In conclusion, hypothesis three, predicting that there would be a significant difference between levels of factor A on attendance, was not supported. There was no significant difference between levels of factor A on program attendance in the current research.

Hypothesis Four

Hypothesis four stated that subjects who received a choice of weight loss treatments would have significantly different adherence scores at the end of the program than subjects who were randomly assigned to treatment type. Adherence was assessed for each subject at each program session. Subjects were rated for self-reported adherence on prescribed behaviors with a three point scale: zero points for no adherence, one point for partial adherence, and two points for full adherence. Adherence data were analyzed only for subjects completing the program to control for differential attrition. The possible range of scores was from zero to 18, and the mean adherence score across all participants was 11.59 (s.d. = 3.83). The cell means and standard deviations for adherence ratings can be found in Table 21. Analysis of variance results for adherence are summarized in Table 22. Adherence patterns in the 2 X 3 design are graphically presented in Figure 5.

TABLE 22

Analysis of Variance on Adherence

Source	df	M.S.	F	Sig. of F
Choice Factor (A)	1	193.86	17.41	.000
Treatment Factor (B)	2	23.20	2.08	.133
A x B Interaction	2	22.96	2.06	.135
Error	67	11.14		

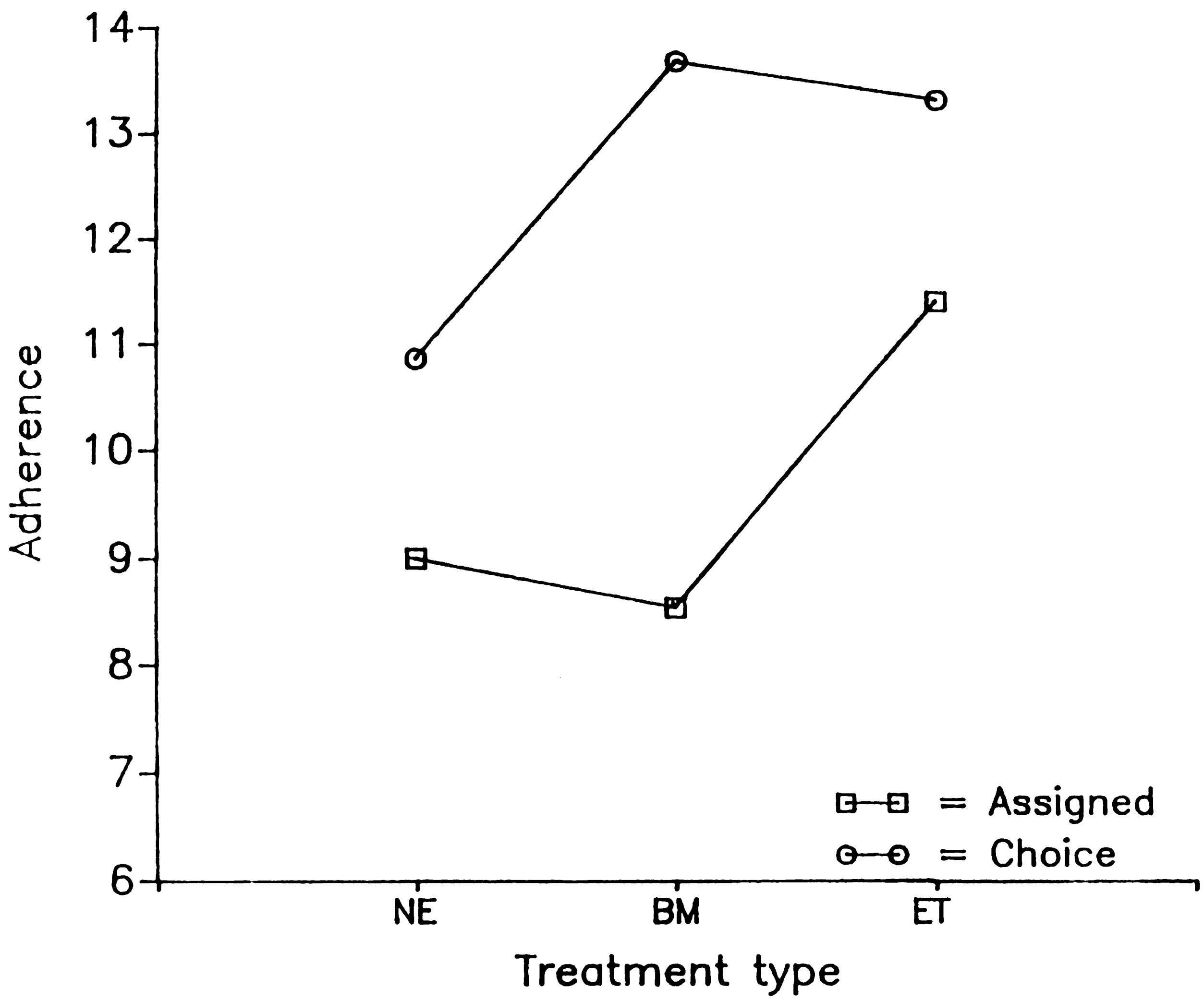

Figure 5: Mean adherence ratings by condition

The mean adherence ratings for subjects receiving a choice of treatments (*M* = 13.07, *s.d* = 3.10) was higher than the mean adherence rating for subjects assigned to treatment types (*M* = 9.58, *s.d.* = 3.85). This difference was highly significant (*F* = 17.41 [1,89], *p* = .000).

The *F*-test for the main effect of the treatment type factor was not significant (*F* = 2.08 [2,67]. *p* = .133), nor was the ANOVA interaction effect between factor A and factor B (*F* = 2.06 [2,67], *p* = .135). Nutritional education (*M* = 9.9, *s.d.* = 3.4) produced lower adherence ratings than did the behavior management treatment (*M* = 11.6, *s.d.* = 4.2) or the exercise training method (*M* = 12.6, *s.d.* = 3.4), but the differences were not significant.

For purposes of discussion in Chapter V, the correlation between adherence and body weight change in pounds was *r* = -.12 (*p* = .161). The correlation between adherence and BMI change was *r* = -.20 (*p* = .045). The correlation between adherence and percent overweight change was *r* = -.16 (*p* = .087).

In conclusion, hypothesis four, which postulated that subjects who received a choice of treatment types would have significantly different adherence ratings than subjects who were randomly assigned to treatment type, was supported. The greater level of adherence scores obtained by the subjects who received a choice of weight loss methods, as compared to those subjects assigned to their treatment type, was larger than what would be expected by chance.

Hypothesis Five

Hypothesis five stated that subjects who received a choice of treatment type would have significantly different scores on a measure of perceptions of their treatment's efficacy than would subjects who were randomly assigned to treatment type. Scores from the perceptions of treatment efficacy measure were expressed as an average of the scale's items, and had a possible range of zero (low) to four (high). The perceptions of treatment efficacy measure was administered at the pre-test, the mid-program assessment, and the post-test. Table 23 summarizes the repeated measures analysis of variance on perceptions of treatment efficacy over time. The cell means and standard deviations of the perceptions of treatment efficacy measure at all three measurement times are summarized in Table 24. Figure 6 graphically presents the perceptions of treatment efficacy trends for the two levels of factor A; similar presentation of trends in perceptions of treatment efficacy for levels of factor B can be found in Figure 7.

There was not a large difference between the choice (M = 3.1, s.d. = 0.45) versus assigned (M = 3.05, s.d. = 0.53) subjects on their perceptions of treatment efficacy at the pre-test. By the mid-program measure, however, the randomly assigned subjects showed a larger increase in their

TABLE 23

Repeated Measures Analysis of Variance on Perceptions of Treatment Efficacy Over Time

Source	df	M.S.	F	Sig. of F
Choice (A)	1	1.42	3.59	.062
Treatment (B)	2	1.32	3.35	.041
A x B Interaction	2	1.20	3.04	.055
Error	66	0.39		
Time (C)	2	1.69	7.94	.001
A x C Interaction	2	0.38	1.79	.171
B x C Interaction	4	0.44	2.08	.087
A x B x C Interaction	4	0.21	0.99	.416
Error	132	0.21		

TABLE 24

Cell Means and Standard Deviations of Pre, Mid and Post Measures of Perceptions of Treatment Efficacy

Condition	Pre N = 95	Means (S.D.) Mid N = 80	Post N = 73
Choice			
NE	3.0 (0.42)	2.9 (1.2)	3.4 (0.52)
BM	3.1 (0.43)	3.3 (0.46)	3.5 (0.46)
ET	3.2 (0.50)	3.2 (0.44)	2.9 (0.79)
Assigned			
NE	2.9 (0.57)	3.1 (0.61)	3.3 (0.38)
BM	3.1 (0.51)	3.5 (0.37)	3.5 (0.42)
ET	3.2 (0.57)	3.6 (0.55)	3.6 (0.35)

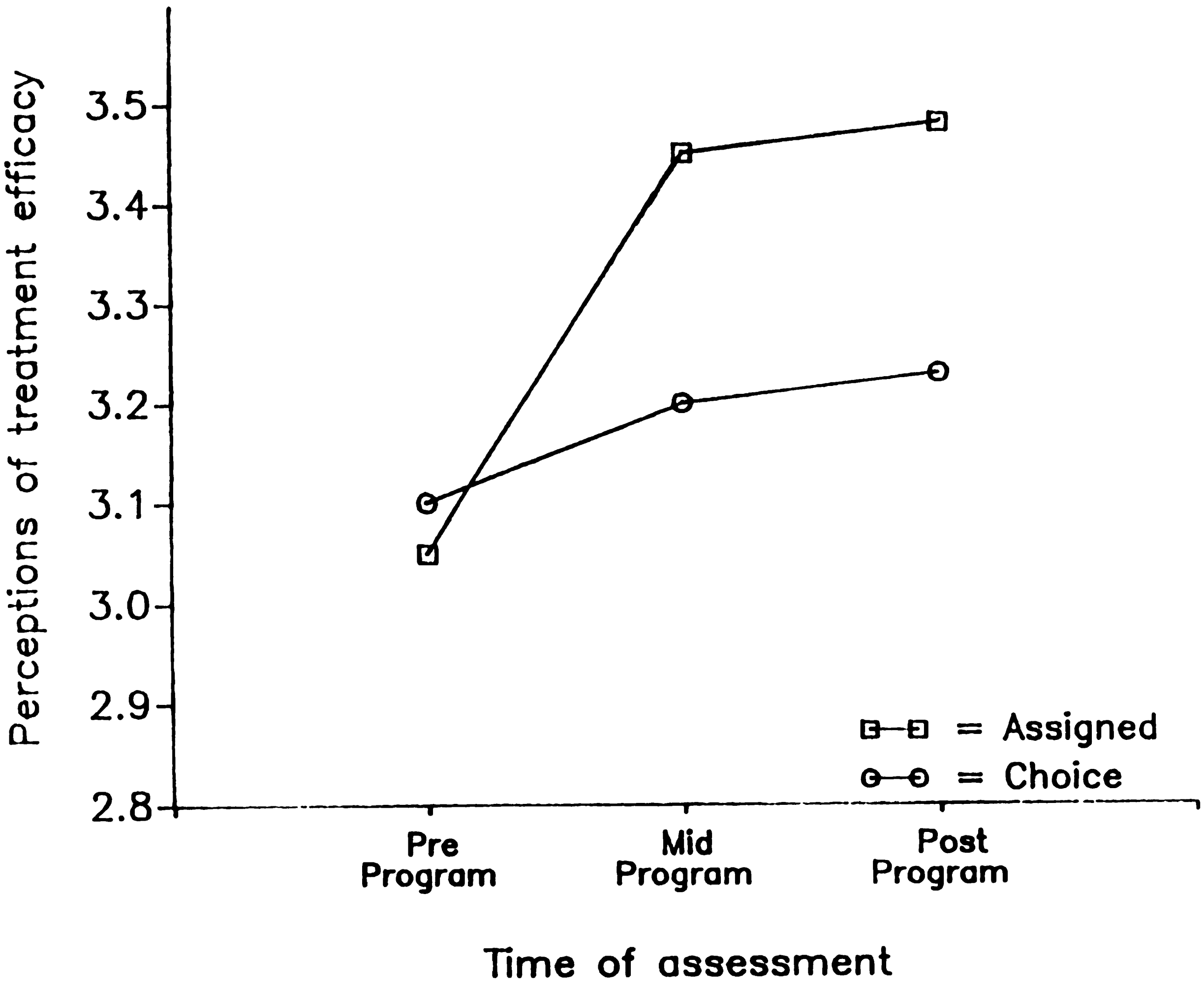

Figure 6: Mean scores on perceptions of treatment efficacy over time for choice vs assigned subjects

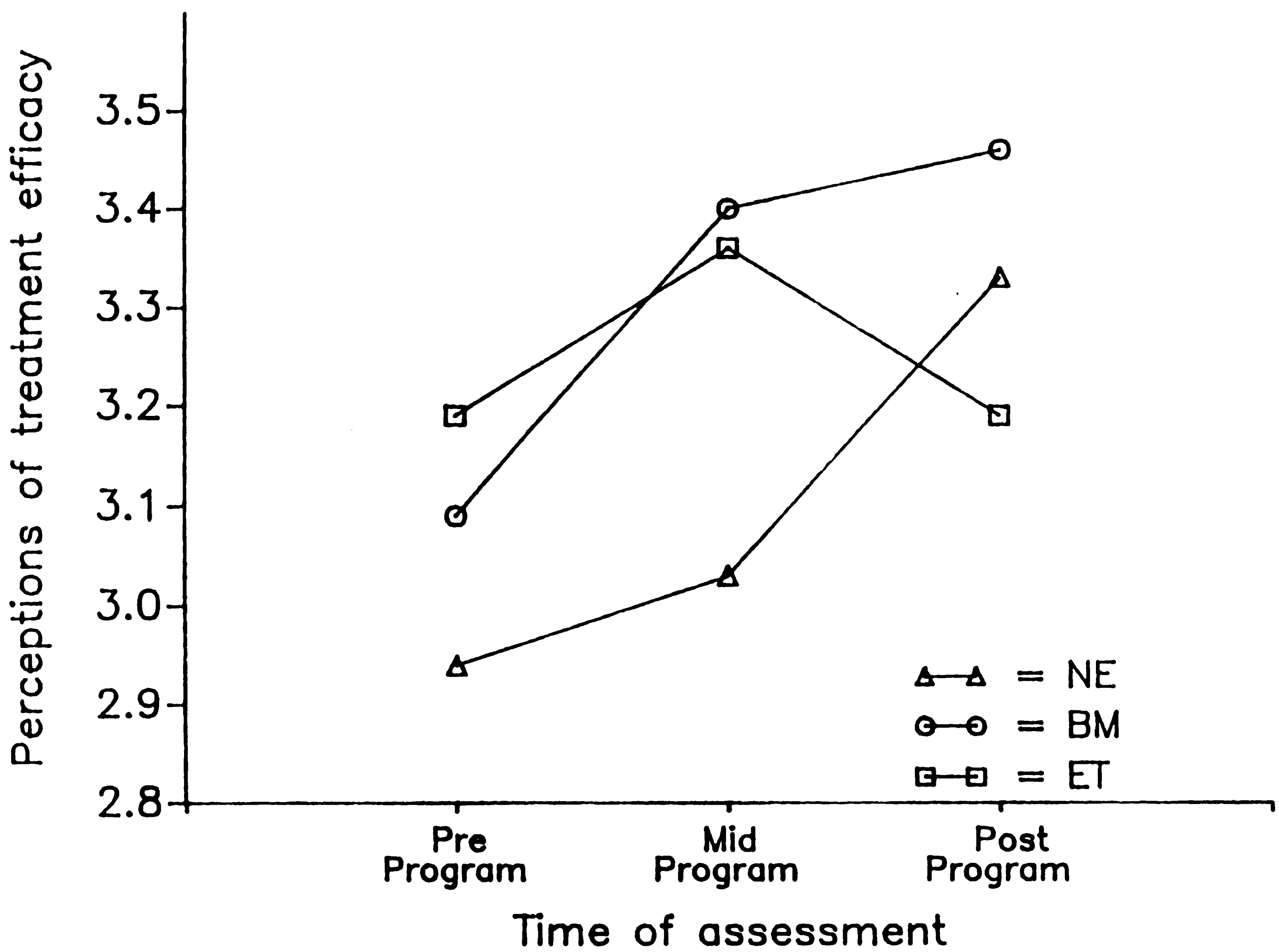

Figure 7: Mean scores on perceptions of treatment efficacy over time for treatment types

TABLE 25

Multiple Comparisons for Treatment Types on Perceptions of Treatment Efficacy at Pre-, Mid-, and Post- Program Measures

Comparison	Contrast	S.E.	T	Sig. of T
Pre-Program (df = 92)				
NE - BM	-0.15	.12	-1.25	.214
NE - ET	-0.25	.13	-1.97	.052
BM - ET	-0.10	.12	-0.83	.411
Mid-Program (df = 77)				
NE - BM	-0.36	.18	-2.00	.048
NE - ET	-0.32	.18	-1.75	.084
BM - ET	0.03	.15	0.22	.828
Post-Program (df = 69)				
NE - BM	-0.13	.18	-0.71	.478
NE - ET	0.14	.18	0.76	.448
BM - ET	0.27	.15	1.77	.080

perceptions of treatment efficacy than did the subjects who chose their treatments (*M* = 3.5 and *M* = 3.2, respectively). This difference remained stable to the post-test measure. As can be seen in Table 23, the effect of the choice condition level approached, but did not reach, significance (F = 3.59 [1,66], p = .062). The effect of time was clearly significant (p = .001), with all treatment groups increasing in their perceptions of their treatment's efficacy over time except those subjects who chose exercise training (who showed a decrease in their opinion of the treatment from mid-program to the post-test).

The factor A by factor B interaction also approached, but did not reach, significance (p = .055). The differences between the three treatment types did, however, reach significance (F = 3.35 [2,66], p = .041). Table 25 presents a summary of the comparisons between treatment types at the three measurement periods. While all three treatment types showed an increase in perceptions of treatment efficacy from the pre-test to the mid-program assessment, the nutritional education treatment subjects had consistently lower treatment efficacy scores than the other two treatments. The only comparison reaching significance, however, was at the mid-program assessment between nutritional education (*M* = 3.03, *s.d.* = .93) and behavior management (*M* = 3.39, *s.d.* = .44). Continued increases in perceptions of treatment efficacy from mid-program to the post-test occured for the behavior management treatments (mean increase = 0.07) and the nutritional education treatments (mean increase = 0.30). The exercise treatment subjects, however, showed a mean decrease of 0.17 from mid-program to the post-test. In fact, the subjects who were assigned to exercise training did show a slight increase in treatment efficacy perceptions (mean increase = 0.07), but the subjects who chose exercise training decreased their treatment efficacy perceptions from mid- to post-measure (mean decrease = 0.30).

For purposes of discussion in Chapter V, several correlations with the perceptions of treatment efficacy measure are presented. The perceptions of treatment efficacy measure correlated with the self-efficacy measure at pre-, mid-, and post-test as $\underline{r}$ = .069 ($\underline{p}$ = .253), $\underline{r}$ = .298 ($\underline{p}$ = .004), and $\underline{r}$ = .398 ($\underline{p}$ = .000), respectively. The mid-program and post-test perceptions of treatment efficacy scores correlated with similar program satisfaction measures at $\underline{r}$ = .455 ($\underline{p}$ = .000) and $\underline{r}$ = .518 ($\underline{p}$ = .000), respectively. Similar mid-program and post-test correlations between perceptions of treatment efficacy and program reactance were $\underline{r}$ = -.119 ($\underline{p}$ = .147) and $\underline{r}$ = -.503 ($\underline{p}$ = .000).

In conclusion, hypothesis five, which postulated that subjects who received a choice of treatment type would have significantly different scores on a measure of treatment efficacy perceptions than subjects who were randomly assigned to treatment types, was not be supported.

Hypothesis Six

Hypothesis Six stated that subjects who receive a choice of treatment type would have significantly different scores on a measure of program satisfaction than subjects who are randomly assigned to type of treatment. Satisfaction with the weight loss program was assessed at the mid-program measure and at the post-test. Scores from the program satisfaction measure are expressed as an average of the scale's items. The possible range is from zero (low) to four (high). A summary of the repeated measures analysis of variance on program satisfaction over time is presented in Table 26. The cell means and standard deviations for program satisfaction are presented in Table 27. Figures 8 and 9 graphically present the program satisfaction trends for levels of factor A and factor B, respectively.

The effect of time in the analysis of program satisfaction scores was not significant ($F = 0.08$ [1,67], $p = .781$), nor were the interactions between time and factor A ($p = .469$), time and factor B ($p = .549$), or time by factor A by factor B ($p = .162$). There was no pattern of significant change in program satisfaction scores from the mid-program to the post-test measure.

There was not a significant difference between subjects receiving a choice of treatment types and subjects assigned to treatment types on program satisfaction ($\underline{F}$ = 1.98 [1,67], $\underline{p}$ = .164). The subjects who chose their treatments did, however, have lower program satisfaction scores at mid-program and post-test than subjects assigned to treatments, even though these differences were not significant. Subjects choosing their treatment had a mean mid-program program satisfaction score of 3.35 (s.d = 0.44) while subjects assigned to treatments had a mean program satisfaction score of 3.53 (s.d. = 0.46) at the same measurement time. At the post-test assessment, subjects who chose their treatment had a mean program satisfaction score of 3.36 (s.d. = 0.50) while assigned subjects had a mean program satisfaction score of 3.53 (s.d. = 0.42).

Differences between the treatment types on satisfaction with the program were significant ($\underline{F}$ = 4.02 [2,67], $\underline{p}$ = .022). Table 28 summarizes the comparisons between the treatment types at the mid-program and post-test measurements. As can be seen, the nutritional education treatment subjects had significantly lower levels of program satisfaction at the mid-program measure than the behavior management treatment ($\underline{p}$ = .046) or the exercise treatment ($\underline{p}$ = .029). The significance, but not the pattern of, these differences disappeared by the post-test measure. The mid-program and post-test program satisfaction means for nutritional education (3.20 and 3.26, respectively) were lower than the means for the behavior management (3.47 and

TABLE 26

Repeated Measures Analysis of Variance on Program Satisfaction Over Time

Source	df	M.S.	F	Sig. of F
Choice (A)	1	0.56	1.98	.164
Treatment (B)	2	1.14	4.02	.022
A x B Interaction	2	0.72	2.54	.087
Error	67	0.28		
Time (C)	1	0.01	0.08	.781
A x C Interaction	1	0.06	0.53	.469
B x C Interaction	2	0.06	0.60	.549
A x B x C Interaction	2	0.19	1.87	.162
Error	67	0.10		

TABLE 27

Cell Means and Standard Deviations for Mid and Post Measure of Satisfaction and Reactance

Condition	Means (S.D.) Satisfaction Mid N = 80	Satisfaction Post N = 73	Reactance Mid N = 80	Reactance Post N = 73
Choice				
NE	3.3 (0.35)	3.3 (0.33)	0.53 (0.5)	0.57 (0.6)
BM	3.4 (0.47)	3.5 (0.48)	0.78 (0.7)	0.46 (0.5)
ET	3.4 (0.46)	3.3 (0.56)	1.00 (0.7)	0.92 (0.8)
Assigned				
NE	3.1 (0.60)	3.3 (0.40)	1.22 (1.2)	0.47 (0.4)
BM	3.6 (0.31)	3.5 (0.40)	0.38 (0.5)	0.40 (0.4)
ET	3.7 (0.27)	3.7 (0.36)	0.48 (0.7)	0.28 (0.4)

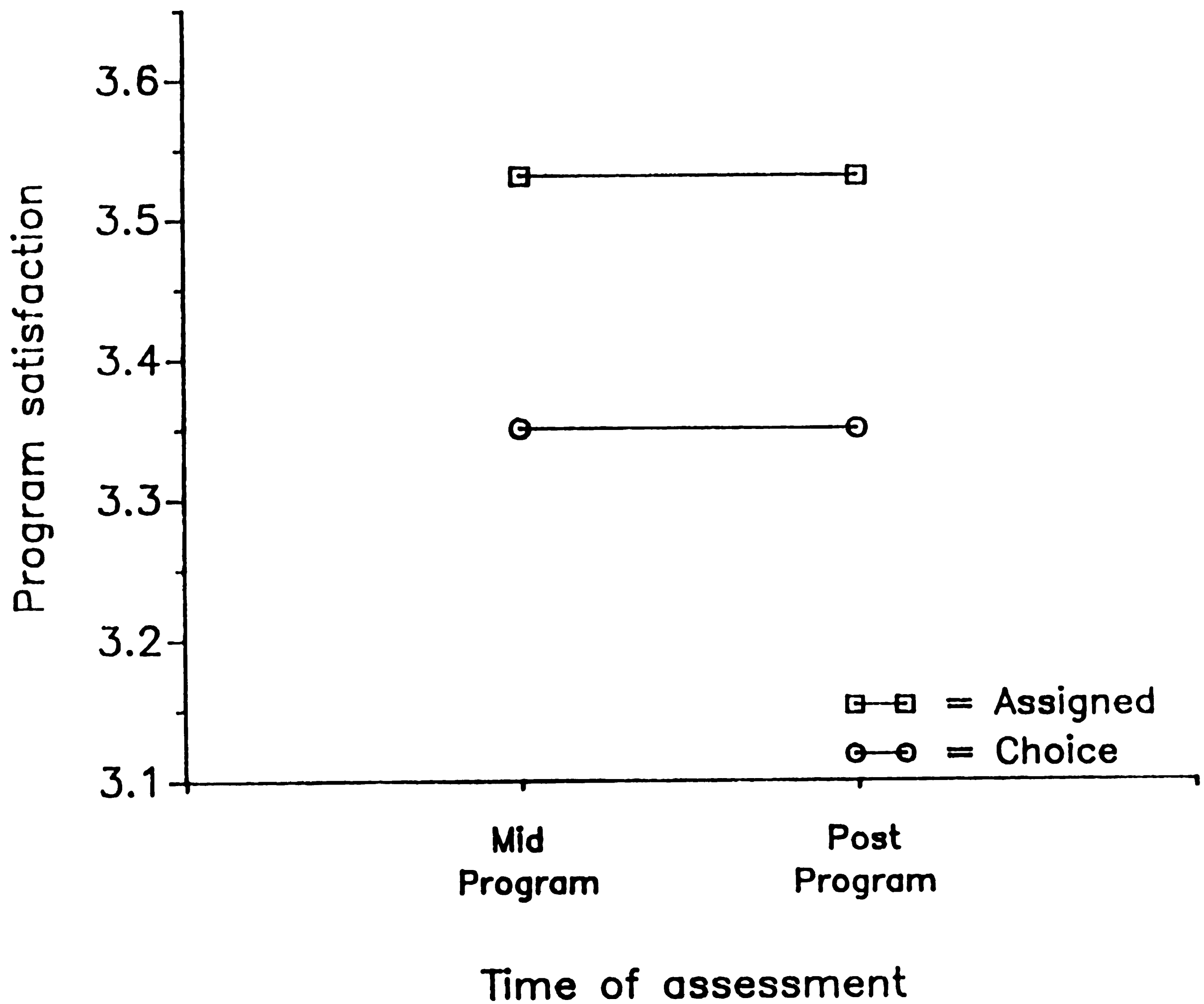

Figure 8: Mean program satisfaction over time for choice vs. assigned subjects

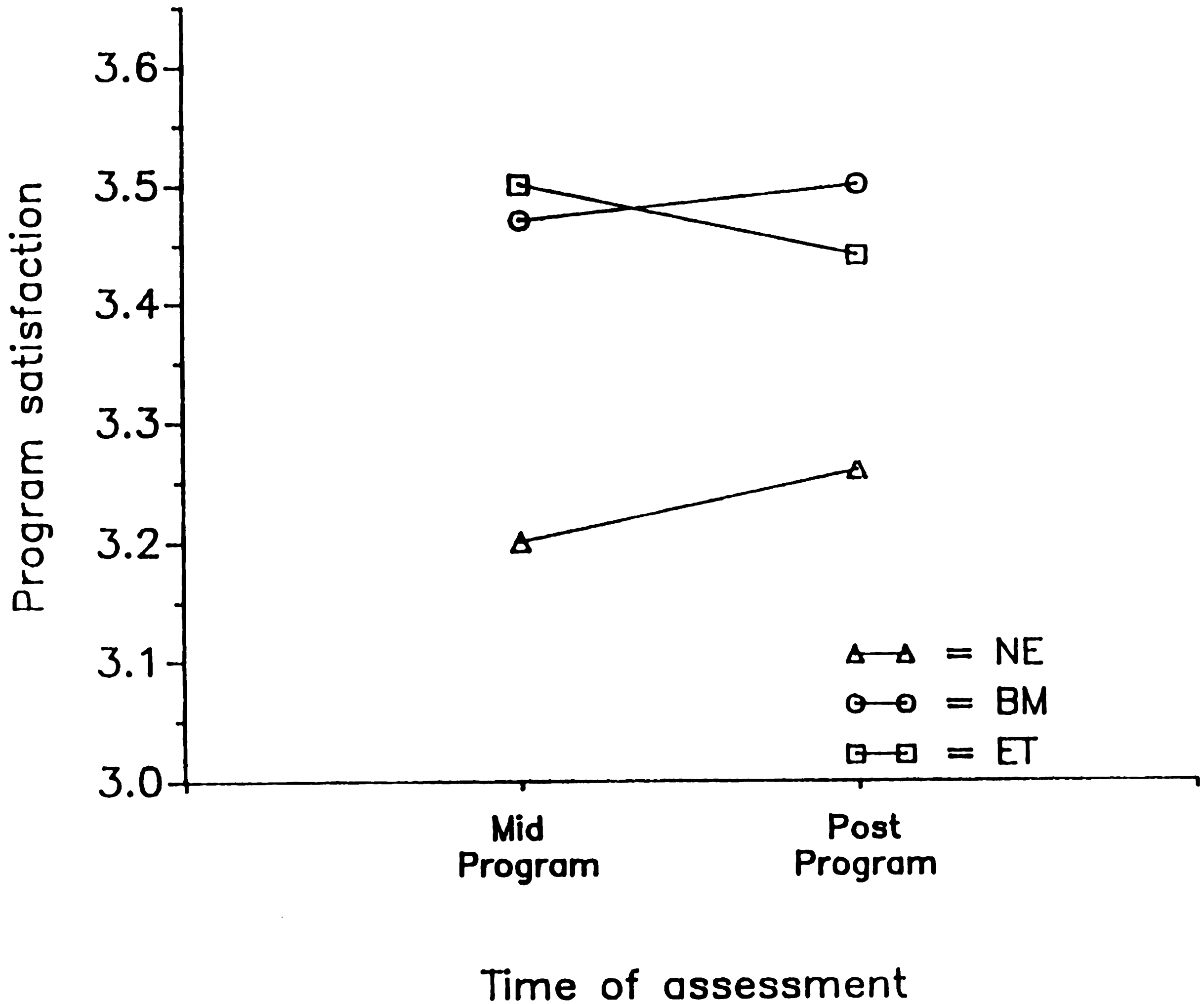

Figure 9: Mean program satisfaction over time for treatment types

TABLE 28

Multiple Comparisons Between Treatment Types on Mid- and Post-Measures of Program Satisfaction

Comparison	Contrast	S.E.	T	Sig. of T
Satisfaction: Mid-Program (df = 77)				
NE - BM	-0.27	.13	-2.03	.046
NE - ET	-0.31	.14	-2.23	.029
BM - ET	-0.04	.11	-0.34	.735
Satisfaction: Post-Program (df = 70)				
NE - BM	-0.24	.15	-1.64	.107
NE - ET	-0.18	.15	-1.18	.241
BM - ET	0.06	.12	0.49	.628

3.50, respectively) and exercise training (3.50 and 3.44, respectively) treatments.

The choice condition by treatment type condition interaction approached, but did not reach, significance (p = .087). Close examination of the cell means listed in Table 27 reveals the nature of this pattern. At the mid-program measure, subjects assigned to nutritional education had lower program satisfaction scores than did subjects who chose nutritional education, while the pattern was reveresed for behavior management and exercise training subjects. At the post-test assessment, the scores for assigned subjects and those receiving a choice were identical in the nutritional education and behavior management treatments but quite discrepant between the two exercise training programs.

In conclusion, hypothesis six, postulating that subjects who received a choice of treatment types would have significantly different program satisfaction scores than subjects who were assigned to treatment types, was not supported.

Hypothesis Seven

The seventh hypothesis under study stated that subjects who receive a choice of weight loss treatment types would have significantly different program reactance scores than subjects who were randomly assigned to treatment types. The program reactance scores are expressed as the average of the scale's items. The possible range of scores is from zero (low) to four (high). The program scale was administered at the mid-program assessment and the post-test. The cell means and standard deviations for the program reactance measure can be found in Table 27. A summary of the repeated measures analysis of variance on program reactance over time is presented in Table 29. Figures 10 and 11 graphically present the program reactance trends for levels of factor A and levels of factor B, respectively.

The main effect for time was at the significance level (F = 4.02 [1,67], p = .049), suggesting that overall levels of reactance to the program decreased from the mid-program to the post-test measures. The interaction between time and factor A was not significant (p = .477), nor were the interactions between time and factor B (p = .908) or between time, factor A, and factor B (p = .151).

Subjects who received a choice of treatments did not differ significantly from subjects who were assigned to treatment tpyes on measures of program reactance (F = 2.67 [1,67], p = .107). Mean levels of reactance were, however, higher for the subjects receiving a choice of treatments at mid- and post-measures (M = 0.82, s.d. = 0.68, and M = 0.65, s.d. = 0.66, respectively) than for subjects who were assigned to treatment type (M = 0.64, s.d. = 0.86, and M = 0.39, s.d. = 0.40, mid and post respectively).

The difference between treatment types on program reactance was not significant in the ANOVA (F = 0.99 [2,67],

TABLE 29

Repeated Measures Analysis of Variance on Program Reactance Over Time

Source	df	M.S.	F	Sig. of F
Choice (A)	1	1.49	2.67	.107
Treatment (B)	2	0.55	0.99	.375
A x B Interaction	2	1.33	2.38	.100
Error	67	0.56		
Time (C)	1	0.73	4.02	.049
A x C Interaction	1	0.09	0.51	.477
B x C Interaction	2	0.02	0.10	.908
A x B x C Interaction	2	0.35	1.95	.151
Error	67	0.18		

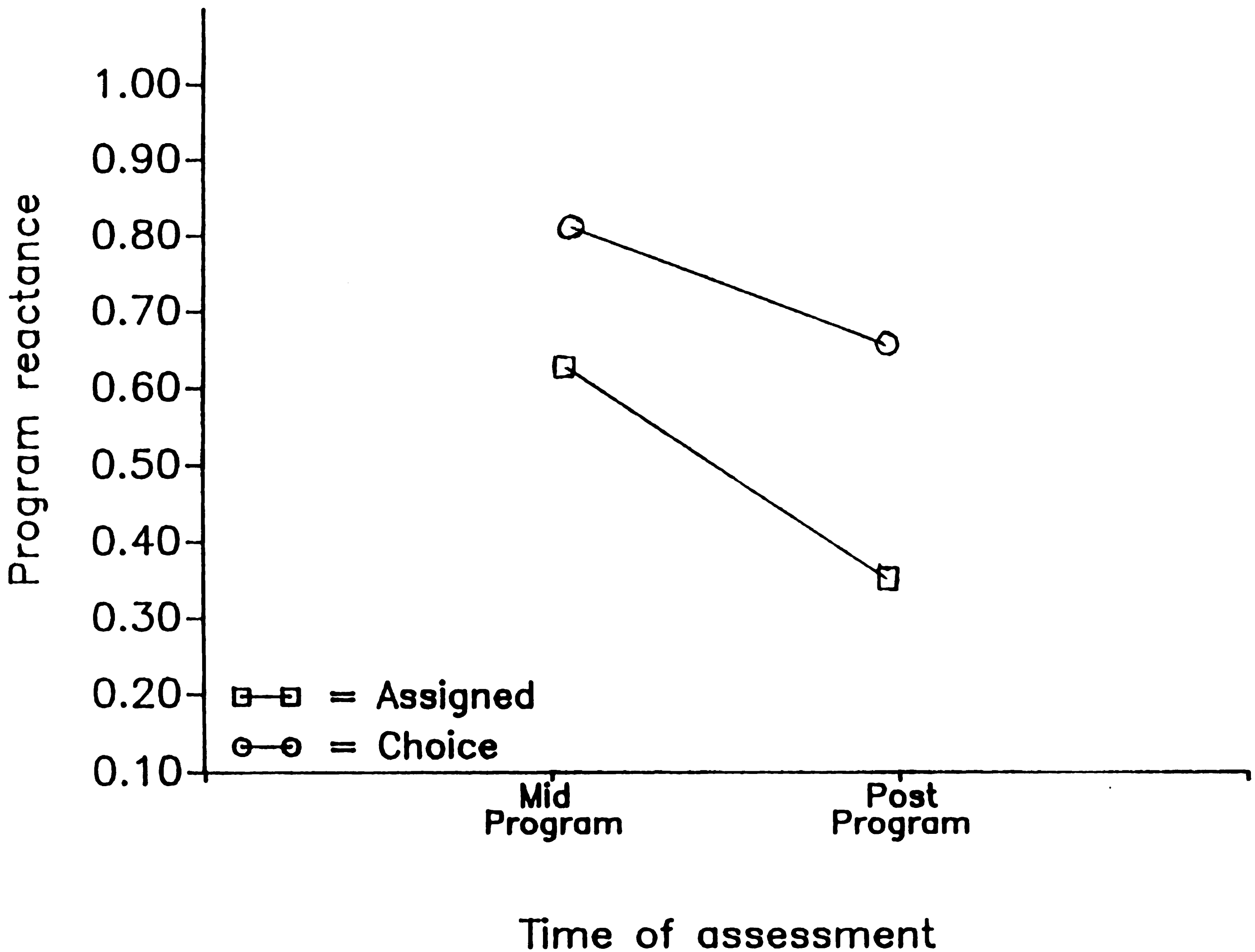

Figure 10: Mean program reactance over time for choice vs. assigned subjects

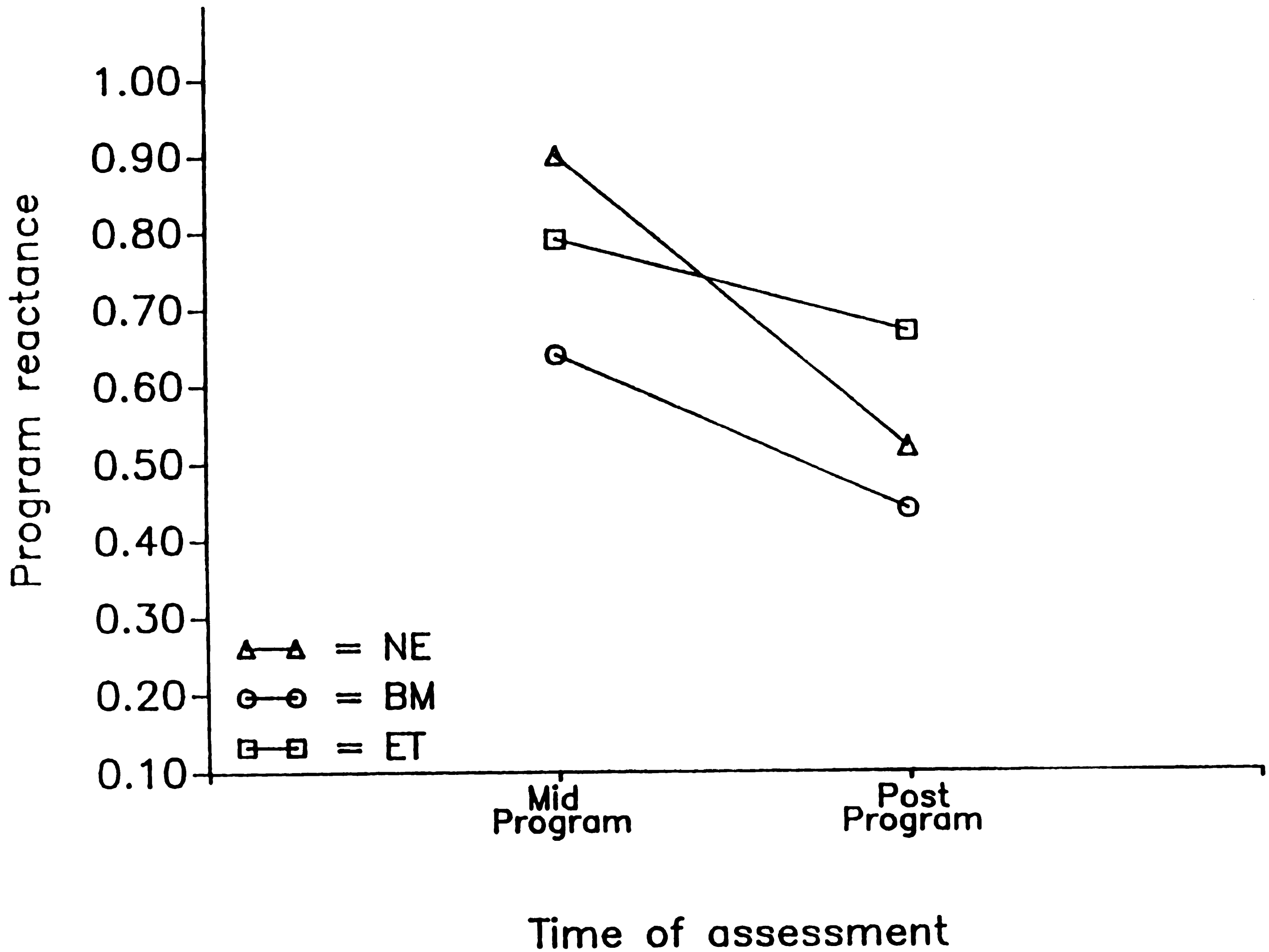

Figure 11: Mean program reactance over time for treatment types

p = .375). Mean reactance scores for the behavior management treatment at mid-program (M = 0.64, s.d. = 0.65) and post-test (M = 0.44, s.d. = 0.47) were lower than the mid- and post-measures for nutritional education (M = 0.90, s.d. = 0.98, and M = 0.52, s.d. = 0.50, respectively) and exercise training (M = 0.79, s.d. = 0.75, and M = 0.67, s.d. = 0.71).

The test for an interaction between levels of factor A and levels of factor B was not significant (F = 2.38 [2,67], p = .100).

Mid-program and post-test correlations between the program reactance measure and the program satisfaction measure were r = -.243 (p = .015) and r = -.338 (p = .002), respectively.

In conclusion, hypothesis seven, postulating that subjects who received a choice of treatments would have significantly different scores on a measure of program reactance than subjects randomly assigned to treatment types, was not supported. Randomly assigned subjects had lower program reactance scores, on average, than did the subjects who chose their treatments. The difference was not greater than what would be expected by chance at the .05 level of significance.

Hypothesis Eight

The eighth hypothesis was that subjects who received a choice of weight loss treatment type would have significantly different scores on a measure of self-efficacy than subjects who were randomly assigned to a treatment type. The self-efficacy measure was administered to program participants at the pre-test, at mid-program, and at the post-test. Scores from the self-efficacy measure are presented as subjects' average rating on the scale's items. The possible range of scores is from zero (low) to ten (high). A summary of the repeated measures analysis of variance is presented in Table 30. Cell means and standard deviations for the self-efficacy data at the pre-test, mid-program, and post-test assessments are presented in Table 31. Figures 12 and 13 graphically present the self-efficacy trends for levels of factor A and levels of factor B, respectively.

Overall, the self-efficacy scores increased over time for all conditions (F = 16.35 [2,134], p = .000). Interactions between time of assessment and the other factors were not significant.

The pre-test self-efficacy mean for the randomly assigned subjects (M = 4.99, s.d. = 1.75) was not much different than the pre-test mean for the subjects who chose their treatment type (M = 4.86, s.d. = 1.54). The difference between levels of factor A increased over time, but not significantly (F = 0.65 [2,134], p = .522). The randomly assigned subjects had higher mean mid-program and post-test self-efficacy scores (M = 6.06, s.d = 1.90, and M

TABLE 30

Repeated Measures Analysis of Variance on Self-Efficacy Over Time

Source	df	M.S.	F	Sig. of F
Choice (A)	1	23.14	3.44	.068
Treatment (B)	2	10.60	1.58	.214
A x B Interaction	2	6.13	0.91	.407
Error	67	6.72		
Time (C)	2	13.15	16.35	.000
A x C Interaction	2	0.53	0.65	.522
B x C Interaction	4	1.51	1.88	.118
A x B x C Interaction	4	1.04	1.30	.274
Error	134	0.80		

TABLE 31

Cell Means and Standard Deviations of Pre-, Mid-, and Post-Measures of Self-Efficacy

Condition	Means (S.D.) Pre N = 95	Mid N = 80	Post N = 73
Choice			
NE	4.1 (1.2)	4.7 (0.6)	4.9 (0.5)
BM	4.9 (1.5)	5.5 (1.5)	6.2 (1.4)
ET	5.2 (1.6)	5.2 (1.9)	5.6 (2.1)
Assigned			
NE	4.3 (1.9)	5.5 (1.9)	6.3 (1.6)
BM	4.9 (1.5)	5.8 (1.4)	6.3 (1.4)
ET	6.0 (1.4)	6.8 (2.3)	6.7 (1.9)

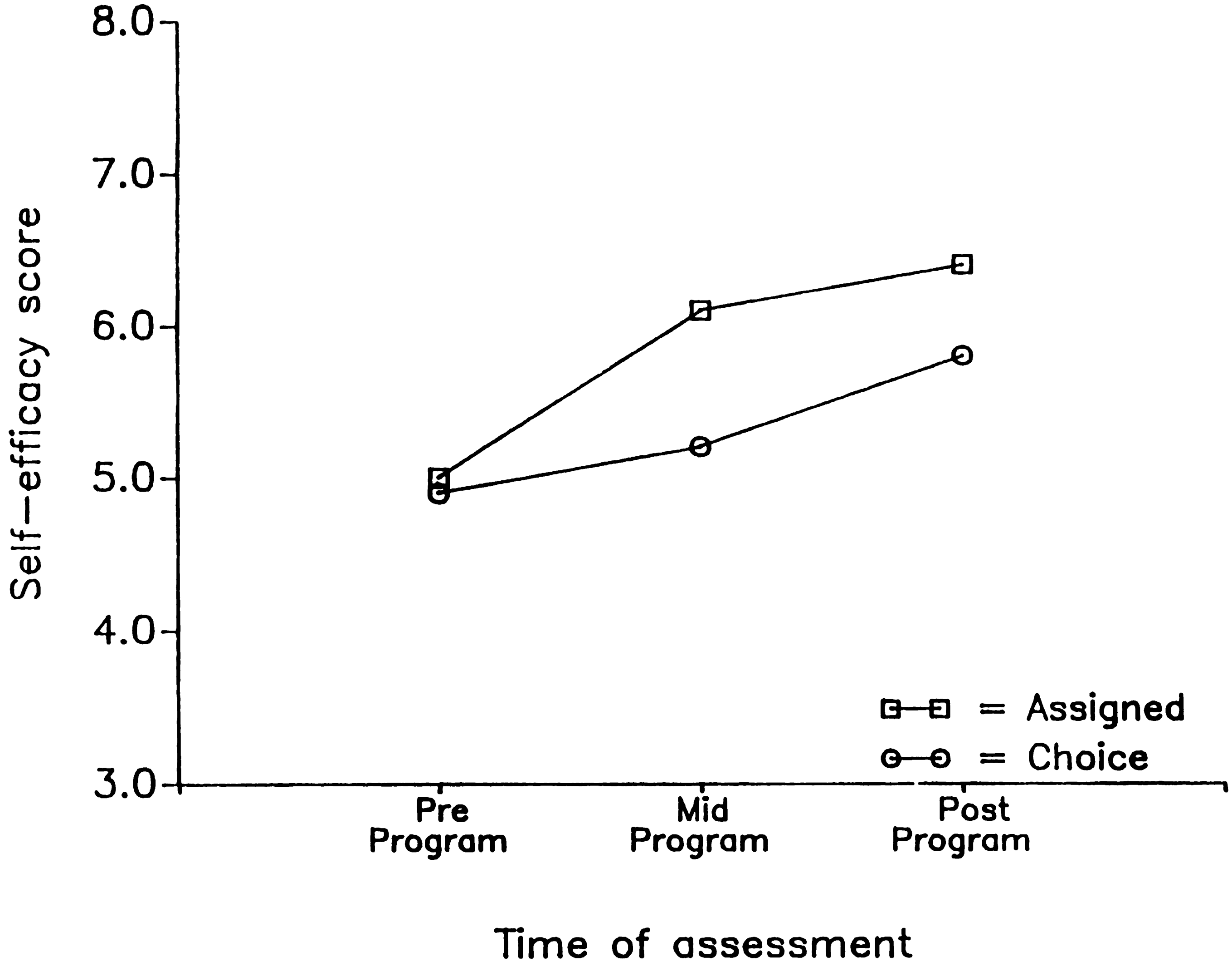

Figure 12: Mean self—efficacy scores over time for choice vs. assigned subjects

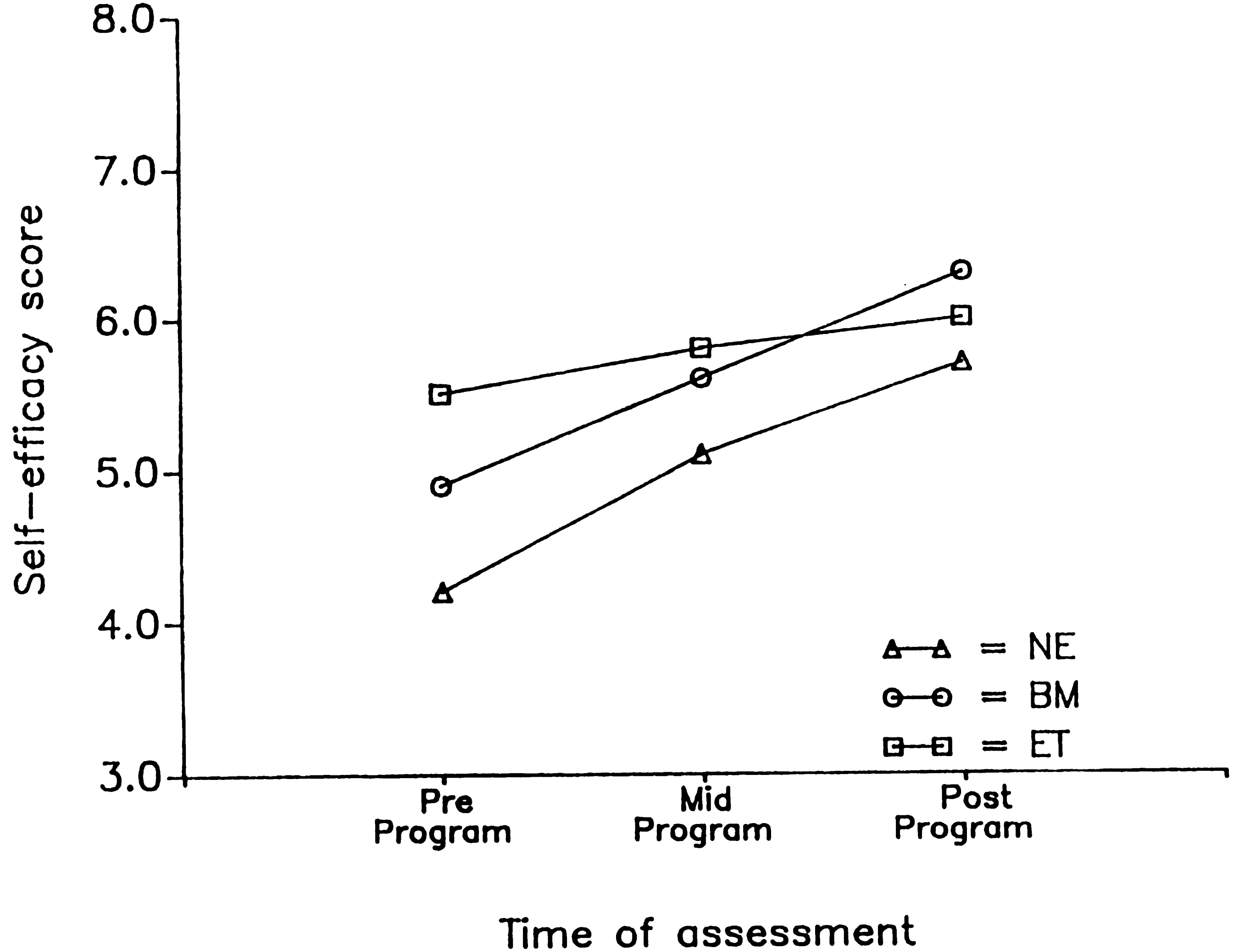

Figure 13: Mean self—efficacy scores over time for treatment types

= 6.4, s.d. = 1.58, respectively) than did the subjects who received a choice of treatment types (M = 5.25, s.d. = 1.58, and M = 5.77, s.d. = 1.65, repectively). Overall, the main effect for the choice versus assigned condition did not reach significance (F = 3.44 [1,67], p = .068).

The F-test for differences between levels of the treatment type factor on self-efficacy was not significant (F = 1.58 [2,67], p = .214). Differences between the three treatment types at the self-efficacy pre-test were significant and have been discussed elsewhere. At the pre-test, the nutritional education treatment subjects had lower self-efficacy scores than the exercise training subjects (p = .001). The comparisons were not significant between nutritional education and behavior management or between behavior management and exercise training (p = .087 for both). The mean self-efficacy scores of the nutritional education subjects increased at mid-program (M = 5.13, s.d. = 1.47) and again at post-test (M = 5.66, s.d. = 1.35) as did the scores for the behavior modification subjects (M = 5.60, s.d. = 1.46, and M = 6.25, s.d.= 1.39, mid and post respectively). The same pattern was true for the exercise training subjects but with smaller increments from mid-program (M = 5.84, s.d. = 2.20) to post-test (M = 5.99, s.d. = 2.05). The behavior management subjects overtook the exercise training subjects on self-efficacy from mid-program to post-test. None of the treatment type comparisons were significant at mid-program or post-test. The interaction between levels of factor A and levels of factor B was also not significant (F = 0.91 [2,67], p = .407).

In conclusion, hypothesis eight, postulating that subjects who received a choice of weight loss treatment types would have significantly different scores on a measure of self-efficacy than subjects assigned to treatment type, was not supported.

Hypothesis Nine

The ninth hypothesis stated that there would be an interaction between levels of factor A (choice versus assigned) and subjects' scores on the Desirability of Control Scale (Burger and Cooper, 1979). Hypothesis nine was constructed to determine whether desire for control would be a useful predictor of outcomes in a choice of treatments paradigm.

The desirability of control measure was administered at the pre-test. Scores are presented as total scale scores. The possible range of desirability of control scores is 20 (low desire for control) to 140 (high desire for control). The cell means were presented in Table 1, as was the summary of the analysis of variance on desirability of control.

The mean desirability of control score for subjects receiving a choice of treatment was 98.75 (s.d. = 14.34). The mean desirability of control score for subjects assigned to treatment type was 103.00 (s.d. = 12.90). The difference was not significant at the .05 level. Multivariate analyses of variance were conducted to directly test the possible interaction between desirability of control and levels of factor A with the family of all outcome variables as the aggregate dependent measure. Table 32 summaries the results of the MANOVA with factor A, factor B, and desirability of control as independent variables and the seven post-test measures as dependent variables (attendance, adherence, self-efficacy, perceptions of treatment efficacy, program satisfaction, program reactance, and weight change). Similar results are summarized for MANOVA tests on the four mid-program measures in Table 33 (program satisfaction, program reactance, perceptions of treatment efficacy, and self-efficacy) and for the two pre-test measures in Table 34 (self-efficacy, perceptions of treatment efficacy). The desirability of control scores were split at the median and entered into the MANOVA as either high or low desirability of control. The distribution of desirability of control scores was roughly normal, and did not possess any obvious modal characteristics to guide an alternative categorical division of the data.

The desirability of control by levels of factor A interaction was not significant for the group of post-test measures (F_H = 0.08 [7,54], p = .999), for the mid-program measures (F_H = 0.20 [4,65], p = .937), nor the pre-test measures (F_H = 0.19 [2,82], p = .824).

TABLE 32

Multivariate Analysis of Variance for the Post-Program Measures With Choice, Treatment Type, and Desirability of Control as Factors

Source	df	Hotellings F	Sig. of F
Choice Factor (A)	7,54	6.98	.000
Treatment Factor (B)	14,106	0.77	.696
Des. of Control (C)*	7,54	1.53	.179
Interactions			
A x B	14,106	1.06	.401
A x C	7,54	0.08	.999
B x C	14,106	0.54	.902
A x B x C	14,106	1.08	.384

* Entered using Median-Split

TABLE 33

Multivariate Analysis of Variance for the Mid-Program Measures With Choice, Treatment Type, and Desirability of Control as Factors

Source	df	Hotellings F	Sig. of F
Choice (A)	4,65	2.10	.091
Treatment (B)	8,128	0.83	.576
Des. of Control (C)*	4,65	1.13	.352
Interactions			
A x B	8,128	0.76	.635
A x C	4,65	0.20	.937
B x C	8,128	1.63	.123
A x B x C	8,128	0.33	.954

* Entered using Median-Split

TABLE 34

Multivariate Analysis of Variance for the Pre-Program Measures With Choice, Treatment Type, and Desirability of Control as Factors

Source	df	Hotellings F	Sig. of F
Choice (A)	2,82	0.48	.618
Treatment (B)	4,162	2.74	.030
Des. of Control (C)*	2,82	1.43	.246
Interactions			
A x B	4,162	0.68	.606
A x C	2,82	0.19	.824
B x C	4,162	2.55	.041
A x B x C	4,162	0.97	.425

* Entered using Median-Split

The remaining *F*-tests in the MANOVA summaries in Tables 32, 33, and 34 parallel the results of the MANOVA summaries in Tables 9, 10, and 11, or are otherwise irrelevant to testing hypothesis nine, and will not be described further. Multiple regression analyses were conducted to determine if the desirability of control scores would yield more predictive power if used as a continuous, rather than discrete, variable. A simple regression model was constructed to use desirability of control, levels of factor A, and an interaction term as predictor variables. The results were entirely redundant of the MANOVAs and, hence, are not presented here.

In conclusion, hypothesis nine, postulating an interaction between desirability of control and having a choice of treatments or being assigned to treatment, was not supported. There is no evidence to support the hypothesis that desirability of control interacts with choice of treatments to affect outcomes.

Hypothesis Ten

The tenth hypothesis stated that subjects who chose exercise training as a treatment would be significantly more internal on the Weight Locus of Control Scale (WLOC) than would subjects who chose behavior management or nutritional education. The WLOC was administered at the pre-test. WLOC scores are presented in terms of the total score; the possible range of scores is from 4 (internal) to 24

TABLE 35

Comparison of Subjects Choosing Exercise Vs. Subjects Choosing Behavior Modification or Nutrition Education on Weight Locus of Control

Comparison	Contrast	S.E.	T	Sig. of T
ET - ½ BM - ½ NE	-3.42	1.97	-1.73	.087

df = 89

TABLE 36

Correlations of Weight Locus of Control With Attendance and Weight Change Measures

	Attendance	Weight Change Lbs.	Weight Change BMI	Weight Change % Overweight
WLOC	.054 p= .301	.122 p= .153	.124 p= .148	.128 p= .141

(external). Cell means were presented in Table 1, but will be discussed again here. Overall, the total sample was highly internal in weight locus of control (mean = 7.31, s.d. = 3.34).

Subjects who chose exercise training had smaller mean WLOC scores (M = 6.63, s.d. = 2.75) than the subjects who chose behavior management (M = 7.59, s.d. = 3.05) or nutritional education (M = 9.09, s.d. = 4.66). Table 35 summarizes the comparison between the subjects choosing exercise training and an average of the subjects choosing nutritional education and behavior management on weight locus of control. A directional t-test was employed. While the trend was for subjects choosing exercise to be more internal in locus of control than were the subjects choosing other treatments, the difference was not significant at the .05 level (T = -1.73, df = 89, p = .087).

In conclusion, hypothesis ten, postulating that subjects choosing exercise training would be significantly more internal on the Weight Locus of Control Scale than subjects choosing behavior management or nutritional education, was not supported. The difference was in the predicted direction but did not reach significance.

Hypothesis Eleven

Hypothesis eleven stated that internality on the weight locus of control measure would be positively related to measures of attendance and body weight change. Table 36 presents the correlations between weight locus of control and all three body weight change measures as well as with attendance. Attendance figures for all subjects were used in this analysis (ie, drop-outs were not excluded). It should be noted that body weight change indices were entered as negative numbers, and thus positive correlations with the weight change measures suggest negative relationships. In other words, externality in locus of control was more strongly related to weight loss than internality.

The correlations were small and not more probable than chance at the .05 level of significance. Thus, hypothesis eleven, predicting a relationship between weight locus of control and measures of attendance and weight change, was not supported.

Hypothesis Twelve

Hypothesis twelve stated that there would be significant differences between levels of factor B (treatment types) on body weight change. The relationship between treatment types on the three weight change measures was discussed thoroughly in the presentation of results for hypothesis two. Cell means and standard deviations for the three weight change measures were presented in Table 12, ANOVA summaries for the three weight change measures were presented in Tables 13 - 15, and comparisons between the three treatment types on each weight change measure were presented in Table 19. The results are briefly summarized here as a formality.

The only treatment type comparison that approached significance was between nutritional education and behavior management. The nutritional education groups had a smaller degree of weight change than behavior management for pounds change ($p = .058$), BMI change ($p = .045$), and percent overweight change ($p = .056$). Comparisons between nutritional education and exercise training, and between behavior management and exercise training, were not significant for any of the three weight change measures.

In conclusion, the effects of the three levels of factor B on the three body weight change measures were not found to be significantly different on the analyses of variance. However, post-hoc mutliple comparisons between treatment types revealed a difference between nutritional education and behavior management that was at the significance level for BMI change and just above the significance level for pounds change and percent overweight change. On the basis of the more powerful ANOVA test, hypothesis twelve was not supported. It is noted, however, that the nutritional education treatments tended to have less desirable results on all the outcomes.

Hypothesis Thirteen

Hypothesis thirteen stated that subjects' histories of past attempts at losing weight would be related to scores on program outcome measures. Table 37 presents the correlations between both frequency of past weight loss attempts and the variety of previous weight loss attempts (ie, different types of methods tried) with the primary outcome measures.

Four variables proved to have significant correlations with the two indices of past weight loss efforts. The frequency of past weight loss attempts was negatively related to adherence ($r = -.27$, $p < .01$). The initial self-efficacy measure was negatively related to both the frequency ($r = -.24$, $p < .05$) and the variety ($r = -.23$, $p < .05$) of past weight loss attempts. In addition, variety of past weight loss attempts was negatively related to the mid-program self-efficacy measure ($r = -.21$, $p < .05$). Finally, the frequency of past weight loss attempts was postively related to the mid-program measure of program reactance ($r = .21$, $p < .05$). No other outcome measures were found to be significantly related to either of the indices of previous weight loss attempts.

In conclusion, there was partial support for hypothesis thirteen, which predicted a significant relationship between subjects' histories of weight loss efforts and each of the

TABLE 37

Correlations of Frequency and Variety of Previous Weight Loss Attempts With Outcome Measures

Outcome Variable	Previous Attempts Frequency	Variety
Lbs. Change	.03	-.01
BMI Change	.04	.02
% Overweight Change	.02	-.02
Attendance	-.16	-.04
Adherence	-.27**	-.16
Self-Efficacy		
Pre	-.24*	-.23*
Mid	-.14	-.21*
Post	-.15	-.07
Perceptions of Treatment Efficacy		
Pre	.00	.04
Mid	.04	-.03
Post	.11	.12
Program Satisfaction		
Mid	-.06	.09
Post	.04	.00
Program Reactance		
Mid	.21*	-.12
Post	.12	-.11

* $p < .05$
** $p < .01$

outcome measurements. In fact, weight loss history was associated with four outcome measures: adherence, initial self-efficacy, mid-program self-efficacy, and mid-program reactance. The relationships between history of past weight loss attempts and other outcome measurements were not significant at the .05 level of significance.

CHAPTER V

DISCUSSION

The purpose of the present research was to examine the role of offering a choice of treatment types to overweight participants of a weight reduction program. Half the subjects were offered a choice between three treatment types, the other half of the subjects were randomly assigned to type of treatment. Primary research hypotheses were constructed to assess the effect of treatment choice on relevant treatment outcome variables: attrition, weight loss, attendance, adherence, perceptions of treatment efficacy, program satisfaction, program reactance, and self-efficacy attributions. Comparisons between the three treatment types (nutritional education, behavior management, and exercise training) were also examined. Secondary exploratory hypotheses were constructed to evaluate the potential predictive value of two constructs of personal control (desirability of control and weight locus of control) in weight loss research. A final exploratory hypothesis examined the relationship between prior history of weight loss efforts and the primary outcomes.

This chapter discusses the results of the data analyses for the thirteen experimental hypotheses, and considers their meaning for the central thesis of the research. Following a review of the hypotheses and their results, the discussion turns towards the limitations of the research study, and suggestions for further research.

The first hypothesis was related to the role of treatment choice in reducing program attrition. Attrition data were analyzed separately for subjects dropping out at the first program meeting, subjects dropping out during the course of the program, and total program-related attrition.

In the present study, overall attrition rates were much higher than anticipated. 38.1% of the initial 118 subjects dropped out of the program. This figure is consistent with early weight loss research efforts (Brownell, 1982; Wilson, 1985). The monetary incentive scheme, however, was included in the present study to hold attrition rates down. In a review of weight loss research studies, Wilson (1985) found that monetary incentives reduced attrition rates to an average of 9.5% in weight loss programs. In Mavis' (1987) dissertation study, the attendance-contingent incentive group (upon which the present scheme was based) had an attrition rate of 20%. These figures are much lower than what was obtained in the present study.

In the present study, monetary incentives clearly did not help to reduce attrition and, at least for eight subjects, may have caused attrition. 6.8% of the original group of subjects dropped out at the first program meeting listing the monetary incentive scheme as their reason for not continuing participation. The reasons for the apparent failure of incentives to reduce attrition is not clear. The lottery method for distributing incentive funds may have seemed too random to the subjects, undermining the attendance contingency. No test of this hypothesis is available from the obtained data, however. Another possible interpretation may be that the ratio between program costs and incentive costs worked to devalue the program. Specifically, the program cost each subject five dollars, but a forty dollar deposit was required to enhance attendance. Subjects may have become suspicious of why so much more money was required to facilitate attendance if the program was really worthwhile. Again, this hypothesis cannot be tested with available data.

Wilsons' (1985) review of weight loss research revealed that 57% of the subjects dropping out of weight loss programs did so because of the slow rate of weight loss they were experiencing. In the present study, only one subject indicated dropping out because the program was not helping her to lose weight. Twenty subjects (17%) dropped out for reasons of schedule conflicts. This situation is similar to Murray's (1976) attempt to implement a choice paradigm in a weight reduction program: 56% of the original subject pool was lost due to schedule conflicts. Murray (1976) was forced to confound choice of program time with choice of treatment type to continue his study.

Attrition due to schedule conflicts raises an important issue regarding offering subjects treatment choices: perhaps the choice of day and time of treatment is more important to people than a choice of treatment type. Of the 13 subjects dropping out at the first meeting because of schedule conflicts, however, only 2 were from the group receiving a choice of treatments. Of the seven subjects who dropped out later in the program for reasons of schedule problems, again only two were from the group receiving a treatment choice. Thus, treatment choices may work, after all, to mitigate attrition due to schedule conflicts. Receiving a choice of treatments may leave subjects with a greater level of commitment to their chosen treatment than is the case when subjects are assigned to treatment type. Available data do not allow an examination of whether schedule conflicts, as a reason for dropping out, was a real concern or a convenient rationalization.

At any rate, significant differences in attrition rates were found between the subjects assigned to treatment types and subjects receiving a choice of treatment types. Thus, while the overall program attrition level was high, receiving a choice of weight loss treatments was associated with lower attrition.

While behavior modification had the lowest attrition rate of the three treatment types, the 27.3% attrition associated with this treatment in the present study is much larger than what was reported in the literature upon which the treatment was developed. Wilson (1985) and Brownell (1982) claim that behavior modification treatments reduce weight loss program attrition to 10% - 15% on average. Even with the monetary incentive scheme, behavior modification treatments in the present study had higher levels of attrition than what is claimed as the norm in the behavioral research literature. The exercise program's 36.6% attrition rate, next lowest in attrition among the three treatments offered, was somewhere near the norms of 25% - 30% described in the literature. The 54.5% attrition obtained for the nutritional education groups is among the worst attrition rates reported in the weight loss research literature.

While exercise and behavior treatments did not significantly differ from each other, nutritional education fared significantly worse on attrition than the other treatments. Interpretive statements about differences discovered between the three treatments on attrition, or on any other outcome variable, cannot be generalized beyond this study, however. Comparisons between the three treatment types are compromised by the fact that each treatment was delivered by a different group leader. It is impossible to know whether any of the outcome differences between the three treatments were due to the nature of the treatments themselves or to differences between the program leaders. It was the experimenter's subjective observation that the nutritional education treatment groups were rather boring, that the behavior management groups were rather lively, and that exercise training subjects developed an esprit de corps. Again, however, these differences could have been due to the treatment type, the treatment leaders, or some other (unknown) factor.

A comparison of those subjects who dropped out with subjects who remained in the program as participants revealed that drop outs had a lower initial self-efficacy score. Interestingly, the nutritional education groups also had a lower intitial self-efficacy score than the other treatment groups. These findings are consistent with self-efficacy theory, which holds that self-efficacy expectations work to determine the amount of effort and persistence that an individual will put forth in the face of obstacles (Bandura, 1977, 1982). Low self-efficacy is logically associated with decreased persistence, and the present data support that relationship --- for the group of drop outs as a whole, and for the nutritional education subjects.

It is important to note that drop outs were not differentiated from participants on their approval of treatment assignment. That is, when asked whether they thought that their specific treatment type was the method most likely to help them lose weight, participants and drop outs responded with similar proportions of yes (roughly 64%) and no (roughly 35%). This finding lends credence to the idea that it was some factor other than treatment differences, such as self-efficacy, that was associated with attrition.

Since the attrition rate was higher among the assigned subjects than the subjects receiving a choice, and since the remaining assigned subjects ended up losing more weight than the subjects receiving a choice (hypothesis two), attrition may have created a selection bias during the course of the study that favored the assigned subjects. For instance, perhaps attrition tended to weed out those subjects who were less committed to losing weight, but at differential rates for the choice and assigned groups. Specifically, it may have been that some of the subjects who received a choice of treatments stayed in the program due more to a commitment to their choice than to a commitment to lose weight. Conversely, assigned subjects uncommitted to weight loss may have had no special reason to be committed to their treatment type, and thus dropped out at a higher rate, leaving a group of remaining subjects more committed to weight loss. If this were true, a smaller variance in weight change measures would be expected for the assigned subjects. The data reveal that this was not the case however. In fact, the assigned subjects had slightly larger variances on the weight change measures than did the subjects receiving a choice of treatments.

It is still possible that the differential attrition rates between assigned and choice subjects worked to create a selection bias that mediated weight loss outcomes. Data reveal that while the two groups were initially equivalent in self-efficacy attributions, the assigned subjects had a higher self-efficacy average at mid-program and post-test measures than the subjects receiving a choice (hypothesis eight). The same pattern was true for the perceptions of treatment efficacy measures (hypothesis five). Thus, at least for the attrition occuring during the course of the program, the evidence suggests that the assigned groups were left with subjects more confident in themselves and in their treatments than were the groups where subjects had received a choice. Data are not available to examine these patterns for subjects who dropped out at the first program meeting. Further, the data do not give any insight into potential competing hypotheses that some factor(s) other than choice may have mediated attrition.

The second hypothesis was related to the influence of treatment choices on weight reduction. Three measures of body weight were used to test this hypothesis: pounds, body mass index, and percent over ideal weight. It was found that the subjects assigned to type of treatment lost more weight than the subjects choosing their treatments on all three body weight measures. A discussion of differences between the three treatment types on body weight change is deferred to the discussion of hypothesis twelve.

The overall sample means on body mass index (32.4) and percent overweight (44.4) suggest that the total sample did represent an obese group of subjects. The norms specified in the weight loss research literature for determining obesity are a body mass index of 27.2 or greater for men and 29.2 or greater for women, and a percent overweight of 20% - 25% or over for men and 30% or over for women. By these criteria, the total sample was still obese at the post-test measure (mean BMI = 30.7; mean percent overweight = 36.8).

Literature reviews (Brownell, 1982; Blundell, 1984; Wilson, 1985) indicate that the average weight loss in non-medical programs is generally between 10 and 15 pounds over an average 8 - 16 week period. Over ten week periods, as was the case in the current research, a weight loss of 7.8 pounds to 8.25 pounds is expected (Wing and Jeffery, 1979). The average weight loss in the current study, across all experimental conditions, was 5.72 pounds. Thus, the overall results in the current study do not compare favorably with results reported in other studies. The comparison of total program weight loss indices obtained in this study to similar indices obtained in other studies may not be valid, however. Most weight loss programs provide treatments that include a combination of the three treatments that were separated here in service of the experimental design. Delivering nutritional, behavioral, and exercise treatments separately may have compromised the effectiveness of each.

As Mavis (1987) pointed out, two factors should be considered when viewing small weight change indices. First, the use of a difference score to describe weight change results in a measurement error larger than the individual variances associated with the scores from which it is derived. Thus, the significance of changes may be lost when the magnitude of changes is small. Secondly, large within-group variation also affects the analyses. A review of the weight change indices obtained in the present study reveals variances that are generally quite large relative to the means. In an analysis of sample sizes and variances in weight reduction studies, Wing and Jeffery (1984) suggest that 45 subjects are needed in each experimental group to find a five pound difference in weight change significant at the .05 level. Groups of this size, however, become unmanageable from group process and human resource perspectives.

The 2.84 pound difference in mean weight loss between the assigned subjects and the subjects receiving a treatment choice was found to be significant in the ANOVA and multiple regression analyses (despite Wing and Jeffery's findings). The small differences favoring the assigned subjects were also found to be significant for the BMI and percent overweight measures on similar analyses. A rationale for why the assigned subjects lost more weight (in absolute and relative terms) than the subjects receiving a choice of treatments is difficult to pin down.

In the discussion of attrition patterns, it was hypothesized that a selection bias occured after subjects dropped out of their respective groups such that the remaining assigned subjects were perhaps more committed to actually losing weight than the remaining subjects who received a choice of treatments. The anticipated smaller variance for assigned subjects on weight changes measures was not found, however. Thus, if selection bias did occur as a result of attrition, it must have been due to some other intervening variable. Patterns of self-efficacy and perceptions of treatment efficacy scores are consistent with a hypothesis that attrition resulted in a selection bias favoring the assigned groups, but competing hypotheses cannot be ruled out on the basis of available data.

A possible alternative hypothesis is that the nature of the program, and its advertisement, attracted subjects who were likely to respond more favorably to being assigned a treatment type than to receiving a choice. That is, subjects who respond to a newspaper advertisement for a weight loss program may represent a population of overweight people who prefer that an "expert" tell them what to do. The means of recruiting subjects may have pre-biased the sample such that a choice of treatments may have been inconsistent with the expectations subjects brought with them to the program. In fact, at the pre-program meeting where treatments and choices were described to the subjects who received a choice, several subjects asked the experimenter to make the decision for them (which, ofcourse, was not done). It is possible, then, that offering subjects a choice of treatments caused some cognitive and/or affective responses that worked to diminish the effectiveness of the treatments for subjects who received a choice relative to subjects who were assigned a treatment type. A comparison of the current sample with a sample of the population of overweight individuals who do not respond to advertisements for group weight loss programs would be helpful here, but is not possible. Virtually nothing is known about this comparison group. The discussion of a potential cognitive/affective effect of choice is taken up again following a discussion of the remaining hypotheses.

The third hypothesis was constructed to examine the influence of offering subjects a choice of treatment types on program attendance. The difference on attendance between the assigned subjects and the subjects choosing treaments was extremely small (0.01 sessions). Differences between treatment types were also small; the greatest difference was between nutritional education and behavior management, and was only 0.46 sessions. Apparently the value of receiving a choice of treatments was not powerful enough to influence attendance. The possibility that potential differences were prevented from occuring due to the attendance-contingent monetary incentives is a plausable explanation for the failure of the choice condition to generate differential attendance scores.

The fourth hypothesis examined the influence of choice of treatments on adherence. Analysis of the obtained results suggested that having a choice of treatment types had a powerful effect on adherence to prescribed behaviors relative to the condition where subjects were assigned to treatments. Subjects receiving a choice of treatments had an average 72.6% adherence and subjects who were assigned to treatments had an average 53.2% adherence. Unfortunately, adherence was not strongly related to weight loss, as is obvious in the results.

There are serious psychometric problems associated with measuring adherence --- in general, and in this study specifically. The adherence measure in the current study was based upon the work of Stalonas et al. (1978) and Perri et al. (1986). Each subject was asked at each program meeting whether he/she had adhered to the previous week's assignment; a score of 2, 1, or 0, was given based upon the experimenter's subjective evaluation of full, partial, or no adherence. The measure is weak relative to other measures employed in this research study and contains no controls for bias (intentional or unintentional) in the experimenter. No evidence can be offered to rule out the competing hypothesis that the results were biased by the experimenter, even though the author believes that this was not the case.

Nonetheless, there is no explanation for why adherence was unrelated to the weight change, other than to assume that the adherence measure was in some way invalid. The alternative explanation that adherence to weight control behaviors is unrelated to weight control does not seem acceptable. While very little research has actually been done on adherence in weight control programs, the control of body weight is clearly an adherence issue. The physiological and behavioral research on body weight control presented in Chapter I establish that body weight fluctuates with changes in caloric intake (diet) and caloric output (physical activity). Eating and physical activity are behaviors, and adherence to these behaviors (in whatever proportions) regulates body weight.

Thus, the results pertaining to adherence in the current study, while consistent with hypothesis four, should at best be taken cautiously.

The subjects in the nutritional education groups tended to fare worse than the other two treatment types: they had lower adherence ratings when compared to subjects in each of the other treatments (though the differences were not significant). The homework required of the nutritional education subjects was the keeping of detailed food diaries. The prescribed behavior did not vary much from week to week as was the case in the behavior management groups where there was a great deal of variety in homework assignments. Thus, keeping the previously mentioned limitations of the adherence measure in mind, nutritional education subjects may have been less interested in the prescribed behaviors than the behavior management subjects. While the exercise training subjects also had the same homework assignments from week to week (eg, walking), their failure to adhere to prescriptions would be "sorely" felt at the next training session, motivating them to step-up their between-session adherence when it faltered. Without attempting to make any broad generalizations, it is at least important to note that the variety and salience of prescribed treatment behaviors may have a large effect on a subject's willingness to adhere.

The fifth hypothesis examined the influence of choice of treatment types on perceptions of treatment efficacy. The differences between the choice condition and the assigned condition were not found to be significant at the .05 level in the repeated measures analysis, though they were close to significance ($p = .062$). It is important to recall that the internal consistency measure of reliability obtained with the current sample on the three item perceptions of treatment efficacy scale was alpha = .61.

Thus, the scale did not possess impressive psychometric strength.

Given the limitations of the assessment device, there was no noteworthy difference in treatment efficacy perceptions between assigned subjects and subjects receiving a choice at the outset of the program, but a difference did appear at the mid-program and post-test measures. While both assignment conditions increased in treatment efficacy perceptions over time, the assigned subjects showed a more dramatic increase from pre-test to mid-program than did the subjects who chose treatments. This finding may be due to an attrition-related selection bias, as discussed previously, but the mechanism is unclear. The pattern of results for perceptions of treatment efficacy between assigned subjects and subjects receiving a choice is nearly identical to the pattern of changes on the self-efficacy measure (hypothesis eight). While the two measures were unrelated at the pre-test, they were significantly related at mid-program (r = .298) and post-test (r = .398). Thus, differences between assigned subjects and choice subjects on perceptions of treatment efficacy may be due more to the mediating effect of self-efficacy attributions than to a direct effect of the manner of treatment assignment (though the causal direction cannot actually be established with the available data).

Mid-program and post-test perceptions of treatment efficacy are correlated with program satisfaction measures (*r* = .455 and *r* = .518, respectively). Further, the post-test treatment efficacy perceptions measure is correlated with the program reactance post-test measure (*r* = -.503). Additionally, satisfaction and reactance measures correlate significantly with self-efficacy. That treatment efficacy perceptions, program satisfaction, program reactance, and self-efficacy are all related seems intuitively correct. The direction of causal influences among these variables seems open to speculation at the present time.

Differences between the three treatment types were found to be significant in the ANOVA, but the pattern of differences is confusing due to a nearly significant interaction between the assignment method and the treatments, and the significant effect of time. Initially, the exercise training subjects had the highest perceptions of treatment efficacy, followed by behavior management subjects and nutritional education subjects. All treatment groups showed an increase in treatment efficacy perceptions over time except the exercise training choice group. This group showed a decrease in treatment efficacy perceptions over time.

The subjects who chose nutritional education had higher initial treatment efficacy perceptions than their assigned counterparts, but this situation reversed itself by the mid-program measure, and reversed itself again by the post-test measure. A similar, but less dramatic, pattern was seen for the two behavior management groups.

After examining the relative scores of all six experimental conditions (rather than simple treatment comparisons) across measures with a known relationship to perceptions of treatment efficacy (eg, self-efficacy, program satisfaction, and program reactance) the author concludes that there is no readily apparent pattern of relationships that can account for the complex pattern of scores among the six experimental conditions on perceptions of treatment efficacy.

Hypotheses six and seven were concerned with the influence of offering a choice of treatments on program satisfaction and program reactance. Neither hypothesis was supported. Satisfaction was not seen to increase over time, while reactance decreased significantly over time.

While the meaning of program satisfaction is easy enough to understand, reactance is a somewhat more difficult concept. Reactance is not simply the converse of satisfaction, but is rather an opposition or resistance, aroused when individuals perceive a loss of freedom (Brehm and Brehm, 1981; Perlmuter and Monty, 1979). Measures of the two constructs should be negatively correlated, but not perfectly so. An individual might, for instance, be relatively unsatisfied with a treatment but not necessarily have his/her reactance aroused. Correlations between mid-program and post-test measures of satisfaction and reactance were $r = -.243$ ($p = .015$) and $r = -.338$ ($p = .002$), respectively. The program satisfaction measure had an internal consistency reliability estimate of alpha = .83, making it a reasonably solid measure. The program reactance measure, however, had an internal consistency reliability estimate of alpha = .57, making it somewhat less than dependable. Thus, while there are differences in the reliability of the two measures, they do seem to measure distinct constructs (at least in a crude way).

The pattern of obtained results on program satisfaction and program reactance is consistent with reactance theory (Brehm and Brehm, 1981; Mann and Janis, 1982). The data suggest, however, that it was the subjects who received a choice of treatment types that felt a loss of freedom. Brehm and Brehm (1981) argue that a perceived loss of freedom increases reactance and may lead to a reduction in satisfaction: precisely the result obtained in the present study for the subjects who received a treatment choice relative to assigned subjects.

While reactance theory predicts that this situation should be maximally aroused when freedom is eliminated altogether (ie, for the subjects assigned to treatments), Brehm and Brehm (1981) acknowledge that other events might alter this. They suggest that reactance may be higher for subjects who choose treatments once they begin to experience the consequences of their choice. In concert with this possibility, it has been suggested that cognitive mechanisms may interact with choice consequences (Brehm and Brehm, 1981; Mann and Janis, 1982). Thus, it may be possible that subjects who received a choice of treatments felt a loss of freedom which aroused their reactance and led to a decrease in satisfaction. The choice subjects may even have increased their perceptions of the value of the unchosen treatments. Conversely, the assigned subjects may have engaged in some "cognitive bolstering" of their treatments. This explanation is also consistent with results obtained on perceptions of treatment efficacy.

Brehm and Brehm (1981) also suggest that reactance in choice situations may be mediated by differences between individuals in their relative desire for control over situations. Unfortunately, the Desirability of Control Scale (Bruger and Cooper, 1979) used in this study did not help to support this notion (hypothesis nine). Nevertheless, reactance theory does adequately account for the pattern of results obtained in the current study regarding program satisfaction and program reactance.

Differences between the three treatment types on program reactance were not significant, though subjects in the behavior management groups tended to have less reactance than subjects in the other groups. This is likely due to the greater degree of variety and flexibility in the behavior management treatment, which allowed for choices within the treatment.

Differences between the three treatment types on program satisfaction were significant, with subjects in the nutritional education groups having lower levels of satisfaction than subjects in the other treatments. This finding parallels other findings regarding the nutritional education treatment. It should be noted that the lower level of program satisfaction among nutritional education subjects was associated with higher levels of reactance at the mid-program measure, but not at the post-test measure. Evidently the subjects who stayed in the nutritional education groups to the end of the program had a more favorable response to their treatment, even though they did not necessarily lose weight. This is consistent with the subjective reports of the nutritional education subjects as related to the program leader.

Hypothesis eight was constructed to examine the influence of treatment choice on self-efficacy attributions. While self-efficacy scores increased significantly over time across all conditions, the difference between assigned subjects and subjects receiving treatment choices was not found to be significant a the .05 level in the repeated measures analysis ($p = .068$). The direction of differences, however, was opposite from the predicted direction.

Since the self-efficacy scores increased over time across all conditions, it is likely that the program worked in some way to facilitate this increase. The question of interest, however, regards why the assigned subjects tended to show a greater increase in self-efficacy over time than the subjects who received a choice of treaments. It has been noted previously that the pattern of self-efficacy scores between assigned subjects and choice subjects paralleled other obtained results. Specifically, at mid-program and post-test the assigned subjects had higher self-efficacy, greater program satisfaction, less program reactance, greater perceptions of treatment efficacy, and more weight loss.

Marlatt and Gordon (1985) and Brehm and Brehm (1981) have hinted at the possibility that reactance effects may entail a two-stage process: reactance may be followed by a sense of helplessness that serves to diminish outcomes. Further, Bandura's (1977) conceptualization of self-efficacy attributions as self-referent thought is consistent with the idea that increases in feelings of helplessness might be associated with lower self-efficacy. Thus, if receiving a choice of treatment types was associated with a perceived loss or restriction of freedom, which aroused reactance and feelings of helplessness, then it is not surprising that there were lower levels of self-efficacy among the choice subjects relative to the assigned subjects. It is also not surprising that these same subjects would not have as favorable a view of treatment efficacy or program satisfaction, and that they would not lose as much weight.

The "restriction of freedom" hypothesis, as an explanation for the self-efficacy results and the overall pattern of results, has three serious limitations. First, the program measurement instruments were not all equally reliable. Second, many of the obtained differences which support the argument were not large enough to reach statistical significance. Third, there is no empirical basis for determining the causal order of relationships among the relevant variables with the available data.

Generally, differences between the three treatment types on self-efficacy attributions were not significant. At the pre-test, subjects in the nutritional education groups were significantly lower than subjects in the other treatments. This difference became non-significant over time, though the nutritional education treatment remained associated with the lowest self-efficacy scores throughout the program. Again, this is consistent with other results obtained for the nutritional education treatment.

While it makes some sense that the subjects who chose exercise training had higher initial self-efficacy scores than subjects choosing other treatments (ie, exercise might have easily been perceived as requiring more persistence and effort), it is curious that the assigned exercise subjects had higher initial self-efficacy scores than all of the other treatment conditions. It may well be that the assigned exercise subjects raised their self-efficacy attributions in anticipation of the perceived requirements of their treatment. Unlike their choice counterparts, the assigned exercisers had no advanced warning of their treatment type. Unfortunately, measures of anticipated expectations were not gathered in the current study. Nevertheless, across all exercise training subjects, there was a higher level of initial self-efficacy. The rate of increase in self-efficacy attributions over time, however, was lower for the exercise training subjects relative to subjects in other treatments. The self-efficacy attributions of exercisers leveled off at mid-program and did not increase much past that point. This parallels subjective reports among the exercisers that they reached a plateau in their physical conditioning by mid-program, finding it somewhat more difficult to push themselves to higher levels of exercise duration.

The remaining hypotheses were exploratory in nature and, hence, are secondary to the primary hypotheses one through eight. Hypothesis nine was offered to explore the possibility of an interaction between receiving a choice of treatment types and the relative desirability of control. Relevant literature suggested that there was a strong likelihood that a high desire for control could enhance the effects of choice on treatment outcomes while a low desire for control could reverse the effects of choice on enhancing outcomes (Krantz and Deckel, 1983; Brehm and Brehm, 1981). It was hoped that statistical control of this potential confounding variable would enhance primary analyses.

Unfortunately, interactions between the choice factor and the desirability of control measure were not found to be significant. A significant finding for the desirability of control variable would have enlivened the discussion of reactance effects. Since the Desirability of Control Scale (Burger and Cooper, 1979) has acceptable psychometric properties, it can only be concluded that either (1) the desire for control simply does not interact with treatment choice in any meaningful way, or (2) the Desirability of Control Scale does not measure a form of desire for control that is relevant to weight loss research outcomes. Based upon available data, either alternative is tenable.

Hypotheses ten and eleven were offered to explore the potential predictive value of another control variable: weight locus of control. The Weight Locus of Control Scale (Saltzer, 1982) was found to have an internal consistency estimate of reliability slightly better than that reported in the literature on the scale's development (alpha = .69 as compared with alpha = .58), but was still not a highly reliable measure.

The overall mean locus of control score for the entire sample ($\underline{M}$ = 7.31) suggests that the sample was highly internal in locus of control. This finding is not consistent with previous research findings which suggest that participants in group weight loss programs are generally more external in locus of control (Wallston and Wallston, 1978; Weiss, 1977; Goldney and Cameron, 1981). This finding is also not consistent with the previously offered suggestion that the program advertisement attracted a sample of subjects that was more likely to desire being told by an "expert" what to do to lose weight (ie, externality).

A reading of the four questions contained in the WLOC scale, however, sheds some insight into the obtained degree of internality in the overall sample. It is the author's opinion that the questions are too obvious in their intent. Answering the items in the external direction would imply a clear lack of readiness to engage in weight reduction efforts and this would be in conflict with subjects' intentions to lose weight as expressed by their enrollment in the program. The internality of the sample likely reflects a weakness in the WLOC scale and a cognitive attributional process among subjects beginning a weight loss program.

Hypothesis ten examined the idea that of individuals who were offered a choice of treatment types, those choosing exercise would be more internal in locus of control than those choosing behavior management or nutritional education. This hypothesis was originally offered by Goldney and Cameron (1981) in their review of the locus of control construct in the weight loss literature. It was suggested that exercise involves more self-direction than other treatments and that individuals external in locus of control would be less willing to choose a treatment strategy that required self-direction. The hypothesis had never been directly tested.

The results of the present study indicate that subjects who chose exercise training were indeed more internal in their locus of control than subjects choosing other treatments, but the obtained difference was not significant (p = .087). However, since the analysis was based on a small sample size and used a signficance level perhaps too stringent for exploratory research, the results may be taken to suggest that locus of control may yet possess some value in predicting what types of treatment overweight individuals will choose when given choices. Clearly, a better weight loss relevant locus of control scale is in need of development to pursue this possibility.

Hypothesis eleven was constructed to explore the suggestion by Weiss (1977) that internal locus of control was positively related to weight loss and program attendance (which, in turn, is related to weight loss). Other authors have also suggested this relationship (Weinberg et al., 1984; Wallston and Wallston, 1978; Goldney and Cameron, 1981). The results obtained in the present study indicate that the relationship between internal locus of control, as measured by the WLOC scale, and outcomes of attendance and weight change is small to non-existent. Correlations between the weight change measures and locus of control were non-significant. Thus, the locus of control construct may have some limited promise in prediciting what types of strategies overweight individuals will choose to reduce their body weight, but has little promise in predicting weight losss outcomes.

Hypothesis twelve pertained to differences between the three treatment types on measures of weight change. In general, the experiment did not concern differences between the treatments, but rather the comparisons between assigned subjects and subjects receiving a choice of treatments. Hypothesis twelve (and any other discussion of differences between the three treatments) was included as a formality. Further, as has already been mentioned, obtained differences between the three treatment types on outcome measures are likely not generalizable to similar treatments outside this study. In the present study, each treatment was delivered by a different leader and this confounds the meaning of comparisons. Each treatment was also offered in a "pure" form (ie, not mixed with strategies from other methods), a situation not entirely representative of the way these treatments are offered in the commercial marketplace.

With these caveats in mind, it can be said that while treatment differences on weight change were not found in the omnibus tests for the three body weight change indices, the multiple comparisons revealed that nutritional education was the weaker of the three treatments in promoting weight loss. The behavior management treatment was associated with slightly more weight loss than the exercise treatment.

The overall weakness of the nutritional education groups on most of the outcome measures in this study suggests that, at least for the subjects and groups in the present study, nutritional education was not equivalent to the other treatments. This finding may be due to the nature of the treatment, the nature of the program leader, or to some a priori deficits in the nutritional education subjects.

At the pre-test, the nutritional education subjects tended to have lower self-efficacy, lower perceptions of treatment efficacy, and were more external in locus of control than other subjects. It is difficult to know whether these findings are a cause or effect of the treatment characteristics. It would seem that pre-test measures should not have been affected by the treatment (as the treatment had not occured yet), but this may not be true. Subjects may have unsuccessfully tried the dieting approach so many times in the past that they rated their confidence (in themselves and in their treatment) as very low.

It would seem more likely that the failure of the nutritional education treatments was due to the nature of the treatment or the program leader. Behavior modification techniques, which can enhance both the face value and the empirical effect of a dieting approach to weight loss, were eliminated from the treatment so that it would appear distinct from the behavior managment treatment. This may have affected perceptions of the treatment. In addition, it seems reasonable enough to assume that simply receiving information about appropriate dietary plans for promoting weight loss is not enough, by itself, to actually stimulate a person to lose weight. In fact, it was the general failure of nutritional approaches to promote weight loss that provoked the application of behavioral techniques to the weight reduction field in the first place.

In summary, it seems that there is enough accumulated evidence in the current study to conclude that the nutritional education treatment was inferior to the other treatments (though not always significantly). This does not affect the validity of having offered the three treatments as roughly equivalent at the beginning of the study: what is most important to the task of assessing the role of choice is not so much the content of the separate treatments, but that they are perceived as being equivalent. Nevertheless, it does suggest that any future attempts at replicating this research should attend to the ethical responsibility of offering a "better" version of the nutritional education treatment.

Hypothesis thirteen was constructed to assess the relationship between subjects' history of prior efforts at losing weight and the various program outcomes. This hypothesis was offered purely for exploratory reasons that were unrelated to the central thesis of the study. The rationale for the hypothesis was that there is an unresolved debate in the weight loss literature regarding whether larger numbers of prior weight loss attempts work to increase or reduce a person's chances of success in their next attempt.

The correlational data presented in Table 37 suggest that increases in prior weight loss efforts are unrelated to most of the outcome variables. Significant relationships did exist between prior efforts at weight reduction and self-efficacy, adherence, and reactance. The relationships observed, however, were in an unfavorable direction. Any effect prior history had on self-efficacy and reactance disappeared by the post-test assessment.

If self-efficacy theory (Bandura, 1977) is valid, it can be assumed that the negative relationship between initial self-efficacy and prior history of weight loss efforts means that the subjects' previous efforts were unsuccessful. A history of failure should reduce self-efficacy attributions for future efforts. Lowered self-efficacy may have played an important role in determining the findings regarding adherence and program reactance, as has been discussed previously.

The primary outcome measure in weight loss research is, and should be, weight change. The data obtained in the present study suggest that there is no relationship at all between prior efforts at losing weight and weight lost in a subsequent effort. It is likely that there is some truth in both arguments regarding the effect of prior weight loss efforts, and that the relationships are sufficiently complex and individual-specific that global analyses cannot resolve the issue.

In consideration of the volume of preceding analysis and discussion, a few summary statements may facilitate final theoretical discussion. A choice of treatment types facilitated a smaller attrition rate and greater adherence. A choice of treatment types was, however, also associated with less weight loss. There were no obtained differences on attendance between subjects choosing treatments and subjects assigned to treatments. Though not significant, the direction of obtained differences also seem to point toward a negative (contrary to hypothesis) effect of choice on perceptions of treatment efficacy, self-efficacy, program satisfaction, and program reactance.

Discussion to this point has implied that it is the author's belief that offering a choice of treatments to the subjects caused some form of cognitive/affective response(s) that worked to diminish the effectiveness of the treatments relative to subjects assigned to treatment type. Self-efficacy theory (Bandura, 1977, 1982), reactance theory (Brehm and Brehm, 1981), and decision theory (Mann and Janis, 1982) have been enlisted to explain the obtained results.

It has been suggested that offering subjects a choice resulted in perceptions of restricted or lost freedom and that this aroused reactance. Data, while not terribly strong, support the contention. It was further suggested that increases in reactance were accompanied by increases in feelings of helplessness and, thus, decreases in self-efficacy. Perceptions of treatment efficacy and program satisfaction were said to have decreased in concert with these other changes. Consequently, the subjects who received a choice lost less weight than the assigned subjects. Again, while not overwhelming, the data were more or less in support of the "theory".

Helson's (1959, 1964) theory of disconfirmed expectations may offer some additional conceptual support for the hypothesis that offering a choice of treatments had a cognitive/affective impact on the subjects that worked to diminish treatment outcomes. Helson postulated that two varieties of "expectation" must be considered in this line of research: expectations as preference choices and expectations as anticipations. According to the theory, if an expected preference elicits an emotional response, then affective and motivational qualities of disconfirmed expectations are determined by the direction (positive vs. negative) and intensity of the discrepency. Thus actual events, seen as more desirable than the anticipated expectation, would result in positive affect and an approach motivation. Conversely, actual events seen as less desirable than anticipated would result in negative affect and avoidance motivation. The result of disconfirmed anticipated expectations is dependent upon preference choices. In other words, it is possible that assigned subjects who preferred a specific weight loss method had preconceived ideas about the other methods, but after actually experiencing the treatment, felt a reduction in the intensity of their preference choice as a function of finding their assigned method to be more desirable than anticipated, hence working to enhance outcomes. This is highly similar to the "cognitive bolstering" operation described by Mann and Janis (1982). Conversely, subjects who chose their treatment type may have found that the treatment was less desirable than anticipated, and had to grapple with the fact that they had chosen the treatment. Hence, affect and motivation may have taken on negative valences for subjects choosing treatments, and outcomes may have been undermined.

A direct test of Helson's (1959, 1964) theory is not possible with the data available from the current study. Preference choices among the assigned subjects are not known and anticipatory expectations were not measured for any of the subjects. Nevertheless, differences between anticipated expectations, preference expectations, and actual events, may have had cognitive/affective effects that played a role in the outcomes obtained in the present study.

Therefore, to the extent that the available data "fit" into these theories, the conclusion of this research study is that a choice of treatment types caused a cognitive and/or affective reaction in the subjects such that treatment outcomes were diminished for subjects who received a choice relative to subjects who were assigned to treatments.

The generalizability of the results obtained in this research is compromised by several factors pertaining to both internal and external validity. The most obvious limitation should be that significance tests between the three treatments were compromised by a lack of random assignment to treatments for subjects in the choice condition. Thus, while it has already been noted that differences between the treatment types are not generalizable due to the confound of group leaders, there is also a statistical reason for using extreme caution in handling results pertaining to the three weight loss methods. Additional statistical threats to the validity of this study include the relatively low reliability associated with several of the measures and the small sample size (particularly by the end of the program).

Another major area of limitation to the generalization of these research findings regards the possibility that the subject recruitment procedures attracted a non-representative sample. It could be that subjects who respond to advertisements for weight loss programs are more likely to expect or anticipate being assigned to a method of weight reduction and are more likely to be reactant to receiving a choice of methods than would be the case for other overweight individuals. It has been noted several times, however, that there are suspected, but unknown, differences between individuals who attend organized weight loss programs and individuals who attempt to lose weight on their own. It has also been stated that the results of this study are not intended to describe the state of affairs for "natural" weight reducers. Thus, as long as the population of overweight individuals who respond to newspaper advertisements for group weight loss programs is the referent, the results can be generalized to that population.

The final threat to the study, the differential attrition (ie, mortality) between assigned subjects and subjects receiving a choice, has been discussed at length previously. It is important to note that the attrition patterns were results, or findings, in the present study. Further, differences due to attrition were statistically controlled in all relevant analyses subsequent to hypothesis one.

There are several directions for potentially fruitful future research that can be suggested based on the results of this study. The obvious next step to exploring the role of choice in weight loss would be to replicate this study while measuring all subjects' anticipated expectations and preference choice expectations. This would directly test the validity of Helson's (1959, 1964) theory as an explanation for the effect of choice in weight reduction programs. It might also be helpful to explore where subjects' expectations came from and what their determinants are. Along these lines, future research should assess subjects' reasons for wanting to lose weight. This is likely an individual difference variable that interacts with the effect of choice.

Research might also be directed to expanding the choice of treatments paradigm to other health-related behaviors, and in new ways. The resulting pyramid of knowledge would allow researchers to learn more about the role of choice, control, and behavioral health outcomes and specify where treatment choices are helpful and where they might best be avoided.

It might also be argued that since the effect of choice was not entirely positive in this study, efforts might better be directed toward developing a "super program" that would maximize weight loss for all (or most) participants, rather than expending more effort on differential treatment prescriptions. When a more powerful weight loss method has been developed, attention might return to the role of choice in enhancing outcomes. Researchers might study the role of mini-choices or micro-choices within a single, effective type of treatment.

Clearly, this study was limited by the validity and reliability of the measures employed. Empirical scale-development research would be a most helpful in this line of research. Particular attention should be devoted toward developing valid and reliable, yet manageable, measures of adherence behavior.

The results of this study suggest that the role and impact of monetary incentives in weight reduction need continued evaluation. Research should pursue the question of which behavior is the best candidate for incentive contingencies. Tying together the development of a better adherence measure with an exploration of adherence-contingent incentives would be a major contribution to the weight loss literature. In addition, the "right" amount of monetary incentive is far from being established at the present time, and the current research suggests that the amount of incentive money may interact with the amount of money required for program costs to alter the effect of the incentive.

Finally, individuals who lose weight on their own, without the aid of an organized program, should be studied in their own right. Much can be learned from these "natural" weight reducers. When a sufficient data base has been gathered about this population, comparisons between program-reducers and "natural" reducers could revolutionize weight reduction research and available treatments.

APPENDICES

APPENDIX A

Physical Activity Readiness Questionaire

Hurry! Return this form today!

Your name:____________________________ Your age:______________

Your phone number: (day)________________ (eve)________________

<u>Physical Health Questionaire</u>

Please complete the following questionaire. We cannot include you in the weight loss program without this information. Note: filling out this questionaire does not mean you will be exercising, it is simply a precautionary measure.
Please mark those items that apply to you:

___ Your doctor said you have heart trouble, a heart murmur, or you have had a heart attack.

___ You frequently have pains or pressure --- in the left or midchest area, left neck, shoulder, or arm --- during or right after you exercise.

___ You often feel faint or have spells of severe dizziness

___ You experience <u>extreme</u> breathlessness after mild exertion.

___ Your doctor said your blood pressure was too high and is not under control. Or you don't know whether or not your blood pressure is normal.

___ Your doctor said you have bone or joint problems such as arthritis.

___ You are male and over 45 or a female over 50 and not accustomed to exercise.

___ You have a family history of premature coronary artery disease.

___ You have a medical condition not mentioned here which might need special attention in an exercise program (for example, insulin-dependent diabetes).

___ None of the above items apply to me.

___ YES, I want to be included in the weight loss program. Please contact me with details about the first program meeting.

APPENDIX B

Description of Treatments
and
Instructions to Subjects

DESCRIPTION OF WEIGHT LOSS METHODS

A variety of weight loss methods are currently in professional use in the United States today. The methods used most often in professional weight loss programs are:

1) nutritional management or dieting,
2) behavior management training, and
3) exercise training.

These three methods have clearly been demonstrated to be effective approaches for promoting weight loss. They each represent differing approaches to losing weight, but are roughly equivalent in their effectiveness.

Many professional weight reduction programs offer all three of these weight reduction methods in abbreviated form, covering only the highlights of each method, and without instructors qualified as experts in each method. The present weight loss program will offer a complete course in each method, taught by instructors qualified in each area. This will allow each participant an opportunity to receive a thorough knowledge of an effective weight loss method.

Before briefly reviewing the three major weight reduction methods offered in this program, you should keep in mind a few things:

1. Weight loss is a relatively long-term process. You should view the present program as a means for you to begin losing weight.

2. In each group, you will be offered some education regarding each of the three methods but you will focus on one of the methods in depth.

3. The present program will last 10 weeks. Following this, a follow-up program will allow you to learn more about other methods of weight loss. You will be gauranteed a position in the follow-up program, though you will be free to discontinue at any time.

Now, let's take a look at the three major weight loss methods that will be offered:

<u>Nutritional Education</u>

... will consist of a program designed to help you create sound and sane dietary plans to lose weight, based upon a method developed by the National Dairy Council. You will learn separate diet plans for losing weight and for keeping the weight off once you reach your goal.

- nutritional approaches to weight management lead directly to weight loss through a reduction in unnecessary calories.

- a nutritional education program will help you locate where in your diet the unnecessary calories really are. You will learn to reduce caloric intake without having to deprive yourself excessively --- as is the case in many dieting plans.

- a rational nutritional manangement plan works directly to decrease the serious health risks associated with being overweight (eg, heart disease, diabetes, stroke).

- a rational nutritional management plan leads to improvements in cardiovascular functioning.

- research has shown that a nutritional approach to weight loss produces an average minimum 1 - 2 pounds per week weight loss, initially. The rate of weight loss slows down over time.

- the nutritional approach to weight loss is the most widely used weight reduction method, and has the most research support for its effectiveness.

Exercise Training

... will consist of a program of moderate physical exercise and increased activity, designed to help you lose weight and increase your level of physical conditioning without excessive strain, pain, or risk of injury. Adapted from the most successful exercise-based weight loss research studies, this program can teach you the fundamentals of stretching, warm-up, and low-impact aerobic exercise. Walking will be the primary exercise used. Taught by an expert in exercise physiology, the goal of this program is not to train you to be an athelete, but to help you lose weight.

- exercise works directly to promote weight reduction by increasing the expenditure of calories and by decreasing the size of fat cells.

- moderate exercise increases your metabolism so that you burn more calories throughout the day, even when you are at rest. This can also help counteract the slowing of your metabolism that occurs with dieting.

- moderate exercise can reduce the serious health risks associated with being overweight. Moderate exercise will increase your cardiovascular fitness, and reduce the risk of heart disease, diabetes, and strokes.

- moderate exercise will work to suppress your appetite, thus indirectly helping your weight loss efforts.

- a moderate program of simple walking produces an average minimum weight loss of 2/3 - 1 pound per week initially. The rate of weight loss increases in a few weeks. (The slightly slower rate of weight loss at first is due to the fact that you are building muscle tissue at the same time.)

- regular exercise is the best predictor of long-term success in maintaining weight losses.

Behavior Management

... will consist of a program designed to teach you meaningful self-control methods for reducing your weight. Based upon the most successful behavior management approaches to weight loss, this program will: help you modify how you eat, teach you to develop realistic weight loss goals and plans, assist you in developing meaningful self-rewards, help you deal with other people in your life regarding your weight loss efforts, teach you how to stop self-defeating behaviors, help you develop new ways to manage stress (which can lead to weight gain).

- the behavior management approach to weight loss actually consists of many helpful self-control methods, and allows you more freedom than other approaches for a choice of actual methods you will use.

- a behavioral approach to weight loss is one of the strongest factors associated with success in maintaining weight losses over long periods of time.

- a behavioral approach to weight loss has been found to enhance the chances of success for people who have trouble staying with a weight loss program.

- the behavior management training is also applicable to other problem areas as well: smoking, alcohol consumption, exercise, any habit problems, or any personal goals. The strategies can be used to advantage in many areas of your life.

- the behavioral weight loss method has been found to produce an average minimum weight loss of one to one-and-one half pounds per week, at a fairly steady rate.

- behavior management approaches to weight loss can enhance your chances of success with dieting, exercise, or any other method of weight loss. Motivation and self-control are the focus of this method.

In summary, three widely used effective weight loss methods will be offered in this program:

1. moderate exercise training,
2. behavior management, and
3. nutritional management or dieting.

All three methods promote an average one pound per week rate of weight loss. Initially, nutritional management produces a slightly faster rate of weight loss while exercise produces a slightly slower rate of weight loss. These differences equalize rather quickly over time. All three methods help to reduce the health risks associated with being overweight. Each method has its own distinct strengths and benefits.

The three methods are roughly equivalent in promoting weight loss, but they represent different approaches to the task of losing weight.

Remember.... the present program is designed to help you initiate your weight loss process. We will provide you with ten weeks of in-depth training in one of these methods, along with some education regarding the other methods. You will be guaranteed a place in the follow-up program where you will have the opportunity to learn more about all of the weight loss methods.

INSTRUCTIONS TO SUBJECTS

Following the description of treatments, subjects in group A.1 were given instructions regarding the choice of treatment type and subjects in group A.2 were given instructions regarding their assignment to treatment type, as follows:

Subjects in Group A.2 -- You have been assigned to one of the weight loss methods offered in this study for the first ten-week phase of this program to help you begin the weight loss process.

Subjects in Group A.1 -- We would like you to choose <u>one</u> weight loss method for the first (10 week) phase of this program. Please choose the method which you feel would be best suited to your needs. Each person is likely to respond differently to each of these methods --- and for different reasons. You may have some insight into which of these three weight loss methods is best for you:

- perhaps you have had past experience with one of these methods and have either positive or negative feelings about it.

- you may already know about one of these methods and want to know more about one of the others.

- you may already know about one of these methods and want to know more about that same method. Or you may want a review of what you already know.

- you might prefer one of these methods as a strategy to begin losing weight and desire another later on for longer term weight loss efforts.

- you may feel your chances of succeeding are better with one of the methods over the others.

Choose the <u>one</u> weight loss method that you think is best for you.

RESULTS OF THE PILOT STUDY:
EQUIVALENCE OF WEIGHT LOSS TREATMENT DESCRIPTIONS

Procedures

Nineteen undergraduate students, enrolled in a communications training course, were used as subjects in this pilot study to determine perceptions of equivalence in the descriptions of three weight loss methods. Subjects were 18 females and one male, ranging in age from 19 to 24 years. With the exception of one student, the sample consisted of a normal weight group of undergraduate students.

The subjects were given a description of a weight loss program which involved three separate training conditions: nutritional management, behavior management, and exercise training. Subjects were asked to "pretend" that they had signed up for the program and were hearing the description of treatments to be offered. In addition to an oral presentation of the treatment descriptions, subjects were given written descriptions of the three treatments. After the presentation of the treatment descriptions, subjects were given a questionaire to assess their perceptions of the three treatments described. After the questionaire was completed, subjects returned the questionaire to the researcher and were given an explanation of the study.

The questionaire used in this pilot study consisted of five items. Item #1 asked the subject whether he/she perceived the treatments, as described, to be roughly equal in effectiveness for promoting weight loss. Item #2 asked to subjects to list the treatment that was perceived as being "least" and "most" effective, if treatments were not perceived as equal. Item #3 asked the subjects to rate the degree to which they perceived each treatment as being logical. Item #4 asked the subject to rate the degree to which he/she was confident that each treatment type would be successful in promoting weight loss. Item #5 asked the subject to state his/her preference for one of the weight loss methods.

Results

item #1: scale = 1 (strongly disagree) to 5 (strongly agree)
mean = 4.55
s.d. = 0.62
n = 18

item #2: each treatment received one vote as being the most effective. exercise training received one vote as being the least effective method; there were no other votes for least effective method.

item #3: scale = 1 (not at all logical) to 5 (extremely logical)
n = 19
nutrition -- mean = 4.68, s.d. = 0.48
behavior -- mean = 4.53, s.d. = 0.61
exercise -- mean = 4.53, s.d. = 0.61

item #4: scale = 1 (not at all confident) to 5 (extremely confident)
n = 19
nutrition -- mean = 4.53, s.d. = 0.70
behavior -- mean = 4.00, s.d. = 0.82
exercise -- mean = 4.58, s.d. = 0.61

item #5: n = 19
nutrition = 5
behavior = 4
exercise = 8
not scorable = 2 (chose all three)

A oneway ANOVA was conducted on the responses to items #3 and #4, as follows:

item #3: SS_T=17.9, SS_B=0.29, SS_W=17.62, *df*=2,54
F = 0.438, n.s.

item #4: SS_T=31.3, SS_B=3.93, SS_W=27.37, *df*=2,54
F = 3.85, n.s.

It should be noted that the grand sample size was considered to be 57 (ie, "responses"). In fact, there were 19 subjects answering questions regarding 3 treatments. Thus, the responses were not really independent.

In conclusion, the description of weight loss treatments appears to contain equivalence of treatment descriptions.

APPENDIX C

Consent Form

PARTICIPANT INFORMED CONSENT

1. I have freely consented to participate in this weight management study being conducted by Thomas C. Fuller.

2. I understand that this study is being conducted under the auspices of Michigan State University and the School of Health Education, Counseling Psychology, and Human Performance.

3. I understand that the purpose of this study is to explore the relationship between various personal characteristics and the weight loss strategies offered. Full disclosure of the complete research design will be made available to me at the last program meeting.

4. I understand that I must contribute $45.00 to the program. $5.00 will be used to help cover program costs and will not be redeemable. $40.00 will be placed in the program raffle deposit fund and I will have a chance to win money for my participation in the study. All monies are to be awarded and distributed in the last program meeting. I must attend the last meeting in order to receive money due to me (or make prior arrangements with the program leader).

5. I understand that I am free to discontinue my participation in the program at any time. However, if I decide not to continue with the program, I understand that none of my $45.00 deposit is refundable.

6. I agree to complete questionaires to be administered during the course of the program.

7. I understand that the results of the program will be strictly confidential. Only group results will be reported; no individuals will be identified.

8. I understand that my participation in the program does not guarantee any beneficial results to me.

9. I agree that at this time I **AM NOT** (a) diabetic, (b) under medical supervision or treatment for high blood pressure, or (c) pregnant. Should this change during the course of the program, I will immediately notify the program leader.

10. I understand that if I am injured as a result of my participation in this research project, Michigan State University will provide emergency medical care if necessary, but these and any other medical expenses must be paid from my own health insurance program.

Signed:______________________________ Date:____________

APPENDIX D

Outlines of the Treatments

OUTLINE OF WEIGHT LOSS TREATMENTS

Nutritional Education Treatment

The nutritional management training method offered to subjects in this study was based upon Lifesteps: Your Personal Plan for Weight Management (National Dairy Council, 1985). Lifesteps was altered slightly to more closely fit the research design. The program was supplemented with additional materials regarding human nutrition.

Session #	Session Topics
1	Explanation of the program. Discussion of self-monitoring. Initial research assessment questionaire.
2	Discussion of basic food groups and daily nutritional needs. Establishing individualized calorie reduction plans. Discussion of serving sizes and portions.
3	Discusssion of menu planning, food shopping, and substitute foods.
4	Discussion of low calorie foods and "fad" diets.
5	Problem-solving discussion. Discussion of food preparation and recipe exchange. Mid-program research assessment.
6	Discussion of binge eating and secretive eating.

7	Discussion of dieting in "special" situations: restaurants and holidays. Calories and alcohol.
8	Discussion of between-meal eating.
9	Integration of nutritional information and establishing short-term and long-term diet plans.
10	Program summary and debriefing. Final research assessment. Raffle drawing for monetary prizes.

Behavior Management Treatment

The behavior modification program offered to subjects in this research study was based upon behavior control methods widely reported in the weight reduction literature. Participants were given a weight reduction manual developed by Brownell (1979) and revised by Mavis (1987). The manual and lectures were supplemented with additional handouts on behavior change methods, human nutrition, and exercise.

Session #	Session Topics
1	Explanation of the program. Introduction to behavioral aspects of body weight management. Initial research assessment questionaire.
2	Discussion of behavior specification, goal specification, and self-monitoring.
3	Application of behavioral methods to strategies of dieting and exercise. Revision of individual behavior change goals and plans.
4	Developing alternative behaviors: response substitution.

5	Behavioral contracting. Rewards, reinforcements and punishments. Mid-program research assessment.
6	Developing control over eating cues: stimulus control. Behavioral management of special situations: restaurants and holidays.
7	Discussion of "sabotage". Relapse Prevention methods.
8	Cogntive aspects of behavior control: internal dialogue.
9	Affective aspects of behavior control: self-esteem, feelings, assertiveness.
10	Program summary and debriefing. Final research assessment. Raffle drawing for monetary prizes.

Exercise Training Treatment

The exercise training program used in this research study was based on a model established by the American Heart Association (1984b). The basic program consisted of low-risk moderate aerobic exercise, informational lectures and demonstrations, and written handouts. Exercise participants were given the Brownell (1979) manual as a supplement to the program. Brisk walking was the primary form of exercise promoted in this program and subjects were encouraged to walk on their own 2 - 3 times per week between program meetings.

Session #	Session Topics
1	Explanation of the program. Three-minute step-test of physical fitness. Initial research assessment questionaire.

2	Discussion of heart rate monitoring. Discussion of exercise risks and risk-management procedures. Exercise training routine.
3	Discussion of calorie expenditure during various types of exercise. Exercise training routine.
4	Exercise training routine.
5	Exercise training routine. Mid-program research assessment.
6	Exercise training routine. Discussion of non-aerobic exercises.
7	Exercise training routine.
8	Exercise training routine.
9	Exercise training routine.
10	Program summary and debriefing. Final research assessment. Raffle drawing for monetary prizes.

APPENDIX E

Measurement Instruments

PERSONAL INFORMATION

Name:____________________________ Date:__________

1. Age:________

2. Sex: [ ] Female [ ] Male

3. Marital Status: [ ] (1) Single, never married
[ ] (2) Married
[ ] (3) Divorced or separated
[ ] (4) Widowed
[ ] (5) Other:__________________

4. Education: Number of years of school __________

5. Occupation: ____________________________________

[ ] Full time [ ] Part time [ ] Not applicable

6. Ethnic Background: [ ](1) Black [ ](2) White
[ ](3) Hispanic [ ](4) Other:__________

7. What is your height (without shoes)? _____ feet
_____ inches

8. Age-at-onset: Please indicate the age at which you first became overweight __________.

9. How many serious attempts have you made at losing weight?
[ ](1) a few (1-5)
[ ](2) several (6-10)
[ ](3) numerous (11-15)
[ ](4) too many to count (over 15)

10. Please describe the WEIGHT of the following people in your life. (circle the appropriate response)

Father: underweight average overweight NA
Mother: underweight average overweight NA

Did/do you have one or more overweight siblings?
___yes ___no

Spouse: underweight average overweight NA
Children: underweight average overweight NA

11. What are the attitudes of the following people about your attempt(s) to lose weight? Are they:

NEGATIVE -- they disapprove or are resentful
INDIFFERENT -- they don't care or don't help
POSITIVE -- they encourage you

(circle the number representing your response)
(circle NA if the item is not applicable to you)

	NEGATIVE	INDIFFERENT	POSITIVE	
Spouse	1	2	3	NA
Children	1	2	3	NA
Mother	1	2	3	NA
Father	1	2	3	NA
Best Friend	1	2	3	NA

12. What different types of weight loss approaches have you tried in the past? (check all that apply)

[ ](1) Drugs/Amphetamines
[ ](2) Surgical (Bypass or Stapling)
[ ](3) Jaw Wiring
[ ](4) Acupuncture
[ ](5) Psychotherapy/Hypnosis
[ ](6) Self-help groups
[ ](7) Behavior Modification
[ ](8) Exercise programs/Fitness Clubs
[ ](9) Specific diet plans:

[ ]Beverly Hills Diet
[ ]Fat Counter Guide
[ ]Kemper Rice Diet/Duke Univ. Diet
[ ]Last Chance Refeeding Diet
[ ]Pritikin Diet
[ ]Scarsdale Diet
[ ]Slim Chance in a Fat World
[ ]Stillman Diet
[ ]Take Off Pounds Sensibly (TOPS)
[ ]Weight Watchers
[ ]Other (specify)__________________

[ ](10) Some other method (specify)______________

<u>Perceptions of Your Weight Loss Method</u>

Below is a list of questions designed to assess your view of the weight loss method being taught in your group. Please answer each question by marking the appropriate response.

1. The weight loss method taught in my group is logical.

   [ ](0) strongly disagree
   [ ](1) disagree
   [ ](2) neither agree nor disagree
   [ ](3) agree
   [ ](4) strongly agree

2. The weight loss method taught in my group will help me to lose weight.

   [ ](0) strongly disagree
   [ ](1) disagree
   [ ](2) neither agree nor disagree
   [ ](3) agree
   [ ](4) strongly agree

3. The weight loss method taught in my group is likely to help others lose weight.

   [ ](0) strongly disagree
   [ ](1) disagree
   [ ](2) neither agree nor disagree
   [ ](3) agree
   [ ](4) strongly agree

4. I believe the most effective means for me to lose weight is (circle one):

   a. nutritional management
   b. behavior management
   c. exercise

Self-Confidence

Below is a list of situations in which people often have trouble maintaining their weight loss efforts. Please read each one carefully. Then circle the number which best describes HOW CONFIDENT YOU ARE THAT YOU WOULD BE ABLE TO MAINTAIN YOUR WEIGHT LOSS STRATEGIES IN THAT SITUATION. If you are absolutely certain that you would continue to use your weight loss methods, then circle 10. If you have no confidence in your ability to continue using your weight loss strategies in that situation, circle 0.

Most likely, your confidence will vary from situation to situation. Circle the appropriate number to rate your degree of self-confidence for each situation.

	Not at all Confident				Moderately Confident						Completely Confident
1. When you feel really happy.	0	1	2	3	4	5	6	7	8	9	10
2. When you feel anxious.	0	1	2	3	4	5	6	7	8	9	10
3. When you want to sit back and enjoy a cigarette.	0	1	2	3	4	5	6	7	8	9	10
4. When you are nervous.	0	1	2	3	4	5	6	7	8	9	10
5. When you feel annoyed.	0	1	2	3	4	5	6	7	8	9	10
6. When you want to relax.	0	1	2	3	4	5	6	7	8	9	10
7. When you are worried.	0	1	2	3	4	5	6	7	8	9	10
8. When you feel angry.	0	1	2	3	4	5	6	7	8	9	10
9. When you feel tired.	0	1	2	3	4	5	6	7	8	9	10
10. When you feel embarassed.	0	1	2	3	4	5	6	7	8	9	10
11. When you feel bored.	0	1	2	3	4	5	6	7	8	9	10
12. When you feel you need more energy.	0	1	2	3	4	5	6	7	8	9	10
13. When you are drinking, or want to drink alcohol.	0	1	2	3	4	5	6	7	8	9	10
14. When you see others eating.	0	1	2	3	4	5	6	7	8	9	10
15. When you want to reward yourself for something you have done.	0	1	2	3	4	5	6	7	8	9	10
16. When someone offers you food.	0	1	2	3	4	5	6	7	8	9	10

	Not at all Confident				Moderately Confident						Completely Confident
17. When you are waiting for someone or something.	0	1	2	3	4	5	6	7	8	9	10
18. When you feel uncomfortable.	0	1	2	3	4	5	6	7	8	9	10
19. When you want to cheer up.	0	1	2	3	4	5	6	7	8	9	10
20. When you want to avoid smoking or drinking.	0	1	2	3	4	5	6	7	8	9	10
21. When you feel depressed.	0	1	2	3	4	5	6	7	8	9	10
22. When you want to take a break from work or other activities.	0	1	2	3	4	5	6	7	8	9	10
23. When you are overly excited.	0	1	2	3	4	5	6	7	8	9	10
24. When you feel upset.	0	1	2	3	4	5	6	7	8	9	10
25. When you feel frustrated.	0	1	2	3	4	5	6	7	8	9	10
26. When you are angry with yourself.	0	1	2	3	4	5	6	7	8	9	10
27. When you feel overwhelmed and don't know what to do first.	0	1	2	3	4	5	6	7	8	9	10
28. When you are concerned about money problems.	0	1	2	3	4	5	6	7	8	9	10
29. When a crisis occurs.	0	1	2	3	4	5	6	7	8	9	10
30. On special celebrations like holidays or birthdays.	0	1	2	3	4	5	6	7	8	9	10

Personal Preferences

Below you will find a series of statements. Please read each statement carefully and respond to it by expressing THE EXTENT TO WHICH YOU BELIEVE THE STATEMENT APPLIES TO YOU. For all items a response from 1 to 7 is required. Use the number that best reflects your belief when the scale is defined as follows:

1 = the statement doesn't apply to me at all.
2 = the statement usually doesn't apply to me.
3 = most often, the statement does not apply.
4 = I am unsure about whether the statement applies to me, or it applies to me about half the time.
5 = the statement applies more often than not.
6 = the statement usually applies to me.
7 = the statement always applies to me

It is important that you respond to all items.

	doesn't apply			applies 1/2 the time, or unsure			always applies
1. I prefer a job where I have a lot of control over what I do and when I do it.	1	2	3	4	5	6	7
2. I enjoy political participation because I want to have as much of a say in running government as possible.	1	2	3	4	5	6	7
3. I try to avoid situations where someone else tells me what to do.	1	2	3	4	5	6	7
4. I would prefer to be a leader rather than a follower.	1	2	3	4	5	6	7
5. I enjoy being able to influence the actions of others.	1	2	3	4	5	6	7
6. I am careful to check everything on an automobile before I leave for a long trip.	1	2	3	4	5	6	7
7. Others ususally know what is best for me.	1	2	3	4	5	6	7
8. I enjoy making my own decisions.	1	2	3	4	5	6	7.
9. I enjoy having control over my own destiny.	1	2	3	4	5	6	7
10. I would rather someone else took over the leadership role when I'm involved in a group project.	1	2	3	4	5	6	7

continued on next page

continued from previous page

	doesn't apply			applies 1/2 the time, or unsure			always applies
11. I consider myself to be generally more capable of handling situations than others are.	1	2	3	4	5	6	7
12. I'd rather run my own business and make my own mistakes than listen to someone else's orders.	1	2	3	4	5	6	7
13. I like to get a good idea of what a job is all about before I begin.	1	2	3	4	5	6	7
14. When I see a problem I prefer to do something about it rather than sit by and let it continue.	1	2	3	4	5	6	7
15. When it comes to orders, I would rather give them than receive them.	1	2	3	4	5	6	7
16. I wish I could push many of life's daily decisions off on someone else.	1	2	3	4	5	6	7
17. When driving, I try to avoid putting myself in a situation where I could be hurt by someone else's mistake.	1	2	3	4	5	6	7
18. I prefer to avoid situations where someone else has to tell me what it is I should be doing.	1	2	3	4	5	6	7
19. There are many situations in which I would prefer only one choice rather than having to make a decision.	1	2	3	4	5	6	7
20. I like to wait and see if someone else is going to solve a problem so that I don't have to be bothered by it.	1	2	3	4	5	6	7

Beliefs About Weight Loss

Below are four questions designed to assess your beliefs about losing weight. Please circle the appropriate number to express the degree to which you agree with the statement.

	strongly disagree		agree			strongly agree
1. Whether I gain, lose, or maintain my weight is entirely up to me.	1	2	3	4	5	6
2. Being the right weight is largely a matter of good fortune.	1	2	3	4	5	6
3. No matter what I intend to do, if I gain or lose weight, or stay the same in the near future, it is just going to happen.	1	2	3	4	5	6
4. If I eat properly, and get enough exercise and rest, I can control my weight in the way I desire.	1	2	3	4	5	6

Program Acceptance

Please complete the following scales, indicating how you feel about various aspects of the program by putting an X in the appropriate space for each item.

The program leader is:

1. Pleasant ___:___:___:___:___ Unpleasant
2. Valuable ___:___:___:___:___ Worthless
3. Very Helpful ___:___:___:___:___ Unhelpful
4. Very Motivating ___:___:___:___:___ Not Very Motivating
5. Very Actively Involved ___:___:___:___:___ Passively Involved

The program materials are:

6. Very Helpful ___:___:___:___:___ Unhelpful
7. Interesting ___:___:___:___:___ Boring
8. Very Motivating ___:___:___:___:___ Not Very Motivating

The weight loss methods taught in my group are:

9. Very Helpful ___:___:___:___:___ Unhelpful
10. Interesting ___:___:___:___:___ Boring
11. Easy to do ___:___:___:___:___ Difficult to do

12. The weekly weight loss goals are much too difficult to achieve.

    strongly agree ___:___:___:___:___ strongly disagree

13. The weight loss methods suggested in my group are rigid and very limiting.

    strongly agree ___:___:___:___:___ strongly disagree

14. The program overall is too restricting --- there are too many rules and regulations.

    strongly agree ___:___:___:___:___ strongly disagree

15. The monetary incentive scheme (or lottery) is unfair.

    strongly agree ___:___:___:___:___ strongly disagree

Follow-up Questionaire

PLEASE HELP ME complete my doctoral research by completing the following questionaire and returning it in the enclosed envelope. A few minutes of your time will mean a great deal to me.

In August you joined a weight loss program at Michigan State University. After a few weekly meetings you stopped coming. Please help me with my research by indicating the reasons why you stopped participating in the program.

Check any items that apply to you.

___ 1. I did not like the type of weight loss program that was being offered.

___ 2. I did not like the program leader.

___ 3. The program was not helping me to lose weight.

___ 4. The day and time of the program meetings was not convenient for me. (ie, schedule conflicts)

___ 5. Unanticipated events in my life interfered with my ability to continue participating.

___ 6. I realized that I was not personally ready to lose weight at that time.

___ 7. Other (please specify): ____________________________
____
____.

Thankyou very much,

Thomas C. Fuller

BIBLIOGRAPHY

BIBLIOGRAPHY

Abraham, S. (1983) Obese and Overweight Adults in the United States, Vital Health Statistics, Series II, No.230, DHHS Publication Number 83-1680, Public Health Service, Washington, D.C.: U.S. Government Printing Office.

American Heart Association. (1984a) Exercise and your heart. Dallas, TX: American Heart Association.

American Heart Association. (1984b) Walking for a healthy heart. Dallas, TX: American Heart Association.

American Heart Association. (1984c) Exercise diary. Dallas, TX: American Heart Association.

American Heart Association. (1984d) Swimming for a healthy heart. Dallas, TX: American Heart Association.

Annual Report of the National Institutes of Health program in biomedical and behavioral nutrition research and training, FY 1982. (1985) In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

Appel, C.P. (1986) From contemplation to determination: Contributions from cognitive psychology. In W.E. Miller and N. Heather (Eds.), Treating addictive behaviors. New York: Plenum Press.

Averill, J.R. (1973) Personal control over aversive stimuli and its relationship to stress. Psychological Bulletin, 80, 286-303.

Balch, P. and Ross, A.W. (1975) Predicting success in weight reduction as a function of locus of control: A unidimensional and multidimensional approach. Journal of Consulting and Clinical Psychology, 43(1), 119.

Bandura, A. (1982) Self-efficacy mechanism in human agency. American Psychologist, 37, 122-147.

Bandura, A. (1977) Self-efficacy: Toward a unifying theory of behavior change. Psychological Review, 84, 191-215.

Bellack, A.S. (1975a) Self-evaluation, self-reinforcement, and locus of control. Journal of Research in Personality, 9, 158-167.

Bellack, A.S. (1975b) Behavior therapy for weight reduction. Addictive Behaviors, 1, 73-82.

Berchtold, P., Berger, M., Greiser, E., Dohse, M., Irmscher, K., Gries, F.A., and Zimmerman, H. (1977) Cardiovascular risk factors in gross obesity. International Journal of Obesity, 1, 219-229.

Bjorntorp, P. (1978) Physical training in the treatment of obesity. International Journal of Obesity, 2, 149-156.

Bjorntorp, P., deJonge, K., Krotkiewski, M., Sullivan, L., Sjostrom, L., and Sternberg, J. (1973) Physical training in human obesity. III. Effects of long-term training on body composition. Metabolism, 22, 1467-1475.

Bjorvell, H., Edman, G., Rossner, S., and Schalling, D. (1985) Personality traits in a group of severely obese patients: A study of patients in two self-chosen weight reducing programs. International Journal of Obesity, 9, 257-266.

Blackburn, G.L. and Read, J.L. (1984) Benefits of reducing -- revisited. Postgraduate Medical Journal, 60(Supplement 3), 13-18.

Blundell, J.E. (1984) Behavior modification and exercise in the treatment of obesity. Postgraduate Medical Journal, 60 (Supplement 3), 37-49.

Borkovec, T.D. and Nau, S.D. (1972) Credibility of analog therapy rationales. Journal of Behavior Therapy and Experimental Psychiatry, 3, 257-260.

Bornstein, P.H. and Rychtarik, R.G. (1983) Consumer satisfaction in adult behavior therapy: Procedures, problems, and future perspectives. Behavior Therapy, 14, 191-208.

Bray, G.A. (1979) Obesity in America. International Journal of Obesity, 3, 363-375.

Bray, G.A. (1978) Definition, measurement, and classification of the syndromes of obesity. International Journal of Obesity, 2, 99-112.

Bray, J.H. and Maxwell, S.E. (1982) Analyzing and interpreting significant MANOVAs. Review of Educational Research, 52(3), 340-367.

Brehm, S.S. and Brehm, J.W. (1981) Psychological reactance: A theory of freedom and control. New York: Academic Press.

Brownell, K.D. (1985) The contribution of psychological and behavioral factors to a classification scheme for obesity. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV, London: John Libbey and Co.

Brownell, K.D. (1982) Obesity: Understanding and treating a serious, prevalent, and refractory disorder. Journal of Consulting and Clinical Psychology, 50(6), 820-840.

Brownell, K.D. (1979) Behavior therapy for weight control: A treatment manual. Unpublished manual.

Burger, J.M. and Cooper, H.M. (1979) The desirability of control. Motivation and Emotion, 3(4), 381-393.

Burton, R.T. Foster, W.R., and VanItallie, T.B., (1985) Health implications of obesity: An NIH consensus development conference. International Journal of Obesity, 9, 155-169.

Chambliss, C.A. and Murray, E.J. (1979) Efficacy attributions, locus of control, and weight loss. Cognitive Therapy and Research, 3, 349-354.

Coates, T.J. (1977) Theory, research and practice in treating obesity: Are they really all the same? Addictive Behaviors, 2, 95-103.

Cohen, J. and Cohen, P. (1975) Applied multiple regression/correlation analysis for the behavioral sciences. Hillsdale, N.J.: Lawrence Erlbaum.

Colliver, J.A., Frank, S., and Frank, A. (1983) Similarity in obesity indices in clinical studies of obese adults: A factor analytic study. American Journal of Clinical Nutrition, 38, 640-647.

Colvin, R.H., and Crist, K. (1983) The futility of follow-up in current behavioral studies of obesity. Behavior Therapist, 6(8), 152-153.

Consumers Union of the United States (1980) Health Quackery. New York: Holt, Rinehart, and Winston.

Costello, R.M. (1975) Alcoholism treatment and evaluation: In search of methods. International Journal of the Addictions, 10(2), 251-275.

Currey, H., Malcolm, R., Riddle, E., and Schacte, M. (1977) Behavioral treatment of obesity: Limitations and results with the chronically obese. Journal of the American Medical Association, 237(36), 2829-2831.

Dahlkoetter, J., Callahan, E.J., and Linton, J. (1979) Obesity and the unbalanced energy equation: Exercise versus eating habit change. Journal of Consulting and Clinical Psychology, 47(5), 898-905.

Demobrowski, T.M., MacDougall, J.M., and Musante, L. (1984) Desirability of control versus locus of control: A relationship to paralinguistics in the Type A interview. Health Psychology, 3(1), 15-26.

Dempsey, J.A. (1964) Anthropological observations on obese and non-obese young men undergoing a program of vigorous physical exercise. Research Quarterly, 35, 275-287.

Devine, D.A. and Fernald, P.S. (1973) Outcome effects of receiving a preferred, randomly assigned of non-preferred therapy. Journal of Consulting and Clinical Psychology, 41(1), 104-107.

DiClemente, C.C. (1981) Self-efficacy and smoking cessation maintenance: A preliminary report. Cognitive Therapy and Research, 5(2), 175-187.

Dishman, R.K. (1982) Compliance/adherence in health-related exercise. Health Psychology, 1(3), 237-267.

Douglas, J.G., Ford, M.J., and Munro, J.F. (1981) Patient motivation and predicting outcome in a hospital obesity clinic. International Journal of Obesity, 5, 33-38.

Ducimetiere, P., Richard, J., and Cambien, F. (1986) The pattern of subcutaneous fat distribution in middle-aged men and the risk of coronary heart disease: The Paris prorpective study. International Journal of Obesity, 10(3), 229-240.

Duddleston, A.K. and Bennion, M. (1970) Effect of diet and/or exercise on obese college women. Journal of the American Dietetics Association, 56, 126-129.

Dwyer, J. (1985) Classifying current popular and fad diets. In J. Hirsch and T.B. VanIntallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

Eufemia, R.L. and Wesolowski, M.D. (1985) Attrition in behavioral studies of obesity: A meta-analytic review. Behavior Therapist, 8(6), 115-116.

Ewing, J.A. (1977) Matching therapy and patients: the cafeteria plan. British Journal of Addiction, 72, 13-18.

Frankle, R.T. (1985) Dietotherapy in the treatment of disease. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

Franklin, B.A. (1984) Exercise program compliance. In J. Storlie and H.A. Jordon (Eds.), Behavioral management of obesity. Jamaica, NY: Spectrum.

Franklin, B., Buskirk, E., Hodgson, J., Gahagan, H., Kollias, J., and Mendez, J. (1979) Effects of physical conditioning on cardio-respiratory function, body composition, and serum lipids in relatively normal-weight and obese middle-aged women. International Journal of Obesity, 3, 97-109.

Garner, D.M., Garfinkel, P.E., Stancer, H.C., and Moldofsky, H. (1976) Body image disturbances in anorexia nervosa and obesity. Psychosomatic Medicine, 38(5), 327-336.

Gatchel, R.J. and Baum, A. (1983) An introduction to health psychology. New York: Random House.

Glass, G.V. and Hopkins, K.D. (1984) Statistical methods in education and psychology. Engelwood Cliffs, N.J.: Prentice-Hall Inc.

Goldney, R.D. and Cameron, E. (1981) Locus of control as a predictor of attendance and success in the management of obesity. International Journal of Obesity, 5, 39-43.

Gormally, J., Rardin, D., and Black, S. (1980) Correlates of successful response to a behavioral weight control clinic. Journal of Counseling Psychology, 27(2), 179-191.

Gwinup, G. (1975) Effect of exercise alone on the weight of obese women. Archives of Internal Medicine, 135, 676-680.

Hadjiolova, I., Mintcheva, L., Dunev, S., Daleva, M., Handjiev, S., and Balabanski, L. (1982) Physical working capacity in obese women after an exercise programme for body weight reduction. International Journal of Obesity, 6, 405-410.

Hall, J.C., Veale, B., Horne, K., and Watts, J.M. (1984) The nutritional knowledge scores of morbidly obese patients selected for gastric bypass surgery. International Journal of Obesity, 8, 123-128.

Hand, D.C. and Taylor, C.C. (1987) Multivariate analysis of variance and repeated measures. New York: Chapman and Hall.

Harris, M.B. (1983) Eating habits, restraint, knowledge and attitudes toward obesity. International Journal of Obesity, 7, 272-186.

Hartigan, K.J., Baker-Strauch, D., and Morris, G.W. (1982) Perceptions of the causes of obesity and responsiveness to treatment. Journal of Counseling Psychology, 29(5), 478-485.

Helson, H. (1959) Adaptation level theory. In S. Koch (Ed.), Psychology: A study of a science (Vol. 1). New York: McGraw-Hill.

Helson, H. (1964) Adaptation-level theory. New York: Harper and Row.

Herman, P.C. and Polivy, J. (1975) Anxiety, restraint, and eating behavior. Journal of Abnormal Psychology, 84, 666-672.

Hirsch, J. (1985a) The present status of obesity research. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research:IV. London: John Libbey and Co.

Hirsch, J. (1985b) Dietary treatment. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research:IV. London: John Libbey and Co.

Hoiberg, A., Berard, S., Watten, R.H., and Caine, C. (1984) Correlates of weight loss in treatment and at follow-up. International Journal of Obesity, 8, 457-465.

Holm, G., Jacobsson, B., Holm, J., Bjorntorp, P., and Smith, U. (1977) Effects of submaximal physical exercise on adipose tissue metabolism in man. International Journal of Obesity, 1, 249-257.

Holmes, N., Ardito, E.A., Stevenson, D., and Lucas, C.P. (1984) Maintenance of weight loss in a heavily overweight population. In J. Storlie and H.A. Jordan (Eds.), Behavioral management of obesity. Jamaica, NY: Spectrum.

James, W.P.T. (1984) Dietary aspects of obesity. Postgraduate Medical Journal, 60(Supplement 3), 50-55.

Janis, I.L. and Mann, L. (1977) Decision making. New York: Free Press.

Jeffery, R.W., Bjornson-Benson, W.M., Rosenthal, B.S., Lindquist, R.A., and Johnson, S.L. (1984) Correlates of weight loss and its maintenance over two years of follow-up among middle-aged men. Preventive Medicine, 13(2), 155-168.

Jeffery, R.W., Snell, M.K., and Forster, J.L. (1985) Group composition in the treatment of obesity: Does increasing group homogeneity improve treatment results? Behavior Research and Therapy, 23(3), 371-373.

Jeffery, R.W., Wing, R.R., and Stunkard, A.J. (1978) Behavioral treatment of obesity: The state of the art 1976. Behavior Therapy, 9, 189-199.

Kaplan, R.M., Atkins, C.J., and Reinsch, S. (1984) Specific efficacy expectations mediate exercise compliance in patients with COPD. Health Psychology, 3, 223-242.

Keesey, R.E. (1980) A set-point analysis of the regulation of body weight. In A. Stunkard (Ed.), Obesity. Philadelphia: Saunders Co.

Kirk, R.E. (1982) Experimental Design: Procedures for the behavioral sciences. Monteray, CA: Brooks/Cole.

Kissin, B., Platz, A., and Su, W.H. (1971) Selective factors in treatment choice and outcome in alcoholics. In N.K. Mello and J.H. Mendelson (Eds.), Recent advances in studies on alcoholism. Washington, D.C.: U.S. Government Printing Office.

Krantz, D.S., Baum, A., and Wideman, M.V. (1980) Assessment of preferences for self-treatment and information in health care. Journal of Personality and Social Psychology, 39(5), 977-990.

Krantz, D.S. and Deckel, A.W. (1983) Coping with coronary heart disease and stroke. In T.G. Burish and L.A. Bradley (Eds.), Coping with chronic disease: Research and applications. New York: Academic Press.

Langer, E. and Rodin, J. (1976) The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. Journal of Personality and Social Psychology, 34, 191-198.

Larsson, B., Bjorntorp, P., and Tibblin, G. (1981) The health consequences of obesity. International Journal of Obesity, 5, 97-116.

Lauer, J.B., Wampler, R.S., Lantz, J.B., and Romine, C.J. (1979) Psychosocial aspects of extremely obese women joining a diet group. International Journal of Obesity, 3, 153-161.

Lennon, D., Nagle, F., Stratman, F., Shrago, E., and Dennis, S. (1985) Diet and exercise training effects on resting metabolic rate. International Journal of Obesity, 9, 39-47.

Leon, A.S., Conrad, J., Hunninghake, D.B., and Serfass, R. (1979) Effects of a vigorous walking program on body composition, and carbohydrate and lipid metabolsim in obese young men. American Journal of Clinical Nutrition, 33, 1776-1787.

Lowe, M.R. and Fisher, E.B. (1983) Emotional reactivity, emotional eating, and obesity: A naturalistic study. Journal of Behavioral Medicine, 6(2), 135-149.

MacKeen, P.C., Franklin, B.A., Nicholas, W.C., and Buskirk, E.R. (1983) Body composition, physical work capacity, and physical activity habits at 18-month follow-up of middle-aged women participating in an exercise intervention program. International Journal of Obesity, 7, 61-71.

Mahoney, M.J. (1974) Self-reward and self-monitoring techniques for weight control. Behavior Therapy, 5, 48-57.

Mairken, G. (1981) How to pick the right therapist. Consumer's Digest, 20(4), 36-40.

Mann, L. and Janis, I. (1982) Conflict theory of decision making and the expectancy-value approach. In N.T. Feather (Ed.), Expectation and actions: Expectancy-value models in psychology. Hillsdale, N.J.: Erlbaum.

Marlatt, G.A. and Gordon, J.R. (Eds.) (1985) Relapse prevention: Maintenance strategies in the treatment of addictive behaviors. New York: Guilford Press.

Marston, M.V. (1970) Compliance with medical regimens: A review of the literature. Nursing Research, 19, 312-323.

Mavis, B. (1987) The use of monetary incentives in a social context in the modification of weight loss. Unpublished dissertation, Michigan State University.

Metropolitan Life Foundation (1983) Height and weight tables. New York: Metropolitan Life Insurance Company.

Miller, J.W. and Schildkraut, M.L. (1983) How good are the quick weight loss clinics? Good Housekeeping, 196(4), 225-226.

Miller, P.M. and Sims, K.L. (1981) Evaluation and component analysis of a comprehensive weight control program. International Journal of Obesity, 5, 57-65.

Miller, W.R. and Hester, R.K. (1986) The effectiveness of alcohol treatment: What research reveals. In W.E. Miller and N. Heather (Eds.), Treating Addictive Behaviors. New York: Plenum Press.

Murray, D.C. (1976) Preferred versus nonpreferred and self-control training versus determination raising as treatments of obesity: A pilot study. Psychological Reports, 38, 191-198.

National Dairy Council (1985) Lifesteps: Your personal plan for weight management. Rosemont, IL: National Dairy Council.

O'Connell, J.K., Price, J.H., Roberts, S.M., Jurs, S.G., and McKinley, R. (1985) Utilizing the health belief model to predict dieting and exercise behavior of obese and nonobese adolescents. Health Education Quarterly, 12(4), 343-351.

O'Leary, A. (1985) Self-efficacy and health. Behavior Research and Therapy, 23(4), 437-451.

Orford, J. (1985) Excessive Appetites. New York: John Wiley and Sons.

Oscai, L.B. and Williams, B.T. (1968) Effects of exercise on overweight middle-aged males. Journal of the American Geriatrics Society, 16(7), 794-797.

Parker, M.W., Winstead, D.K., and Willi, F.J.P. (1979a) Patient autonomy in alcohol rehabilitation. I. Literature review. International Journal of the Addictions, 14(7), 1015-1022.

Parker, M.W., Winstead, D.K., Willi, F.J.P., and Fisher, P. (1979b) Patient autonomy in alcohol rehabilitation. II Program evaluation. International Journal of the Addictions, 14(8), 1177-1184.

Pekarik, G., Blodgett, C., Evans, R.G., and Wierzbicki, M. (1984) Variables related to continuance in a behavioral weight loss program. Addictive Behaviors, 9, 413-416.

Perlmuter, L.C. and Monty, R.A. (1979) Choice and perceived control. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Perri, M.G., McAdoo, W.G., McAllister, D.A., Lauer, J.B., and Yancey, D.Z. (1986) Enhancing the efficacy of behavior therapy for obesity: effects of aerobic exercise and a multicomponent maintenance program. Journal of Consulting and Clinical Psychology, 54(5), 670-675.

Pi-Sunyer, F.X. (1985) Effect of exercise on food intake. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

Piziak, V.K. (1983) Medical management of obesity. Postgraduate Medicine, 74(5), 158-163 and 166 and 171-172.

Porcello, L.A. (1985) Characteristics of professional weight control programs. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research:IV. London: John Libbey and Co.

Rodin, J., Bray, G.A., Atkinson, R.L., Dahms, W.T., Greenway, F.L., Hamilton, K., and Molitch, M. (1977) Predictors of successful weight loss in an outpatient obesity clinic. International Journal of Obesity, 1, 79-87.

Rosenstock, I.M. (1966) Why people use health services. Millbank Memorial Fund Quarterly, 44, 94-127.

Rotter, J.B. (1975) Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology, 43(1), 56-67.

Rotter, J.B. (1966) Generalized expectancies of internal versus external control of reinforcement. Psychological Monographs, 80(1), 1-28.

Sakoda, J.M., Cohen, B.H., and Beall, G. (1954) Tests of significance for a series of statistical tests. Psychological Bulletin, 51(2), 172-175.

Saltzer, E.B. (1982) The weight locus of control (WLOC) scale: A specific measure for obesity research. Journal of Personality Assessment, 46(6), 620-628.

Saltzer, E.B. (1978) Locus of control and the intention to lose weight. Health Education Monographs, 6(2), 118-128.

Sanchez-Craig, M. (1980) Random assignment to abstinence or controlled drinking in a cognitive-behavioral program: Short-term effects on drinking behavior. Addictive Behaviors, 5, 35-39.

Sandifer, B.A. and Buchanan, W.L. (1983) Relationship between adherence and weight loss in a behavioral weight reduction program. Behavior Therapy, 14, 682-288.

Sankey, K. (1984) The practical effect of obesity on the insured life --- relative risks associated with disease states --- "the impaired life". Postgraduate Medical Journal, 60(Supplement 3), 5-12.

Sash, S.E. (1977) Why is the treatment of obesity a failure in modern society? International Journal of Obesity, 1, 247-248.

Schaller, W.E. and Carroll, C.R. (1976) Health, quackery, and the consumer. Philadelphia, PA: W.B. Saunders and Co.

Schichting, P., Hoilund-Carlsen, P.F., and Quaade, F. (1981) Comparison of self-reported height and weight with controlled height and weight in women and men. International Journal of Obesity, 5, 67-76.

Simopoulos, A.P. (1985) Research trends related to the study and management of obesity. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

Sjoberg, L. (1985) Motivation and compliance: How assessed and how important? In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

Snetselaar, L.G. (1983) Nutrition counseling skills. Rockville, MD: Aspen Systems Corp.

Stallones, R.A. (1985) Epidemiologic studies of obesity. Annals of Internal Medicine, 103(6 pt. 2), 1003-1005.

Stalonas, P.M., Johnson, W.G., and Christ, M. (1978) Behavior modification for obesity: the evaluation of exercise, contingency management, and program adherence. Journal of Consulting and Clinical Psychology, 46(3), 463-469.

Sternberg, B. (1985) Relapse in weight control: Definitions, processes, and prevention strategies. In G.A. Marlatt and J.R. Gordon (Eds.), Relapse prevention. New York: Guilford Press.

Storlie, J. (1984) Psychological factors related to eating and activity behaviors. In J. Storlie and H.A. Jordan (Eds.), Evaluation and treatment of obesity. New York: Spectrum Publications.

Strain, G.W. and Strain, J.J. (1979) Psychological impediments to weight loss. International Journal of Obesity, 3, 167-170.

Stunkard, A.J. (1978) Behavioral treatment of obesity: the current status. International Journal of Obesity, 2, 237-248.

Stunkard, R.B. (1975) From explanation to action in psychosomatic medicine: The case for obesity. Psychosomatic Medicine, 27, 195-236.

Stunkard, A.J. and Pencik, S.B. (1979) Behavior modification in the treatment of obesity. Archives of General Psychiatry, 36, 801-806.

Thornton, C.C., Gottheil, E., Gellens, H.K., and Alterman, A.I. (1977) Voluntary versus involuntary abstinence in the treatment of alcoholics. Journal of Studies on Alcohol, 38(9), 1740-1748

Tobias, L.L. and MacDonald, M.L. (1977) Internal locus of control and weight loss: An insufficient condition. Journal of Consulting and Clinical Psychology, 45(4), 647-653.

Tremblay, A., Fontaine, E., Poehlman, E.T., Mitchell, D., Perron, L., and Bouchard, C. (1986) The effect of exercise training on resting metabolic rate in lean and moderately obese individuals. International Journal of Obesity, 10(6), 511-517.

Truswell, A.S. (1985) Obesity: Diagnosis and risks. British Medical Journal, 291(7), 655-657.

VanItallie, T.B. (1978) Diets for weight reduction: Mechanisms of action and physiologial effects. International Journal of Obesity, 2, 113-122.

VanItallie, T.B. and Abraham, S. (1985) Some hazards of obesity and its treatment. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

VanKoten-Chappell, C. (1982) Self-efficacy as a predictor of weight loss. Unpublished dissertation, University of Oregon.

Vannicelli, M. (1979) Treatment contracts in an inpatient alcohol treatment setting. Journal of Studies of Alcohol, 40(5), 457-471.

Vertes, V. (1984) Very low calorie diets --- history, safety, and recent developments. Postgraduate Medical Journal, 60 (Supplement 3), 56-58.

Vickery, D.M. and Fries, J.F. (1976) Take care of yourself: A consumer's guide to medical care. Reading, Mass.: Addison-Wesley.

Wallston, B.S. and Wallston, K.A. (1978) Locus of control and health: A review of the literature. Health Education Monographs, 6(2), 107-117.

Wallston, B.S., Wallston, K.A., Kaplan, G.D., and Maides, S.A. (1976) Development and validation of the health locus of control (HLC) scale. Journal of Consulting and Clinical Psychology, 44(4), 580-585.

Weinberg, R.S., Hughes, H.H., Critelli, J.W., England, R., and Jackson, A. (1984) Effects of preexisting and manipulated self-efficacy on weight loss in a self-control program. Journal of Research in Personality, 18, 352-258.

Weiss, A.R. (1977) Characteristrics of successful weight reducers: A brief review of predictor variables. Addictive Behaviors, 2, 193-201.

Winer, B.J. (1971) Statistical principles in experimental design. New York: McGraw-Hill.

Wing, R.R. and Jeffery, R.W. (1984) Sample size in clinical outcome research: The case of behavioral weight control. Behavior Therapy, 15, 550-556.

Wilner, D.N. (1968) A practical guide to psychotherapy. New York: Harper and Row.

Wilson, G.T. (1985) Psychological prognostic factors in the treatment of obesity. In J. Hirsch and T.B. VanItallie (Eds.), Recent advances in obesity research: IV. London: John Libbey and Co.

Wilson, G.T. (1980) An evaluation of behavior therapy in obesity. International Journal of Obesity, 4, 371-376.

Winefield, H.R. (1982) Reliability and validity of the health locus of control scale. Journal of Personality Assessment, 46(6), 614-619.

Wing, R.R. and Jeffery, R.W. (1979) Outpatient treatments of obesity: A comparison of methodology and clinical results. International Journal of Obesity, 3, 261-179.

Zuti, W.B. and Goldberg, L.A. (1976) Comparing diet and exercise as weight reduction tools. The Physician and Sports Medicine, 4, 49-53.