AN EXPERIMENTAL STUDY ON LOCUS OF CONTROL, INSTRUCTOR FOLLOW-UP CONTACT AND WEIGHT LOSS DURING AND AFTER AN INSTRUCTIONAL PROGRAM ON SELF-MANAGEMENT SKILLS FOR WEIGHT CONTROL

by

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ABSTRACT

The purpose of this study was to investigate the relationship between Locus of Control scores, instructor follow-up telephone contact and weight loss by participants during and 6 months after an instructional program on weight control. The instructional program was designed to teach participants self-management skills to assist them to change eating and exercise habits significantly enough for weight loss to occur and be maintained over time. The research sample consisted of 24 adult women (ages 19 - 74) who registered for a night school class on weight control. Locus of Control was measured by the Rotter and the James Internal-External Locus of Control tests. Weight loss was measured by pounds lost and percentage of body weight change attained.

On the basis of the Locus of Control scores, participants were divided into three equal groups of low, medium and high external scores. An equal number of participants from each of these three groups was randomly assigned into either a one or four telephone call instructor follow-up group.

A 2 x 3 analysis of variance test with four repeated measures was used to determine the difference between the weight change means of each of the groups (three locus of control groups and two follow-up groups). The results of this statistical testing indicated that there were no statistically significant (.05) relationships between weight loss and either Locus of Control score or instructor follow-up contact schedule.

The effects of several situational and biographical variables on amount of weight loss was also examined. A multiple regression analysis of eleven variables to predict weight loss showed that only attendance was statistically significant and then only at the end of the 6 month follow-up period.

However weight change on its own was shown to be significant over the repeated measures both for pounds lost and percent of body weight change. The weight change was significant for the participants in the program but was not predictable either by Locus of Control score or instructor telephone follow-up contact schedule.

Reasons for lack of statistically significant results were discussed and recommendations for future research suggested.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

As part of this study, an instructional course was developed to train adults in self-management of eating and exercise habits. Research was conducted on the relative weight loss success of participants who attended the course. The study explored the relationship between weight loss and the participants' Internal-External Locus of Control scores as measured by the Rotter (1966) scale. The study also investigated the relationship between weight loss and two different schedules of instructor follow-up in the form of telephone contact and considered the interaction effect of participants' locus of control, instructor follow-up contact schedule, and subsequent success in weight loss.

A. SELF-MANAGEMENT SKILLS TRAINING FOR WEIGHT LOSS

Adult educators are concerned with learning outcomes and attempt to design systematic instructional programs to assist the adult learner acquire and maintain new knowledge, attitudes and skills. The learner should be able to apply the acquired skills in a variety of situations. The participant's performance of the new behaviors is the measure of success of the instructional program. Two challenges which face adult educators are related to the design of instructional programs. Instructors must attempt to design programs that will help each participant achieve success. Secondly, instructors need to design programs that will help people continue to improve performance after the instructional program is completed.

Most adults already have developed self-management skills that they use in daily personal and working life. However, some adults have behavior patterns that they have unsuccessfully tried to change. Such habits range from nail-biting to alcoholism. Eating and exercise patterns are examples of habits that have been difficult for people to change on their own. Training individuals in self-management techniques based on principles of learning may help participants successfully change behavior during and after the instructional program.

Obesity is a prevalent problem throughout North America. Numerous factors contribute to the obesity problem in our society. Food processing techniques and fast food outlets have increased access to food with high sugar and fat content. Vivid advertising has focused attention on food products. At the same time, mechanical devices have decreased the amount of physical activity that individuals are likely to get.

Numerous myths exist on how to lose weight including fad diets of doubtful value which may jeopardize health. Many people have attempted to lose weight on their own and have also sought assistance from others including doctors, public health nurses, recreational workers, teachers of exercise classes, friends and acquaintances. Though adult learners seem motivated to lose weight and ask others for assistance, overweight problems continue. In order for an individual to lose weight he must change the caloric balance so that calorie output exceeds input. Obesity is a problem directly related to eating and exercise behavior patterns and is an excellent candidate for attention by adult educators. Programs need to be designed to teach individuals how to develop and maintain optimal eating and exercise habits in order to lose weight and maintain weight loss.

Early research in the use of a behavioral approach to weight control focused on behavior management treatment administered by therapists (Abramson, 1973; Stunkard, 1972). Many psychologists found behavioral approaches to weight control to be the most successful techniques in the on-going battle of the bulge. Though behavioral management strategies have given new hope, psychologists have not had unqualified success in their programs. Behavior management techniques seem to work for some people some of the time. Success is not likely to be maintained over time. As weight control is a result of continuous control over eating and exercise choices, no external therapy program can include a consistent application of behavior management techniques to the individual client unless in an institutional treatment program. Only the person himself can apply treatment needed to change behavior. Thus the emphasis must shift from external therapist application of behavior management techniques to training individuals in self-management strategies.

Increasing attention is being focused on the importance of each individual's eating and exercise choices as a major determinant in weight control and health maintenance (McAlister et. al., 1976). Research has shown that behavior management techniques can be successfully used to help participants change eating and exercise habits to lose weight (Stuart & Davis, 1972; Stunkard & Mahoney, 1976). Behavioral management programs assume all socially relevant behaviors are learned and maintained through interaction between the individual and relevant persons and situations in his environment (Stuart & Davis, 1972). This approach proceeds from recognition of the importance of environmental forces and their effect on individuals' eating and exercise choices. Treatment begins with the measure-

ment of the form and rate of observable behaviors. Intervention focuses on the modification of antecedents and consequences of the specific behaviors to be changed.

Building positive health habits involves a complex chain of behaviors. For weight loss to occur, an individual must learn to change his eating and exercise habits. However, the participant often has had a lengthy history of failure with weight loss attempts. New health habits are thus difficult to acquire and maintain. Long-term maintenance of weight control depends on the extent to which the individual can learn how to manage behavior change strategies on his own.

Adult educators should examine this problem and design programs that can be employed with adults requesting assistance in overcoming obesity. Instructional programs should be designed to teach adults to use learning principles to make changes in behavior patterns so weight loss will occur. Programs must take into consideration individual differences and the specific habit patterns to be changed. The educator must consider difficulties associated with adopting new behavior, the complexity of the behavior chain, the timing of reinforcements as well as the supportiveness of the learner's personal environment.

If a program can be designed and effectively delivered as a continuing education course, then nurses, counsellors, recreational leaders, exercise instructors, nutritionists or others could be trained to use the program to teach self-management strategies for weight control. Thus the first part of this study involved the design of a continuing education course on weight control which was given in a Vancouver night school centre. This program attempted to teach each participant how to apply self-management

skills to eating and exercise control. It was designed to promote the acquisition of new habits so that each individual could modify the balance between caloric intake and energy expenditure to the extent needed to overcome obesity.

Any self-management training program must be designed to facilitate development and maintenance of self-management skills over time and across situations. People may be able to change habits during a short period of time especially when the external support of an instructional program is available. However, they may not have learned new skills sufficiently to maintain them when this support is no longer available on a regular basis. Many participants show weight increases after program completion (Hagen, 1974; Wollersheim, 1970; Harris & Bruner, 1971). The availability and timing of external support may be an important factor in the instructional design of self-management training whether for weight loss or other applications. For some people, daily contact may be necessary; for others weekly or monthly contact may be sufficient. The nature and schedule of support available after the initial instructional period may influence continued weight loss and weight loss maintenance.

The use of booster sessions to maintain improvement of habit change has been advocated (Hunt & Matarazzo, 1973; O'Leary & Wilson, 1975), but systematic research on it has been lacking. The research carried out by Kingsley and Wilson is perhaps the first comprehensive investigation of the potential advantages of incorporating regularly scheduled booster sessions into a comprehensive behavioral treatment framework (Kingsley & Wilson, 1977 p. 297). The schedule used by Kingsley and Wilson included booster meetings two weeks after the last class, then another one three weeks later,

followed by another four weeks after that with a final booster session five weeks later. They were able to get excellent attendance at the booster sessions partly by withholding the individual's deposit which was returned contingent on attendance at classes and booster sessions.

As maintenance of weight loss is a difficulty of weight control programs, this study included an exploration of the relationship of follow-up instructor contact and weight loss. The night school class format limited the kind of follow-up contact that could be made with participants. Therefore, the instructor had to decide what was the realistic extent and nature of follow-up contact that could be used without arousing a negative reaction from participants (especially from those who had gained weight or lost interest in weight loss). Because of logistical problems with follow-up sessions, low probability of attendance by all members, and recent successes in use of telephone contact in distance education courses, a telephone follow-up contact was used. Every participant was told to expect follow-up contact by telephone but given no indication of the number or timing of telephone calls.

The second variable to consider was the length of the follow-up period. Kingsley and Wilson (1977) point out that of nineteen controlled studies performed before 1972 as reviewed by Hall and Hall (1974), only two reported follow-up of more than six months. Harris and Bruner (1971) found significant weight loss over a three month treatment period but the loss was not maintained seven months after the program finished. Foreyt and Kennedy (1971) reported significant success of behavior groups over no treatment control groups nine months after the program. Hall (1973) and Hall, Hall, Hansen and Borden (1974), found that a self-control behavioral

program produced significant differences from control groups at the end of the program but not at the end of a six month follow-up period. Six months was chosen by the experimenter of the present study as a realistic follow-up period in order to assess the permanence of the weight loss achieved by participants.

Few guidelines from research were available on planning a follow-up contact schedule. The number of instructor telephone contacts in this study was designed on the basis of the interval schedule outlined by Kingsley and Wilson (1977) but adapted to a six month follow-up period. The follow-up schedule included four telephone calls at weeks three, eight, fourteen and twenty-one for one group. A single contact at the half-way point (week fourteen) was the schedule for the second group. Those people in the four follow-up call group were expected to continue to lose more weight than those receiving only one telephone call.

Although successful weight control has been achieved through behavior management programs, wide variation in weight loss success is evident. Some people acquire new eating and exercise patterns more readily than do others. Individual differences in success are reported by Penick et. al. (1971), Horan and Johnson (1971), Mahoney (1974) and Rozensky and Bellack (1976). Research on self-management based weight reduction programs has shown that subjects who administer self-management procedures as instructed generally lose weight (Rozensky & Bellack, 1976). However, it is difficult to keep participants using the techniques regularly and contingently.

Behavior management programs appear to offer promising results but only for some individuals. So far it has not been possible to consistently predict which individuals will be successful weight losers during and after

programs focusing on behavior management strategies. However the individual's belief regarding personal control over the events in his life as measured by the Rotter Internal-External Locus of Control scale has been identified as one variable that may predict success in weight control (Balch & Ross, 1975; Manno & Marston, 1972). This study provided an opportunity to explore the relationship between Internal-External Locus of Control score and participants' relative weight loss success during and after the classes. As this instructional program focused on self-management skills and the control of one's own weight loss program, it was expected that participants with low external Locus of Control scores would be more successful weight losers than those with either medium or high external scores and that individuals with low external scores would perform better in the four call follow-up group than in the single call group.

If Locus of Control as measured by Rotter's Internal-External scale is found to predict weight loss success then the test could be used in the initial assessment of participants registered in self-management weight control programs. This Rotter I-E Locus of Control test may alert instructors to significant individual differences that may predict likelihood of success in a weight control program based on instruction in self-management skills. The instructor can then modify instructional strategies and level of support for individual participants in the program in an attempt to assist each individual achieve and maintain success.

B. STATEMENT OF THE PROBLEM

Research Questions

This study included the design of an instructional program in self-

management of eating and exercise habits. The program was offered as a group class in a Vancouver School Board night school centre. The research tested the relationship between three levels of initial Internal-External score (low, medium, and high externals) and weight loss during and after the program. Moreover, the experimental design included two instructor follow-up contact schedules (one telephone call and four telephone calls). The relationship between these two follow-up contact schedules and maintenance of weight loss six months after the program was examined. In addition, the interaction between the Internal-External scores and the follow-up contact schedules was studied.

The study was structured to answer the following questions:

1. Is there a relationship between Internal-External Locus of Control score and success in weight loss during and after this weight control program?

2. Is there a relationship between schedule of instructor follow-up calls used in this study and success in weight loss?

3. Is there an interaction between Internal-External Locus of Control score, instructor follow-up telephone call schedule and success in weight loss?

Definitions

Operational definitions used for this study were as follows:

1. Instructional Program in Weight Control

   The instructional program was based primarily on the behavior management approach described by Stuart and Davis (1972). A description of the program is included in Appendix A. The program was conducted as part of a Vancouver School Board night school program and ran one evening a week for eight weeks.

2. Instructor Follow-Up

   Two different schedules of instructor follow-up contact occurred over a six month period. One group received a telephone call fourteen weeks after the

final class. The other group received telephone calls at weeks three, eight, fourteen and twenty-one after the final class. Both groups were contacted for a final weight report twenty-six weeks after the last class.

3. Internal-External Locus of Control Groups

The Internal-External Locus of Control of Reinforcement variable (I-E) derived from Rotter's (1954) Social Learning Theory. Measurement of I-E Locus of Control was based on the participants' scores on the Rotter (1966) scale. The Internal-oriented individual sees reinforcement as contingent on his own behavior while the External-oriented individual sees reinforcement as unrelated to his own behavior and beyond personal control and responsibility (Lefcourt, 1966; Rotter, 1966).

Participants in the program completed two paper and pencil versions of the I-E scale, the Rotter and the James scales (see Appendix B). Participants were divided into three groups on the basis of their score on the Rotter I-E test. The James test was used as additional information in order to separate individuals with the same Rotter I-E score.

4. Weight Control Success

The success of the participants in the instructional program was measured as the number of actual pounds lost, as well as the percentage of body weight change achieved.

Assumptions

It was assumed that:

- weight change is directly related to change of eating and exercise behavior by the individual;
- Locus of control orientation can be measured by a paper and pencil test;
- no great confounding treatment effectiveness resulted from the fact that the course instructor and the experimenter were one and the same.

Hypotheses

H_1 Low externals will have a higher average weight loss than medium or high externals at the end of the instructional program and at the end of the six month follow-up period.

H_0 There will be no statistically significant difference in the average weight loss by the low externals as compared to medium or high externals at any time period.

H_2 The average weight loss in the four call follow-up group will be higher than the average weight loss in the one call follow-up group.

H_0 There will be no statistically significant difference in the average weight loss in the four call follow-up group and the one call follow-up group.

H_3 The average weight loss of the low externals in the four call follow-up group will be higher than the average weight loss of the medium or high externals in either of the two follow-up groups.

H_0 When the average weight loss of low externals is compared to the average weight loss of either of the other two I-E groups in either the one call or four call follow-up group, no statistically significant difference will be found.

CHAPTER II

REVIEW OF THE LITERATURE

This literature review presents major research evidence on self-management weight control programs and an overview of the Internal-External Locus of Control construct.

A. SELF-MANAGEMENT PROCEDURES AND WEIGHT CONTROL

Regardless of specific factors that led to a weight problem, control is related to an individual's ability to learn new eating and exercise patterns. Programs based on behavior management have attempted to help participants learn new knowledge and skills in behavior change strategies and to use them to improve eating and exercise behaviors enough for weight loss to occur. Behavior change for weight control rests on principles of learning and social learning theory. Eating behavior and overeating are viewed as similar to other learned behavior patterns (Ullman & Krasner, 1965). It is beyond the scope of this study to fully examine literature in this area but appropriate to present the conceptual basis for training in behavior change strategies for the control of eating and exercise behaviors.

Weight Control as a Critical Problem

The maintenance of fitness and health is a pressing problem facing Canadians. Health care costs are rapidly increasing, and while it is difficult to know precisely what is spent in Canada, Robertson (1973) suggests that:

1. Health costs comprise a substantial part of the national expenditure.

2. Costs are rising rapidly.

3. By far the biggest element in health costs are those connected with running hospitals; these are the most rapidly rising of all costs.

4. Expenditures for physicians' service are the second biggest element in costs and are also rising rapidly.

In the mid-1950's, expenditures on personal health care amounted to 3 percent of the Gross National Product. By 1969, the proportion had risen to 5.5 percent. The proportion of personal income the individual spent on health care rose by one-half from 4.28 percent in 1957 to 6.35 percent in 1969. Total expenditures on personal health care increased from $1,047,403,000 in 1957 to $3,887,467,000 in 1969 - almost quadrupling during this twelve year period (Robertson, 1973, pp. 108-109). Hospitals and insurance expenses are not the only costs. Other costs relate to work time and productivity loss, social and family crises from illness and death of family and community members, and losses in the quality of people's lives due to poor health and disease.

Obesity has been associated by Mayer (1968) with four types of health hazards:

1. Changes in normal body functioning.

2. Increased risk of developing certain diseases.

3. Detrimental effects on established diseases.

4. Adverse psychological reactions.

Obesity may be a co-existing rather than a causal factor in illness. However, the greater the obesity, the more likely are severe abnormalities to occur and to be complicated by obesity. Fat people have been noted to have less exercise tolerance, more difficulty in normal breathing and high-

er frequency of respiratory infections than people of normal weight. Mayer (1968) concluded that there is a correlation between weight and heart disease. Insurance company reports suggest excessive mortality rate declines for overweight patients able to reduce their weight enough to attain a lowered insurance rate. These statistics show an association between obesity and early mortality (Mayer, 1968). McAlister et. al. (1976) confirm that cardiovascular diseases, notably congestive heart failure, stroke, and coronary heart disease, are associated with obesity.

There are many conditions in which significant benefits are obtained with loss of excess weight, particularly in diseases of the circulatory and locomotor systems. Among conditions aggravated by obesity are: angina pectoris, hypertension, congestive heart failure, intermittent claudication, rupture of intervertebral discs, osteoarthritis, varicose veins, and other varieties of bone or joint disease. Obese people frequently have an impaired carbohydrate tolerance and are unable to utilize glucose properly. Such people need to reduce their weight to avoid complications caused by high blood sugar, such as need for insulin, and to reduce episodes of acidosis. Obese diabetic patients usually benefit by weight reduction. Obesity is also a hazard for pregnant women. Toxemia in delivery and difficulties with the fetus are more common in fat women than in those of normal weight (Mayer, 1968; McAlister et. al., 1976).

Is the obese person who is otherwise in excellent health more likely to develop a major disease or die sooner than persons of equally good health and normal weight? Mayer (1968) concluded that obesity does create an extra hazard for otherwise healthy people, although the figures to support this conclusion were obtained from insurance company and military sta-

tistics -- data with imperfect validity.

Obesity and Exercise

Although there has been no conclusive demonstration linking diseases and physical inactivity, exercise helps control high risk factors such as obesity, mental stress and high blood pressure. Exercise helps control appetite, relieves tension, allows weight reduction without severely restricting calories and nutrients, stimulates circulation, aids digestion, and helps maintain good muscle tone. Vigorous physical exercise has been shown to lower levels of certain fats circulating in the blood. High blood pressure is associated with cardiovascular diseases and physical exercise may exert a helpful effect on this condition. Finally, exercise may have a direct beneficial effect on the arteries and vessels of the heart as well as help develop extra circulation routes and increase collateral circulation (Stuart & Davis, 1972). The optimal amount of physical exercise and vigour is still under study, however epidemiological data indicates that individuals engaged in active occupations have a lower incidence of ischemic heart disease and a better recovery record than individuals in sedentary occupations (Stuart & Davis, 1972).

Onset of Obesity

There have been numerous attempts to explain the causes of and predisposing factors leading to obesity. Existence of numerous forms of inherited obesity in animals and the ease with which adiposity can be produced by selective breeding suggest that genetic factors can play a determining role in obesity (Mayer, 1968). Seltzer and Mayer (1964) demonstrate that obesity occurs with greater frequency in some physical types than in

others. Preliminary studies by Withers (1964) suggest that somatypes are heritable. Obesity that started in childhood tends to be resistant to treatment (Abraham & Nordsieck, 1960; Stunkard & Burt, 1967). Studies of adipose tissues may help explain the persistence of obesity that began during childhood. Many persons obese from childhood show marked increase in the total number of adipocytes in the subcutaneous tissue and in other depots. With weight reduction, individual cells shrink but total fat cell numbers remain constant (Hirsch & Knittle, 1971).

Obesity onset varies from individual to individual. Mayer (1968) has concluded that whatever the predisposing factors, obesity has as its root cause a positive energy balance for that individual. Self-management research does not focus on the causes of obesity but on the application of behavior management techniques to reverse the energy balance to a negative position so more calories are burned than consumed. The intent of self-management instruction is to help the learner examine and modify eating and exercise habits.

Measurement of Obesity

Mayer (1968) notes that obesity (excessive fatness) may not be consistent with overweight (weight in excess of average). He suggests skinfold measurement as a better means of assessing obesity than weight measurement. Skinfold measurements are usually taken at three sample spots although Mayer (1968) suggests right arm skinfold density as an adequate measure. Problems occur with the use of skinfold measurement in weight control instructional programs. For the measurement to be reliable, the person taking the measurement must have training and experience. Skinfold

measures cannot be easily used by participants to get regular feedback about progress.

Weight measurement has thus been the widely accepted measure of success in weight control programs. Outcomes are easily and directly measurable. Weight measures are also used to describe the extent of obesity in our society. Most standard-setting work has been done by insurance companies. Comparing an individual or group in terms of heights and weights with a set of averages does not give the complete measure of obesity but comparisons can be used as guidelines for setting ideal weight goals. In most weight control research, comparisons are not based on skinfold averages or height-weight tables but on the relative success of each individual compared to his own weight scores at separate times and to the weight scores of other individuals.

Measurement of Weight Change Versus Change in Eating and Exercise Behaviors

The emphasis in weight control programs is on changing eating and exercise habits in order to change weight measurement. If weight loss does not occur, health hazards will not be avoided. However, the individual can learn to improve eating and exercise patterns even without noticeable weight change if there has not been a significant reversal of the energy balance. Hence weight changes measure the extent of the change of energy balance but may not measure all improvements in eating and exercise behaviors of the individual.

Learners may be able to improve eating choices and exercise habits without significantly altering their weight. Individual differences in weight loss may reflect initial amount of overweight, fluid retention,

constipation, menstrual cycle, or change of fat to muscle tissue. When success of individuals in different experimental conditions are compared, differences in success of weight loss may reflect differing physiological parameters of the individuals. While random selection to various conditions may average out these differences in large enough samples, most weight control research has been done either on individual cases or with relatively small groups of individuals. Secondly, weight loss may be attained by individuals able to change eating and exercise patterns enough to achieve a negative energy balance but who endanger their health as a result. They may lose weight by extreme measures such as fasting, use of diuretics, induced vomiting or fad diets.

Instruction based on the diabetic food exchange described by Stuart and Davis (1972) and regular exercise usually results in a maximum loss of one to two pounds a week. This is considered an acceptable rate of change that likely means an adequate nutrient intake is still being maintained. Self-management programs have generally shown slow weight losses of 0.5 to 1.0 pound per week (Harris, 1969; Wollersheim, 1970; Hall et. al., 1974; Jeffry, 1974).

Weight change measures do not always reflect improved eating and exercise habits. However, measurement of actual eating and exercise behaviors usually depends on self-reports by clients. Questions about the reliability of self-report measurement are more extensive than are these concerns about the validity of measurement of weight change to assess differences in eating and exercise behaviors.

Success of Weight Control Programs

Traditional medical, dietary, and psychotherapeutic approaches to obesity have failed to produce encouraging results. Stunkard concluded, "Most obese persons will not stay in treatment for obesity. Of those who stay in treatment most will not lose weight and of those who do lose weight, most will regain it" (1958, p. 79). Psychological explanations have not been useful in helping the control of obesity. No research has shown a statistical link with obesity and psychological disturbance (Stunkard, 1959). He adds that it has not been possible to define psychological characteristics of obese patients which will consistently distinguish them from non-obese persons.

One of the first published accounts that proposed a behavioral model for treating obesity was presented by Ferster, Nurmberger and Levitt (1962). These writers presented a theoretical basis for weight loss which depended upon stimulus control techniques. They analyzed the extent to which naturalistic cues elicit and control eating responses and suggested techniques to progressively restrict both the range and frequency of cues associated with eating. Stuart (1967) used these techniques in what became known as the breakthrough study in weight control. His work showed great promise for the behavioral treatment of obesity as opposed to the disappointing results of psychologically based insight oriented treatments.

Underlying the psychological treatment approach is the view that personality factors set the occasion for behaviors like appropriate and inappropriate eating choices. Efforts to use this approach in treatment of overeating have met with little success. Stuart and Davis (1972) reviewed some of the possible explanations for the disappointing results of personality-oriented treatments. These included the high degree of speculation

necessary in forming hypotheses to guide treatment, the tendency to focus on problems rather than solutions and the likelihood of attaching guilt and blame to the individual rather than focusing on social and environmental factors which maintain inappropriate eating and exercise behaviors. A range of treatment approaches have been tried. Behavioral management programs seem to be the best options to date (Stuart & Davis, 1972; Stunkard & Mahoney, 1976; Hall et. al., 1974).

Antecedent Stimulus Control

One of the important principles relevant to changes of eating behavior is antecedent stimulus control. Research suggests that obese individuals eat in response to stimuli other than physiological signals of hunger while normal weight subjects tend to be guided by internal cues (Stunkard, 1959; Schachter, 1971). Bruch (1961) hypothesized that the obese have not learned to discriminate between physiological symptoms accompanying food deprivation and arousal characteristic of emotional states such as fear, anger and anxiety. There is evidence that the obese do not label gastric contractions as hunger. Using a gastric balloon to measure contractions, Stunkard and Koch (1964) have shown that for obese subjects there is little correspondence between the state of the stomach and self-reports of hunger. In contrast there is a relatively close correspondence between the state of the stomach and reports of hunger for normal weight subjects. Stunkard (1959) concluded that cues for hunger were different for obese and non-obese persons.

Studies by Schachter, Goldman and Gordon (1968) also found a correlation between the state of the viscera and amounts eaten by normal weight

subjects and little correspondence for fat subjects. In normal weight subjects, feelings associated with gastric motility and hypoglycemia appear to trigger eating. What triggers eating in the obese? The standard answer in the past was that psychic states precipitate eating in the obese, and treatment was focused on why individuals overeat. As a result, most treatments were psychotherapy or insight oriented. Yet there has been no clear indication of characteristics different in normal weight and overweight subjects except a positive energy balance for their activity level (Schachter, Goldman & Gordon, 1968). This led to the speculation that external food relevant cues trigger eating responses in obese subjects.

Schachter and associates (1971) have done several studies showing that obese individuals are more responsive to external environmental food cues than normal weight individuals who are more responsive to internal physiological cues. By manipulating perceived time with normal and obese subjects, it was shown that obese subjects will more likely eat if environmental cues indicate it is mealtime while normal weight subjects tend to be guided by internal cues to eat (Schachter & Gross, 1968). Obese subjects who thought it was not yet time to be hungry ate less than those who thought it was time to eat, while non-obese subjects ate less when they believed their dinner hour had arrived though it had not.

In two separate studies, Ross and Johnson (cited by Stuart & Davis, 1972, p. 47) studied the eating behavior of obese and non-obese individuals when food was highly visible. Each study manipulated the visibility of food through controlling the amount of illumination in which it could be viewed or through wrapping the food in transparent rather than non-transparent paper. Each study experimentally validated the supposition that

the visibility of food is a greater influence on the behavior of obese as opposed to non-obese persons. A study by Nisbett (1968) also supports the notion that obese persons are more subject to the influence of food cues than are non-obese persons.

Both Ferster et. al. (1962) and Goldiamond (1965) have pointed out that eating behavior occurs in a wide range of situations and is under the control of many stimuli other than those physiological cues causing hunger. Thus there is a need to examine antecedent discriminative stimuli affecting food consumption. Programs should assist individuals intervene between prevalent food cues and subsequent inappropriate eating responses. As the person will be continually faced with these food cues in the environment, programs should include stimulus control training. Stuart and Davis (1972) suggest a variety of specific suggestions to help the person reduce his vulnerability to food cues and to develop alternate non-eating responses to these stimuli. Other studies have outlined procedures to reduce the strength of antecedent stimuli that lead to eating including techniques for food buying, storing, preparing, serving and eating (Hagen, 1974; Ferster, Nurmberger & Levitt, 1962).

Consequent Control of Behavior

The second major class of variables is control of the consequences of behavior. One of the major difficulties in implementing change in behaviors such as eating, smoking, drinking, and drug taking relates to the consummatory nature of the response to be eliminated. The positive consequence of consuming the food is immediate whereas the positive consequence of restraining (weight loss) is far removed from the moment of eat-

ing and the distant positive consequences of restraining.

Studies have considered the effectiveness of therapist reinforcement, group support by others in the program, environmental and social reinforcement outside the program and self-administered reinforcement. Reinforcement has been used for actual weight loss and for daily improvements in eating and exercise behaviors.

Wollersheim (1970) found that clients who received therapist and group social reinforcement for weight loss lost more weight than clients given non-specific treatment, traditional insight therapy or no treatment at all. Penick, Filion, Fox and Stunkard (1971) also used therapist and group social reinforcement to achieve weight loss. Group reinforcement may be important for some individuals. However, a difficulty arises when the program is over and the individual is left on his own to maintain the new behavior. Other studies have included the disbursement of tangible rewards such as tokens, previously deposited valuables and money. Reinforcement for weight loss results in relatively rapid initial losses (Hall, 1973; Harris & Bruner, 1971). Harmatz and Lapuc (1968) found that paying subjects contingent on weight loss was effective for initial loss. Other studies finding success in the use of tangible rewards included work done by Mann (1972) who repaid subjects with deposited money and Hall (1972) who paid subjects from a research grant. However, these studies discovered problems. Mann (1972) found that patients resorted to diuretics, starvation and induced vomiting to reach goals. Difficulties also arose with lack of maintenance once the program was completed. Thus social and tangible reinforcement is useful to produce initial weight loss but effects achieved during the pro-

gram are not always maintained after the program is completed.

The second critical area of consequent control is environmental social reinforcement. Maintenance of weight loss might be improved if people important to the participant actively reinforce his efforts to lose weight. Stuart and Davis (1972) discuss the importance of getting help from loved ones. Mahoney (1973) instructed subjects to ask family and friends not to criticize them about their weight loss program. Mahoney and Mahoney (1975) trained participants' families in social reinforcement. Family support correlated strongly with success in weight loss. However, it is very difficult to control the responses of significant others in the natural environment. More work is necessary to help the person re-program his immediate social environment so as to reinforce behaviors leading to weight loss and maintenance of weight loss.

Self-reinforcement is the other strategy of consequent control. Some research projects report that addition of self-reinforcement improved behavior change programs (Jackson & Van Zoose, 1972; Mahoney, Moira & Wade, 1973). Mahoney (1974) found self-reinforcement for weight loss more effective than either self-monitoring alone or no treatment. He also found self-reinforcement for specific habit improvement more effective than self-reinforcement for weight loss. He found better maintenance at one year follow-up for those people who had used self-reinforcement for improvement of daily eating habits. Jeffry (1973) replicated these findings.

Aversive Control

Aversive control is used to eliminate a response. However, the goal in obesity control is not elimination of eating but reduction of the cal-

oric intake. Procedures to increase appropriate eating and exercise behaviors rather than punishment should be stressed. Complications in the use of aversive control arise as the participant may have difficulty in applying procedures consistently. Aversive control may heighten anxiety and inappropriate eating may increase as a result. Abramson reviewed punishment or avoidance conditioning techniques used to eliminate inappropriate eating . He wrote, "It appears safe to conclude that despite some early enthusiasm, there is little evidence to indicate that aversive procedures are an effective treatment for obesity" (1973, p. 548).

Self-Monitoring

Self-monitoring is another behavior management technique used extensively in weight control studies. Self-monitoring has been used to collect data on weight changes, eating habits and physical activity. It may be important that self-monitoring is directed towards specific goals but goal setting has not received much experimental attention. Bandura (1969) showed it is important to ensure that terminal goals are realistic and broken down into smaller goals so progress can be measured and reinforced.

Self-monitoring may help the learner be more aware of his eating and exercise habits. It may act as a reminder that progress is not being made and may also reinforce any progress that is occurring. Kanfer and Goldstein describe self-monitoring as a "tool that is not sufficiently powerful for use as a primary vehicle for lasting behavior change but which can be used successfully to increase the client's motivation for change" (1975, p. 328). Simply recording a behavior may influence its occurrence (Kazdin, 1974). However, this reactive effect is variable and transient (Thorensen & Mahoney,

1974). Stuart (1971) found self-monitoring useful for initial loss only, a finding replicated by Mahoney (1974) and Mahoney, Moura and Wade (1973). In summary the major finding about self-monitoring is that it needs to be used in combination with other techniques.

Effectiveness of Behavioral Programs Versus Other Programs

Reviews of obesity treatment (Stuart & Davis, 1972; Stunkard, 1972; Stunkard & Mahoney, 1976) conclude that behavior modification techniques are effective. Stuart's results (1967) were far better than any reported (80 percent lost 20 pounds or more, 30 percent lost 40 pounds or more). Previous research reviews (Stunkard & McLaren-Hume, 1959) reported 25 percent of subjects losing 20 or more pounds and 5 percent losing 40 or more pounds. Furthermore, high attrition occurred in psychologically based programs with 20 to 80 percent of patients abandoning programs before completion (Stunkard, 1959). Levitz and Stunkard (1974) compared four groups over a three month treatment program. Behavior modification produced significantly lower attrition rates and greater weight losses than did the other treatment methods. After nine months, differences among treatments were even greater.

Wollersheim (1970) reported significant differences between groups of college students who were taught self-management techniques and those who served as no contact control subjects or who received other treatments. Bellack et. al. (1974) also found the behavioral management contact group more effective than a no contact group. Two other studies (Harmatz & Lapuc, 1968; Harris, 1969) point to the potential effectiveness of using learning principles in the treatment of obesity. A study by Penick et. al.

(1971) adds support to the view that behavior management techniques represent a significant advance in the treatment of obesity. His findings are for only three months compared to Stuart's (1967) success on a year long program. However, the weight losses reported by Penick et. al. are even greater than those reported by Stuart after only three months. Although the exact utility of various techniques have yet to be identified, there can be little doubt that eating and exercise habits can be viewed as behavior amenable to change through application of strategies based on principles of learning.

Problems Remaining in Behavioral Management Programs

Even though weight control has been achieved through behavioral management, problems with maintenance of weight loss still exist. Treated groups usually show weight increases after the program is completed (Hagen, 1974; Wollersheim, 1970; Harris & Bruner, 1971). Behavior management success has so far occurred largely during short periods of time. There is a need for research with follow-up measurement at possibly six months and one year after the initial program. Instructional programs need to be designed to help participants maintain the weight loss after the program. Continued follow-up contact may be necessary to help individuals maintain weight loss over time.

A second problem is the wide individual variation in responsiveness to behavioral treatment programs. Individual differences are reported by Penick et. al. (1971), Horan and Johnson (1971) and Mahoney (1974(a)). Research on obesity has in many cases been with limited populations such as college students (Harris & Bruner, 1971; Harris, 1969; Wollersheim, 1970)

rather than with the middle-age adult in whom the overweight problem is prevalent. Little study has been done on predicting which subjects will be successful in behavior management programs or on matching learners to specific behavior management strategies or instructional programs.

Attrition is the third major problem. Dropouts have been a problem for traditional programs in weight control and for those based on learning principles (Harris & Bruner, 1971). There is a need for research on factors that cause participants to abandon the program. Research has indicated that subjects in programs were more successful than subjects in no program control groups (Wollersheim, 1970; Hagen, 1974; Harris, 1969; Harris & Bruner, 1971; Penick et. al., 1971; Stunkard & Mahoney, 1976). One of the first concerns in program design is getting the individuals to consistently attend the program sessions.

Research has been conducted to compare the effectiveness of behavioral management programs with no-program control groups and with programs based on other treatments. Behavioral programs have shown increased success over other treatments. Research on behavioral management of weight includes comparisons of different techniques including stimulus control, reinforcement, aversion therapy and self-monitoring. There has been no clear evidence supporting any one technique as superior on its own.

Behavioral management has been found to be successful when the techniques are applied. Both the problem of individual variation within groups and maintenance of the weight loss after the program may relate to the extent that individuals apply behavior management techniques. Application reflects the extent to which they actually learn self-management theory and skills. Research should now focus on instructional components in weight

control programs. Effective training in self-management may result in lower attrition rates, decreased variability in success within groups and higher success in weight loss maintenance after program completion. Research is needed to identify variables which predict success in self-management weight control programs. The problems outlined in weight control research suggest that further study is needed in the area of instruction in self-management skills so that each participant will be able to successfully manage weight control during and after a program.

B. WEIGHT CONTROL INSTRUCTIONAL PROGRAM

Curriculum Content

Little information about curriculum content for behavioral-based weight control programs is available in adult education or behavioral research literature. Thus this study began with the design of an instructional program to teach principles of self-management as applied to changes in eating and exercise patterns. The objectives and activities designed for this study are described in Appendix A.

One general description of curriculum content is presented by Mahoney and Mahoney (1976). They recommend the following components for a maximally effective program.

1. A simple and portable self-monitoring system which emphasizes actual behaviors rather than weight (for example, eating habits, exercise, food relevant thoughts).

2. Basic information on nutrition with an emphasis on the development of sound long-term eating patterns which permit weight control without jeopardizing essential nutrient intake (no crash dieting, no totally restricted foods).

3. Instruction in exercise management outlining the physiological assets of exercise and encouraging increases in daily energy output (activity patterns) which are more likely to be maintained than calisthenics.

4. Guided instruction in the many facets of stimulus control as a means of regulating food intake.

5. Initial provision of therapist or group support with the magnitude and frequency of their reinforcement gradually withdrawn as the individual continues progressing.

6. Training of spouses and other family members in social reinforcement strategies in order to maintain program-induced improvements.

7. Training in modification of self-defeating thought patterns and unrealistic performance standards.

8. Training in development of broad problem-solving skills and the establishment of self-regulated incentive systems (tangible, self-reward, self-praise) to enhance maintenance.

The program designed for this study attempted to incorporate these guidelines and the behavioral approach described by Stuart and Davis (1972).

Instructor/Helper Variables

Initial training in self-management seems to require instructor support to help the individual build eating and exercise management skills. Kanfer and Goldstein describe the helper's role as follows:

1. "Helping the individual establish favorable conditions for carrying out a self-control program and providing initial reinforcement to alter balance in favor of changing the undesirable behavior (motivation).

2. Helping the individual acquire specific behavior change techniques that ease the process of change (training).

3. Reinforcing the client's efforts and successes in carrying out a self-management program (support and maintenance)" (1975, p. 317).

There has been little systematic research into instructor's effectiveness in behavioral programs for weight control. However, psychotherapy literature suggests there is need for therapeutic and interpersonal skills in conducting behavior change programs (Feske, Hunt, Luborsky, Orme, Parloff et. al., 1970; Kanfer & Goldstein, 1975). The following is a description of skills needed by the helper or instructor (Craighead, Kazdin & Mahoney). The helper needs to:

- be competent in behavior management principles and knowledgeable about basic principles of nutrition and exercise;
- have basic interviewing and interpersonal skills;
- care about the client and be sensitive to the client's needs at all times (1976, p. 413).

Bellack et. al. (1974) give support for the view that external control at some level is necessary for the maintenance of self-control. Their program emphasized reliance on self-control for behavior change with external control added to help maintain the use of self-management as opposed to programs such as financial contracting where external consequences are a primary aspect of the program. Kanfer and Karoly (1972) suggest that external control is critical to maintenance of self-management. These results suggest that when self-management is the primary focus, the presence or absence of external control is more important than the degree of external control.

Participant Variables

Behavioral management procedures for weight control have been effective but a high degree of intra-group variability has been evident (Penick et. al., 1971). Little attempt has been made to match subjects to treat-

ments or to design treatments for individual subjects. Abramson (1973), Bellack (1976), and Hall and Hall (1974) recommend efforts be directed towards identifying individual predictor variables to facilitate more effective subject-treatment match. Keisler (1966) criticized the use of post hoc correlational analysis of results involving variables such as age, sex, marital status, history of weight problem and dieting success. Instead he suggested the following procedure be used:

1. Identify skills or characteristics necessary for a specific treatment procedure.
2. Select individuals independently assessed as differing on those characteristics.
3. Compare the performance of the groups on the target program.

Comparisons should include treatment by subject interactions and a study of the overall treatment and subject differences.

C. LOCUS OF CONTROL

Locus of Control as a Generalized Expectancy

One possible predictor of success is a generalized belief in Internal Locus of Control. Most subjects successful in self-modification of diverse behaviors were significantly more internal than were least successful subjects (Schallow, 1975). Also, Internals were more successful in losing weight than Externals (Balch & Ross, 1975; Manno & Marston, 1972). Lefcourt (1972) observed that the Internal individual is less subject to external sources of influence than is the externally oriented individual. Best and Steffy (1975) explored this suggestion in a study on smoking behavior. They suggest that programs in smoking habit reduction should match

internal and external focused treatment to the respective internal and external orientation of the participants. If a relationship between Internal Locus of Control and weight loss during and after a night school program on self-management weight control is found, then instructors might attempt to modify instruction to match the individual's locus of control orientation.

Reinforcement or reward is crucial to the acquisition and performance of skills and knowledge. However, an event regarded by some persons as a reward or reinforcement may be perceived differently by others. One of the determinants of this reaction is the degree to which the individual perceives that the reward follows from and is contingent upon his own behavior. Rotter (1966) hypothesized that Locus of Control is of major significance in understanding the nature of learning processes in different kinds of learning situations. In Rotter's (1954) theory, the potential for any behavior to occur in a given situation is a function of the person's expectancy that the behavior will secure the available reinforcer and depends also on the value of the available reinforcements for that person. This construct was developed as a generalized expectancy that relates to whether the individual believes that he possesses or lacks power over what happens to him. Rotter, Seeman and Liverant define Internal-External Locus of Control as follows:

> "As a general principle, then, internal control refers to the perception of positive and/or negative events as being a consequence of one's own actions and thereby under personal control. Whereas external control refers to the perception of positive and/or negative events as being unrelated to one's own behaviors in certain situations and therefore beyond personal control" (1962, p. 499).

In Rotter's (1954, 1955, 1960) theory, a reinforcement acts to strength-

en an expectancy that a particular behavior or event will be followed by that reinforcement in the future. Once an expectancy for such a behavior-reinforcement sequence is built up, the failure of the reinforcement to occur will reduce or extinguish the expectancy. Expectancies generalize from a specific situation to situations perceived as related or similar. A generalized attitude, belief or expectancy regarding the nature of the causal relationship between one's own behavior and its consequences might affect a variety of behavioral choices in a broad range of life situations. Such generalized expectancies in combination with specific expectancies and the value of the potential reinforcements act to determine an individual's choice of behaviors.

Development of Tests to Measure Internal-External Locus of Control

Phares (1957) used a Likert format test with 13 external and 13 internal attitude statements. James (1957) revised Phares' test still using 26 items plus filler items based on the most successful items from Phares' test. This James-Phares' test correlated significantly with the Incomplete Sentences Blank personal adjustment score (Rotter, 1950) - extreme externals and internals appearing less adjusted. In addition, the James-Phares' scale was found to correlate ($r=.51$, $n=101$) with the California F scale. Both scales measure the degree to which individuals see the world as containing powerful forces they cannot influence. Liverant in association with Rotter and Seaman (1962) undertook to broaden the test, develop subscales and control for social desirability by construction of a new forced-choice questionnaire. The scale was item and factor analyzed and reduced from a 100 to a 60 item scale by Liverant on the basis of internal

consistency criteria. Through item analysis, they found that the subscales were not generating separate predictions; items to measure more specific sub-areas of Internal-External control were abandoned.

This scale was eventually modified to a 29 item forced-choice test including six filler items. The items deal with the subject's belief about the nature of the world and his expectations about how reinforcement is controlled. Thus the test is considered as a measure of generalized expectancy. None of the items is directly related to a preference for Internal versus External control. Two further questions about the Internal-External scale have not been investigated in any depth. These concern the origins and sources of Locus of Control orientation and operations for altering such orientations.

A variety of techniques (forced choice, Likert-type scales, true-false scales, interview assessment, projective devices and performance measures drawn from Level of Aspiration tasks) have been used to measure locus of control. Considerable research on diverse populations has demonstrated construct validity in experimental and field situations (Lefcourt, 1966; Rotter, 1966). The most significant evidence of the construct validity comes from predicted differences in behavior for individuals above and below the median of the scale (Rotter, 1966). Internal consistency estimates are relatively stable though only moderately high. Test-retest reliability for a one month period is quite consistent in two different samples. Rotter (1966) concludes that a generalized expectancy that one can affect the environment through one's behavior is present and that it can be reliably measured.

Although there has been much evidence supporting the validity of the

Rotter test, there has also been criticism. Most research with Rotter's I-E scale has proceeded from the assumption that the scale measures are a unidimensional trait. However, Mirels (1970) identified two factors:

1. Fatalism-belief that luck, fate or fortune versus hard work, ability and personal responsibility determine one's outcomes.

2. Social System Control - belief concerning the extent to which the individual citizen can or cannot affect change within the socio-political realms of their society.

Mirels suggests that predictions involving the I-E scale might be sharpened by separate consideration of these two factors. Reid and Ware (1973) also suggest I-E is a multi-dimensional construct.

Mirels (1970) and Reid and Ware (1973) ask whether self-control of impulses, desires and emotional behaviors is part of the present two factor structure determined by Rotter's I-E construct. Or is it a third dimension of I-E? Reid and Ware (1973) suggest that the three dimensions are reasonably independent of one another.

Belief in self-control appears to differ from both belief in chance determinants of one's outcomes and expectations of control by socio-political forces in society. Rotter's scale might be measuring more directly the dimensions of fatalism and social system control rather than self-control. In the study conducted by Balch and Ross (1975) no significant correlations between I-E scores and either program

completion or weight loss success were found on either of Mirel's factors. There is no final resolution of the question of whether the I-E scale measures a unidimensional trait -"generalized expectancy of reinforcement"- or not. However, the research described in this paper considers the Rotter scale as measuring a unidimensional Internal-External locus of control construct.

Internal-External Locus of Control and Weight Control Programs

Behavioral weight reduction programs direct attention to the individual's ability to modify external antecedents and consequences that affect eating and exercise patterns. Locus of Control has some possibility as a predictor of success in a self-management weight control program. The internally oriented individual who believes he can control important aspects of his life would be expected to be more successful than the externally oriented individual who believes that luck or fate are important determinants of his life (Rotter, 1966). Balch and Ross (1975) found significant correlations between locus of control scores and both completion (measured as at least 75% attendance at the nine weekly meetings) and success (measured as weight loss greater than eight pounds). Their findings suggest that the Locus of Control dimension as measured by Rotter's scale is relevant and could be used to predict success in a weight control program based on training the individual in self-management skills related to eating and exercise patterns.

The research described in this study was designed to further investigate whether the Rotter I-E scale is useful in predicting weight loss success for participants in a particular self-management skills training pro-

gram and the relationship between I-E score, two different instructor follow-up contact schedules and subsequent weight loss success of the participants in the program.

CHAPTER III

DESIGN AND METHODOLOGY OF THE STUDY

A. INSTRUCTIONAL PROGRAM

Program Participants

The program participants were 24 adult women (ages 19-65, mean 38.8 years), who registered for a Weight Control class in a Vancouver School Board night school program in the fall term of 1977. The course was advertised once in the Vancouver Sun Newspaper, (August, 1977) as part of the regular fall advertisement of Vancouver night school programs. Only women volunteered to participate in this weight control class. None were referred to the program for medical or other reasons, nor were people individually recruited to the program, but responded only to the newspaper advertisement. This group may be more representative of the weight control problem in the adult community than are many weight control research groups of subjects recruited largely from university settings. When registering for the class, participants were not aware they were participating in an experiment. No pre-requisites were required except participants were not to register if they knew they were pregnant.

The weight control instructional program was an eight week sequence of two hour group classes given one evening a week. The study included two classes running concurrently. The course was designed as an adult education activity and not as therapy. The night school centre provided a community based setting and a means of reaching a cross section of adults. However, this delivery format also constrained the study. The instruction-

al design had to fit into a two hour weekly session. No external demands (such as refundable deposits for attendance) could be placed on participants. Nor could participants be assigned into a no-program control. All individuals registered for the course paying the standard night course fee of sixteen dollars. The instructor was the experimenter, a female graduate student in adult education who, together with a community nutritionist, had previously taught two other weight control programs[1] based on balanced nutritional planning and use of behavioral management techniques.

Intake Session

On the evening of the first class, the instructor introduced the course objectives describing the behavioral management approach to weight control and the types of activities that would be used during the class (short lectures, question and discussion periods, group activities, film discussions, and homework assignments). The instructor described her own personal interest and difficulties with weight control. The class was told that perfect attendance was expected. The group was informed that, unlike most night school programs, this course would include follow-up contact by the instructor to determine the success each individual was having with weight loss goals. No explicit information was given as to the nature and extent that this follow-up contact would take.

After initial rapport was established between participants and the instructor, each individual completed the Rotter and James I-E tests and a weight history questionnaire (see Appendix C). Participants were in-

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1. One at Simon Fraser Health Unit, Coquitlam, the second at the Coquitlam Recreation Centre.

formed that these "opinionnaires" would be used by the instructor to determine differences between individuals in the group. The instructor would then use this information in planning learning activities for this particular class. After these questionnaires were completed, each participant was weighed and their weight recorded. The remainder of the first class was devoted to a lecture/discussion on the relationship between eating and exercise balance and the importance of each individual assessing her own specific eating and exercise habits. The film, Weight Control a Step Away[1] was used to reinforce ideas presented in this first class.

The individuals were told that overweight is a result of a prolonged positive energy balance resulting from inappropriate eating and exercise habits. The goal of the program was to teach new eating and exercise habits so they could lose weight and maintain the loss. The intent of the course was to teach a systematic way to approach eating and exercise balance based on learning principles. This overview was presented during the first class and re-emphasized throughout the whole program.

Program Continuation

Classes two through eight followed a similar format. As participants arrived for each session, they checked into the scale room where they were weighed by the instructor in their street clothing but without shoes, heavy sweaters or jackets. The instructor recorded the weight and told the individual the net change from the previous weigh-in. After all participants

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1. Informedia Production Ltd., Vancouver, British Columbia.

had been weighed, the instructor went back to the classroom. Each class began with a brief review of the weight control techniques introduced in the previous session followed by questions and discussion on the homework assignment (see Appendix A) and difficulties encountered the previous week.

Problems were analyzed on the basis of information provided from food-record diaries. The group was introduced to behavior management techniques of 1) stimulus control, 2) slowing down eating behavior, 3) self-monitoring and 4) self-reinforcement. Each technique and the learning principles upon which it was based was explained by the instructor. Throughout the sessions, participants worked either alone or in small groups on activities designed to have them analyze problems and suggest solutions. Problems employed were those raised by group members.

In addition to training participants to use behavior management techniques, a major emphasis was placed on nutrition education. The program used the daily food exchange system described by Stuart and Davis (1972). This food exchange system was introduced by a lecture followed by exercises where participants used their own food and activity records to determine actual and ideal daily food exchange plans. The food exchange system was continually reviewed throughout the course. Self-monitoring charts were introduced during week two. Participants used these charts and their own daily food exchange goals as the daily criteria for measurement of success. Exercise and physical activity were also emphasized. Lectures and discussions were held on applying behavior management techniques to increase physical activity as well as to decrease food intake. However, no actual physical activity was included during the night school class itself. The pro-

gram was oriented towards slow steady loss by making small daily changes in eating and exercise habits - changes that the individual would be able to maintain over time. Interaction was a major feature of the program as the group worked together throughout the classes while attempting to suggest behavior management techniques to solve specific problems encountered by the people in the class.

Follow-Up Contact After Instructional Program

The instructor made telephone calls to the individuals in the four call follow-up group at weeks three, eight, fourteen and twenty-one after the last class. The second group received one instructor follow-up telephone call at week fourteen. Telephone contact was made in the evening and included a brief discussion about their present weight, weight loss success to date, and included encouragement and suggestions about specific difficulties encountered.

All participants were invited by mail to a follow-up session at the night school centre. This meeting was held six months after the final class. One person had dropped out of the program during the classes. One person was in the hospital and two people indicated they did not wish to attend. The three individuals who could not attend the follow-up session indicated that their weight was exactly the same as when they had started the program. The other people attended and their final weight score was recorded at that time. Eight people were interested in meeting again. Follow-up meetings were held with these people for three more months. However, these sessions were outside the boundaries of the present study.

B. EXPERIMENTAL PROCEDURES

Administration and Scoring of Internal-External Locus of Control Tests

The Rotter and the James Internal-External Locus of Control tests were group administered by the researcher. The two night school classes were each tested separately during the second half-hour period of the first class. Testing was done in the classroom. All scoring was done by an assistant who marked the tests, recorded the scores and coded the groups. Throughout the study, the researcher remained blind to the Internal-External scores of the participants. These two paper and pencil tests were used to assess each participant's relative score on an Internal-External Locus of Control continuum.

Assignment of Participants to Groups

On the basis of their score on the Rotter scale, the 24 participants were divided into three equal groups of low, medium and high External Locus of Control orientation. The scores on the James scale were used to separate participants who had identical scores on the Rotter scale.

An equal number of participants from each locus of control group was then randomly assigned by a coin toss into either the one telephone call or four telephone call follow-up group. A listing of participants, their Rotter and James scores, and their assignment into Locus of Control and follow-up groups appear in Appendix D.

Record of Weight Control Success

Weight scores were collected at four different times: initial class, final class at week eight, at a period fourteen weeks later, and 26 weeks

after program completion. Weight measurements for the first class, final class, and follow-up meeting at week 26 were taken by the experimenter on the balance beam scale at the night school centre. The third weight measure at fourteen weeks was self-reported by the individual during the instructor follow-up telephone call. During the instructional program, each participant had checked their own scale with their weight measured on the balance beam scale. This self-report measure was given in terms of the equivalent weight score on the night school centre balance beam scale. Trust had been established between the instructor and the participants, but one must assume that the self-report measures were given truthfully. Weight control was measured as the change in the number of pounds and as change in the percentage of body weight.

Analysis of Weight Control Success

2x3 Factorial Design on Weight Control Success

Weight Loss:

	LOW I-E	MED I-E	HIGH I-E
Four Call Follow-up			
Single Call Follow-up			

Percentage of Body Weight Lost:

	LOW I-E	MED I-E	HIGH I-E
Four Call Follow-up			
Single Call Follow-up			

A 2x3 analysis of variance design was used to analyze the differences between the mean weight loss of each group. The function of this factorial design was to explore the relationship between Internal-External Locus of Control and success in a weight control program, the relationship between four call follow-up and one call follow-up schedules and subsequent success in weight control, and the interaction between Internal-External Locus of Control, instructor follow-up and success in weight control.

CHAPTER IV

PRESENTATION OF THE DATA

A. DESCRIPTION OF THE RESULTS OBTAINED FROM THE ANALYSIS OF VARIANCE

The experimental phase of this study was designed to test the relationship between Locus of Control (low, medium, and high levels of externality), instructor follow-up schedule (one telephone call and four telephone calls) and success in weight loss (pounds lost and percentage of body weight change) at four different times. In order to investigate these relationships, a 2x3 analysis of variance design with four repeated measures was employed.

The results of the statistical analysis for change of body weight (in pounds) are presented in the following two tables. Table 1 presents mean weights for each group over the eight months life of the study. Table 2 shows the results of significance tests among these means. F-values were calculated for differences between the weight change means of each of the six cells in the 2 x 3 design. No statistically significant differences in weight change for the three I-E groups or for the two follow-up groups were found for any time period. Thus the data obtained does not support the hypotheses about increased weight loss success for either the low external locus of control group or for the four call instructor follow-up group.

TABLE 1

MEAN WEIGHTS IN POUNDS

OVER EIGHT MONTHS

LOCUS OF CONTROL	High External	High External	Medium External	Medium External	Low External	Low External	Marginal
FOLLOW-UP	One Call	Four Calls	One Call	Four Calls	One Call	Four Calls	
September	153.17	161.50	151.88	162.50	154.63	139.38	153.87
November	145.83	154.13	148.88	160.88	149.88	132.88	148.87
March	150.33	151.25	148.75	160.75	152.25	134.25	149.57
June	151.00	152.63	149.50	158.50	149.38	137.88	149.76
Marginal	150.08	154.88	149.75	160.66	151.53	136.09	150.52

STANDARD DEVIATIONS

September	25.47	19.97	22.91	24.14	15.10	17.52
November	24.02	16.65	22.24	27.22	12.48	19.10
March	19.14	18.68	22.01	26.06	12.53	19.50
June	25.06	23.77	20.57	27.91	13.34	20.90

TABLE 2

EFFECTS OF LOCUS OF CONTROL AND FOLLOW-UP SCHEDULES ON POUNDS CHANGE IN BODY WEIGHT

(Analysis of Variance Summary Table)

SOURCE	S.S.	df.	MEAN SQUARE	F.	PROBABILITY (One Tail)
Locus of Control	2245.44	2	1122.72	0.65	0.532
Follow-Up Schedule	0.17	1	0.17	0.00	0.992
Locus & Follow-Up	3015.01	1	1507.50	0.88	0.433
Error	20146.18	17	1714.48		
Weight Change Over Time	353.15	3	117.72	7.40	0.000
Weight Change & Locus	65.13	6	10.86	0.68	0.665
Weight Change & Follow-Up	32.16	3	10.72	0.67	0.572
Weight Change, Locus & Follow-Up	119.81	6	19.97	1.25	0.295
Error	811.63	51	15.91		

The results of the statistical analysis for change of body weight (in percentage of body weight change) are presented in the next two tables. Table 3 presents mean percentage of body weight for each group over the 8 months of the study. Table 4 shows the results of the significance tests among these means. F-values were calculated for difference between the percentage of body weight means of each of the 6 cells. No statistically significant differences in percentage body weight change were found for the two follow-up groups at any time period. The data about the percentage of body weight change does not support the hypotheses that weight loss success will be greater for either the low external group or the four call instructor follow-up group.

Thus the null hypotheses were confirmed as follows:

H_0 There were no statistically significant differences in the average weight loss by the low external group as compared to the medium or high external group at any of the time periods.

H_0 There were no statistically significant differences in the average weight loss by the participants in the four call follow-up group as compared to those in the one call follow-up group.

H_0 When the average weight loss of low externals was compared to the average weight loss of either of the other two I-E groups in either the one call or four call follow-up group, no statistically significant differences were found.

However, weight did differ significantly over the four repeated measures; both for actual pounds lost ($F=7.40$, $df=3$, $p < .01$) and for percentage of body weight change ($F=6.50$, $df=3$, $p < .01$). The average weight loss at the end of the eight classes was 5.0 pounds or 3.2 percent of body weight change. By the end of the 6 month follow-up period this average weight loss dropped slightly to 4.1 pounds or 2.64 percent of body weight

TABLE 3

MEAN PERCENTAGE OF BODY WEIGHT

OVER EIGHT MONTHS

LOCUS OF CONTROL	High External	High External	Medium External	Medium External	Low External	Low External	Marginal
FOLLOW-UP	One Call	Four Calls	One Call	Four Calls	One Call	Four Calls	
September	100.00	100.00	100.00	100.00	100.00	100.00	100.00
November	95.30	95.60	98.03	98.78	97.13	95.23	96.73
March	98.73	93.68	98.00	98.78	98.63	96.33	97.30
June	98.70	94.28	98.67	97.30	96.73	98.93	97.37
Marginal	98.18	95.89	98.66	98.71	98.12	97.62	97.85

STANDARD DEVIATIONS

September	.00	.00	.00	.00	.00	.00
November	.17	2.02	1.58	2.35	4.42	4.22
March	4.00	3.30	2.61	2.51	3.91	7.62
June	1.04	5.43	2.75	4.53	3.75	9.36

TABLE 4

EFFECTS OF LOCUS OF CONTROL AND FOLLOW-UP SCHEDULES ON PERCENT OF CHANGE IN BODY WEIGHT

(Analysis of Variance Summary Table)

SOURCE	S.S.	df.	MEAN SQUARE	F.	PROBABILITY (One Tail)
Locus of Control	4037.64	2	2018.82	0.60	0.559
Follow-Up Schedule	1904.73	1	1904.74	0.57	0.461
Locus & Follow-Up	2179.40	2	1089.70	0.32	0.727
Error	57010.74	17	3353.57		
Weight Change Over Time	14613.84	3	4871.28	6.50	0.001
Weight Change & Locus	2284.84	6	380.81	0.51	0.800
Weight Change & Follow-Up	1674.11	3	558.04	0.74	0.531
Weight Change, Locus & Follow-Up	5854.54	6	975.76	1.30	0.274
Error	38244.86	51	749.90		

change. Thus the weight loss program was successful but the losses were not differentially predicted by locus of control scores or by instructor follow-up contact schedules.

B. DESCRIPTION OF THE RESULTS OBTAINED FROM THE MULTIPLE REGRESSION ANALYSIS

Several variables have been suggested by other researchers as factors that may be important for successful weight loss. This study included an examination of the relationship between a number of such factors and prediction of weight loss success at the end of the instructional period and at the end of the six month follow-up period. The effects of these situational and biographical variables on amount of weight loss were examined by means of multiple regression. The independent variables considered were Locus of Control score, follow-up contact group, number of sessions attended, initial weight, night of class attended, age, whether overweight as a child, whether overweight as a teen, whether one parent was overweight, whether both parents were overweight, and height. Table 5 presents a summary of this data at the end of the eight week instructional program. Only attendance rate was statistically significant in predicting weight loss ($F=4.5$, $df=11$, $p < .01$). The Beta score for attendance indicates that each session attended resulted in a .52 pound weight loss. Table 6 outlines a similar summary, but at the end of the six month follow-up period. At the end of that period, none of the variables correlated with final weight beyond a chance level of .05. When all eleven variables were forced into the equation to predict weight loss at the completion of the eight week course, they yielded an R^2 of .49. By the end of the eight month follow-up, their predictive power had dropped to an R^2 of .38.

TABLE 5

PREDICTION OF WEIGHT LOSS SUCCESS

BY END OF THE EIGHT WEEK INSTRUCTIONAL PROGRAM

(Multiple Regression Summary Table)

	Cumulative R^2	Simple r	Beta	F. to enter
Locus of Control	.02	.14	.19	.573
Follow-Up Schedule	.02	.04	.18	.439
Attendance Rate	.20	.40	.52	4.564 *
Initial Weight	.20	.07	.31	1.108
Night of Class	.22	.18	.26	.647
Age	.22	.07	.07	.040
Overweight as a Child	.23	.12	.02	.184
Overweight as a Teenager	.25	.04	.16	.134
One Parent Overweight	.41	.41	.49	2.704
Both Parents Overweight	.41	.24	.12	.172
Height	.49	.23	.39	1.750

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* Significant at .01 Level.

TABLE 6

PREDICTION OF WEIGHT LOSS SUCCESS
AT END OF SIX MONTH FOLLOW-UP PERIOD

(Multiple Regression Summary Table)

	Cumulative R^2	Simple r	Beta	F. to enter
Locus of Control	.02	.15	.16	.324
Follow-Up Schedule	.03	.10	.08	.070
Attendance Rate	.16	.35	.29	1.169
Initial Weight	.16	.10	.04	.017
Night of Class	.17	.07	.14	.157
Age	.17	.04	.29	.591
Overweight as a Child	.18	.11	.16	.091
Overweight as a Teenager	.21	.06	.05	.012
One Parent Overweight	.32	.36	.40	1.464
Both Parents Overweight	.35	.38	.25	.582
Height	.38	.05	.21	.403

Figure 1. WEIGHT LOSS SUCCESS IN POUNDS LOST AT THREE TIME PERIODS

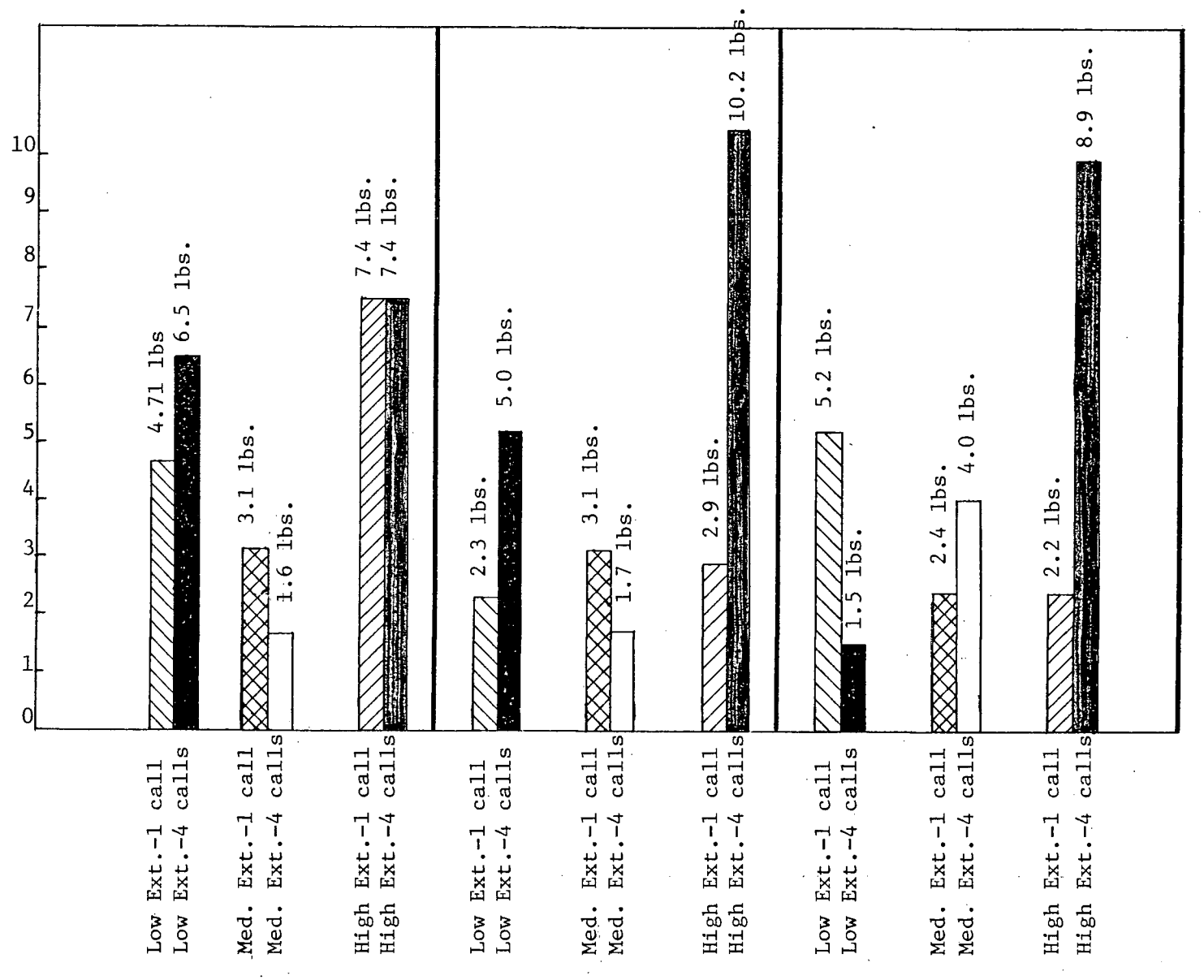
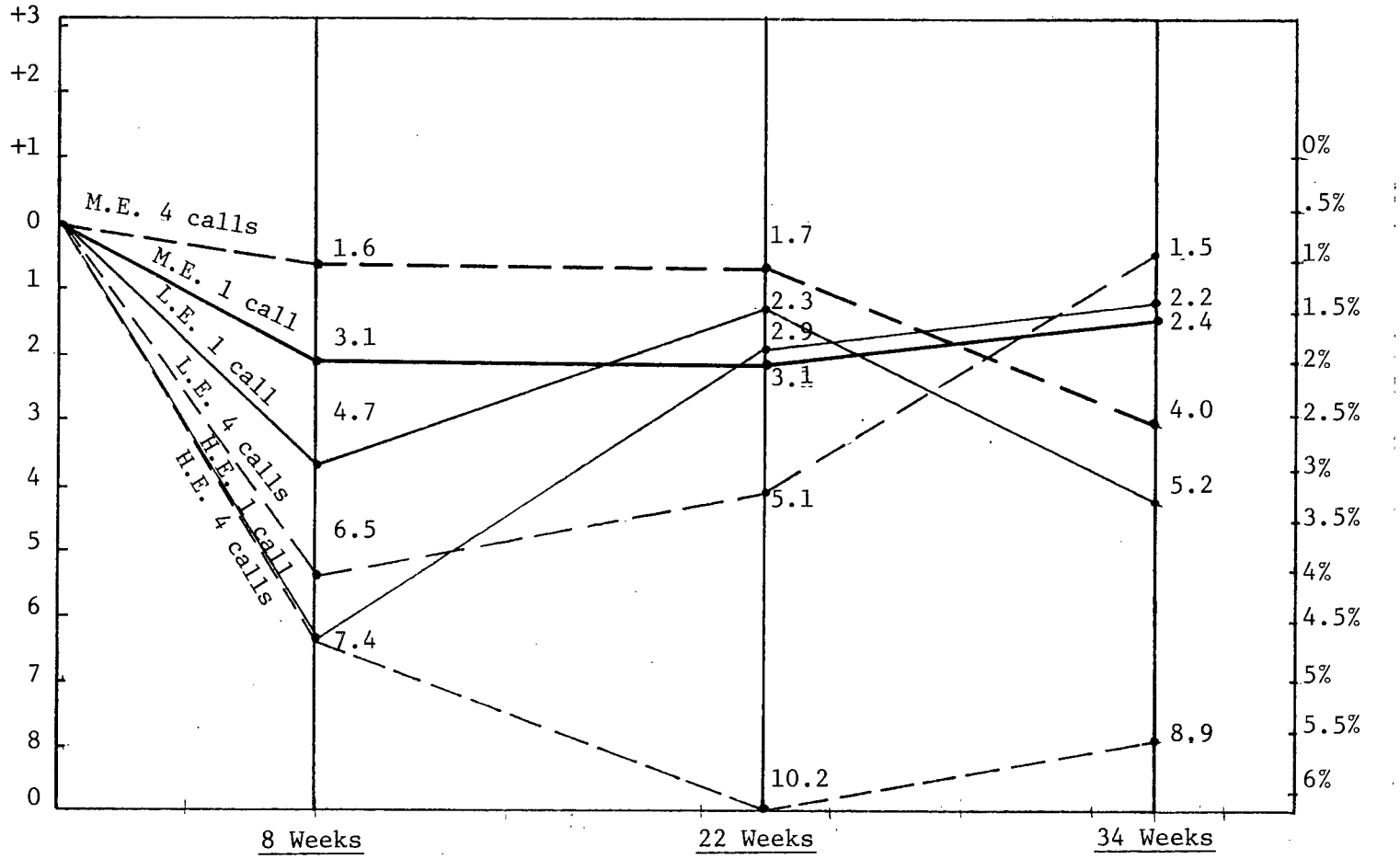


Figure 2. WEIGHT LOSS SUCCESS IN POUNDS AND PERCENT BODY WEIGHT CHANGE OVER FOUR REPEATED MEASURES



M.E. : Medium Externals
L.E. : Low Externals
H.E. : High Externals

C. SUMMARY OF THE RESULTS

Figure 1 presents a summary of weight loss success in pounds lost by each of the six groups at three time periods. These three time periods are:

1) at the end of the 8 week instructional program,

2) 22 weeks after the beginning of the program,

3) 34 weeks after the beginning of the program.

Figure 2 gives a visual presentation of the weight loss success in both pounds lost and percent body weight change over the 4 repeated measures of the 8 month life of the study.

Twenty-three participants (one individual left town after the second class) were divided on the basis of I-E scores into low, medium, or high external groups. One-half of each of these I-E groups was randomly assigned into either one call or four call follow-up groups.

While the high externals in the four call follow-up condition were the most successful weight losers, their weight losses were not significantly different from weight losses of the other five treatment conditions (each I-E group compared in both follow-up conditions). None of the differences proved statistically significant at the .05 level and none of the three null hypotheses could be rejected.

When eleven variables were forced into a multiple regression equation, attendance rate was the one single variable found to be statistically significant in predicting success in weight loss and then only at the end of the 8 week instructional program. By the end of the follow-up period, none of the individual variables correlated with final weight beyond a chance

level. Collectively these eleven variables accounted for 49 percent of the variance. This dropped to 38 percent by the end of the 6 month follow-up period.

The overall change of weight was statistically significant both at the end of the eight week instructional program and at the end of the six month follow-up period as shown by a repeated measures analysis of variance test. Participants did alter their weight score significantly, but it was not possible to predict success on the basis of Locus of Control score or follow-up contact schedules. The average subject lost 5.0 pounds at the end of the 8 week program which amounted to a 3.27 percent reduction of body weight. The average subject managed to maintain a loss of 4.1 pounds by the end of the six month follow-up period or 2.64 percent reduction of body weight.

CHAPTER V

CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS FOR FUTURE RESEARCH

A. CONCLUSIONS

The following conclusions were derived from the results of the present study:

1. It was not possible to predict weight loss on the basis of Locus of Control scores, number of telephone calls received after the classes, or from interaction effects of Locus of Control scores and follow-up calls.
2. Participants were significantly lighter both at the end of the eight week instructional program (down 5.0 pounds or 3.27 percent reduction of body weight) and at the end of the six month follow-up period (down 4.1 pounds or 2.64 percent reduction of body weight). This weight loss was statistically significant at the .01 level both for pounds lost ($F=7.40$, $df=3$, $p < .01$) and for percent weight change ($F=6.5$, $df=3$, $p < .01$).
3. Participants who attended more instructional sessions lost more weight by the end of the eight week classes than did participants who attended fewer sessions. This difference was statistically significant ($F=4.5$, $df=11$, $p < .01$). Each session attended resulted in an average weight loss of .52 pounds. However, by the end of the six month follow-up period, attendance rate at the classes was no longer a significant predictor of weight loss.

B. DISCUSSION

Even though participants did lose a significant amount of weight and maintained the loss over six months, the three hypotheses of this study were all refuted.

The first hypothesis that:

> there is a statistically significant difference in the average weight loss by the low external group as compared to the medium or high external group at any of the time periods

could not be tested because of no overall significance due to Locus of Control and thus, the null hypothesis (of no effect) remains in force. As this program was designed to instruct each individual in the use of behavior management techniques, each person was expected to set up and maintain her own weight control program. The study attempted to explore whether a low External score on the Rotter Internal-External Locus of Control test disposed individuals attending this adult education course towards greater weight loss success both during the program and after the classes were completed.

The individuals with low external locus of control scores did lose a significant amount of weight over the four repeated measures. Most of the weight loss occurred during the 8 week instructional period. However, individuals in the other groups also lost a significant amount of weight during the program and managed to maintain the weight loss achieved. Three possible reasons why low External Locus of Control score was not able to predict success at a statistically significant level when the weight loss of low Externals was compared to that of either medium or high Externals are presented below:

1. The sample of 23 people divided into three groups may have been too small for a significant difference of weight loss to be discerned between the low, medium, and high external Locus of Control groups.
2. Generalized Locus of Control may be a construct useful in predicting weight loss success, but the Rotter I-E test may not be an adequate instrument to measure Locus of Control including belief about personal self-control and the ability to make lifestyle changes. Instruments such as the Self-Control Potential Scale (Stuart, 1978, p. 58) may be more effective in predicting success in weight loss than was the Rotter I-E test used in this study.
3. Generalized Locus of Control may not be a construct useful in predicting weight loss success.

The second null hypotheses was retained as follows:

> there was no statistically significant difference in the average weight loss by participants in the four call follow-up group as compared to those in the one call follow-up group.

This study was conducted as part of a night school program and constrained by the type of on-going attendance beyond regular classes that could be expected from all participants. The experimenter decided to test the effectiveness of two telephone follow-up contact schedules on on-going success in weight control. The overall weight change for all groups both at the end of the program and at the end of the six month follow-up period was found to be statistically significant, but it was not possible to differentially predict weight loss on the basis of the different telephone follow-up schedules.

Four possible reasons why it was not possible to predict weight loss

success on the basis of the four call contact schedule are outlined below:

1. All participants knew that the instructor would contact them at a later date and that they would be invited to a follow-up meeting of the whole group. Expectation of follow-up contact may have been important for some individuals in both groups regardless of number or timing of telephone calls received.
2. Some of the learners may have had success because of their own high commitment to weight loss. Some of these highly motivated individuals may have been present in each group thus moderating any difference in success between the one call and four call follow-up groups.
3. It could be that the two telephone contact schedules were not different enough to result in a significant difference in maintenance of weight loss success between the two groups.
4. Perhaps follow-up contact schedules need to be much more regular and sustained in order for continued weight loss to occur.

The third null hypothesis was also confirmed:

> when the average weight loss of low externals was compared to the average weight loss of either of the other two I-E groups in either the one call or four call follow-up group, no statistically significant difference was found.

As the instructional program focused on teaching self-management skills related to eating and exercise control, it was suggested that those individuals with high Internal Locus of Control belief would be more success-

ful in developing and using these self-management skills to lose weight than would groups with low or medium Internal Locus of Control scores. However, it was the high Externals in the four call follow-up group that lost a greater number of pounds when compared to any of the other groups in either follow-up condition. They were the only group that continued to lose weight after the instructional sessions, but the difference was not found to be at a statistically significant level. If further investigation were conducted using a more sustained and regular instructor contact schedule, then it would be worthwhile to test again for the interaction effect between Internal-External Locus of Control score, follow-up contact schedule and weight loss success.

C. SUMMARY OF PROGRAM FINDINGS

Even though weight loss was not predicted by locus of control scores, instructor follow-up schedules, or interaction of locus of control and follow-up contact, participants in the program did lose weight at a significant level and maintained the loss. Furthermore, those participants who attended more sessions lost significantly more weight during the eight week program than did people who attended fewer sessions. The average weight loss was 0.5 pound for each session attended. Most of the weight loss by participants was achieved during the 8 week instructional session period.

It seems that the instructional program was effective for participants regardless of their generalized Internal-External Locus of Control score or follow-up contact schedule. No clear conclusions can be drawn from this study about why participants lost weight nor why those who attended more sessions lost significantly more weight than did participants who at-

tended fewer sessions as the study did not directly test for the effectiveness of this particular instructional program. It may be that instruction in self-management was effective in training some individuals in the skills of applying self-management techniques to eating and exercise habits. For other individuals, the important aspect may have been the external support provided by the instructor and group members during the program. A program that provides regular weigh-ins, instructional activities, and instructor and group support may lead to significant weight loss for most participants. The results attained during this program may be attributed to the effectiveness of the program or they may be the result of participation in a program regardless of its instructional effectiveness. Some individuals may have been more highly motivated or committed to weight loss and demonstrated this motivation by attendance and weight loss success. Whatever the reasons, program attendance was associated with weight loss. As participants attending this particular weight control program did achieve and maintain significant success, further development and testing of the program seems warranted.

D. RECOMMENDATIONS FOR FUTURE RESEARCH

1. The eight class instructional program used in this study should now be revised and tested again with a larger sample of participants and with evaluation of the instruction by participants and by outside evaluators.
2. Regular and sustained follow-up contact schedules by either instructor or group members should be designed and tested for effectiveness both during and after an instructional program.

3. The program should be tested using different instructors.
4. Incentive plans to encourage attendance at classes (such as refundable deposits) should be tested.
5. Stuart's Potential for Self-Control test should be given along with the Rotter I-E Locus of Control test. These tests should be assessed for their ability to predict weight loss when participants are assigned to different conditions of follow-up contact and refundable deposit plan.

Revision of the Eight Session Instructional Program

The eight instructional sessions should be evaluated by participants and by an external evaluator on the basis of the objectives and the effectiveness of the instructional activities used to reach the objectives. This study did not include any formal evaluation of the effectiveness of each of the instructional sessions. However, now that the class has been used with two groups of learners, some improvements could be suggested. Certain areas of the program appeared to the instructor-researcher to have strength. These included:

- question and answer techniques based on participants' experiences related to eating and exercise habits
- regular check with each individual on problems she encountered the previous week
- group participation in presenting possible solutions to the problems raised by members of the class
- individual and group exercises on the diabetic food exchange system
- film presentations and discussions
- regular weigh-ins and charting of weight changes

- continual review of behavior management principles with examples related to individuals' problems raised in the class

- techniques for charting positive feedback for success including food diaries, food exchange charts, graphs.

Areas that seemed weak to the instructor-researcher included instruction in how to:

- visualize success

- change one's own self-talk

- set up one's own support and reward system

- change one's response to family and work pressures.

Three additional questions should be addressed in any revision:

1. What techniques would help individuals learn to identify and change particularly difficult behavior chains including eating binges and problem eating during times of emotional upset such as fear, anxiety, fatigue, boredom, anger?

2. How can an instructor help people maintain interest and motivation during failure in changing eating and exercise habits?

3. How can an instructor help an individual choose what behavior management strategies to use at different phases of her behavior management program?

One assumption made in the design of this instructional program should be re-examined. It was assumed that people attending a night school class could not be expected to participate in a program past the initial eight week sessions for which they registered. However, it has been suggested in weight control research that programs of six months to one year are needed for weight loss programs to be effective. The logistics of any study over this extended time period pose problems in research design as

some participants will likely leave the program. This study used a minimal contact procedure assuming that all participants assigned to the four call follow-up schedule would be willing to participate to that extent and therefore data could be gathered on all subjects. Even with this limited contact, two of the 23 people indicated that they had not lost weight and that they really were not interested in receiving any further telephone calls. However, many people attending a night school program may be willing to participate in follow-up sessions. The follow-up schedule should now be revised and should include more regular sustained contact for as long as the participant is interested in participating in the weight control program.

In addition to testing the program in a night school centre, it could be tested in other settings as well. The instructional program might be successful if used with groups that are already established and operating such as TOPS or Calorie Counters. Such groups are often looking for outside resource assistance. It may be that group leaders could be trained to offer the program themselves. In addition, groups might be organized through public health units, recreational centres, community schools, medical clinics and hospitals. Further revision could also be conducted to indidualize portions of the program for self-study. Individuals using such packages could then attend seminars and receive support through telephone link-up.

The obesity problem is extensive in our society. Behavior management approaches offer the most optimism to date. This study included the design of an instructional program in weight control and showed that participants lost weight and maintained their weight loss. Further revisions

and testing of the program in different settings with a larger sample seems justified. Different delivery mechanisms could be used once the basic core instructional program is refined and re-tested.

Design and Testing of Follow-Up Contact Schedules

A difficulty is presented to anyone who wants to study follow-up contact schedules and that difficulty is attrition. Some individuals will not remain in the program over a length of time. However, the major question in weight control research is not whether to use follow-up contact but rather what type of follow-up to use and when. Questions that could be explored in further research are outlined below:

- What Type of Contact?

  Is telephone contact adequate or is personal contact necessary? If personal contact is recommended should it be with the instructor or with group members?

- What Schedule of Contact?

  Should extra contact be available between the weekly class sessions during the initial instructional sessions as well as after the classes are completed? Should contact be daily, two or three times a week, weekly or less often? Over what length of time should contact continue?

- What Should Be the Nature of the Contact?

  Should the focus be support, information, advice or reward for success?

- Who Should Initiate Contact?

  Should the instructor initiate all contact? Should the learner contact the instructor? Should group members share contact responsibilities? Should a participant be encouraged to set up her own contact/support system with family or friends or other hopeful weight losers?

Testing of Program with Different Instructors

The program should be tested using different instructors to determine if the design can be effectively used by a variety of instructors. The program design should be of use to instructors in Public Health, Recreation Centres, Hospitals, Medical Clinics and to instructors in voluntary weight loss support groups. There may be a need for instructors to have credibility as someone who has or still is struggling with a weight control problem. However, most people in North America meet this criterion to some extent. In order to test the program with various instructors in different settings, an instructor orientation program to train potential instructors would have to be designed and evaluated.

Incentive Plan to Encourage Attendance

For the purpose of this study, it was decided not to use refundable deposit schemes that have been found of some value in other programs (Kingsley and Wilson, 1977). The only plan that would be considered by this researcher would be a plan that included the collection of deposits from the participants which were then refundable on a weekly basis for attendance at the weekly instructional session. There are difficulties in the administration of a refundable deposit scheme in an adult education setting. However, as such plans have been related to weight loss success in other studies, it does seem to be a program variable that deserves further attention. If refundable deposits seem to be a critical variable leading to success in weight loss, perhaps programs could offer a deposit scheme as an option to participants. It has been suggested that deposit schemes work only for some individuals. Further investigation of the in-

teraction between locus of control and refundable deposit for attendance is an area recommended for further study.

Internal-External Locus of Control and Potential for Self-Control Tests and Weight Loss Success

This study looked at the effectiveness of the Rotter I-E Locus of Control test as a predictor of weight loss in this program. The I-E test was not statistically significant in predicting success either at the end of the eight classes or at the end of the six month follow-up period. Further research should examine the interaction effect between Locus of Control tests and sustained instructor contact and refundable deposit for attendance. If a significant interaction is found, then instructors could use these tests at the beginning of the program. The instructor could then discuss the results with the learner and attempt to design an individual program which has enough support to help each individual increase the likelihood of achieving and maintaining weight loss success.

E. RESEARCH DESIGN FOR FURTHER STUDY

Instructional Program as Part of Future Study

The present research was conducted as a field study. This researcher recommends that any future research on weight control instructional programs should actually include the presentation of an adult education course. Research could be conducted to investigate what specific conditions lead to improved performance for participants registered in the course. In designing field experiments, certain constraints must be considered including the on-going viability of the program as an adult educa-

tion activity as well as the requirements of experimental design. Three problems described earlier should also be addressed in any weight control program design:

1. Individuals have shown variable success in weight loss during programs.

2. Attrition is a major problem affecting weight loss success.

3. Participants do not usually continue to lose weight once the instructional sessions are completed.

As these factors suggest that participants should be given an opportunity to participate in a program as long as the person chooses, the program design proposed for further research includes weekly sessions available on a continuous basis. Different individuals will lose weight at different rates and will require different lengths of time to reach their goals. The initial instructional program could still be eight sessions followed by further reinforcement sessions available on a weekly basis. Learners would decide whether to register for the next two months at the end of each eight week session. However, participants would also be allowed to attend on an occasional basis paying a weekly fee for each class attended. Programs would be offered year round. The instructional sessions would be two hours; the reinforcement sessions would be one hour in length. A fee schedule would be calculated to cover instructional costs of the initial two hour sessions, the one hour reinforcement session and telephone contact time. Groups would pay the same fee for each two month session regardless of their assignment into different instructor contact conditions.

Experimental Conditions

If this program were in place, research could be conducted with the

adult education classes on weight control. Participants would self-select into a class on the basis of preferred class time and place. Each class would be randomly assigned into various conditions including:

- class with on-going mid-week instructor telephone calls or no telephone contact
- refundable deposit for attendance or no deposit plan
- different instructors.

Each participant would be given the Rotter I-E Locus of Control and the Potential for Self-Control tests at the first session.

Each participant assigned to the instructor telephone contact condition would receive two mid-week calls by the instructor. Calls would be approximately ten minutes duration. Calls would commence during the first week of instruction and continue throughout each session for which the participant registered. The instructor would continue telephone contact for one session (two months) past the last session of registration but on a once a week basis rather than twice a week. Participants in the telephone contact group would receive a description of the contact schedule during the initial instructional session.

The refundable deposit for attendance scheme would be similar to that described in Kingsley and Wilson (1977). Each participant would be asked to sign a contingency contract that specified that attendance at seven of the eight instructional sessions would result in the refund of a set amount, with additional amounts refunded two months and six months after their final registered session. A suggested amount would be $20 for attendance at initial classes with $10 returned for each of the other weigh-in sessions. The same deposit plan could then be offered to these participants each time

they registered for the next two month period of weekly reinforcement sessions. However, after the first two months of classes, participation in the deposit plan would be a matter of choice for those individuals assigned to that particular group.

Measurement would include weight loss and attendance rate taken each week of the program. Weight scores would also be recorded two months and six months after the participants' last registered session. Participants would be told in advance that they would be contacted at these times to determine the extent to which they had been able to maintain weight loss after the completion of the program. A summary of the weight loss results that might be expected from this research design are outlined in Appendix E.

If future research finds differential results with either instructor telephone contact on a regular basis or with a refundable deposit plan, then such components should be integrated into the design of weight control instructional programs. Furthermore, if differential results can be predicted on the basis of interaction of I-E Locus of Control or Potential for Self-Control test scores and either regular instructor telephone contact or refundable deposit plan then these tests may be useful for instructors and participants. The tests could be used to suggest the extent of external support needed by different individuals so that program participation helps each individual achieve substantial results.

F. SUMMARY

The conclusions from research designed for this study suggest that

attendance in an instructional program on self-management skills for weight control can assist some individuals lose weight and maintain the loss over a six month period. As in other research studies there was a variable amount of success by the participants. The study attempted to predict success on the basis of locus of control scores and on the extent of instructor follow-up contact after the classes. Although participants did alter their weight score significantly both at the end of the eight week instructional program and at the end of the six month follow-up period, it was not possible to predict success on the basis of either Locus of Control score or follow-up contact schedules.

The program designed for the purpose of the study showed some initial promise as an effective instructional program. However, the goal of instruction is to help each participant who registers in a weight control class actually achieve and maintain his weight goal. More attention should now be placed on developing and systematically evaluating ways to help all participants assess the specific eating chains which lead to an excessive caloric intake for their present activity level. Further research should be conducted on how to improve the effectiveness of instructional programs so that each participant can learn to use self-management skills to change his own eating and exercise habits significantly enough that weight loss will occur and be maintained over time.

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APPENDIX A

DESCRIPTION OF THE INSTRUCTIONAL PROGRAM

Objectives of the Program

1. In a period of eight months, eight weeks during the instructional program and six months after, participants will lose weight slowly and steadily at the rate of 0.5 to 1 pound a week.

2. Once participants have reached their desired weight, they will maintain this weight for the duration of the six month follow-up period.

Week One Objectives:

1. In a group discussion, participants will describe in one sentence the relationship of food intake and activity in successful weight control.

2. In a group discussion, participants will list four steps of Habit Control including: describe present habits; set realistic goals; make specific plans to reach these goals; check up to see how you have done and reinforce on the basis of the success.

3. Given a sample weight record form, participants will fill out a food record diary for each of the next seven days.

4. In a group discussion, participants will describe the kind of weight loss they can expect in this weight control program based on gradual change of eating and exercise habits.

Week One Activities:

1. Introduce the course:
   - describe the objectives
   - describe program activities
   - describe instructor's expectations of participants
   - describe follow-up component
   - discuss participant's expectations of course.

2. Introduce the instructor:
   - background in weight control instruction
   - previous experience in weight control.

3. Introduce the questionnaires:
   - James and Rotter questionnaires
   - personal weight history questionnaire.

4. Record height and weight.

5. Introduce film: Weight Control a Step Away[1].

6. Conduct small group discussion on the film. Reinforce how changes in eating and exercise habits are necessary in order for weight loss to occur.

7. Introduce self-monitoring procedures:
   - discuss keeping records
   - show how food diary record can be kept.

8. Review and check with participants on:
   - instructor's expectations of participants
   - objectives and activities of instructional program
   - participant's expectations of course
   - balance of eating and exercise for weight loss success
   - importance of self-monitoring as first step.

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Week Two Objectives:

1. In a group discussion, participants will describe the four major steps in habit control as presented by the instructor.

2. In a group discussion, participants will describe two key factors in weight control as emphasized in the film: Weight Control A Step Away.

3. In a group discussion, participants will describe three major advantages of keeping a food record.

4. Given the Menu Planning Guide, Food Exchange Charts and their own week's Personal Food Record Diary, participants will translate their own food records to the food exchange charts.

5. Given a food exchange guide and chart, participants will keep a daily record of the number of food exchange units they eat in each of the food groupings for the next seven days.

Week Two Activities:

1. Record weight.

2. Review in discussion format:
   - two key factors in film: Weight Control a Step Away.
   - four major steps in habit control
   - advantages of keeping a food diary.

3. Lecture/discussion on the Food Exchange System.

4. Individual activity: translate food records to exchange units.

5. Review and answer questions on:
   - eating/exercise directions including: slow down eating, walk daily, reduce fats and sugars, record everything that is eaten
   - use of Food Exchange units recording form.

Week Three Objectives:

1. Given their own food exchange record charts for a week, a copy of the menu planning guide and a list of daily food exchange plans from Stuart and Davis "Slim Chance in a Fat World", participants will set up their own sample daily meal planning guide based on a 1200 or 1350 calorie exchange system. Their sample guide will indicate the times of meals and snacks each day with the number of food exchanges to be eated at each time.

2. Given their own daily meal planning guide and the menu planning guide, participants will set up a sample menu for one day with specific foods (types and quantities) that might be eaten at each meal and snack.

3. In a group discussion, participants will discuss recommended preparation methods for foods in each of the food groups.

4. In a group discussion, participants will describe three advantages of scheduling meals and snacks on a regular basis.

5. In a group discussion, participants will discuss three advantages of using the food exchange chart and menu planning system for planning food intake.

6. Given a food exchange chart and menu planning guide materials, participants will record the number of units in each food group and the times they were eaten each day for each of the next seven days.

Week Three Activities:

1. Record weight.

2. Question and answer period on the food exchange system.

3. Lecture/discussion on the importance of planning ahead
   - times of meals and snacks
   - food exchange units for each meal and snack.

4. As an individual exercise, individuals work out sample menu plans for either the 1200 or 1350 food exchange plan.

5. Introduce film: Man Was Made to Move.[1]

6. Discuss film and the link between physical activity and weight control.

7. Review and answer questions on:
   - timing of meals and snacks
   - planning food exchange units in advance
   - importance of recording exchange units
   - weight control goals for this week including: daily exercise, slow down eating, reduce fats and sugars, record food exchange and jot down notes on any trouble spots.

1. Carillon Audio-Visual Media, Amsterdam, Holland.

Week Four Objectives:

1. In a group discussion, participants will describe at least six benefits of regular physical activity.

2. In a group discussion, participants will be able to describe at least ten physical activity options they have. From a set of handouts, they will describe how many calories would be burned in ten minutes of each activity.

3. During the next week, participants will record their daily exercise activities.

4. In a group discussion, participants will describe the daily food plan and how to choose food options within each food group.

5. In a group discussion, participants will list at least three benefits of slowing down eating and describe three ways to help them slow down their eating.

6. Given information on calories eaten during one week, participants will calculate how one inappropriate "binge" can mean weight gain.

7. In a group discussion, participants will describe how fat change can be affected by menstrual cycle, water retention and change of fat to muscle tissue.

8. In a group discussion, participants will describe three reasons for advance scheduling of meals and snacks within the allowable food exchange units.

Week Four Activities:

1. Record weight.

2. Questions and answers from previous week.

3. Review food exchange plans and food preparation hints.

4. As a group exercise, participants will list advantages of physical activity and options for physical activity in their own life.

5. Introduce, view and discuss film: Physical Fitness a New Perspective.[1]

6. Discuss effect of physical activity on calorie balance by using the "Fitness Wheel" from the B.C. Heart Foundation.

7. Review and answer questions on:
   - home assignments
   - goal setting (both eating and exercise)
   - using food recording forms
   - analyzing trouble situations in more depth.

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Week Five Objectives:

1. In a group discussion, participants will describe basics of weight control including: eating and exercise balance, steps to changing habits, use of food exchange system to set goals, use of recording sheets to check up on success of these goals.

2. In a group discussion, participants will list at least ten situations in which eating problems often occur.

3. In a group discussion, participants will outline possible solutions to problem eating in at least three of these situations.

4. Using a food recording sheet, participants will keep detailed notes on any situations which trigger problem eating during the next seven days.

Week Five Activities:

1. Record weight.

2. Review basics of weight control through lecture and discussion including:
   - eating and exercise balance
   - goals using food exchange system
   - recording success on these goals and noting trouble spots
   - slowing down eating
   - increasing physical activity
   - using four steps to changing habits (record habits, set small goals, plan to reach these goals, check up on success and reward for this success).

3. Conduct a group exercise on situational eating problems:
   - brainstorm a list of situations in which eating problems often occur
   - discuss at least three of these situations in detail :
   - describe three factors causing the problem
     have group outline possible ways to handle such situations in a different way so that problem eating does not occur
   - describe ways to reduce exposure to food in these situations
   - describe ways to increase awareness while eating
   - describe possible alternatives to eating in these situations.

4. Review and answer questions on:
   - situational control of eating
   - assignment to record in more detail the actual situations in which they have problems over the next seven days.

Week Six Objectives:

1. In a group discussion, participants will analyze and suggest solutions for at least three situations that trigger problem eating.

2. In a group discussion, participants will describe strategies that might be used to avoid problem eating in a range of situations.

3. Given a graph and personal weight record, participants will plot their own weight graph since the beginning of the program.

4. In a group discussion, participants will describe the importance of visual feedback on both eating and exercise success and on weight loss success.

5. Participants will describe at least three advantages of visualizing success in weight control rather than visualizing failure.

Week Six Activities:

1. Record weight.

2. Review situational control of eating in a lecture/discussion.

3. Do group activity working through three more examples of problem situations that trigger eating.

4. Discuss questions on other difficult situations:
   - ask for suggestions from the group on handling specific difficult situations
   - review strategies that might be useful to help avoid problem eating.

5. Have each participant plot her own weight graph from her own weight record sheet.

6. Discuss the importance of visualizing success not failure.

7. Review and answer questions on:
   - situational control and problem-solving approach
   - use of visual feedback such as charts and graphs
   - visualizing success
   - steps they might take this week.

Week Seven Objectives:

1. In a group discussion, participants will describe at least ten situations which cause stress and consequently problem eating.

2. In a group discussion, participants will analyze at least three of these situations and suggest specific steps to keep problem eating from occurring.

3. Participants will describe in writing one problem situation of their own and list steps they plan to follow to improve that situation during the next seven days.

Week Seven Activities:

1. Record weight.

2. Discuss questions from participants.

3. Conduct a lecture/discussion on stress and time management in relationship to weight control success.

4. Have participants brainstorm and list situations where stress and problem eating are connected for them.

5. Introduce and view the film: Stress. 1

6. In a group discussion, use the problem-solving approach on at least three specific situations related to difficulties in stress/time management and weight control.

7. Have participants take one situation of their own and list in writing the steps they plan to take this week to improve that particular situation.

8. Review and answer questions on:
   - problem-solving approach to stress management
   - specific situations that trigger problem eating
   - specific steps they will take this week.

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Week Eight Objectives:

1. In a group discussion, participants will describe a four step problem-solving approach to weight control including:
   - describing specific eating and exercise goals on a daily basis
   - setting specific eating and exercise goals on a daily basis
   - having plans to deal with difficult situations
   - using recording sheets, graphs, and diaries to show specific success and failure for resetting of specific eating and exercise goals.

2. In a group discussion, participants will brainstorm techniques they might use if problem eating starts to accelerate during the next few weeks.

Week Eight Activities:

1. Record weight and up-date graph.

2. Review questions and discussions on:
   - two key factors in weight control (eating and exercise)
   - four steps in problem-solving approach to habit change.

3. Introduce and discuss film: Fad Diet Circus. [1]

4. Review any questions about weight control.

5. Have group brainstorm techniques they could use on their own if problem situations occur during the next few weeks.

6. Remind group about follow-up contact by instructor during the next six months.

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APPENDIX B

INTERNAL-EXTERNAL LOCUS OF CONTROL TESTS

Directions Read to the Group for Rotter Test

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives lettered a or b. Please select the one statement of each pair (and only one) which you more strongly believe to be the case as far as you are concerned. Be sure to select the one you actually believe to be more true rather than the one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously there are no right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. In some instances you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you are concerned.

Directions Read to the Group for James Test

These are a number of statements about various topics. They have been collected from different groups of people and represent a variety of opinions. There are no right or wrong answers. For every statement there are large numbers of people who agree and disagree. Please indicate the response that most closely corresponds to the way that you personally feel. Circle SA for strongly agree, A if you agree, D if you disagree, SD if you strongly disagree.

ROTTER INTERNAL-EXTERNAL TEST

1. a. Children get into trouble because their parents punish them too much.
   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.
   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.
   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.
   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.
   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.
   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try some people just don't like you.
   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.
   b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.
   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
    b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
    b. Getting a good job depends mainly on being in the right place at the right time.

12. a. The average citizen can have an influence in government decisions.
    b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.
    b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.
    b. There is some good in everyone.

15. a. In my case getting what I want has little or nothing to do with luck.
    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss depends on who was lucky enough to be in the right place first.
    b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
    b. By taking an active part in political and social affairs the people can control world events.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.
    b. There really is no such thing as "luck".

19. a. One should always be willing to admit mistakes.
    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.
    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good ones.
    b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.
    b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.
    b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.
    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.
    b. It is impossible for me to believe that chance or luck plays an important role in my life.

26. a. People are lonely because they don't try to be friendly.
    b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.
    b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.
    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.
    b. In the long run the people are responsible for bad government on a national as well as on a local level.

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JAMES INTERNAL-EXTERNAL TEST

SA A D SD 1. I like to read newspaper editorials whether I agree with them or not.

SA A D SD 2. Wars between countries seem inevitable despite efforts to prevent them.

SA A D SD 3. I believe the government should encourage more young people to make science a career.

SA A D SD 4. It is usually true of successful people that their good breaks far outweighed their bad breaks.

SA A D SD 5. I believe that moderation in all things is the key to happiness.

SA A D SD 6. Many times I feel that we might just as well make many of our decisions by flipping a coin.

SA A D SD 7. I disapprove of girls who smoke cigarettes in public places.

SA A D SD 8. The actions of other people toward me many times have me baffled.

SA A D SD 9. I believe it is more important for a person to like his work than to make money at it.

SA A D SD 10. Getting a good job seems to be largely a matter of being lucky enough to be in the right place at the right time.

SA A D SD 11. It's not what you know but who you know that really counts in getting ahead.

SA A D SD 12. A great deal that happens to me is probably just a matter of chance.

SA A D SD 13. I don't believe that the presidents of our country should serve for more than two terms.

SA A D SD 14. I feel that I have little influence over the way people behave.

SA A D SD 15. It is difficult for me to keep well-informed about foreign affairs.

SA A D SD 16. Much of the time the future seems uncertain to me.

SA A D SD 17. I think the world is much more unsettled now than it was in our grandfathers' times.

SA A D SD 18. Some people seem born to fail while others seem born for success no matter what they do.

SA A D SD 19. I believe there should be less emphasis on spectator sports and more on athletic participation.

SA A D SD 20. It is difficult for ordinary people to have much control over what politicians do in office.

SA A D SD 21. I enjoy reading a good book more than watching television.

SA A D SD 22. I feel that many people could be described as victims of circumstances beyond their control.

SA A D SD 23. Hollywood movies do not seem as good as they used to be.

SA A D SD 24. It seems many times that the grades one gets in school are more dependent on the teachers' whims than on what the student can really do.

SA A D SD 25. Money shouldn't be a person's main consideration in choosing a job.

SA A D SD 26. It isn't wise to plan too far ahead because most things turn out to be a matter of good or bad fortune anyhow.

SA A D SD 27. At one time I wanted to become a newspaper reporter.

SA A D SD 28. I can't understand how it is possible to predict other people's behavior.

SA A D SD 29. I believe that the U.S. needs a more conservative foreign policy.

SA A D SD 30. When things are going well for me I consider it due to a run of good luck.

SA A D SD 31. I believe the government has been taking over too many of the affairs of private industrial management.

SA A D SD 32. There's not much use in trying to predict which questions a teacher is going to ask on an examination.

SA A D SD 33. I get more ideas from talking about things than reading about them.

SA A D SD 34. Most people don't realize the extent to which their lives are controlled by accidental happenings.

SA A D SD 35. At one time I wanted to be an actor (or actress).

SA A D SD 36. I have usually found that what is going to happen will happen, regardless of my actions.

SA A D SD 37. Life in a small town offers more real satisfactions than life in a large city.

SA A D SD 38. Most of the disappointing things in my life have contained a large element of chance.

SA A D SD 39. I would rather be a successful teacher than a successful business-man.

SA A D SD 40. I don't believe that a person can really be master of his fate.

SA A D SD 41. I find mathematics easier to study than literature.

SA A D SD 42. Success is mostly a matter of getting good breaks.

SA A D SD 43. I think it is more important to be respected by people than to be liked by them.

SA A D SD 44. Events in the world seem to be beyond the control of most people.

SA A D SD 45. I think that states should be allowed to handle racial problems without federal interference.

SA A D SD 46. I feel that most people can't really be held responsible for themselves since no one has much choice about where he was born or raised.

SA A D SD 47. I like to figure out problems and puzzles that other people have trouble with.

SA A D SD 48. Many times the reactions of people seem haphazard to me.

SA A D SD 49. I rarely lose when playing card games.

SA A D SD 50. There's not much use in worrying about things...what will be will be.

SA A D SD 51. I think that everyone should belong to some kind of church.

SA A D SD 52. Success in dealing with people seems to be more a matter of the other person's moods and feelings at the time rather than one's own actions.

SA A D SD 53. One should not place too much faith in newspaper reports.

SA A D SD 54. I think that life is mostly a gamble.

SA A D SD 55. I am very stubborn when my mind is made up about something.

SA A D SD 56. Many times I feel that I have little influence over the things that happen to me.

SA A D SD 57. I like popular music better than classical music.

SA A D SD 58. Sometimes I feel that I don't have enough control over the direction my life is taking.

SA A D SD 59. I sometimes stick to difficult things too long even when I know they are hopeless.

SA A D SD 60. Life is too full of uncertainties.

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APPENDIX C

PERSONAL WEIGHT HISTORY QUESTIONNAIRE

Date _____

What is your name? _____

What is your address? _____

_____

What is your telephone number? (At home) _____

(At work) _____

What is your birthdate? _____

What is your height? _____

What is your weight today? _____

Were you overweight as a child? (Describe if so) _____

_____

_____

Were you overweight as a teenager? (Describe if so) _____

_____

_____

Was there a particular time as an adult that you began to be overweight?

(Describe if so) _____

_____

_____

Are or were either or both of your parents overweight? _____

_____

_____

_____

During the last year, have you had a major change of weight? Have you recently gained or lost a significant amount of weight? Have you recently attempted to diet or somehow change your weight? Please add any other details that you think are particularly relevant about your weight control success and failure over the last year.

APPENDIX D

DESCRIPTION OF PARTICIPANTS

Code Number	Age	Initial Weight	Final Weight	Rotter Score	James Score	Assigned Group on Basis of I-E Score	Random Assignment to Follow-up Group
15	50	166	153	3	53	Low External	one call
24	29	123	136	4	61	Low External	four call
4	55	133.5	133	5	69	Low External	one call
9	55	156	154	6	63	Low External	four call
7	55	165	165	6	66	Low External	one call
22	28	154	146.5	6	65	Low External	one call
19	32	153	152.5	6	75	Low External	four call
18	34	125	109	7	66	Low External	four call
23	74	144	140	7	67	Medium External	four call
12	22	197.5	197	7	69	Medium External	four call
5	58	151	151	7	70	Medium External	one call
11	38	165	165	8	64	Medium External	one call
14	32	149.5	136	8	64	Medium External	four call
6	53	171.5	162	8	68	Medium External	one call
21	25	159	161	9	56	Medium External	four call
1	49	120	120	9	70	Medium External	one call
10	29	132	120	9	77	High External	four call
2	30	175.5	163	9	79	High External	four call
3	26	167	152	9	87	High External	four call
8	23	157	153	10	80	High External	one call
16	39	176.5	175	10	80	High External	one call
13	29	126	125	11	68	High External	one call
20	19	162	-	11	73	High External	dropped out
17	27	171.5	175.5	13	80	High External	four call

APPENDIX E

PREDICTED RESULTS FOR PROPOSED RESEARCH DESIGN

Individuals would be assigned to one of four conditions:

1. No telephone contact, no deposit plan.
2. Telephone contact, no deposit plan.
3. No telephone contact, deposit plan.
4. Telephone contact, deposit plan.

	No Deposit	Deposit
No Telephone Contact	1	3
Telephone Contact	2	4

It is suggested that the following results would be achieved:

1. Regardless of Locus of Control score, those individuals receiving instructor telephone contact would lose more weight at a statistically significant level than would those individuals not receiving contact both during the instructional session and at the end of 6 months after the last registered session.
2. Regardless of Locus of Control score, those individuals in the deposit plan and no telephone contact (group 3) will lose more weight than will those individuals in the no deposit, no telephone contact group (group 1) during the instructional session. However, there may not be any significant difference between groups 6 months after the last session.

3. Those individuals with high Internal Locus of Control and/or high potential for self-control scores will lose a statistically significant amount of weight in each condition but will do considerably better in condition 2 than in the other groups both during classes and 6 months later. (There may be some reactance to the deposit plan by high Internals which may lead to reduced success by high Internals in condition 4).
4. Those individuals with high External Locus of Control scores and/or low potential for self-control scores will lose a statistically significant amount of weight in each group during the classes. However, those in group 4 will do considerably better during the classes than will Externals in other groups. By the end of the 6 month period, high Externals in groups 2 and 4 will have greater success than will high Externals in groups 1 and 3.
5. There will be no statistically significant difference in the weight loss success of low Internals as compared to medium or high Externals.
6. There will be no statistically significant difference in weight loss between groups with different instructors.
7. Those individuals who attend more sessions will lose significantly more weight than will those who attend fewer sessions.