THE RELATIONSHIP AND PREDICTIVE ABILITY
OF SELF-EFFICACY AND LOcus OF CONTROL
AMONG FEMALES IN A WEIGHT LOSS
HEALTH EDUCATION INTERVENTION

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
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by

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CHAPTER I

INTRODUCTION

Health Education is a field of study which seeks to improve health status by encouraging healthy lifestyles and behaviors. The Canadian Ministry of Health has based its national health policy on a model proposed by Laframboise (1974) which states that health is a function of: 1) the quality of the environment; 2) human biology and genetic factors; 3) access to medical care; and 4) personal health behavior or lifestyle. Analysis of health policy by Dever (1976) suggests that 44 percent of premature mortality in the nation can be attributed to unhealthy lifestyle. Health Education has the potential to reduce much of this behavior-related mortality. More importantly, health education can improve the quality of life and help people achieve their personal goals and aspirations.

A current definition of health education by Green, Kreuter, Deeds and Fartride (1980) states that it is "any designed combination of methods to facilitate voluntary adoptions of behavior conducive to health." The overall broad goal of health education is to help people function effectively and realize their full potential as human beings. The more limited and specific goal of categorical community health education programs is to reduce behaviors that cause illness, disability or otherwise interfere with peoples' health and well-being. Iverson (1984) and Warner (1982) have noted health
education's significant and cost-effective impact on such behaviors as smoking, exercise, and patient compliance.

The process of community health education consists of diagnostic and intervention stages. The diagnostic phase seeks to understand the antecedents, correlates and/or determinants of health behavior. Basic health behavior research determines or diagnoses why people do and do not practice healthy and unhealthy lifestyles. Intervention research in health education tries to discover which methods most effectively influence the antecedents of healthy behavior. This study consists of basic research in health behavior and seeks to understand the relationship between peoples' specific beliefs and program outcomes in a weight loss health education intervention.

Iverson and Hosakawa (1975) observed that health education's eclectic nature causes its practitioner to borrow models indiscriminately from other academic fields. They suggested more health education research should determine which outside models and theories have utility in the profession. Locus of control is a psychological construct that has been widely used in health behavior/health education research. A new construct that has received little attention in health education literature is Bandura's (1977) model of perceived self-efficacy. The intent of this study was to determine the relationship between these related but distinct beliefs among female participants in a weight loss program. An additional purpose was to establish the value of these constructs for health education research by determining how well these two variables predict success in a weight loss program.
Locus of control and perceived self-efficacy are psychological constructs founded in social-learning theory. Both are measurements of beliefs and expectancies. Behavior models of Rosenstock (1966), Rotter (1954), Green et al (1980), and Bandura (1977) suggest that beliefs are major determinants of health behavior. Butler (1982) observed that, all factors being equal, people display a tendency to move in the direction of their expectations and beliefs.

Research by King (1962) suggested health behavior is more a function of subjective beliefs and perceptions than objective reality. This necessitates that health educators measure and determine which beliefs most highly correlate with healthy lifestyles. The combined influence of a perception of self-efficacy and an internal locus of control may prove to be a predictor of specific health behaviors.

**Locus of Control**

Locus of control is a personality measurement developed by Rotter (1966). It expresses how a person views the causality of reinforcement. People who believe reinforcement is the result of luck, chance, fate or powerful others are labeled as *externals.* Those who perceive reinforcement to be under their own control are called *internals.* A person's locus of control orientation is established on the basis of agreement with internally and externally worded statements. Responses are recorded in a Likert-scale format. Individuals are seldom exclusively internal or external. Orientation appears to be normally distributed between the two extremes.
Locus of control is only a part of the larger social learning theory model developed by Rotter (1954). Locus of control is best understood when placed within the context of other social learning theory variables. In simplest terms Rotter suggested that the relative potential for a behavior to occur is a function of:

1. The perceived value of a specific reinforcement;
2. The expectancy that specific behaviors will result in particular reinforcements;
3. The situational factors that are unique to a given situation. Locus of control is a measurement of the second of these three factors. It is one of many generalized expectancies that individuals formulate on the basis of previous experiences.

Phares (1976) reported that locus of control is a valid and reliable instrument that has demonstrated its utility in hundreds of studies. Review of locus of control literature by Wallston and Wallston (1978c), however, showed that often it has been an insignificant factor in explaining health behavior. There is much debate as to the extent specific behaviors can be attributed to locus of control orientation. Wallston and Wallston (1978a) reported that people sometimes respond to locus of control scale items in a contradictory manner. Individuals may report that they agree strongly with both internally and externally worded statements. This inconsistency may explain why some studies show no or little correlation between locus of control and health behavior.

Another cause of nonsignificant results may be the fact that locus of control scales only measure people's general beliefs of
causality. Most locus of control research is based on the 1966 Rotter scale. This instrument consists of twenty-six broad statements of causality. Because each item does not refer to a specific topic (such as health), the instrument has the ability to predict behavior in a variety of settings. Rotter (1975) observed that having broad predictive power is logically associated with a limited ability to predict behavior in specific situations.

Rotter (1975) suggested that different loci of control scales be developed for specialized content areas. The Wallston, Wallston, Kaplan and Maides (1976) health locus of control was an attempt to develop an area-specific instrument. Their health locus of control scale shared only ten percent variance with the Rotter scale. Wallston et al. (1976) demonstrated that their scale was significantly (p<.04) able to predict specific health behaviors. Such predictions of health behaviors were not observed with the Rotter Scale.

Further subdivision of the health locus of control has demonstrated greater specificity. Wallston and Wallston (1978b) recognized even their health locus of control was a broad measurement of generalized expectancy. They suggested that health locus of control could be further subdivided into more specific disease or health behavior loci of control. A topic-specific locus of control scale was developed by Salzer (1978) for weight control. This scale demonstrated greater prediction power for weight loss intent than both the Rotter and Wallston scales. Correlations between the Saltzer weight locus of control and the Wallston et al. (1976) and Rotter (1966) scales were r=.32 (p<.001) and r=.21 (p<.001) respectively.
Self-efficacy

A more recent model proposed by Bandura may help to explain and eliminate deficiencies in locus of control research. The self-efficacy construct, like locus of control, is rooted in Social Learning Theory. Perceived self-efficacy is a generalized expectancy that describes an individual's belief in his/her capacity to accomplish specific tasks. Bandura (1977) described self-efficacy as a judgement of the likelihood that one can organize and execute given actions required to deal with prospective situations. While self-efficacy theory appears similar to locus of control, there are important differences.

Locus of control is a global measurement of how people perceive causality. It measures perception that specific behaviors result in predictable outcomes (reinforcements). Bandura calls these beliefs "outcome expectancies." Perceived self-efficacy, by contrast, is an introspective personal assessment of ability, skill or motivation needed to perform a specific task. Locus of control measures to what extent we believe specific behaviors result in reinforcement. Self-efficacy measures our perceptions that we personally can perform those behaviors we believe provide reinforcement.

Weight loss beliefs further illustrate the difference between locus of control and perceived self-efficacy. A person might believe that obesity is caused behaviorally. This individual may believe also that obesity can be reduced through behavior change. He/she could further believe that luck, fate or chance play no role in the cause or cure of obesity. Such a person should be classified as
having an internal weight locus of control. This same internal, however, may doubt his/her ability to affect the behaviors that will control a problem that he/she believes is controllable. Such an individual is an "internal" with low perceptions of self-efficacy.

A potential problem in locus of control research may be that the measurement scales are contaminated with self-efficacy items. A look at various locus of control scales reveals that some questions can be interpreted on the basis of self-efficacy rather than locus of control. The Wallston and Wallston (1978a) health locus of control scale, for example, contains the statement, "I can control my health". Disagreeing with the statement scores the respondent as "external". Disagreement with the statement might indicate the belief that health is beyond human control. But a person also could strongly disagree because of the perception that he/she lacks the skills, knowledge or motivation to control a situation they believe is controllable potentially.

A related criticism of locus of control research was made by Cherlon and Bourque (1974). They observed locus of control scales sometimes contain both first person "I can control" and plural "people can control" statements. Cherlon et al contended that locus of control scales should consist of one type or the other but definitely not both.

The failure to exclude items that can be interpreted on the basis of self-efficacy perceptions from locus of control scales can create a condition where true internals are misclassified as externals and vice versa. Such contamination may exaggerate or
reduce the statistical association between locus of control and behavior. This could explain why locus of control has often been an insignificant variable in previous studies.

Locus of control and perceived self-efficacy may have diagnostic and evaluative functions in health promotion efforts. Care must be taken, however, to use locus of control scales that omit items that can be interpreted on the basis of self-efficacy.

Using revised scales, this research project simultaneously measured locus of control and perceived self-efficacy and determined if these variables, indeed, were distinctly independent constructs. The research project also studied the relationship of these two variables for the problem of weight reduction.

Analysis of covariance determined the predictive power of these variables on the dependent outcomes of pounds lost, percentage of predicted weight loss goal achieved, and weekly program attendance. Program participants were weighed at the beginning and completion of the ten week program. Demographic data were collected to determine possible relationships between age, sex, education, employment status and the pertinent dependent and independent variables.

**Justification**

Bandura (1977) suggested an internal locus of control is a necessary but insufficient factor for many healthy behaviors. An internal orientation must be accompanied by perceptions of self-efficacy. He diagrammed the relationship between the variables as follows:
Outcome expectancy is the belief that by doing behavior X, reinforcement Y will occur. Perceived self-efficacy is the belief that one can personally perform behavior X. Outcome expectancy deals with locus of control. Self-efficacy is related to self-confidence and belief in one's personal ability. Past health locus of control research has failed to make a clear distinction between the two concepts.

Understanding the difference between self-efficacy and locus of control can improve the diagnostic phase of health education. McGuire (1981) suggested health education messages too often seek to enhance motivation and a sense of responsibility. Such messages typically tell people they "ought to" change behavior. McGuire contended a large portion of the public already understands the benefits of a healthy lifestyle. Such individuals need "how to" rather than "ought to" messages. He suggested more health education be devoted to the "how to" content of skill development and confidence
enhancement. By measuring the target population's locus of control and perceived self-efficacy, we know which message to deliver. Without this knowledge we can only guess as to the proper selection of strategies.

Bandura (1977) observed that poorly conceived outcome expectancy (locus of control) strategies can have an unintended negative impact. Messages which convince people that problems are potentially solvable will create frustration among internals who lack enough self-efficacy to act. Programs which remind people that overweight can be controlled but fail to provide necessary skills and feelings of self-efficacy are more likely to create a sense of hopelessness rather than behavior change. When health educators accurately diagnose the target population's locus of control and perceived self-efficacy, they less likely will implement misdirected programs that frustrate participants.

In addition to designing the health education intervention to match the predominant psychological orientation of a target population, Wallston and Wallston (1978c) suggested individuals can be assigned to programs on the basis of locus of control orientation. Wallston et al (1976) demonstrated significantly greater weight loss for individuals who were placed in a weight management program which corresponded to subjects' internal-external orientation. Perceived self-efficacy could be used conceivably in a similar diagnostic fashion.
Locus of control and self-efficacy scores also may be used in program evaluation. Conditto and Lichtenstein (1981) demonstrated perceived self-efficacy was a good (r=.57) predictor of which participants in a smoking cessation program would revert to smoking. Perceived self-efficacy scores also accurately predicted under what circumstances recidivism would occur. If the correlation between self-efficacy and/or locus of control and specific behaviors is high, these variables might be used as proxy measurements for behavioral outcomes. These scores could provide meaningful variables for health education research.

A fundamental problem in health education research is the lack of sequential progression. Green (1977) stated health education research has a non-cumulative nature. A logical strategy to overcome this problem is to first document which variables are the antecedents or determinants of behavior. That was the primary function of this research project. After such behavioral diagnoses are conducted, future efforts can determine which methods most effectively influence the antecedents of behavior.

Current health education literature contains no perceived self-efficacy research. This study is intended to determine the value of this construct in weight control. Earlier health locus of control research in health education utilized scales contaminated with self-efficacy items. First, this dissertation will attempt to determine if weight locus of control and perceived self-efficacy to lose weight were truly independent constructs. Second it will try to establish
their relative contribution to successful weight management. Such information is useful in efforts to develop strategies to deal with this difficult and pervasive problem.

**Statement of the Problem**

The purpose of this study is to determine if locus of control and perceived self-efficacy were independent beliefs among participants in a formal weight management program. An additional purpose of the study is to determine if, and to what extent, locus of control and perceived self-efficacy predict success in a weight loss program.

**Hypotheses**

The null hypothesis being tested is weight locus of control and perceived self-efficacy were independent variables and had no correlation to each other. The alternative hypotheses is that a (positive, negative or curvilinear) relationship existed between these two variables.

The second null hypothesis was that weight locus of control and perceived self-efficacy had no ability to predict weight loss. The alternative hypothesis was that locus of control, self-efficacy and/or the interaction of these two variables could predict weight loss outcomes.

**Definitions**

*External Locus of Control*—The belief that outcomes or reinforcement are the result of luck, chance, fate or forces beyond human control.

*Generalized Expectancy*—A personality variable dealing with belief and perceptions about causal relationships, control of reinforcement...
and personal assessments of capabilities. Generalized expectancies can be subdivided into outcome and self-efficacy expectations.

**Health Locus of Control**—A more specific expectancy that measures beliefs as to what extent personal health status is controlled by human action.

**Internal Locus of Control**—The belief that outcomes or reinforcement are the result of personal action and freely chosen behaviors.

**Locus of Control**—A generalized expectancy that measures a person's belief as to what extent humans can control reinforcement and outcomes.

**Obesity**—The condition of having an undesirable amount of excess body fat.

**Outcome Expectancy**—A person's estimate that given behaviors will or will not lead to given outcomes.

**Perceived Self-efficacy**—The belief that a person is or is not capable of successfully performing a given behavior.

**Perceived Weight Loss Self-efficacy**—The belief that a person is or is not capable of executing behaviors related to weight control.

**Weight Locus of Control**—A specific expectancy that measures a person's belief as to what extent humans can regulate weight loss.

**Delimitations**

The study was delimited to eighty-three self-selected female participants in a "Slim for Life" class taught by the Utah Heart Association. The study was conducted between April and June 1984. The study was delimited to adult (> age 21) women. Subjects who were
pregnant or taking medication for weight loss were not included in the study.

Subjects were not asked to indicate their race. Since the Utah population is approximately 96 percent caucasian it was assumed a similar high proportion of subjects were white. The lack of minority subjects restricts the external validity of this study to caucasian female subjects.

Limitations

1. Participants in this study were self-selected members of a Heart Association "Slim for Life Class". It is assumed that the major reason people enroll in weight reduction programs is cosmetic. Because this class was conducted by the Heart Association, it is possible that a higher percentage of participants enrolled because of health reasons and/or physician referral. Subjects in a "Slim for Life" class may not be representative of participants in other weight loss programs.

2. Approximately fifty percent of the subjects in the "Slim for Life" class volunteered to participate in the study. It is possible that these subjects differed from non participants. The program outcomes of the volunteers in this study were slightly less favorable than subjects in the past "Slim for Life" classes. Records from the Heart Association indicate past class members lost an average of eleven pounds compared to the average loss of nine pounds in this study. The drop out rate from past studies was approximately thirty five percent. A total of thirty-six percent dropped out from this
study. Part of the slightly lower outcomes in this study might be accounted for by the fact that some classes were taught by university students who were teaching for the first time.

3. Dependent weight loss measurements were made only after a period of ten weeks. Longitudinal evaluations of correlation between locus of control, self-efficacy and weight loss might differ from observations made after only ten weeks.

4. While the dependent variable in the study was weight loss, the goal of a weight reduction program is to lose pounds of fat. Even though the majority of weight loss probably consisted of adipose tissue, it is possible that some individuals might also have lost lean tissue. No attempt was made to analyze the body composition of lost weight.

5. It could be argued that participation in a weight loss class is an indication of an internal locus of control. Registering for a weight reduction class, to some extent, reflects the belief that something can be done to reduce weight. People who truly believe that little can be done to lose weight would be less likely to enroll in a program that stresses behavior modification for weight loss. Compared to obese individuals who choose not to attend weight loss programs, the subjects in this study may have an aggregate locus of control orientation that is skewed to the internal side. The distribution of scores, however, indicated a lack of homogeneity of locus of control orientation.
Assumptions

1. It is assumed that participants' responses to test instruments reflected personal feelings rather than what are perceived to be desirable answers.

2. It was assumed that subjects who dropped out of the class accurately reported weight within 1.8 pounds. Research by Paganini-Hill and Ross (1982) indicated subjects from a non-therapeutic population underreport their weight by an average of 1.8 pounds. Thus, it is assumed underreporting did not exceed this level.

3. It was assumed that the distribution of weight locus of control and perceived self-efficacy scores approximated the normal distribution.

Summary

Two variables thought to be related to specific health behaviors are locus of control and perceived self-efficacy. Locus of control orientation indicates a person's beliefs about humans' ability to control outcomes and whether specific behaviors result in predictable outcomes. Self-efficacy measures personal assessments of ability to perform given behaviors. It is hypothesized that the combination of internal locus of control and strong perceptions of self-efficacy facilitates the adoption healthy behavior patterns.

Previous health locus of control research has not clearly differentiated between the constructs of locus of control and self-efficacy. Locus of control scales often contain items that are potentially interpretable as items of self-efficacy. This may explain
the contradictory and insignificant results of much health locus control research.

This study utilizes a revised topic-specific locus of control instrument and determines if locus of control and self-efficacy, indeed, were independent beliefs among female participants in weight control programs. Additional analyses explain the relationship of these variables with subsequent weight loss.
CHAPTER II
REVIEW OF RELATED LITERATURE

This chapter examines the literature pertinent to this research project. For convenience the review of related literature is divided into the following sections:

1. An overview of obesity literature.
2. Health-related locus of control literature.
3. Self-efficacy literature.

A brief summary will highlight significant findings of each section.

An Overview of Obesity and Overweight Literature

Definitions of obesity and overweight are numerous. Seltzer and Mayer (1965) defined obesity as being one standard deviation above a normal skinfold density. Metropolitan Life Insurance Company (1983) defined overweight as a condition when a person weighs more than ideal body weight based on height and frame size. Mayer (1968) observed that excess weight is not always due to excess fat. Football players are overweight according to standard height-frame size charts but these individuals are not over-fat. Kannel and Gordon (1974) defined obesity as a condition where the body has twenty percent excess fat. Mayer (1977) also defined obesity as having more than twenty percent excess body fat and defined
overweight as having between zero and twenty percent excess body fat. Remington, Fisher and Parent (1983) reported that ideal percent body fat for adult males and females is 15 and 25 percent respectively.

Obesity is a major public health problem. Brownell (1982) suggested that obesity is a serious condition because it is highly prevalent, it is resistant to treatment and it has serious psychological and physiological consequences. The public's ever-present concern about weight is based on cosmetic concerns. Each year millions of diet books are purchased by American consumers.

Obesity appears to be a very common problem in contemporary America. Bray (1976) estimated fifty percent of adult Americans exceed their ideal body weight. Research by Mayer (1968) and Van Itallie (1979) suggested that the incidence of adult obesity is increasing. Research by Abraham and Johnson (1979) indicated that approximately twenty-four percent of adult Americans were more than twenty percent above ideal body weight.

Health risks associated with obesity are numerous. Reviews of the literature by Levinson (1977), Bray (1976), Kannel and Gordon (1979) have shown that obesity is associated with hypertension, hyperlipidemia, angina, diabetes, surgical risk, pulmonary and renal problems, pregnancy complication, osteoarthritis, gallstones and lower back pain. The exact relationship between obesity and some diseases remains controversial. There is no consensus on obesity's role in the development of cardio-vascular disease. One school of thought maintains that obesity is an independent risk factor. Others
argue obesity is a risk factor only to the extent it causes hypertension or hyperlipidemia.

Studies by Keyes (1979) suggested that overweight is a cardiovascular risk factor only in extreme cases. A recent Metropolitan Life Insurance Company (1983) revision of their 1954 weight tables raised standard ideal weights. Other researchers suggested this move was premature. Garrison, Feninleib, Castelli, and McNamara's (1983) epidemiologic analyses suggested smokers tend to weigh less than non-smokers. Garrison et al concluded the low weight smoking correlation confounded the true association between mild obesity and cardiovascular disease. Their stratified data compared only non-smokers with non-smokers, smokers with smokers. Their analysis suggested that even mild obesity is an unhealthy condition. The debate as to how much excess fat is unhealthy remains unresolved.

Of equal importance to the medical consequences of obesity are the social and psychological hazards of being overweight. Brownell (1982) noted the obese suffer from a double stigma. First, obese individuals are viewed as having an undesirable physical condition. Second, and unlike other physical problems, obese individuals are blamed for having their condition. The social bias against the obese is detected as early as the first grade. Staffier (1967) found that obese children were rated significantly (p<.05), less likeable than children with gross physical handicaps. The overweight person must constantly deal with messages in the media which reinforce the bias that only thinness is beautiful.
Obesity is an extremely complex problem with numerous interrelated causes. For some individuals obesity is partially the result of external factors. Of recent interest is the so-called set point theory advocated by Keesey (1980) and Bennett and Garin (1982). Set point theory suggests the body sets and activity defends a specified weight, much in the way it regulates body temperature or pH balance. Set point theorists argue that when a person alters caloric intake, the body metabolically compensates to maintain the predetermined set point. Various studies support this notion.

Research by Keys and Brozek (1953) demonstrated that when individuals were placed on a highly restrictive diet the body quickly compensated by greatly reducing basal metabolic rate which normally accounts for seventy percent of burned calories. Remington et al (1983) suggested this drop in basal metabolic rate may account for the plateau dieters seem to reach after losing an initial ten easy pounds.

In a study by Sims and Horton (1968) prisoners volunteered to dramatically increase caloric intake in efforts to gain twenty to twenty-five pounds. Many subjects failed to increase their weight. Physiological measurements demonstrated that the body had compensated for surplus caloric intake by raising basal metabolic rate. At the conclusion of the study subjects who did gain weight quickly returned to normal weight even though no restriction was placed on eating.

The number of fat cells generated in early life may be another external cause of obesity. Bjorntorp and Sjostram (1971) and Bray (1970) demonstrated a clear distinction between juvenile onset
(hyperplastic) and adult onset (hypertrophic) obesity. The two types of obesity result from separate mechanisms. Hyperplastic obesity is caused by having abnormally high numbers of fat cells. Hirsch and Kittle (1970) reported fat cell number can be elevated five-fold in obese individuals. Persons with fat cell hyperplasia are more likely to be overweight than persons with a normal number of fat cells. External factors including genetics and early nurturing patterns may facilitate the development of excess adipocytes in critical stages of growth.

Adult onset obesity appears to be caused by increased size of fat cells rather than the number of fat cells. This type of obesity results from caloric intake-expenditure imbalance in adult life. Mayer (1968) noted we are consuming fewer calories than our nineteenth century ancestors. He reported the mass introduction of labor saving devices has dramatically reduced caloric expenditures. Fisher et al (1983) and Bailey (1978) likewise suggested that obesity is primarily a result of a reduction in caloric expenditure. Increasing caloric expenditure through exercise is one factor that can be controlled.

Brownell (1982) emphasized obesity is not a single condition with a single etiology. The cure or control of obesity for some people may not be related to its cause. Brownell noted the successful treatment of obesity depends on the type of obesity and its severity. Powers (1982) reported the recommended therapy for mildly obese patients is behavior modification and exercise. Moderately overweight individuals are being treated most successfully
with clinically administered very low calorie diets combined with behavior modification. Powers (1982) reported the recommended treatment for severely obese high risk patients is surgery.

Behavior modification strategies used in weight loss classes are usually based on techniques expressed by Stuart and Davis (1972) which emphasized stimulus control. These techniques consist of altering the availability of, and accessibility to food, limiting eating to specific places, maintaining eating as a separate activity and monitoring eating behaviors. More recent behavioral approaches advocated by Mahoney (1978) include cognitive restructuring and self-reinforcement. Typical reinforcement strategies include contingency contracting and partially refunding class enrollment fees.

A growing component of weight control programs is exercise. Mayer and Stare (1955), Bailey (1978), and Fisher et al (1983) noted people underestimate the importance of exercise on weight control. People often only consider the relatively small immediate calorie expenditure of exercise. Mayer suggest the biggest impact of exercise may be its suppressant effect on appetite. Brownell (1982) also observed that twenty-five to thirty-five percent of weight loss achieved by dieting consists of lean tissue. The loss of muscle tissue decreases future potential to expend calories. Osci and Hollosy (1969) demonstrated that by combining diet with exercise, the loss of lean tissue could be reduced to account for only 5 percent of total weight loss. Dohlkoetter, Callahan and Linton (1979) reported participants assigned to an eight week program of diet and exercise lost significantly more weight (p<.05, x=6 lbs) than subjects assigned to dieting alone.
Early studies on the prognosis of long-term weight control were bleak. Stunkard (1959) suggested most people in weight control programs do not remain in treatment. Most of those who do stay in treatment do not lose weight and those who do lose weight almost always regain it. More recent analyses are less pessimistic.

Contemporary reviews of over 100 controlled studies of behavioral weight control programs have been conducted by Foreyt, Goodrick and Gotto (1981), Jeffrey, Wing and Stunkard (1979), Wing and Jeffery (1979), Mahoney (1978); Wilson and Brownell (1980), and Brownell Heckerman and Westlake (1979). Their reviews indicate a high degree of consistent outcomes. Behavior modification programs lead to an average loss of eleven pounds in a ten to twelve week program. Brownell et al (1979) and Foreyt et al (1981) noted the consistancy of weight loss is remarkable given differences in fees, training of therapists, and characteristics of the patients.

Average weight loss in programs utilizing additional components was higher slightly than programs utilizing only behavior modification. Dohlkoetter et al (1979) noted that exercise tended to significantly (p<.05), increase weight loss. Stalonas, Johnson and Christ (1978) also noted significantly greater (p<.001) weight loss in individuals assigned to a program of dieting plus exercise. Pearce, LeBow and Orchard (1981) reported additional significant (p<.05) weight loss when spouses of obese subjects were included in the weight loss classes. Jeffery, Thompson and Wing (1978) demonstrated the significant (p<.05) impact of financial contracting for weight loss. Craighead, Stunkard and O'Brien (1981) and Jeffery et al
(1978) reported lengthening treatment also significantly (p<.01 & p<.05), increased average weight loss.

Comprehensive surveys of studies with one year or more follow-up have been conducted by Foreyt et al (1981) Stunkard and Penick (1979), and Wilson and Brownell (1980). The average weight loss after one year was approximately ten pounds. However, weight loss was highly variable among subjects.

An important caveat of obesity research is that overweight patients in formal programs may differ from overweight individuals not enrolled in weight control classes. Survey research by Schachter (1982) indicates the long term self-cure of obesity in non-therapeutic populations is a relatively common event. He theorized participants in formal weight reduction programs are more likely to be individuals who were unsuccessful in previous weight loss attempts. The success rates for weight control in the general public, therefore, is probably higher than generally reported in formal programs.

**Health-Related Locus of Control Literature**

Locus of control is a psychological construct based on Rotter's (1954) Social Learning Theory. Social Learning Theory rejects extreme behavioral and psychoanalytic explanations of human action. Social learning theorists postulate behavior is influenced by both environmental stimuli and cognitive processes that mediate and interpret environmental influences. Perceptions of causality, control and efficacy are thought to play a major role in behavior patterns.

Locus of control is a perception or generalized expectancy that measures to what degree a person believes that humans control
reinforcement. It measures the belief that by doing behavior X reinforcement Y will occur. People with an internal locus of control believe reinforcement and outcomes are the result of personal actions, efforts and choices.Externals believe reinforcement and outcome are caused by luck, chance, fate, powerful others or forces beyond personal control. Some locus of control scales subdivide external orientation between "powerful others" and "luck-fate" perceptions.

A variety of locus of control scales have been developed since 1966. One instrumentation strategy is to utilize a forced-choice format where respondents must choose one of two contradictory statements. One statement suggest internal and the other external control of reinforcement. Typically the external and internal statement has assigned high or low numerical values. After a subject has completed the questionnaire the appropriate numbers are added and/or averaged to assign an overall locus of control orientation score.

Another instrumentation strategy is to have subjects respond in a Likert-scale format to both internally and externally-worded statements. Strongly agreeing with an external statement gives the subject a high score. Strongly disagreeing with an internal state is reversed scored to, again, give the respondent a high score. Total responses are added or averaged to determine a person's overall locus of control orientation.

Tobias and McDonald (1977) suggested the validity of locus of control scales be determined by measuring internal consistencey, item
to total correlation, social desirability bias and the amount of variance accounted for by each item. Internal consistency assesses whether subjects respond to locus of control items in a consistent manner. Items to total scale correlation determines if response to an individual item is consistent with the overall score. Social desirability testing seeks to determine whether people answer on the basis of their true feelings or what they perceive to be the socially approved response. The amount of variance accounted for by each item is established by factor analysis.

Wallston and Wallston (1978a) suggested that good locus of control items should have a mean score that is near the midpoint of possible responses. They stated that good items elicit a wide distribution of responses. Paying careful attention to item wording was also mentioned by Wallston and Wallston as an important instrumentation issue. Cherlin and Bourgue (1974) observed that locus of control scales sometimes contain both first person "I can control" and plural "people can control" statements. Cherlin and Bourgue contended that locus of control scales should consist of one type or the other but definitely not both. Bandura (1977) reported the need to differentiate between outcome efficacy and perceived self-efficacy language in conducting locus of control research.

General locus of control scales have been developed by Rotter (1966), Nowicki and Strickland (1973), Lefcourt (1976), and Phares (1976). These are broad scales not designed to measure causal views on specific topics such as health, economic status, or political control. Rotter (1975) suggests that to improve the predictive power of locus of control it is necessary to develop area-specific scales.
In recent years a number of health-specific loci of control have been developed by Wallston and Wallston, Kaplan and Maides (1976), Wallston and Wallston (1978), Kirsch (1972), and Parcel and Meyer (1978). These scales measure people's beliefs of what or who determines their health status. Wallston (1982) reported health internals believe behavior and lifestyle are the prime determinants of health. He suggested internals have the greatest chance of acting in health enhancing manners.

According to Wallston (1982) health locus of control beliefs change depending on personal experience. He suggested health locus of control is not an enduring personality trait and labeling a person external or internal should only be a temporary designation that may not be true at other times or situations. Wallston and Wallston (1978) observed some subjects responded to health locus of control scales by strongly agreeing with both internally and externally-worded statements. Wallston (1982) explained these contradictory responses by suggesting it is not atypical to simultaneously espouse both internal and external health locus of control beliefs. Given the variety of health issues, he suggested causation may be attributed internally for certain illness, and externally for others. A clearer picture of people's health locus of control can be obtained by using topic-specific loci of control.

A number of health-related locus of control studies have been conducted using a variety of general and health specific locus of control scales. Studies by Mlott and Mlott (1975), and Rosenbaum and
Argon (1979) indicated that nonsmokers and exsmokers were significantly (p<.01 & p<.006) more internal than smokers. James, Woodruff and Werner (1965) demonstrated that males who believed the Surgeon General's 1964 report on smoking and health and quit had significantly (p<.05) higher internal scores than those who believed the report but remained smokers. Although Coan (1973) did not observe a significant (p<.05) internal-nonsmoking correlation, the majority of studies suggest that internals are more likely to avoid smoking in order to improve health status.

Investigations by Sonstroem and Walker (1973) indicated that internal college males were significantly (p<.01) more likely to participate in voluntary exercise and held a more positive attitude toward physical exercise than external subjects. Williams (1972a) and (1972b) reported that internal high school students reported significantly (p<.05 & p<.05) greater use of seatbelts and were more likely to seek preventive dental care than external counterparts. Rosenblum, Stone and Skipper (1981) observed no correlation between locus of control orientation and maternal compliance in immunization of preschoolers. Parcel, Nader and Rogers (1980) reported that internal-oriented children who placed a high value on health, reported significantly (p<.0025) less illness than classmates.

Correlational analysis of locus of control orientation as a predictor of contraceptive behavior has been contradictory. Research by Lundy (1972) and McDonald (1976) suggest that significantly (p<.01 & p<.05) more female internals practiced effective birth control. Harvey (1976), however, found no significant (p<.05)
difference between contraceptive behavior of external and internal female college undergraduates. Herald and Goodwin (1979) observed the same lack of a significant \( p < .27 \) difference between internal and external adolescents.

Arakelina (1980) theorized locus of control would be a good predictor of compliance behavior. Compliance-related locus of control research has been equivocal. Marston (1970) observed a significant \( p < .05 \) relationship between locus of control and compliance in myocardial patients. Kirscht and Rosenstock (1977) observed internals were more likely to take hypertensive medication but they failed to demonstrate significance \( p < .05 \).

Locus of control research on weight control has produced an unclear picture. Descriptive research by O'Bryan (1972) suggested that overweight women were not significantly \( p < .05 \) more external than other women. Balch and Ross (1975), Mann and Marston (1972), and Chavez and Michaels (1980) found that internality was significantly correlated with successful weight reduction and completion of a weight control class. The research of Bellack, Rozensky, and Schwartz (1974) and Tobias and MacDonald (1977) suggested locus of control was not a significant \( p < .05 \) predictor of successful weight loss. Isbitsky (1981) reported there was only a slight correlation between locus of control and eating behavior. Cohen and Albert (1978) concluded from their research that externally focused obese patients were at highest risk for treatment failure. Wallston and Wallston, Kaplan and Mades (1976) also failed to find significant \( p < .05 \) weight loss differences between internals and
externals. Their research, however, indicated that subjects reported significantly (p<.05) greater satisfaction when placed in programs that corresponded to their locus of control orientation. Internals placed in a self-directed program did lose more weight than internals in a highly structured program.

The use of a four item weight locus of control scale was an innovation in Saltzer's (1978) weight control research. This instrument demonstrated its superiority over other locus of control scales in the ability to predict behavioral intention to lose weight. The results support Wallston's (1982) and Rotter's (1975) observations on the efficacy of using topic specific instruments.

One potential problem in the Saltzer weight locus of control scale was the failure to restrict scale items to either the cause or cure of obesity. For many individuals the predisposition to obesity may be the result of external variables while control is achieved by internal factors. One of Saltzers' scales items was the statement "Being the right weight is largely a matter of good fortune". Such a statement may or may not be true depending on whether it refers to the cause or control of obesity. Failure to limit questions to the treatment of obesity makes the Saltzer scale an inappropriate instrument for this study. Saltzer also only measured the relationship of weight locus of control to behavioral intent rather than actual weight loss.
Self-Efficacy Literature

The self-efficacy construct is also based on Social Learning Theory which emphasises the central role of cognitions in the behavioral process. Foreyt and Rathjen (1978) stated that behavior is not merely a function of inner psychological forces nor is it a passive reaction to external pressure. Bandura (1980) noted other psychological theories of behavior neglect these intervening cognitive processes that link knowledge with response. Social learning theory stresses the importance of cognitive processes which interpret environmental stimuli. Bandura (1977) proposed self-efficacy theory as the major mediating cognitive process between knowledge, environmental stimuli and action.

Self-efficacy was defined by Bandura (1980) as judgements of the likelihood that one can organize and execute given actions required to deal with prospective situations. Self-efficacy was defined also as the conviction that one can successfully execute behaviors required to provide desired outcomes. Bandura (1980) and Butler (1982) observed, that as a general rule, people do not try to perform behaviors that they think exceed their ability. Bandura (1977) and Smedsland (1978) suggest that self-efficacy determines: 1) whether or not we initiate coping behaviors; 2) how hard we try to perform the behavior and 3) how long we try to perform the behavior while encountering obstacles and unpleasant experiences.

Having realistic self-efficacy perceptions is necessary for acquiring many health behaviors. Bandura (1980) noted people who over-estimate their capabilities will be placed in a frustrating,
embarrassing or dangerous situation of not being able to perform behavior in a given situation. People who underestimate their ability will fail to initiate positive and rewarding behaviors.

Self-efficacy theory may contribute to health education because of its potential to explain health behavior. Bandura (1977) proposed self-efficacy as the common underlying cognitive process that explains and predicts behavior change. It provides a plausible explanation of how learning experience influences behavior. Bandura and Adams (1977) reported self-efficacy also predicts degree of behavior change. Kendall and Korgaski (1980) suggested self-efficacy will become an important dependent variable in behavioral research and that diversified attempts to change behavior are effective to the degree they influence people’s self-efficacy expectations. Goldfried and Robins (1982) noted because self-efficacy can be quantified and measured it is a useful research tool.

Bandura (1977) reported efficacy perceptions are based on four groups of factors. The first and most influential source of perceived self-efficacy is past experience in specific situations. When individuals succeed in executing a given task the belief in ability to repeat the behavior is increased. When faced with new prospective situations self-efficacy perceptions are based on past performances in similar or related situations. Peltz (1982) noted a reciprocal relationship between successful performance and self-efficacy. High perceptions of self-efficacy tend to facilitate successful execution of behaviors which then raise future efficacy expectations.
The second determinant of self-efficacy is vicarious experiences or observing others successfully execute behaviors. As people see teachers or peers succeed, cognitive processes increase perceptions that they also can execute the observed behavior.

The third source of self-efficacy expectations is verbal persuasion. The arguments, logic, encouragement and expressed beliefs of others can increase or decrease our perceptions of self-efficacy.

The final influence on self-efficacy is physiological state. When people are about to perform a specific behavior, the body's physiological status (heart rate, presence of adrenalin, etc.) impacts perceptions of self-efficacy. Bandura (1982) noted people read these physiological manifestations of stress as ominous signs of vulnerability to failure or dysfunction. As with direct experience, the relationship between physiological state and self-efficacy is reciprocal.

Early self-efficacy research concentrated on phobic and avoidance behaviors. In studies with snake phobics Bandura, Adams, and Beyer (1977) demonstrated the ability of self-efficacy measurements to predict treatment outcomes. Perceived self-efficacy and actual performance were significantly (p<.05) higher for subjects assigned to participant modeling than for those who only observed modeling. The self-efficacy scores and performance of both groups exceeded the non-treatment control group scores. In a study of agoraphobics Bandura, Adams, Hardy and Howell (1980) likewise demonstrated that the vicarious experiences group had significantly (p<.05) higher self-efficacy and behavior scores than the control group. Bandura
et al (1980) and Bandura (1980) also observed that by imagining 
mastery, phobic subjects could increase perceptions of self-efficacy. 

Research by Bandura et al (1980) demonstrated that perceived 
self-efficacy scores were even more predictive for performance than 
past behavior. Goldfried and Robins (1982) noted that self-efficacy 
may be superior predictors over actual past performance because self-
efficacy perceptions are the resulting products of a cognitive pro-
cess that takes place after past experience or performance. 

More recent studies have explored the predictive power of self-
efficacy on a variety of behaviors. Bandura and Schunk (1981) 
demonstrated that self-efficacy could be cultivated in slow learning 
students by having them set and achieve small subgoals. Students 
assigned to the treatment of using small subgoals progressed signifi-
cantly (p<.05) faster in self-directed math learning and achieved 
greater mastery of math skills than subjects assigned to a group that 
only set a long-term endpoint goal. Barling and Snipelisky (1983) 
demonstrated that performance accomplishments to be a stronger deter-
minant of children's academic self efficacy belief than teacher mod-
eling. 

Ryckman, Michael, Thorton and Cantil (1982) developed a physical 
self-efficacy scale that significantly (p<.05) predicted subjects' 
ability to perform specific athletic skills. Shelton and Mahney 
(1978) reported that weight lifters who were asked to "psych 
themselves" showed significantly greater (p<.05) ability to lift 
weight than controls. Subjects reported that repeating statements of 
self-efficacy was a common method of "psyching up." Barling and Abel
(1983) demonstrated that perceived self-efficacy to execute tennis skills significantly ($p < .01$) correlated with performance. Response outcome beliefs did not correlate with the twelve aspects of observed tennis skills.

The research of Bradley, Poser, and Johnson (1980) demonstrated that perceived self-efficacy for weight loss was highly correlated with the actual number of pounds lost. Fifteen patients in a conditioned satiety program were asked to predict how many pounds they expected to lose in a seven week period. Weight loss expectancy values were calculated by multiplying expected weight loss in pounds by subjects' confidence rating (ranging from 1 to 100%) that they would, indeed, achieve their expected weight loss in a seven week period. Subjects outcome expectations significantly correlated with weight loss ($r = .67, p < .01$) for all fifteen subjects and ($r = .73, p < .01$) for the twelve finishers of the program. Bradley et al. (1980) noted this weight loss expectancy was the only one of thirteen characteristics that significantly correlated with weight loss. One of the variables that did not predict success was the number of pounds lost in previous weight loss attempts. This supports Bandura's (1977) contention that self-efficacy was more predictive of outcome than past experience.

Smoking cessation research has demonstrated the predictive utility of self-efficacy theory. Condieotte and Lichtenstein (1981) demonstrated posttreatment self-efficacy score's ability to predict smoking cessation rates. Individuals with high self-efficacy scores remained abstinent at a significantly ($p < .001$) higher rate than
subjects with low self-efficacy scores. Smoking cessation research by DiClemente (1981) also demonstrated that subjects with high self-efficacy scores showed significantly (p<.005) higher long-term quit rates. He also demonstrated that self-efficacy scores were predictive of what situations would lead to recidivism.

Self-efficacy theory is becoming more of an accepted basis for psychotherapy. Werner (1982) suggested that cognitive therapy is merely evaluating clients in terms of limitations and distortions in their consciousness and then helping them to bring their perceptions to a closer approximation of reality. Pessimistic self-efficacy perceptions may be real but removable barriers to health behaviors. Lazarus (1980) stated that the art and science of effective psychotherapy consists of inspiring hope and achieving self-efficacy in the client. He stated it is becoming widely recognized that sustained and positive treatment outcomes are predicated on the feeling of mastery and control the client acquires. These same feelings of efficacy may be fundamental to the process of successful weight loss.

A few studies have simultaneously examined the relationship of locus of control or outcome expectancy and self-efficacy. Maddux, Sherer and Rogers (1982) conducted research to determine if self-efficacy and locus of control are independent variables with independent effects on behavior change. Subjects read one of two communications which stated it would be either very easy or difficult to learn a specific assertive skill. Subjects in each category were next given one of two communications which stated the assertiveness skill was either highly or only minimally effective.
Results indicated that being given a high or low difficulty (self-efficacy) statement significantly (p<.0001) influenced behavioral intention to use the assertive skills. Subjects who were told the techniques were highly useful (outcome expectancy statement) also reported significantly (p<.001) more intention to use the assertiveness skill. Maddux et al (1982) observed that outcome-expectancy manipulation influenced self-efficacy expectations. Communications which reported the skill as highly effective had the significant (p<.07) influence of raising subjects' perceived self-efficacy to perform the behavior.

In a study by Davis and Yates (1982) undergraduate students were tested to see if manipulating self-efficacy and outcomes-expectancies would impact performance and depression. Subjects were given either a hard or easy anagram to solve. This was intended to impact self-efficacy perceptions. To manipulate outcome expectancy students were given fictitious graphs which showed that either most or very few peers were able to solve the anagram. Male subjects exhibited significantly (p<.05) decreased performance and depression following manipulation when self-efficacy was set low (given a graph indicating most peers solved the anagram). Davis and Yates (1982) observed that performance correlated more highly with self-efficacy than outcome expectancy.

Research by Chambless and Murray (1979) sought to measure the effect of manipulating self-efficacy perceptions among internal and external participants in a weight loss program. Weight loss subjects were given placebos in addition to standard behavior management
techniques. At the third class meeting half of the internals and externals were debriefed about the placebo and were encouraged to attribute their weight loss to personal efforts and behavioral management skills. The remainder of externals and internals were led to believe that any weight loss was primarily the result of the placebo.

Results indicated a significant (p<.001) interaction between locus of control and self-efficacy. Internals given self-efficacy communications lost significantly (p<.01) more weight than any other group. External subjects given drug-efficacy statements also lost significantly (p<.05) more weight than two remaining groups. Mean weight in remaining groups either increased or remained the same. Similar results were reported in an identical study by Chambliss and Murray (1979 b) with subjects in a smoking cessation program.

In both the Chambliss and Murray studies, the Rotter (1966) scale was used to determine locus of control. It is probable that the use of topic-specific weight locus of control would provide greater correlations between weight loss and locus of control.

**Summary**

A review of the literature revealed that obesity is a highly prevalent condition and is associated with a variety of diseases. Behavioral treatment of obesity produces consistent but modest reductions (eleven pounds) for ten-week classes. Obesity was observed to have complex etiology that differs from person to person. Brownell (1982) observed that the factors which cause, maintain and control obesity may be unrelated.
Analyses of the effect of locus of control have been conducted for a wide variety of health issues. Strickland (1978) observed that the role of locus of control may be exaggerated because significant outcomes are more likely to be reported in the literature than studies with insignificant results. This research has produced contradictory results. The variety of different scales used in health locus of control research makes comparisons between studies difficult. It was also observed that many locus of control scale items can be interpreted as measurement of self-efficacy.

Self-efficacy theory is a relatively new construct that is proposed as the major mediating cognitive process between knowledge, environmental stimuli and action. Self-efficacy perceptions are influenced by; 1) past experience in similar situations; 2) vicarious experience; 3) persuasion by others; and, 4) physiological state. Most perceived self-efficacy research has been conducted with phobic and avoidant type behaviors. Selected studies did suggest that self-efficacy perceptions do predict outcomes in smoking and weight loss programs.

No weight loss studies were found where the subjects' perception of self-efficacy was measured prior to treatment. While self-efficacy can be manipulated to some degree, existing self-efficacy perception may correlate with subsequent performance. A person's pre-existing and ingrained perceptions of weight loss self-efficacy may prove to be a strong outcome predictor. Only one study in related literature was found that correlated existing self-efficacy perception with subsequent weight loss. In the Bradley et al study
(1980) the single measurement of self-efficacy was the subjects' estimated confidence of achieving a specific weight loss. A more sophisticated estimate of weight loss self-efficacy perceptions is needed.
CHAPTER III

METHODS AND PROCEDURES

For organizational purposes the methodology used in this study is described in the following sections: Research Design, Hypotheses, Subject Selection, Research Approval, Measurements and Instrumentation, Condition of Testing, Data Analysis and Summary of Methods and Procedures.

Research Design

This study is a descriptive-correlational analysis of the relationship between weight locus of control and perceived self-efficacy. A secondary analysis determined the predictive power of these two variables for subsequent weight loss. In this second analysis, weight locus of control and perceived self-efficacy were treated as independent variables that predicted variance in the dependent variable of subsequent weight loss in a ten week period.

At the beginning of the ten-week Heart Association "Slim for Life" classes, eighty-three subjects were given three tests to determine weight locus of control orientation, strength of self-efficacy perceptions to control eating behavior and confidence in achieving predicted loss. Subjects were weighed at the first class. At the conclusion of the ten week course subjects were again weighed. The temporal sequence of the study is presented in Figure
2. Appropriate statistical analyses determined the relationship between variables of interest.

Figure 2

Temporal Sequence of Research Design

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<td>b. Locus of control orientation Measured</td>
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<td>c. perceived self-efficacy measured</td>
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Hypotheses

The first research question of this study is whether weight locus of control and perceived self-efficacy are independent beliefs among participants in a weight management program. The null hypothesis states that the two variables are independent and have no correlation to each other. An alternative hypothesis is that a (positive, negative or curvilinear) relationship exists between the two variables.

The second research question is to determine if weight locus of control and perceived self-efficacy are predictive of successful weight loss. The null hypotheses being tested are:

1) There is no correlation between weight locus of control and weight loss.

2) There is no correlation between perceived self-efficacy and weight loss.
The alternative hypothesis is that weight loss is associated with one, or both, of the independent variables.

**Subject Selection**

If data are normally distributed and have high variance, it is not necessary to have a large sample size to calculate the Pearson-r statistic and perform analysis of covariance. A sufficient number of weight loss classes was utilized to insure sufficient sample size based on pilot test variance.

Subjects consisted of women participating in a Utah Heart Association weight loss, "Slim for Life" class. Males and females on medication for weight control were not included in the study. Pregnant subjects were omitted also from analysis.

The average Heart Association weight loss class consists of between fifteen to thirty subjects. Six classes were included in the study to meet analysis requirements. Classes were held weekly for ten sessions of instruction. Each class lasted approximately one and one half hours.

**Research Approval**

After a preliminary locus of control instrument was constructed, it was submitted to the Ohio State University Human Subjects Review Committee. Formal testing of subjects was initiated after clearance from the Human Subjects Committee was granted. The Human Subject Committee requested that all participants sign a copy of HS-027 form (see Appendix A), and that participants not be given the results of their psychological scores. The committee also requested a copy of the written instructions given to participants and a letter approval
from the Utah Heart Association (see Appendix B). These conditions were met. The Human Subjects Committee's letter of approval is included as Appendix C.

**Measurement and Instrumentation**

Several important principles guided the development of the weight locus of control scale; these included:

1) Items selected for the test instrument needed to demonstrate reliability. This was established on the basis of test-retest scores on a pilot instrument. A period of three weeks separated testing from retesting. Average r scores for items was .85.

2) Items used in the weight locus of control scale could not be interpretable as statements of perceived self-efficacy. This was determined by a panel of experts.

3) All locus of control items were written in plural form. No first person statements were used.

4) Items selected for the weight locus of control scale referred to the control rather than cause of obesity.

5) Appropriateness of the readability level was determined by the panel of experts.

6) Items selected for the weight locus of control scale must have demonstrated their ability to discriminate. Hopkins and Glass (1978) reported the greatest potential for high correlations occur when responses to each item are highly variable. Items demonstrating limited ability to discriminate internals from externals were excluded from the final instrument.
7) Locus of control scales should consist of near equal amounts of internal and external statements. The pilot instrument consisted of eight internal and eight external statements. The three statements from each category that demonstrate good discrimination were used in the final instrument.

A panel of experts evaluated each item in the locus of control scale for clarity, syntax and content validity. Panelists were provided with a scoring sheet and instructions to assist them in evaluating sixteen potential locus of control items (see Appendix D). Members of the panel of experts recommended that three items not be included in the final weight locus of control instrument. Additional suggestions for improvement were incorporated into the final draft of the instrument.

The panel of experts consisted of the following individuals:
Robert Kaplan Ph.D. Professor of Health Education, The Ohio State University, Columbus, Ohio.
Moon Chen Ph.D. Associate Professor of Health Education, The Ohio State University, Columbus, Ohio.
Herman Peine Ph.D. Psychologist, Timpanogus Mental Health Center, Provo, Utah

The pilot test instrument was administered to fifty participants in Brigham Young University undergraduate history and computer science classes during December, 1983. Reliability was determined by retesting these same individuals three weeks later. The Pearson product-moment statistic established test-retest correlations. The average item reliability coefficient was $r = .85$. Matching was done
by social security numbers. The panel of experts indicated if correlation scores of any item should preclude its use in the final instrument. Selection of the final six locus of control items was based on their ability to generate high variation. The final weight locus of control instrument is presented in Appendix E.

Perceived self-efficacy in the study was measured with an existing scale. Correspondence was initiated with Dr. John Foreyt, Assistant Professor in the Baylor College of Medicine, and Principal Investigator of the Diet Modification Clinic, National Heart and Blood Vessel Research and Demonstration Center, Houston, Texas. Dr. Foreyt was aware of two weight loss self-efficacy scales that had been used to assess patients self-efficacy beliefs at the Diet Modification Clinic. No published research was available on either scale. The "Eating Pattern Questionnaire", (see Appendix F), was designed for the general population and scored in a similar fashion to locus of control scales. It was selected as the most appropriate instrument for use in this study. This 30-question instrument asks respondents to express the degree of confidence in their ability to control eating in difficult situations.

Conditions of Testing

At the beginning of the first weight loss class, subjects were asked to participate in the research project. Subjects were be informed that their involvement consisted of taking short personality tests and providing program-entry and conclusion body weights. Confidentiality was insured. Class members were encouraged to participate but were told involvement was voluntary. Subjects were given a
copy of the HS-027 consent form to be signed if they agreed to participate.

The weight locus of control and perceived self-efficacy instruments were administered by class instructors. Each instructor was given written instruction for data collection (see Appendix C). Each instructor read aloud the testing instructions which were given also to subjects (see Appendix H). Participants had their body weight recorded by Heart Association instructors at the beginning of the course. Achievable weight loss in the ten weeks was calculated using a standard developed by the Heart Association. Additional demographic data were collected (see Appendix I).

At the conclusion of the final class, subjects were again weighed. Subjects who dropped out of the class were contacted by phone and asked how many pounds they have gained or lost since attending the last class. Only measurements taken in the last twenty-four hours were acceptable. Subjects unable to report their current body weight were asked to weigh themselves the following morning and subsequently were contacted by phone. A total of five follow-up calls was made to individuals unable to report their current weight. Subjects who dropped out of the class were included in the statistical analysis.

Data Analysis

Collected information was transferred to computer tape for data analysis. The six locus of control items were combined and averaged to obtain an over-all score. Responses to the five point Likert-scale were scored as follows for externally worded statements.
Strongly Agree  1 = .00
Agree            2 = .25
Neutral          3 = .50
Disagree         4 = .75
Strongly Disagree 5 = 1.00

Internal responses were reverse-scored using the same scale.
The higher the resulting score the more internally-oriented were the subjects.

Perceived self-efficacy scores were obtained by totaling subject responses from the 30 test items. Items were scored as 1.00, .75, .50, .25 and .00. The higher the score the greater was the perceived self-efficacy. The subject's average response was substituted for any item marked "not applicable". Potential total scores ranged from zero to thirty. The final perceived self-efficacy and locus of control scores were in the form of internal data.

Three secondary measurements of perceived self-efficacy were the subjects' best estimate of how many pounds they expected to lose. Subjects were asked to rank, on a scale from one to five, their overall confidence that they would reach their predicted weight loss goal. The product of these two measurements was used also as an independent variable.

A frequently omitted variable in locus of control research is the value individuals place on specific reinforcements. Reinforcement value should be an integral part of Social Learning Theory research. Rotter (1975) suggested much locus of control research is invalid because investigators failed to simultaneously examine the value placed on specific reinforcements.
It was hypothesized that voluntary participation in a weight loss program indicated that all subjects highly value normal weight. However, to detect any major differences in the value placed on weight loss, subjects were given a revised version of the Rokeach Value Inventory (see Appendix J).

An appropriate statistic to test the relationship between two sets of interval data is the Pearson-r statistic. The use of this statistical test assumes that the relationship between variables is linear. Fitz-Gibbon and Morris (1978) advocate construction of a scatter plot prior to data analysis. This would detect a possible curvilinear relationship which would preclude the use of the Pearson-r statistic.

The fundamental problem in this study was to determine the relationship between weight locus of control and perceived self-efficacy and discover if they were, in fact, distinct and separate beliefs. The null hypothesis was that the two variables were independent and had no correlation. The alternative hypothesis was that a positive, negative or curvilinear relation existed between the two variables.

An appropriate statistical analysis to describe the impact of predictive power of an independent interval variable on a dependent interval variable is analysis of covariance. This test is most appropriately used when the variables are normally distributed. Pilot testing of the instruments insured selection of variables that most closely approach the normal distribution.

The independent or predictor variables in this analysis were weight locus of control and perceived self-efficacy scores. The
dependent measurement was the percent of achievable weight loss realized in a ten week period. This measurement is calculated by dividing actual weight loss by achievable weight loss in a ten week period. Heart Association personnel assisted subjects in calculating ideal body weight to assure no individual over-estimated his/her achievable weight loss potential. Additional dependent variables included the total number of pounds lost and successful completion of the "Slim for Life" class (see Appendix I).

The second research hypothesis was that an internal locus of control and high perceptions of self-efficacy would have significant effect on weight loss. Analysis of covariance demonstrated if the dependent variance was effected by measures of locus of control and perceived self-efficacy. The null hypothesis being tested was that locus of control and perceived self-efficacy have no significant effect on weight loss outcomes. The alternative hypothesis was that weight loss is significantly affected by one or a combination of the independent variables. Pearson r correlations were used also to measure the degree of relationship between independent and dependent variables.

**Summary of Methods and Procedures**

In April 1984, eighty-three subjects in a Utah Heart Association "Slim for Life" weight loss class were recruited into this descriptive correlation study of health behavior. Subjects were given psychological tests during the first of ten class sessions to determine weight locus of control orientation, perceived self-efficacy to perform specific weight management behaviors and overall
confidence in losing weight. Current and achievable body weights were calculated. Final weight loss was recorded at the last class.

Correlative analysis established the degree of independence between weight locus of control and perceived self-efficacy. Further analysis determined the ability of these two variables to predict successful weight loss.
CHAPTER IV
RESULTS

To describe the results of the study, this chapter will be divided into three sections. The first provides a descriptive analysis of research participants and the major independent and dependent variables. Section two presents the analysis of the relationship between weight locus of control and perceived self-efficacy. The final section describes the relationship of locus of control and perceived self-efficacy with the dependent weight loss variables. The research questions will be restated in sections two and three and followed by explanations of the statistical analyses applied. The results of analyses will be presented with tables where appropriate.

Descriptive Analysis of the Sample Population

A total of eighty-five individuals volunteered to participate in the study. This self-selected population represented approximately half the participants in six "Slim for Life" classes. The one male subject and a fifteen year old were excluded from analysis. This left a total sample of eighty-three females for analysis.

Age

The average program participant was forty-two years of age. Age distribution had a standard deviation of thirteen years. The oldest subject was seventy-two and the youngest was twenty-four.
Education

Respondents were asked to identify the highest year of schooling completed. Table 1 presents the reported educational distribution of subjects.

Table 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attended Some High School</td>
<td>1</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Graduated from High School</td>
<td>16</td>
<td>19.3</td>
<td>21.0</td>
</tr>
<tr>
<td>Attended Some College</td>
<td>30</td>
<td>36.1</td>
<td>58.0</td>
</tr>
<tr>
<td>Graduated from College</td>
<td>26</td>
<td>31.3</td>
<td>90.1</td>
</tr>
<tr>
<td>Post Graduate Study</td>
<td>8</td>
<td>9.6</td>
<td>100.00</td>
</tr>
<tr>
<td>No response</td>
<td>2</td>
<td>2.4</td>
<td>100.00</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Employment Status

Subjects were asked to indicate current employment status. Individuals who reported themselves to be employed and a homemaker were coded as employed. A description of subjects' employment status is presented in Table 2.
Table 2

Employment Status

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employed</td>
<td>44</td>
<td>53.0</td>
<td>53.0</td>
</tr>
<tr>
<td>Homemaker</td>
<td>33</td>
<td>39.8</td>
<td>92.8</td>
</tr>
<tr>
<td>Student</td>
<td>1</td>
<td>1.2</td>
<td>94.0</td>
</tr>
<tr>
<td>Retired</td>
<td>5</td>
<td>6.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Marital Status

The marital status of subjects is presented in Table 3.

Table 3

Marital Status

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>56</td>
<td>67.5</td>
<td>67.5</td>
</tr>
<tr>
<td>Single/Divorced</td>
<td>20</td>
<td>24.1</td>
<td>91.6</td>
</tr>
<tr>
<td>Widowed</td>
<td>2</td>
<td>2.4</td>
<td>94.0</td>
</tr>
<tr>
<td>No response</td>
<td>5</td>
<td>6.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Current Weight

The mean weight of class participants was 171 pounds. The distribution of weight had a standard deviation of 35 pounds. The heaviest participant weighed 258 pounds. The lightest was 118.
Value Placed on Weight Loss

Subjects were asked to rank the relative value they placed on twenty different values that included good health and a pleasing personal appearance (see Appendix J). Subjects placed a number one next to their value of greatest importance and continued numbering until a number twenty was placed by the value they considered least important.

Good health received an average ranking of 5.6. Attractive appearance had a average ranking of 12.2. The value placed on health and appearance did not seem to have any correlation with locus of control or perceived self-efficacy. The individuals with the fifteen highest locus of control scores ranked health as 5.8 and appearance as 10.8. The fifteen subjects with the lowest locus of control scores ranked the two values as 6.8 and 9.9 respectively. The distribution of values did not appear to relate to locus of control.

Weight Locus of Control

Weight locus of control orientation was determined by subjects' responses to a six-item scale (see Appendix E). The higher the score the more external the subjects' weight locus of control orientation. Potential scores ranged from zero to one hundred. The mean locus of control orientation was 36.7 with a standard deviation of 11.2. The highest response was 62.5. The lowest was zero.
Perceived Self-Efficacy

Subjects' perceptions of being able to control eating behavior was measured by the Eating Pattern Questionnaire (see Appendix F). Three secondary measurements of self-efficacy included the subjects' best estimate of the number of pounds they expected to lose in ten weeks and their relative confidence, on a scale of one to five, that they would, indeed, lose their predicted number of pounds. The product of multiplying estimated weight loss with degree of confidence (5=very confident, 4=confident, 3=somewhat confident, 2=uncertain, 1=very uncertain), was used as the final measurement of perceived self-efficacy.

Potential Eating Pattern Questionnaire scores ranged from zero to thirty. The average response was sixteen and the standard deviation of scores was 4.4. Scores ranged from 5.4 to 30.

The mean predicted ten-week weight loss was 14 pounds. The distribution of predicted weight loss had a standard deviation of 3.9 pounds. The highest predicted loss was 25 pounds and lowest was five.

The subjects' expressed confidence in reaching their predicted weight loss is presented in Table 4.
Table 4

Confidence in Achieving Weight Loss

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Confident</td>
<td>32</td>
<td>38.6</td>
<td>38.6</td>
</tr>
<tr>
<td>Confident</td>
<td>29</td>
<td>34.9</td>
<td>73.5</td>
</tr>
<tr>
<td>Somewhat Confident</td>
<td>21</td>
<td>25.3</td>
<td>98.8</td>
</tr>
<tr>
<td>Uncertain</td>
<td>1</td>
<td>1.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Very Uncertain</td>
<td>0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The final self-efficacy variable (predicted weight loss \( \bar{X} \) confidence value) had a mean of 37.8 with a standard deviation of 32.0. Scores on this variable ranged from 0 to 185.

Program Outcomes

The three dependent variables of interest in this study were number of pounds lost, percentage of weight loss goal achieved, and attendance in the "Slim for Life" classes.

The mean weight loss for subjects was 8.9 pounds. The standard deviation for weight loss was 6.8 pounds. The largest loss was 37 pounds. One individual gained two pounds during the program.

The average subject achieved 69 percent of her predicted weight loss. The standard deviation for percent of predicted weight loss was 51. Scores ranged from 0 to 247 percent achievement of predicted loss.
Program Attendance

Program attendance was divided into the categories of perfect attendance (excused absences not counted), attending five to nine classes and attending four or fewer classes. Program attendance is presented in table 5.

Table 5

Program Attendance

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect Attendance</td>
<td>53</td>
<td>63.9</td>
<td>63.9</td>
</tr>
<tr>
<td>Attended 5-9 classes</td>
<td>14</td>
<td>16.9</td>
<td>80.8</td>
</tr>
<tr>
<td>Attended 4 or fewer</td>
<td>16</td>
<td>18.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Age as a Confounding Factor

Age is the single most significant predictor of overall health status. The correlation between age and health problems is a potential confounding factor that must be accounted for.

Epidemiologic evaluations of obesity and overweight reveal a consistent correlation between age and weight. Analysis by Reiber and Kan (1982) demonstrated the proportion of overweight women increases monotonically to the late middle age (55-64) before leveling off. It is possible that the independent and dependent variables in this study have different distributions according to age.
The subjects were divided into four age groups in order to detect age-related differences in the variables of interest. Table 6 shows the distribution of independent variables according to age.

Table 6

Age Distribution of Independent Variables

<table>
<thead>
<tr>
<th>Age</th>
<th>Locus of Control</th>
<th>Self Efficacy</th>
<th>Confidence</th>
<th>Prediction times</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29 (n=13)</td>
<td>x̄=331</td>
<td>x̄=16.6</td>
<td>x̄=4.2</td>
<td>x̄=32.8</td>
</tr>
<tr>
<td></td>
<td>SD=133</td>
<td>SD=5.7</td>
<td>SD=.83</td>
<td>SD=35.0</td>
</tr>
<tr>
<td>30-39 (n=28)</td>
<td>x̄=396</td>
<td>x̄=16</td>
<td>x̄=4.1</td>
<td>SD=39.8</td>
</tr>
<tr>
<td></td>
<td>SD=101</td>
<td>SD=4.2</td>
<td>SD=.81</td>
<td>SD=39.8</td>
</tr>
<tr>
<td>40-49 (n=15)</td>
<td>x̄=343</td>
<td>x̄=17.2</td>
<td>x̄=4.2</td>
<td>x̄=42.7</td>
</tr>
<tr>
<td></td>
<td>SD=99</td>
<td>SD=4.0</td>
<td>SD=1.0</td>
<td>SD=24.1</td>
</tr>
<tr>
<td>50 and over (n=27)</td>
<td>x̄=362</td>
<td>x̄=15.1</td>
<td>x̄=4.1</td>
<td>x̄=35.9</td>
</tr>
<tr>
<td></td>
<td>SD=155</td>
<td>SD=4.2</td>
<td>SD=.7</td>
<td>SD=25.3</td>
</tr>
</tbody>
</table>

Women in the 40-49 age group appeared to have slightly higher perceptions of self-efficacy and internal locus of control orientation. These small differences may be accounted for the small cell size (n=15) in that age group. The independent variables did not appear to be influenced by age. Table 7 reveals a similar lack of variance among the age-group dependent variables.
Table 7

Age Distribution of Dependent Variables

<table>
<thead>
<tr>
<th>Age</th>
<th>Pounds Lost</th>
<th>% of Predict Loss</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>20–29 (n=13)</td>
<td>x̄=7.7</td>
<td>x̄=71</td>
<td>x̄=1.8</td>
</tr>
<tr>
<td></td>
<td>SD=7.1</td>
<td>SD=75</td>
<td>SD=.83</td>
</tr>
<tr>
<td>30–39 (n=28)</td>
<td>x̄=9.0</td>
<td>x̄=68</td>
<td>x̄=1.4</td>
</tr>
<tr>
<td></td>
<td>SD=8.3</td>
<td>SD=59</td>
<td>SD=.74</td>
</tr>
<tr>
<td>40–49 (n=15)</td>
<td>x̄=10.2</td>
<td>x̄=82</td>
<td>x̄=1.6</td>
</tr>
<tr>
<td></td>
<td>SD=5.1</td>
<td>SD=41</td>
<td>SD=.89</td>
</tr>
<tr>
<td>50 and over (n=27)</td>
<td>x̄=8.6</td>
<td>x̄=72</td>
<td>x̄=1.4</td>
</tr>
<tr>
<td></td>
<td>SD=5.8</td>
<td>SD=48</td>
<td>SD=.768</td>
</tr>
</tbody>
</table>

Research Question I

The first major research question of this study was to determine if weight locus of control and perceived self-efficacy were independent beliefs among participants in a weight control program. The null hypothesis being tested was that the variables were independent and no relationship existed between them.

The SPSS program for calculating Pearson-r correlations was utilized to examine the relationship between locus of control and self-efficacy as separately measured by the Eating Pattern Questionnaire, predicted number of pounds lost, confidence in achieving weight loss, and predicted loss times confidence. Results of these calculations are presented in Table 8.
Table 8
Pearson Correlation Coefficients of Weight Locus of Control with Select Measurements of Perceived Self-efficacy

<table>
<thead>
<tr>
<th>Locus of Control By Eating Pattern</th>
<th>Locus of Control By Predicted Weight Loss</th>
<th>Locus of Control By Confidence In Weight Loss</th>
<th>Locus of Control By Confidence Times Predicted Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson-r = -.22</td>
<td>.06</td>
<td>-.13</td>
<td>-.08</td>
</tr>
<tr>
<td>p=</td>
<td>.021</td>
<td>.290</td>
<td>.117</td>
</tr>
</tbody>
</table>

Very low correlations were observed between locus of control and the measures of perceived self-efficacy. The highest and only significant observed correlation was between locus of control and the Eating Pattern Questionnaire. The Pearson r value was .22 at a p value of .021. Based only on this correlation between locus of control and this variable, the null hypothesis should be rejected. The other Pearson r correlations, however, were approximately .10 at much higher p values. For these measures of perceived self-efficacy, there is insufficient evidence to reject the null hypothesis that weight locus of control and perceived self-efficacy are independent variables.

Research Question II

The second major research question was to determine if, and to what extent the independent variables of weight locus of control and perceived self-efficacy predict success in a weight loss program. The null hypothesis was that the independent variables were not related to number of pounds lost, percent of predicted weight loss goal achieved, or program attendance.
Locus of control, perceived self-efficacy, predicted weight loss, and predicted weight loss multiplied by confidence were used as covariates in an analysis of covariance. Since there were only four values for confidence of weight loss, that variable was entered into the analysis of covariance as a main effect.

Results of using the percent of predicted weight loss achieved as the dependent variable in an analysis of covariance are presented in Table 9.

Table 9

Covariate Analysis of the Percent of Predicted Weight Loss Achieved

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Significance of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td>17.119</td>
<td>4</td>
<td>4.295</td>
<td>124.0799</td>
<td>0.001</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>0.009</td>
<td>1</td>
<td>0.009</td>
<td>0.2618100</td>
<td>0.610</td>
</tr>
<tr>
<td>Predicted Weight Loss</td>
<td>0.695</td>
<td>1</td>
<td>0.695</td>
<td>20.07283</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Perceived Self-efficacy</td>
<td>0.001</td>
<td>1</td>
<td>0.001</td>
<td>0.260243E-01</td>
<td>0.872</td>
</tr>
<tr>
<td>Confidence x Predicted Loss</td>
<td>16.969</td>
<td>1</td>
<td>16.969</td>
<td>490.2607</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Main Effects</td>
<td>1.043</td>
<td>3</td>
<td>0.348</td>
<td>10.04415</td>
<td>0.001</td>
</tr>
<tr>
<td>Weight Loss Confidence</td>
<td>1.043</td>
<td>3</td>
<td>0.348</td>
<td>10.04415</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Explained</td>
<td>18.222</td>
<td>7</td>
<td>2.601</td>
<td>75.20746</td>
<td>0.001</td>
</tr>
<tr>
<td>Residual</td>
<td>2.492</td>
<td>72</td>
<td>0.035</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>20.714</td>
<td>79</td>
<td>0.262</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

83 cases were processed. 3 cases (3.6 pct) were missing.

(* indicated significance of p<.05 level)

The calculated F values indicate that predicted weight loss, confidence in weight loss and the product of predicted weight loss times confidence were all significant (p<.001) predictors of the percentage of anticipated weight loss achieved. F values for locus
of control and the Eating Pattern Questionnaire had p values of .610 and .872 respectively.

The percent of dependent variation explained by all covariates is obtained by subtracting the mean square residual divided by the total mean square from the number one. The combined effect of the covariates explained 87 percent of the dependent variance of predicted weight loss achieved.

Results of using number of pounds lost as the dependent variable are presented in Table 10.

Table 10
Covariate Analysis of Number of Pounds Lost

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Significance of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td>3461.146</td>
<td>4</td>
<td>865.286</td>
<td>645.2000</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>0.298</td>
<td>1</td>
<td>0.298</td>
<td>0.2223103</td>
<td>0.639</td>
</tr>
<tr>
<td>Predicted Weight Loss</td>
<td>0.639</td>
<td>1</td>
<td>0.639</td>
<td>0.4764772</td>
<td>0.492</td>
</tr>
<tr>
<td>Perceived Self-efficacy</td>
<td>7.412</td>
<td>1</td>
<td>7.412</td>
<td>5.526857</td>
<td>0.021 *</td>
</tr>
<tr>
<td>Confidence x Pred. Loss</td>
<td>3400.974</td>
<td>1</td>
<td>3400.974</td>
<td>2535.933</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Main Effects</td>
<td>143.781</td>
<td>3</td>
<td>47.927</td>
<td>35.73683</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Weight Loss Confidence</td>
<td>143.781</td>
<td>3</td>
<td>47.927</td>
<td>35.73683</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Explained</td>
<td>3604.927</td>
<td>7</td>
<td>514.990</td>
<td>384.0015</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Residual</td>
<td>96.560</td>
<td>72</td>
<td>1.341</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3701.487</td>
<td>79</td>
<td>46.854</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

83 cases were processed. 3 cases (3.6 pct) were missing.

(* indicated significance of p=.05 level)
The calculated F values indicate that confidence in weight loss and confidence x predicted loss were significant (p<.001) predictors of pounds lost. The Eating Pattern Questionnaire also produced significant F values at the p<.021 level. Locus of control and predicted pounds lost had very high p values (.639 and .492) and were not significant. The combined covariates explained 97 percent of the dependent variance for this variable.

Analysis of covariance for program completion generated the following results found in Table 11.

Table 11
Covariate Analysis of Program Completion

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>DF</th>
<th>Mean Square</th>
<th>F</th>
<th>Significance of F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td>9.100</td>
<td>4</td>
<td>2.275</td>
<td>4.320026</td>
<td>0.003 *</td>
</tr>
<tr>
<td>Locus of Control</td>
<td>0.170</td>
<td>1</td>
<td>0.170</td>
<td>0.3226130</td>
<td>0.572</td>
</tr>
<tr>
<td>Predicted Weight Loss</td>
<td>0.244</td>
<td>1</td>
<td>0.244</td>
<td>0.4632372</td>
<td>0.498</td>
</tr>
<tr>
<td>Perceived Self-efficacy</td>
<td>0.464</td>
<td>1</td>
<td>0.464</td>
<td>0.8816421</td>
<td>0.351</td>
</tr>
<tr>
<td>Confidence x Pred. Loss</td>
<td>8.694</td>
<td>1</td>
<td>8.694</td>
<td>16.50807</td>
<td>0.001 *</td>
</tr>
<tr>
<td>Main Effects</td>
<td>0.933</td>
<td>3</td>
<td>0.311</td>
<td>0.5905320</td>
<td>0.623</td>
</tr>
<tr>
<td>Weight Loss Confidence</td>
<td>0.933</td>
<td>3</td>
<td>0.311</td>
<td>0.5905320</td>
<td>0.623</td>
</tr>
<tr>
<td>Explained</td>
<td>10.033</td>
<td>7</td>
<td>1.433</td>
<td>2.721671</td>
<td>0.015 *</td>
</tr>
<tr>
<td>Residual</td>
<td>37.917</td>
<td>72</td>
<td>0.527</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>47.950</td>
<td>79</td>
<td>0.607</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

83 cases were processed. 3 cases (3.6 pct) were missing.

(* indicated significance of p=.05 level)

The variable of predicted weight loss times confidence in weight loss was a significant (p<.001) predictor of program completion.
Weight loss confidence was also significant at the \( p < .015 \) level. The covariates only explained 13 percent of the variance of this variable.

An indication of this relative ability of each independent to predict dependent outcomes can be gained by comparing the \( p \) values generated from the analyses of covariance. A summary of the levels of significance is presented for each dependent and independent variable in Table 12.

<table>
<thead>
<tr>
<th>Weight Locus of Control</th>
<th>Number of Pounds Lost</th>
<th>Percent of Predict Weight Loss Achieved</th>
<th>Successful Program Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.639</td>
<td>.601</td>
<td>.572</td>
</tr>
<tr>
<td>Eating Pattern Questionnaire</td>
<td>.021</td>
<td>.872</td>
<td>.351</td>
</tr>
<tr>
<td>Predicted Weight Loss</td>
<td>.492</td>
<td>.001</td>
<td>.498</td>
</tr>
<tr>
<td>Confidence in Weight Loss</td>
<td>.001</td>
<td>.001</td>
<td>.015</td>
</tr>
<tr>
<td>Confidence x Predict Loss</td>
<td>.001</td>
<td>.001</td>
<td>.001</td>
</tr>
</tbody>
</table>

Using a \( p \) value of .05, one can make the following decisions regarding the second null hypothesis for each of the five independent variables:
Weight Locus of Control

Weight locus of control had the lowest levels of significance for the dependent outcomes. The null hypothesis should not be rejected for this variable. Weight locus of control appeared to have little or no influence on dependent variables.

Perceived Self-efficacy as Measured by the Eating Pattern Questionnaire

Perceived self-efficacy had a significant (p<.021) effect on the number of pounds lost. It did not effect program completion or percent of predicted loss achieved.

Predicted Weight Loss

Predicted weight loss had a significant (p<.001) effect on achieving predicted weight loss. It was not significantly related to the other two dependent outcomes.

Confidence in Weight Loss

This variable had a significant effect on the number of pounds lost and percent of predicted weight achieved (p<.001). It also had a significant (p<.015) effect on program completion.

Confidence x Predicted Loss

This measurement had a significant effect on all three variables at the p<.001 level. Using this measurement we can reject the null hypothesis for each dependent measure of success. It appears to be the strongest and most consistent predictor of outcomes. By itself this variable was able to explain 82 percent of the variance for the percentage of predicted weight loss achieved, 92 percent of the variance for number of pounds lost and 18 percent of the variance for programs completion. No other variables by themselves explained such high percentages of the dependent variance.
Correlation Between Independent and Dependent Variables

Correlations between a single independent and a single dependent variable can be calculated with the Pearson r statistic. Table 13 presents these separate correlations.

Table 13
Pearson r Correlation of Independent and Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Number of pound Lost</th>
<th>Percent of predicted Loss Achieved</th>
<th>Program Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Locus of Control</td>
<td>r = .06</td>
<td>r = .08</td>
<td>r = .03</td>
</tr>
<tr>
<td></td>
<td>p = .30</td>
<td>p = .24</td>
<td>p = .38</td>
</tr>
<tr>
<td>Eating Pattern Questionnaire</td>
<td>r = .04</td>
<td>r = .00</td>
<td>r = .09</td>
</tr>
<tr>
<td></td>
<td>p = .36</td>
<td>p = .49</td>
<td>p = .22</td>
</tr>
<tr>
<td>Predicted Weight Loss</td>
<td>r = .08</td>
<td>r = .09</td>
<td>r = .02</td>
</tr>
<tr>
<td></td>
<td>p = .23</td>
<td>p = .19</td>
<td>p = .42</td>
</tr>
<tr>
<td>Confidence in Weight Loss</td>
<td>r = .18</td>
<td>r = .15</td>
<td>r = .15</td>
</tr>
<tr>
<td></td>
<td>p = .05</td>
<td>p = .09</td>
<td>p = .08</td>
</tr>
<tr>
<td>Confidence x Predicted Loss</td>
<td>r = .96</td>
<td>r = .89</td>
<td>r = .42</td>
</tr>
<tr>
<td></td>
<td>p = .001</td>
<td>p = .001</td>
<td>p = .001</td>
</tr>
</tbody>
</table>

The majority of correlations between dependent and independent variables was low. The major exception is the final secondary measurement of self-efficacy. It demonstrated a very high correlation with total number of pounds lost (r = .96, p < .001) and percent of predicted weight achieved (r = .89, p < .001). These high correlations combined with the F scores generated by this variable make it the most important independent measurement in this study.
Summary

Results of the statistical analysis suggest that weight locus of control and the four measurements of perceived self-efficacy are largely independent constructs among female participants in a weight loss program. There was a low correlation ($r = .22$, $p < .021$) between locus of control and the Eating Pattern Questionnaire. Correlations between locus of control and the secondary measurements of perceived self-efficacy were not significant. The first null hypothesis was accepted.

Select measures of perceived self-efficacy demonstrated a significant ability to predict successful outcomes among females in the weight reduction class. The number of confidence level multiplied by predicted loss variable had a significant ($p < .001$) effect on the number of pounds lost, percent of predicted loss achieved and successful program completion. The combined effect at all covariates was able to explain ninety-seven, eight-seven and thirteen percent of the respective dependent outcomes. The second null hypothesis was rejected.

The Eating Pattern Questionnaire, predicted weight loss, and confidence in weight loss also had significant effects on some of the dependent variables. Locus of control had no significant effect on any of the program outcomes.
CHAPTER V

CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This chapter is divided into the following sections:

1. Conclusions
2. Discussion and Implications of Findings
3. Recommendations for Future Research

The conclusion section will review the purpose of the survey, methods research questions and major findings. The discussion section will highlight the implications of the study for health education, self-efficacy theory and locus of control. Questions of external validity and replication will be discussed. The final section will include suggestions for future research.

Conclusions

One purpose of this study was to determine if weight locus of control and perceived self-efficacy were distinct, independent variables among participants in a weight control program. An additional purpose was to determine if weight locus of control and perceived self-efficacy were significant predictors of success in Heart Association "Slim for Life" classes.

Eighty-three adult females volunteered to participate in the descriptive correlation study. Subjects were given a series of
personality scales and weighed at the first of their ten classes. Weight locus of control orientation was determined by a six-item scale developed by the principal investigator. Perceived self-efficacy was assessed by response to the Eating Pattern Questionnaire. Secondary measures of self-efficacy included the subjects' predicted ten-week weight loss and the number produced by multiplying these two variables. End of program weight was recorded at the final class.

The first research question of this study was whether or not weight locus of control and perceived self-efficacy are independent beliefs among female participants in a weight loss program.

Only a small correlation \( r = .22, p < .021 \) was observed between weight locus of control and perceived self-efficacy as measured by the Eating Pattern Questionnaire. Even smaller correlations were observed between locus of control and predicted weight loss \( r = .06, p < .29 \), and locus of control and confidence in weight loss \( r = .13, p < .12 \). While locus of control is significantly \( p < .021 \) related to self-efficacy as measured by the Eating Pattern Questionnaire, the correlation is low \( r = .22 \). Locus of control and the other perceived self-efficacy variables appear to be relatively independent constructs among participants in this weight loss program.

The second research question was to determine if weight locus of control and perceived self-efficacy are predictive of outcomes in a weight reduction program.
There were large differences in these variables' ability to predict dependent outcomes. Weight locus of control demonstrated no significant effect on the amount of weight lost, the percent of predicted loss achieved, or successful program attendance.

Measurements of subjects' perceptions of self-efficacy demonstrated statistically significant effects on dependent outcomes. Four different measurements of perceived self-efficacy were used in this study. The strongest and most consistent predictor of dependent variance was a variable formulated by multiplying each subject's best prediction of ten-week weight loss by a number representing the subject's relative confidence in being able to reach her goal. This variable demonstrated a significant (p<.001) effect on each of the three dependent outcomes. It explained up to 92 percent of the variance for individual dependent outcomes.

Subjects' simple predicted weight loss demonstrated a significant (p<.001) effect on the percent of predicted weight loss achieved. It did not have a significant effect on the total number of pounds lost or program attendance.

Relative confidence in weight loss had a significant (p<.001) effect on pounds lost and percent of predicted loss achieved. It also demonstrated a significant (p<.015) effect on program attendance.

The primary measure of perceived self-efficacy in this study was the Eating Pattern Questionnaire used at the Baylor Medical School Diet Modification Center. The questionnaire asked subjects to indicate their relative confidence in being able to control eating
behavior in 30 difficult situations. Responses were combined to form an overall score. The subjects' Eating Pattern Questionnaire scores demonstrated a significant \( (p<.021) \) effect on the number of pounds lost. It did not have a significant impact on the percent of predicted weight loss achieved or successful program attendance. Overall, subjects' rough estimates of success were better predictors than the aggregate score derived from the Eating Pattern Questionnaire.

Analyses of the separate individual correlations between the independent and dependent variables revealed high correlations between predicted weight loss x confidence and total pounds \((r=.96, p<.001)\) and percent of weight loss prediction achieved \((r=.89, p<.001)\). Correlations between other variables were much lower.

Effective community health education must be based on an adequate understanding of health behavior. Specifically it is important to identify key antecedents or determinants of behavior. Once health behavior is explained, appropriate interventions can be developed to effect key variables.

**Discussions of Findings**

Results of this study suggest health educators should devote more attention to the construct of perceived self-efficacy rather than locus of control in weight management programs. It is important that health educators clearly differentiate between these two related concepts. Future health behavior research dealing with either locus of control or self-efficacy should not use instruments that are a heterogeneous blend of both constructs.
Future health education research should determine which other content areas are influenced by self-efficacy perceptions. Suggested areas of research include patient compliance, substance abuse education, first aid training and physical fitness.

Based on the findings of this study, however, it can be said that selected measures of perceived self-efficacy have a significant effect on weight control program outcomes. The magnitude of dependence variance accounted for by the secondary measures of perceived self-efficacy is apparently substantial enough to warrant the future attention of health educators and weight control specialists. The results of the study justify health educators using perceived self-efficacy as a variable in weight control research. It is an appropriate proxy measurement for behavior change when used in conjunction with other variables.

Select measurements of perceived self-efficacy explained a large portion of dependent outcomes. It is important that health educators broaden their list of target variables to include peoples' subjective appraisals to their ability to execute health behaviors. Appropriate knowledge, attitudes and values may be necessary for effective weight loss, but without strong perceptions of self-efficacy they are insufficient for long term behavior change. Health Educators will need more training in the behavioral sciences to affect self-efficacy perceptions.

Since perceived self-efficacy is related to weight loss success, weight control instructors should seek to enhance students confidence in their ability to control weight. Future research should determine
which learning activities have the greatest beneficial impact on perceived self-efficacy. Bandura (1982) reported that the most important of four influences on self-efficacy is past experience. For this reason, weight loss class assignments with a high likelihood of success should be sequenced early in the course.

Perceived self-efficacy may have a diagnostic value for health educators. Subjects with different levels of self-efficacy may respond differently to various programs or learning activities. If so, program participants at a beginning of a program can then be assigned to education interventions most appropriate for their needs.

**Perceived Self-efficacy Research Issues**

Bandura (1980) defined perceived self-efficacy as judgements of the likelihood that one can organize and execute given actions required to deal with prospective situations. The Eating Pattern Questionnaire most closely approached the typical construction of other self-efficacy instruments. Subjects rated their personal confidence in being able to control specific eating situations. It was noteworthy that the secondary measurements were stronger predictors than the Eating Pattern Questionnaire. The secondary measurements were more global predictions of outcome than ability to perform specific behaviors.

An explanation of the Eating Pattern Questionnaire's more limited ability to predict outcomes may be due to the fact that it is formulated from the cumulative total of thirty separate responses. Each statement was given the same equal weight of importance. The aggregate scoring system used in the questionnaire may have been
inefficient because different people may have different numbers of problem-overeating situations. Obesity may not be related to the number of problem-eating situations so much as to total caloric intake in a few situations. Future instrumentation might have subjects rate their confidence of controlling eating in the three situations where they do most of the caloric consumption.

It was observed that perceived self-efficacy, as measured by the Eating Pattern Questionnaire, showed a significant (p<.021) effect on number of pounds lost but never demonstrated a significant effect on the percent of predicted weight loss achieved. This inconsistency may reveal inherent biases in the study's dependent variables.

Using the total number of pounds lost as the dependent variable gives the very obese the greater opportunity to demonstrate successful outcomes because they have the greatest total number of pounds to lose. Using the percent of achieved predicted loss as the outcome variable favors the mildly overweight person since each pound lost accounts for a higher portion of predicted loss. Arguments can be made for the inclusion of both variables as outcome measurements.

The findings of this research were based on program-entry measurements of perceived self-efficacy. It was hypothesized that these were relatively stable perceptions. While self-efficacy perceptions held by individuals at the start of the program did predict outcomes, it is likely also these perceptions were influenced by the class experience. Much of the "Slim for Life" content is related to eating control skill development. Self-efficacy perceptions probably were affected by this educational process. The
extent to which self-efficacy perceptions change as a result of the class was not the intent of this study. The relationship between end-of-program perceived self-efficacy and dependent outcomes also needs to be better understood.

One important weight control topic not included in this study was exercise. Current weight control literature emphasizes the importance of combining eating regulation with increased physical activity. No attempt was made to assess self-efficacy perceptions of being able to maintain an exercise program. Subjects in the "Slim for Life" class were encouraged to exercise twenty minutes each day. The relationship between exercise self-efficacy with dietary control self-efficacy and their individual and combined influence on weight loss needs to be examined.

Locus of Control

It was observed that many loci of control scales contain questions that can be answered or interpreted on the basis of perceived self-efficacy. Great care was taken to exclude potential self-efficacy statements from the weight locus of control scale used in this study. The total exclusion of self-efficacy statements might partially explain the failure of this scale to demonstrate significant effects on program outcomes. It is possible that the reason some locus of control studies have shown significant effects is because of the self-efficacy questions contained in those scales.

While the weight locus of control scale used in this study has not undergone extensive psychometric analysis, care was taken to avoid other identified problems in other loci of control scales.
Reliability was tested adequately. The most probable explanation for weight locus of control's failure to demonstrate significant effects is that one's belief about humans' ability to control weight prospectively has little or no impact on personal behaviors related to weight regulation.

**External Validity Considerations and Replication**

Findings of this study should be interpreted cautiously. It should be remembered that subjects were selected from a weight loss class sponsored by a local Heart Association chapter. A higher percentage of participants in a heart association-sponsored weight reduction class may be there for medical reasons than subjects in proprietary weight loss programs. The motivations for joining different weight loss classes should be explored.

Only fifty percent of the subjects in the "Slim for Life" classes elected to participate in the study. Before the results of this study could be generalized to all participants in similar programs, it must be shown that non-participants did not differ significantly from the volunteer subjects. The delimitation of the study also restricts the findings to primarily white adult females.

Research by Schachter (1982) demonstrated that attempts at weight loss are more successful in the general public than among subjects in therapeutic populations. People enrolled in a weight control program may differ from individuals who seek to reduce their weight without the assistance of a formal program. Since Schachter believes the subjects in formal programs are often those who have been unsuccessful at controlling behavior on their own, future
research should contrast the weight loss self-efficacy perceptions of weight control participants and individuals seeking to control personal weight without the assistance of a class.

**Recommendations for Future Research**

Based upon the findings of this study, the following research is recommended:

1. Future research should determine if the results of this study can be replicated in male, adolescent and minority populations.
2. In order to establish the external validity of this study, the motivations for joining a Heart Association weight loss class should be compared to the motivation for joining weight loss classes not taught by a health agency.
3. Analysis should determine the relationship between exercise-related perceived self-efficacy and eating self-efficacy. Both should be used as covariates in analyzing dependent outcomes.
4. Future research should determine to what extent self-efficacy perceptions change as a result of participation in a weight control class.
5. Future health education research should determine which health behaviors are partially explained by self-efficacy theory. Suggested areas of research include patient-compliance, substance abuse education and physical fitness.
6. Additional analysis should determine if perceived self-efficacy and program outcomes are related to other demographic variables such as employment, education and marital status.

7. Future research that seeks to understand the relationship between weight locus of control and multiple measures of perceived self-efficacy should use multiple regression statistics rather than Pearson r statistics.

8. A follow-up study should contrast the self-efficacy perceptions of participants in weight control programs with the perceptions of people in the non-therapeutic population.

9. Weight control specialists should determine which learning activities have the greatest impact on people's perceived self-efficacy perceptions regarding weight control. The optimal sequencing of activities should be examined.
APPENDIXES
APPENDIX A
Human Subject-027 Form

THE OHIO STATE UNIVERSITY

CONSENT FOR PARTICIPATION IN
SOCIAL AND BEHAVIORAL RESEARCH

I consent to participating in (or my child's participation in) research entitled:

______________________________________________________________

______________________________________________________________

(Principal Investigator)

I consent to participating in (or my child's participation in) research entitled: of his/her authorized representative has explained the purpose of the study, the procedures to be followed, and the expected duration of my (my child's) participation. Possible benefits of the study have been described as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding the study and that any questions I have raised have been answered to my full satisfaction. Further, I understand that I am (my child is) free to withdraw consent at any time and to discontinue participation in the study without prejudice to me (my child). The information obtained from me (my child) will remain confidential unless I specifically agree otherwise by placing my initials here ________.

Finally, I acknowledge that I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: ___________________ Signed: ___________________ (Participant)

Signed: ___________________ Signed: ___________________

(Principal Investigator or his/her Authorized Representative) (Person Authorized to Consent for Participant - If Required)

Witness: ___________________

HS-027 (Rev. 12-31) -- To be used only in connection with social and behavioral research.
APPENDIX B

Heart Association Letter of Approval

Utah Heart Association
AN AFFILIATE OF THE AMERICAN HEART ASSOCIATION
645 East 400 South
Salt Lake City, Utah 84102
Phone (801) 322-3601

April 15, 1984

Mr. Gordon Lindsay
2509 West 6985 South
Salt Lake City, Utah 84118

Dear Gordon:

This letter is to confirm your arrangements for testing some of the participants in our weight control classes. The teachers in 6 classes have been given the materials.

We understand that you have agreed to all the human subjects review committee guidelines and that confidentiality will be maintained.

We look forward to getting a copy of your research when it is completed.

Sincerely,

Susan Ward, M.B.A., R.D.
Nutrition Director
APPENDIX C

Human Subject Committee Approval

Subjects were deemed NOT AT RISK and the protocol was unanimously APPROVED WITH THE FOLLOWING COMMENTS:

1. **Submit the summary of written instructions to subjects, as promised in response to item #13 of the summary sheets.**

2. **Provide copy of HS-027 Consent Form with title and Principal Investigator's name in the proper place**

3. **Provide agreement from Utah Heart Association for the research to be conducted.**

4. **Do not offer or provide feedback to subjects concerning their psychological test scores**

Comments:

The Committee understands that 80 subjects will be involved, since there is a discrepancy between page 7 and page 44 as to the number.

Approval does not apply to pretesting or to any procedures prior to the date of this approval.
APPENDIX D

Panel of Experts Instructions

Dear Panel Member:

The purpose of the panel of experts is to aid in the development of a valid weight locus of control scale. Sixteen potential items were pilot tested during November-December 1983, on 42 subjects in undergraduate college classes. The mean response, standard deviation and the test-retest correlation is reported for each item. Panel members will be asked to identify any item which would be inappropriate in the test instrument. A series of questions will be asked about each item in order to determine its suitabiliity in the final instrument.

Attached is a list of the sixteen potential items, a description of final selection criteria, a brief explanation of locus of control and self-efficacy theory and sixteen item evaluation forms. Please read the "Criteria Selection" form and the "Locus of Control and Self-efficacy Theory" paper and proceed to complete the Item Evaluation Forms. Please return the sixteen item evaluations. A stamped envelope has been provided for your use.

Please call (801-533-6120) if I can provide additional instruction. Thank you very much for your assistance in this project.

Sincerely,

Gordon B. Lindsay

(see next page)
LOCUS OF CONTROL AND SELF-EFFICACY THEORY

Locus of control is a personality variable that measures to what degree a person believes humans control reinforcement. People with an internal locus of control orientation believe reinforcement and outcomes are the result of personal actions, efforts, and choices. Externals believe reinforcement and outcomes are caused by luck, chance, fate or other forces beyond control.

Loci of control scales typically consist of an equal number of internally and externally worded statements. Subjects are asked to respond to each statement by indicating their degree of agreement or disagreement. Theoretically a person with an internal locus of control should agree with the internally worded and disagree with the externally worded statements. An externally oriented person should respond in an opposite manner.

Weight locus of control is a more specific measurement that reveals a person's belief regarding human ability to control body weight. A person with an extreme internal weight locus of control would believe that body weight is totally regulated by freely chosen behaviors. An extreme external orientation would consist of the belief that weight is totally regulated by forces beyond human control.

A closely related construct to locus of control is perceived self-efficacy. Self-efficacy is defined as a judgement of the likelihood that one can organize and execute a specific behavior. It could also be described as the conviction that one can successfully perform a given behavior.

In order to assist in the development of a valid weight locus of control scale it is important to perceive the difference between locus of control and self-efficacy. Locus of control should measure a person's belief as to what extent humans can control their life and that specific behaviors produce predictable outcomes. Perceived self-efficacy is more of a personal assessment of one's ability to perform particular behaviors. In other terms locus of control measures the belief that by doing behavior "X" outcome "Y" will result. Self-efficacy measures one's confidence in being able to perform behavior "X". On the item evaluation sheets you will be asked if the locus of control statements can be easily interpreted by subjects as a personal assessment self-efficacy.

(see next page)
ITEM SELECTION CRITERIA

1. The panel of experts consist of six individuals.

2. An item will not be included in the final instrument if more than one panel member disagrees with the majority response on questions 1 and 2.

3. An item will not be included in the final instrument in the study if two or more panel members answer "no" to questions 3, 4, 5, 7, and 8 or "yes" to question 6.

4. No two items will be included together in the final instrument if in question 8, three or more panel members state they are most similar. This will help avoid the selection of items which share identical variance.

5. Within the above requirements, the final selection of items will be made by the primary investigator. Priority will be given to statements which demonstrated the highest standard deviation during the pilot testing.

6. The final instrument will consist of three internally and three externally worded statements.

Statistical calculations were based on the following scoring system:

<table>
<thead>
<tr>
<th>Response</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>1</td>
</tr>
<tr>
<td>Agree</td>
<td>2</td>
</tr>
<tr>
<td>Neutral</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>4</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>5</td>
</tr>
</tbody>
</table>

RESULTS FROM THE PANEL OF EXPERTS SURVEY WILL BE TABULATED AND MAILED TO ALL PANEL MEMBERS.

(see next page)
### Potential Scale Items

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. People who are overweight can change their lifestyle and become as thin as they desire.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. People’s weight is partially regulated by forces beyond their control.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. There are proven habits and behaviors that will help any person lose weight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. If people eat properly and get proper exercise they can control weight in the way they desire.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Even when overweight people do the right things it is extremely hard for them to lose weight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Whether people lose or gain weight is entirely the result of freely chosen behaviors.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. The bodies of overweight people actively resist attempts to lose weight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Losing weight is totally a matter of controlling lifestyle and behavior.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

(see next page)
ITEM EVALUATION FORM

STATEMENT ONE:  
People who are overweight can change their lifestyle and become as thin as they desire.

MEAN RESPONSE          __2.9__  
STANDARD DEVIATION __1.04__  
PEARSON R-TEST-RETEST CORRELATION __.93__

PLEASE CIRCLE THE ANSWER THAT WOULD BEST REPRESENT YOUR FEELINGS

1. How do you think a person with an internal weight locus of control would most typically respond to the above statement?
   A. They would agree       B. They would disagree

2. How do you think a person with an external weight locus of control would most typically respond to the above statement?
   A. They would agree       B. They would disagree

3. Is the above statement made in clear understandable language?
   A. Yes                  B. No

4. Does the above statement suggest that people can control their weight through changes in personal behavior?
   A. Yes                  B. No

5. Is the above statement made in plural rather than first person forms?
   A. Yes                  B. No

6. Can the above statement be easily interpreted as measurement of perceived self-efficacy rather than locus of control?
   A. Yes                  B. No
7. Does this statement refer to the control or cure of obesity rather than its cause?
   A. Yes    B. No

8. Is the Pearson-R statistics for test-retest reliability sufficiently high enough for the statements inclusion in the study?
   A. Yes    B. No    C. Not Sure

9. Which of the other fifteen statements seems to be most similar to statement number one?

10. Please suggest any changes or corrections which would improve the statement as an item in a weight locus of control study.
APPENDIX E
WEIGHT CONTROL BELIEFS

(Circle the number that would best express your feelings regarding the following statements)

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
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<tr>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Even when overweight people do the right things it is extremely hard for them to lose weight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. The body of an overweight person actively resists attempts to lose weight.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. If overweight people fail in their attempt to lose excess pounds it can only be because they did not control the behaviors related to weight control.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
APPENDIX F

Eating Patterns Questionnaire

Read the situations and moods below, and rate your DEGREE OF CONFIDENCE that you could with some effort consistently keep from eating or drinking in the given situation or mood.

1 = no confidence  
2 = little confidence  
3 = some confidence  
4 = a fair amount of confidence  
5 = complete confidence  
NA = not applicable (never in that situation or mood)

<table>
<thead>
<tr>
<th>Situation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When happy?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2. While you read</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3. While you watch TV?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4. When angry?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5. When lonely?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6. When visiting friends at their home?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7. When bored?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8. When friends are visiting at your home?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>9. When excited?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
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<tr>
<td>10. In the evening after dinner?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
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<tr>
<td>11. Immediately after exercising?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
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<tr>
<td>12. When overworked?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
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<tr>
<td>13. While attending a spectator sports event?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
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<tr>
<td>14. While smoking?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
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<tr>
<td>15. When your spouse is snacking?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>----</td>
</tr>
<tr>
<td>16. While preparing meals?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>17. When hungry?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>18. In between breakfast &amp; lunch, at work?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>19. When anxious?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>20. When depressed?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>21. In between lunch and dinner, at home?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>22. When tired?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>23. While at the movies?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>24. At parties?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>25. When ill?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>26. When celebrating?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>27. When pressured by someone to eat?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>28. When in the presence of others who are eating but not pressuring you</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>29. When tense?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>30. In the presence of tempting food that can be seen or smelled?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>NA</td>
</tr>
</tbody>
</table>
APPENDIX G

Instructions for "Slim for Life" Teachers

Distribute the questionnaires to all participants at the end of
the class. After each subject has a copy of the materials please
read aloud the first page of instructions that were given to class
members. Subjects who agree to participate should sign the informed
consent form. They may keep the carbon copy if they desire.
Subjects should then complete the attached forms and leave them with
you. I will gather completed questionnaires from you later that day.

Do not interpret any questions for class members. Simply ask
them to write down their best response.

If you have any questions please call me at 533-6120 or
967-5829. Thank you very much for your help in this research project.

Sincerely,

Gordon B. Lindsay
APPENDIX H

Summary of Instructions to Subjects

We would like to request your voluntary participation in a university research project. The purpose of the study is to measure peoples' belief about weight control. Your participation consists of completing a few short questionnaires. It will take approximately fifteen minutes to complete the forms. We would also like the opportunity to record your present weight and your weight at the end of the ten week program. Should you decide to stop attending classes or be unable to come to the final class we will contact you by phone to determine your weight at that time.

All information requested in this project will be kept confidential. Your recorded weight and survey responses will be grouped with the data from other individuals. Your birthday rather than your name will be used for identification purposes.

Your participation in this research is voluntary and not a required part of the Heart Association "Slim for Life" class. Please discuss any questions you might have with the class instructor. If you would like any additional information regarding the study please call 967-5829. If you choose to participate in this study would you please complete the attached informed consent form and complete the questionnaires.
APPENDIX I

WEIGHT CONTROL STUDY

1. What is your birthday?   Day_______  Month_______  Year_______

2. What is your telephone number? _______________________

3. What is your current weight without shoes with light indoor clothing on?  ___________ lbs.

4. What is your height without shoes?  ____ft.  ____inches

5. What would you estimate to be your ideal body weight?  _______ lbs.

6. As best you can recall, how much did you weigh when you were twenty years old?  _______ lbs.

7. Are you currently taking any medication for weight control?  YES or NO

8. Are you pregnant?  YES or NO

9. Are you currently:  (circle one)
   a. employed
   b. out of work
   c. homemaker
   d. student
   e. retired
10. Last education completed: (circle one)
   a. eighth grade or less
   b. some high school
   c. graduated from high school
   d. some college or technical school
   e. graduated from college or technical school
   f. post graduate or professional degree

11. Finally we would like you to make a simple prediction. This class will
    end ten weeks from today. How many pounds do you think you will lose
    in the next ten weeks? _________ lbs.

12. How confident are you that you will lose at least that many pounds by
    the end of the ten week program? (circle one)
    a. very confident
    b. confident
    c. somewhat confident
    d. uncertain
    e. very uncertain
APPENDIX J

Value Survey

This is a scientific study of value systems. There are no right or wrong answers in this study. The best answer is your own personal opinion.

Below is list of 20 values. We are interested in finding out the relative importance of these values to you.

Study the list carefully. Then place a 1 next to the value which is most important to YOU, place a 2 next to the value which is second most important, etc. The value which is least important should be ranked 20.

When you have completed ranking all the values, go back and check over your list. Feel free to make changes. Please take all the time you need to think about this so that the end result truly represent YOUR values.

_____ A COMFORTABLE LIFE (a prosperous life)
_____ AN EXCITING LIFE (a stimulating, active life)
_____ A SENSE OF ACCOMPLISHMENT (lasting contribution)
_____ A WORLD AT PEACE (free of war and conflict)
_____ A WORLD OF BEAUTY (beauty of nature and the arts)
_____ EQUALITY (brotherhood, equal opportunity for all)
_____ FAMILY SECURITY (taking care of loved ones)
_____ FREEDOM (independence, free choice)
_____ GOOD HEALTH (well-being, freedom from sickness)
_____ HAPPINESS (contentedness)
_____ INNER HARMONY (freedom from inner conflict)
_____ MATURE LOVE (sexual and spiritual intimacy)
_____ NATIONAL SECURITY (protection from attack)
_____ PHYSICAL ATTRACTIVENESS (good looks, a nice figure)
PLEASURE (an enjoyable, leisurely life)

SALVATION (saved, eternal life)

SELF-RESPECT (self-esteem)

SOCIAL RECOGNITION (respect, admiration)

TRUE FRIENDSHIP (close companionship)

WISDOM (a mature understanding of life)
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