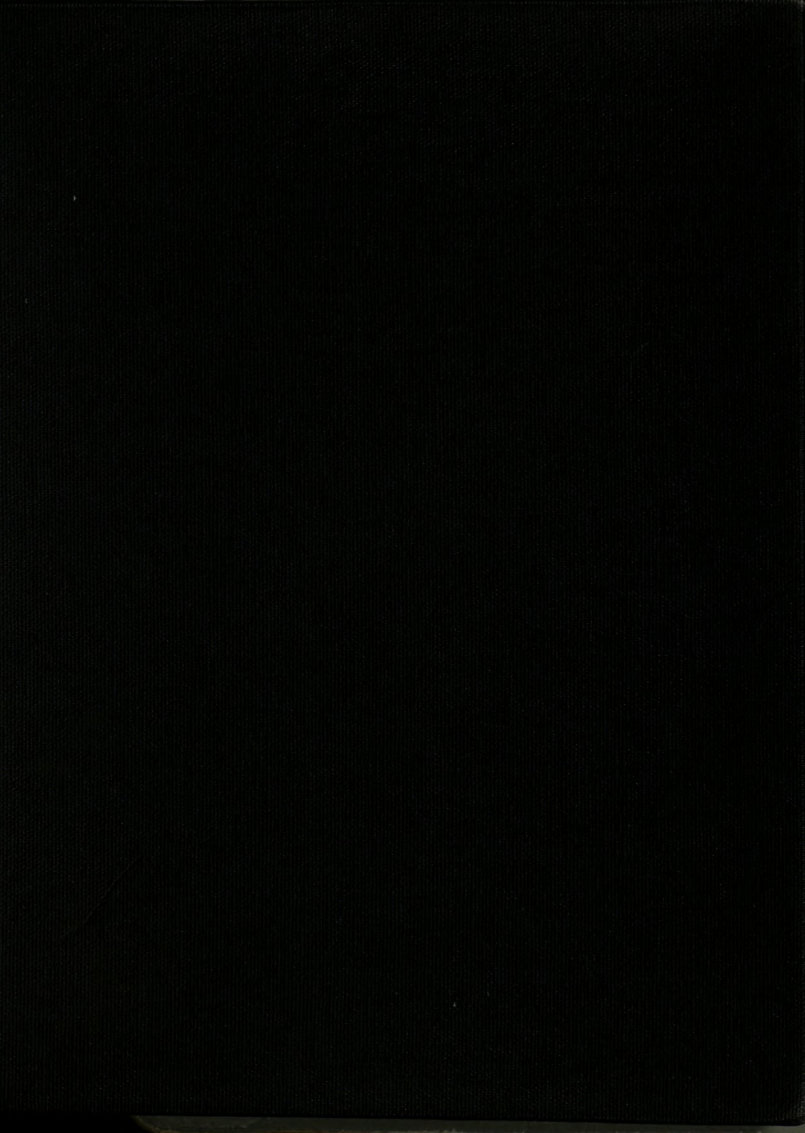






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**THE USE OF MONETARY INCENTIVES
IN A SOCIAL CONTEXT IN THE
MODIFICATION OF WEIGHT LOSS**

By

Brian E. Mavis

A DISSERTATION

**Submitted to
Michigan State University
in partial fulfillment of the requirements
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1987

ABSTRACT

THE USE OF MONETARY INCENTIVES IN A SOCIAL CONTEXT IN THE MODIFICATION OF WEIGHT LOSS

By

Brian E. Mavis

The purpose of the two studies reported was to determine the most effective method of using a given sum of money as incentive to promote weight loss. Four weight-contingent incentive strategies used were: (a) continuous positive monetary reinforcement, (b) monetary response cost, (c) positive reinforcement with a lottery system, and (d) response cost with a lottery system. For comparison, an attendance contingent monetary reward condition and a no-incentive condition were used. In the first study, a six condition design was used. Participants were randomly assigned to all but the no-incentive group, which was a non-random comparison cohort. In the second study, participants were randomly assigned to either the monetary reward condition or the no-incentive condition.

All subjects participated in a 10 session/14 week program. The sessions focused mainly on behaviour modification and social support. Participants were

recruited by advertisements in the newspaper.

The dependent measures were weight, perceptions of self-efficacy related to eating behaviours, program satisfaction and reactance, group satisfaction and cohesiveness, incentive satisfaction, and program effectiveness. Program attendance and attrition rates were also compared. Information was gathered by questionnaires administered at pre-program, mid-program and post-program.

The major hypotheses involved comparisons among the conditions to determine the relative efficacy of weight-contingent, attendance-contingent and no-incentive conditions.

In both studies, there are no consistent differences found with respect to the weight loss: in the first study the findings were unclear while no differences were found in the second. All conditions demonstrated an increase in perceptions of self-efficacy over time. Participants indicated a high degree of satisfaction and little reactance with all aspects of the research.

Both no-incentive groups had the highest attrition rates with the exception of the monetary response cost group which had a comparable attrition rate. The no-incentive group was also associated with low degrees of group cohesion.

At the post-test, participants chose the monetary reward strategy as most favorable. Those in the monetary reward condition were most likely to continue in a sub-

sequent maintenance program.

The research demonstrates the use of incentives and the importance of random assignment.

To my parents, who have always
trusted me to make my own decisions
and who have supported me in those
decisions.

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Often throughout the work on my dissertation, I referred to this research as the "never-ending story". To recount all of the people who have contributed their resources during this project is impossible. Their time, expertise, and support have enabled me to finally complete this part of my life and move on to other projects, and likely, other seemingly "never-ending stories". Now it has come to an end, I would like to document the contribution of a few people.

None of this research could have been carried out without the grant awarded by the MSU College of Osteopathic Medicine to Dr. Bertram Stoffelmayr. In addition to facilitating this monetary support, he has been my mentor and friend throughout my graduate education.

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Many people donated their skills to help me in the delivery of the weight management programs required for the research. Dr. Wayne Van Huss of the Department of Health Education, Counseling Psychology and Human Performance arranged for the use of the Center for the Study of Human Performance (CSHP); Bob Wells, the coordinator of CSHP was invaluable in working out minor details throughout the project. Mary Noel R.D. was irreplaceable as the Dr. Ruth of Nutrition. Chris Schafer M.D. provided the medical background information related to weight control. Chet Zelasko Ph.D. acted as my consulting exercise physiologist. Cam Reissinger continued the research by providing a maintenance program for the participants. This went a long way to reducing some of my anxieties. Finally, Tom Fuller provided valuable assistance in the maintenance program. But of more importance, Tom provided support, anger and humour as needed to ease me through it all and as a result in him I have a close friend and colleague.

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CHAPTER I

INTRODUCTION

Our personal lifestyles and habits, characterized as the way we live, account for almost 50% of all adult mortality (Centers for Disease Control, 1980). Cardiovascular disease remains a major killer responsible for almost half of all adult deaths; cancer contributes another 20% to the death toll. These mortality figures indicate that many people are killing themselves through their own careless habits, environmental pollution and harmful social conditions.

Improvement in the health status of Americans depends in large measure on changes in personal health habits and the reduction of self-destructive behaviour (Knowles, 1977). The evidence suggests that many people could reduce their health risks through lifestyle modifications such as decreasing cigarette smoking and alcohol consumption, reducing caloric and fat intake, and regular participation in moderate physical activity.

The affluence of our lifestyles is readily evident to the astute observer. In 1982, the Michigan Department of Public Health surveyed over 1,400 people to assess the

prevalence of specific health risks among state residents. Among the findings was an indication that approximately one-third (32.7%) of the residents were overweight based on HANES (Health and Nutrition Examination Survey) estimates. Of this group, half were 20% or more above ideal weight (Michigan Department of Public Health, 1983). Based on this commonly used criterion of 20% overweight as a definition for obesity, there are at least 34 million obese American adults (Dwyer, 1986). Moreover, 20% of the men and 30% of the women in the Western world could be considered obese (MacCuish and Ford, 1979), making obesity one of the most prevalent disorders of the Western world (Osancova and Hejda, 1975).

A recent survey by the Wheat Industry Council has found that at any given time, approximately 28% of all Americans are on a weight-loss diet (Wheat Industry Council, 1985). For many people excessive weight, in and of itself, is not a problem. However, obesity is associated with increased risks for hypertension, hyperlipidemia, diabetes mellitus, pulmonary and renal problems as well as complications during pregnancy and surgery (Eiseman, 1980; Van Itallie, 1979).

There are nine common interventions used in the treatment of obesity: behavioural methods, group support methods, psychotherapy, hypnosis, diet prescriptions, fasting, exercise, drug therapy, and surgical interventions

(Ureda and Taylor, 1982). The breadth of these methods reflects the diversity of influences responsible for the regulation of body weight. While the interrelationships among these spheres of influence are still somewhat of a mystery, a great deal about the biology and psychology of obesity has been learned over the last 20 years (Stunkard, 1983). "'Weight reduction' is the deceptively simple-sounding goal for a pervasive, multiply-determined, psychosocio-somatic problem..." (Abrams, 1984 p.21). The once-firm distinction between obesity of psychological origin and obesity of biological origin has recently been questioned, and with it simple explanations for excessive body weight. What is left is an imposing puzzle with a many pieces yet to be found.

Body Weight Regulation

The maintenance of an internal equilibrium assures continued adaptation to a wide variety of external conditions. The relative constancy of many physiological indices, such as temperature, blood pressure and serum glucose levels, suggests a biological regulatory mechanism. Conversely, the large degree of weight variation among individuals might suggest to some that body mass is not highly regulated, and that extreme body weight represents the breakdown of an already tenuous control system.

When the weight variability of an individual is

considered, the stability shown over time matches or exceeds that of other physiological measures. A large cross-section survey found that the average weight of a sixty year old American man was within five pounds of the average thirty year old (Ten-State Nutrition Survey, 1970). Keesey suggests that body weight, like other physiological parameters, is regulated around some reference level or set-point (Keesey, 1980). An extensive review of the physiological mechanisms thought to regulate body weight and the functioning of the body weight set-point is presented in Keesey and Powley (1986).

Animal studies have been the primary source of evidence in support of a natural biological mechanism for the regulation of body weight (Hoebel and Teitelbaum, 1966). Under normal circumstances, body weight remains stable or increases at a constant rate. When weight is experimentally elevated by tube-feeding, insulin injections or high fat diets, animals automatically restrict their post-intervention food intake to reduce their body weight to original levels. Similarly, a pattern of increased consumption follows a period of starvation to restore weight to the baseline level.

Rats made obese by lesions of the ventromedial hypothalamus also regulate their body weight. Just as with normal weight rats, after the removal of an external intervention, compensatory feeding patterns are used to

restore body weight to baseline obese levels (Hoebel and Teitelbaum, 1966). Thus the hypothalamic rats manifest the same regulatory mechanisms as normal rats, maintaining a surgically induced obese body weight.

Only two studies of human weight regulation have been reported. They follow the same model developed in animal studies: body weight is manipulated and the consequences observed. Keys, Brozek, Henschel, Mickelson and Taylor (1950) subjected volunteers to starvation diets which reduced their body weights by 25%. When subsequently allowed to eat ad libitum they overate, increasing their body weight to pre-experimental levels. Sims and Horton (1968) paid 22 volunteers to consume a high calorie diet with a goal of increasing their body weight by 25% -30% over a period of 40 days. After achieving experimental obesity these men were allowed to return to their normal dietary patterns. All returned to their baseline body weights through spontaneously reduced consumption, paying little attention to either calorie intake or body weight during the process (Stunkard, 1983).

The evidence from these studies indicates that initially nonobese individuals regulate their body weight. It seems logical to the casual observer that obese individuals do not regulate their body weight, and this in fact is the cause of their obesity. However, an inability to regulate body weight would make mankind unique within the animal

kingdom. Instead, Nisbett (1972) has suggested that while obese individuals do in fact regulate their body weight, the set point about which their weight is regulated is higher than what is tolerated by social pressure, ie. by current standards they are biologically programmed to be fat. Evidence indicates some physiologically determined mechanism which sets body weight. Many of the distinctive behaviours of obese dieters such as a preoccupation with food, lethargy, and increased emotional reactivity are shared by normal weight individuals undergoing deprivation and starvation. Through dieting, obese individuals place themselves in a paradoxical position where they are statistically overweight while being biologically underweight.

A likely medium for set-point regulation is adipose tissue according to research reviewed by Sjostrom (1980). The number (hyperplasty) and size (hypertrophy) of fat cells play an important role in determining body weight. Short-term caloric restrictions of less than one to two years reduces the size of fat cells but not the number of cells. Subsequent weight gain restores fat cell size and if weight gain surpasses past levels, new fat cells are formed! This creates a biological dilemma for severely obese individuals. Research by Bjorntorp and associates has provided some support for this idea (Bjorntorp, Carlgren, Isaksson, Krotkiewski, Larsson & Sjostrom, 1975).

Fat cell assays from weight program participants indicated that obese clients stopped losing weight and dropped out of treatment when fat cell size returned to normal levels, suggesting the existence of a biological limit. Whereas hypertrophic individuals attained near-normal weight levels, hyperplastic individuals were still overweight although fat cell size was normal. Only through cell depletion beyond normal levels could weight loss continue for hyperplastic clients.

CHAPTER II

THE TREATMENT OF OBESITY

Historically, treatment programs for obesity have produced discouraging results. The refractory nature of the problem has been characterized by Stunkard (1958): "Most obese persons will not enter treatment for obesity. Of those who enter treatment, most will not lose weight, and of those who do lose weight, most will regain it" (p. 86). A review of the treatment literature for the 30 years prior to 1960 indicates that attrition rates for the routine medical treatment of obesity ranged from 20% to 80% and that less than one quarter of those remaining in treatment lost at least 20 pounds (Stunkard & McLaren-Hume, 1959).

The publication of a study by Stuart in 1967 ushered in a new era in the treatment of obesity. In applying behavioural interventions to the treatment of obesity, his results indicated greater weight loss and reduced attrition rates compared to other studies, with a time expenditure no greater than that reported for other available treatment modalities. Since the publication of Stuart's research, a large number of studies involving behaviour therapy in the

treatment of obesity have been published. Many changes to the original treatment program have been tested (Stunkard & Brownell, 1979). The first phase after Stuart's original uncontrolled study was to determine the power of the intervention via comparisons to similar obese subjects experiencing other treatment approaches, or left to themselves with no treatment at all. A comparison of two behavioural treatment groups to a no-treatment control group found that those subjects in the behavioural groups lost more weight than those in the control group, and that experimental group continued to lose weight after the completion of the intervention (Harris, 1969). Kinglsey and Wilson (1977) demonstrated that a group behaviour therapy program was more effective than individual treatment.

Research by Wollersheim (1970), and Penick and associates (Penick, Fillion, Fox & Stunkard, 1971) compared behaviourally-based programs to other treatment approaches. Wollersheim's subjects in behaviour therapy lost more weight at post-treatment and two month follow-up than subjects in either a self-help or placebo group: subjects in the no-treatment control group actually gained weight during the course of the research. Penick et al. provided a powerful test of the efficacy of a behavioural approach by testing a behaviour therapy program delivered by beginners against a traditional weight treatment program

delivered by experts. In two cohorts of subjects, the overall effectiveness of the behavioural program, even when delivered by inexperienced therapists, was superior to a traditional weight control program.

A recent study provides additional support for the efficacy of behavioural interventions (Foreyt, Scott & Gotto, 1982). The authors combined the results from 11 published studies with pre-, post- and follow-up data: the pooled data represent 501 participants receiving behaviour therapy, 157 receiving nonbehavioural supportive counseling and 74 no-treatment controls. The weighted means for the behaviour modification group were 174 pounds pretreatment, 167 pounds after eight weeks of treatment, and 167 pounds after 18 weeks of follow-up. In contrast, the other treatment group had a mean pretest weight of 172 pounds, a mean weight of 170 pounds after 12 weeks of treatment and a mean weight of 174 pounds after a 28 week follow-up. The control group had a mean weight of 159 pounds at pretreatment, and means of 159 pounds and 156 pounds at nine and 13 weeks of follow-up. The control group had a combined dropout rate of 43 per cent. Based on this sample of the treatment literature, behavioural treatments produced greater sustained weight loss than non-behavioural treatments.

The enthusiasm surrounding the management of obesity through behaviour therapy has led Stunkard and Brownell to

conclude that behaviour therapy is one of the most promising new approaches in the treatment of moderate obesity (Stunkard & Brownell, 1979 p. 199). To suggest that the evidence overwhelmingly supports the use of behaviour therapy as the treatment of choice for weight control would be overzealous. A comparative outcome evaluation of 145 outpatient weight loss studies involving diet, drug, behavioural and exercise interventions by Wing and Jeffery (1979) provides a broad overview of current weight treatment outcomes. They report that a group of 284 "waiting list" no-treatment controls lost an average 1.1 pounds pooled across 23 studies, while 82 "attention placebo" controls in nine studies lost an average of 6.1 pounds. Diet, drug, behavioural and exercise interventions all were found to produce mean weight losses of 15 to 20 pounds. Behaviour therapy and anorectic drugs were the most often used intervention strategies and each produced a rate of weight loss of approximately one pound per week. The researchers found that better than average weight loss was reported in those studies of longer duration, with an average correlation of 0.71 between weight loss and program duration. An evaluation of various types of behavioural approaches revealed that average weight losses in studies using aversive behavioural techniques were smaller than those obtained using other behavioural procedures. Aversive procedures produced a mean change of 7.1 pounds

over 7.6 weeks, while other behavioural studies produced weight losses of 11.6 pounds in 12.4 weeks: the difference in success of these procedures seems related to differences in length of treatment, since the mean weight loss per week is virtually identical. The long-term weight loss produced by the various studies reviewed was difficult to assess, since only 30% of the studies included any form of follow-up data. From the available information, behaviour therapy produced the best weight loss maintenance for six months post treatment. Many of the behavioural programs showed continuing weight loss after the intervention. The authors concluded that current therapies produce an average weight loss of about 12 pounds, with a mean dropout rate of 16 per cent. Though the available data are scarce, it appears that behaviour therapy produces better maintained weight loss than any other treatment approach. Thus any of the current obesity treatments produce better results than those achieved by no-treatment and attention-placebo controls. The particular strength of a behavioural approach rests in long-term weight maintenance: available data suggests that behaviour therapy produces superior long term weight loss maintenance, often accompanied by continued weight loss.

The Current Status of Behavioural Intervention

The positive prognosis for behavioural interventions in the treatment of obesity has stimulated a large body of

research. Many reviews on the behavioural treatment of obesity have been published (Abrams, 1984; Abramson, 1973, 1977; Bellack, 1975; Brownell, 1982; Foreyt, 1977; Franks & Wilson, 1975; Hall & Hall, 1974; Jeffery, Wing & Stunkard, 1978; Leon, 1976; Leon & Roth, 1977; Stuart, 1975; Stunkard, 1958, 1978; Stunkard & Mahoney, 1976; Walen, Hauserman & Lavin, 1977; Wilson, 1978; Wooley, Wooley & Dyrenforth, 1979). From these reviews, several important components for an effective behavioural weight reduction program have been identified.

Self-monitoring

This procedure has been found to very important both in defining the scope of the problem as well as measuring progress during the program. Abrams (1984) suggests that self-monitoring of daily caloric intake is necessary but not sufficient for an effective weight management program. Brownell (1983a) writes that self-monitoring is identified by patients as the most important component of the program. His program (Brownell, 1979) incorporates self-monitoring of daily caloric intake and a diary to monitor habit change during the course of the program. In a controlled comparison of five treatment groups, Romanczyk (1974) found that a no-treatment control and daily weight self-monitoring group were equally ineffective. However, the addition of either behaviour management or stimulus control techniques could not enhance the effectiveness of a regimen

of daily self-monitoring of weight and caloric intake.

Goal Setting

Goal setting is an important aspect of a program with respect to the administration of reinforcers. Together, self-monitoring and goal setting represent the first two components of the three phase model of self-control (Kanfer & Karoly, 1972). Many weight management programs incorporate steady weight loss goals of one to two pounds per week. It is important that reasonable goals are set so as not to discourage the participants with unrealistic expectations. Similarly, the goals should represent a meaningful achievement, where progress over time is clearly discernable. Chapman and Jeffrey (1978) report that instruction in setting realistic self-standards and goals was rated by participants as the most helpful part of a behavioural intervention.

Operant Consequences and Contracting

This procedure has been used successfully in weight management programs, most often in the form of behavioural contracting. Such contracts can act to enhance commitment to the program and reduce the attrition rate (Follick, Fowler & Brown, 1984). In addition, contracting delineates the guidelines for defining success and the related reinforcement contingencies (Epstein & Wing, 1984). These procedures have been shown to be important because weight loss usually does not provide sufficient reward to maintain

behavioural changes. Social and tangible rewards are often used to promote adherence to the treatment regimen (Abrams, 1984; Merbaum & Rosenbaum, 1984). At least one study indicates that social reinforcement is as powerful as monetary incentives in promoting goal attainment (Colvin, Zopf & Myers, 1983). A review comparing contract-no contract weight control programs by Epstein and Wing (1984) indicated that the use of contracts was generally superior to no-contract procedures, although there is at least one report of reactivity resulting in dropout, attributable to contracting procedures (Harris & Bruner, 1971).

Stimulus Control Procedures

These procedures were first formalized for application to weight control by Ferster, Nurnberger and Levitt (1962). As applied by Stuart and Davis (1972), these procedures have become a standard part of most weight control programs. The technique involves reducing undesired behaviours by limiting exposure to food-related cues. Typically, these procedures involve keeping food out of sight, limiting the time and location for eating, keeping problem foods out of the house, and stopping automatic eating. Virtually every study which has incorporated stimulus control procedures as part of the treatment program has reported a weight loss of at least one pound a week (Abrams, 1984). The original impetus for the use of these procedures was based on a proposal by Schachter

(1971) that obese individuals are highly sensitive to external food-related stimuli. Both the veracity of Schachter's proposition (Rodin, 1980) and the efficacy of stimulus control procedures (cf. Beneke, Paulson, McReynolds, Lutz & Kohrs, 1978; Loro, Fisher & Levenkron, 1979) have had mixed support. However, they remain an integral part of most current behavioural programs (Brownell, 1983a).

Basic Instruction

Basic information about the role of nutrition and exercise play an important role in weight management regimens. Basic knowledge is necessary in order to make informed choices regarding meal planning and limiting caloric intake (Brownell, 1983a). Similarly, recognition of the effects of exercise to increase calorie output, decrease appetite and stimulate basal metabolism is important. While many clients have a basic knowledge of nutrition, most overweight people need guidance in choosing activities suited to their physical conditions. A slow, progressive program of physical activity is recommended (Abrams, 1984). Many programs include a discussion of the benefits of exercise, though its implementation as a part of the program may be difficult because of the wide variability in the physical condition of the participants.

Research related to the modification of health-related behaviour has progressed to the point where information and

self-management techniques can be effectively presented with minimal therapist contact. The substantive and process aspects of a weight management program can easily be taught with the use of self-help manuals. Extensive reviews by O'Farrell and Keuthen (1983) and Glasgow and Rosen (1984) have identified over 160 self-help manuals covering ten topical areas: over twenty manuals specifically addressed the issue of weight control. It is evident that therapists and clients have a wide variety of manuals to choose from, depending on their specific needs.

The Limits of Behavioural Interventions

The major problem in health promotion is still the enhancement of motivation for health behaviour change. Despite the advances discussed in the treatment of obesity, many issues remained unresolved. A review of 21 behavioural treatment programs indicates that there is a notable consistency in the results obtained from these programs (Jeffery, Wing & Stunkard, 1978). Regardless of the differences in therapist training, treatment duration, treatment cost and client characteristics, the average client will lose close to eleven pounds. Behavioural methods produce the greatest initial weight loss of most available treatment procedures, however the clinical significance of the achieved weight loss is questionable (Brownell, 1983b).

Three reasons for the apparent limited progress in the treatment of obesity have been suggested. The success of any treatment is a function of client self-selection, client heterogeneity at treatment intake, and problem definition from the perspective of the therapist or health professional. Each of these factors act to moderate the success of an intervention, and represent a major field of inquiry within the realms of obesity-related research.

Self-selection

A unique study by Schachter (1982) may have provided a partial explanation to the seemingly intractable nature of obesity to treatment. Schachter conducted smoking and weight history interviews with all members of two pre-defined groups: the psychology department at Columbia University and all resident entrepreneurs within a designated main street area of a small seaside resort community. His purpose was to determine the incidence of obesity and smoking self-cure in a non-self-selected population. Based on self-reports with limited corroboration, he found that 62% of the people who had actively attempted to lose weight had succeeded; another 10% although still overweight had maintained a significant weight loss. Schachter's data represent a lifetime of attempted self-cure while most researchers only view a single attempt of the participants in their programs: this no doubt explains the extraordinary success rates he

reports. However, only 12 (26%) of the 46 obese people interviewed indicated that they sought help for obesity at some time. This rate is much lower than the success rate reported and suggests that most cured themselves over time. This indicates the probability of a definite selection bias in those who seek treatment for obesity.

Colvin and Olson (1983) interviewed 54 subjects from the general population who had maintained a weight loss of 20% or more for at least two years. Their data indicate that 70% of the respondents failed to achieve permanent weight loss on their first attempt. For 28% of the subjects, a critical incident was identified as the impetus for their weight control efforts: for men the percentage was much higher (54%) and was unanimously related to a medical incident. The weight loss methods used included diet modification (72%), exercise (4%), and a combination of both diet and exercise (24%). Sixty percent of the respondents indicated that they gained their weight between high school graduation and 35 years of age. They found that 59% of those interviewed lost weight on their own; 39% indicated that they enrolled in a structured program or sought medical supervision. These data are congruent with those of Schachter (1982) cited above. The data suggest that successful weight loss takes multiple trials and that most people do not seek help in their efforts to control their body weight.

Client Heterogeneity

Leon and Roth (1977) in a major review of the psychological correlates of obesity, concluded that there is little evidence to support the notion that obesity is a unitary syndrome. No single theory adequately accounts for the existing problems associated with obesity: there is no evidence that orality, externality, depression, or anxiety reduction is characteristic of all obese people. The frequency of incidence of obesity-associated problems appears to form a continuum from normal to neurotic individuals. This denotes important implications from the perspective of the therapist. Many combinations of these various characteristics are possible and it is very likely that no single treatment approach will deal with all combinations effectively.

The pragmatic significance of characteristics such as age of onset, sex of client, and internal-external locus of control have been reviewed by several researchers (Abrams, 1984; Brownell, Heckerman and Westlake, 1979). Their findings do not suggest any clear relationships between client characteristics and success in weight control programs. One of the few characteristics which does seem to have tangible treatment implications is the existence of three specific compulsive eating patterns: night eating, binge eating and eating without satiation (Stunkard, 1976). These consumption patterns are difficult to treat: subjects

show good initial progress, but cannot maintain weight loss (Gormally, Rardin & Black, 1980). Almost uniformly, they require individualized intervention. The distinction between restrained and unrestrained eaters (Nisbett, 1972) has also proven to be useful in the treatment and maintenance of weight loss (Brownell, 1985a). This distinction is based on deviations from a biological set-point: hyperplastic individuals who are biologically normal weight and statistically overweight must continually "restrain" their consumption in order to be biologically underweight. Unrestrained eaters are characteristic of individuals with hypertrophic obesity. Research by Herman and associates (Herman & Mack, 1975; Herman & Polivy, 1975; 1980) have documented differences between the consumption patterns of restrained and unrestrained eaters in terms of their reactivity to stress, anxiety, and social cues.

The belief that the nature of obesity is multifaceted is pervasive among therapists and researchers, however discovering meaningful distinctions among subsets of the obese population has been a slow and difficult task. Abrams (1984) suggests that given the existence of a truly diverse clinical population whose problems do not readily emerge at pretreatment sessions, an intervention characterized by ongoing treatment decision-making and regular re-evaluations of the intervention might be the model of choice (p. 27).

Problem Definition

A final explanation for the lack of progress in treatment effectiveness has been a reliance on an outdated conceptual perspective. Health professionals have provided treatment based on the principles of what to eat. Psychologists have studied the issue from the perspective of how to eat. While evidence has been presented which indicates that instruction on how to eat is generally more effective than instruction on what to eat, Brownell (1983b) suggests a new vantage point is needed. Obesity might be redefined as an adherence problem. While the basic prescription for weight loss is simple--eat less and exercise more--how to adhere to the prescribed behaviours is less understood both by clients and therapists alike.

Stunkard (1983) has identified three pervasive clinical problems related to the treatment of obesity: dropping out of treatment; emotional disturbances during treatment; and maintenance of weight loss after treatment. The issue of dropout is of primary importance. If clients do not remain in a program they cannot derive any benefits from the program. This obviously reduces the chances of successful weight loss through their current efforts, and may reduce the likelihood of further attempts promoting an attitude of resignation. Not surprisingly, one of the reasons why participants drop out of treatment programs is because they develop emotional disturbances. Complaints of anxiety,

preoccupation with food, irritability and depression have often been reported (eg. Halmi, Stunkard & Mason, 1980; Stunkard & McLaren-Hume, 1959). Follick and associates have found that a simple attendance-contingent monetary contract reduced attrition by 50%, although there was no difference between the experimental and control groups in terms of weight loss (Follick, Fowler & Brown, 1984).

Brownell (1983b) has called for the use of behavioural procedures to reduce the attrition problem in weight control programs. A new generation of health promotion programs with an emphasis on motivational factors is necessary to improve program effectiveness (Brownell, 1986).

The Issue of Motivation

Traditionally, health promotion programs have had a focus on the acquisition of new knowledge and/or the performance of new behaviours. While there is no doubt about the importance of knowledge in attempts to influence behaviour, often it is insufficient to promote behaviour change. If such a rational model of man were true, then the Surgeon General's warning would have eliminated smoking and overweight individuals would restrict their diets as suggested by their physicians. Efforts to enhance an individual's motivation to initiate and sustain behavioural changes have typically relied on two basic tactics: social support (both positive support and peer pressure) and

tangible rewards (Fisher, Lowe, Levenkron & Newman, 1982). Many programs have made efforts to mobilize family, friends and coworkers to support program participants (eg. Brownell, Heckerman, Westlake, Hayes & Monti, 1978; Hickey, Friedman, Harper, Foreyt & Bornstein, 1985; Wilson & Brownell, 1978), and to create support groups for participants at the conclusion of the program (Levine & Sorenson, 1984). The creation of such structural supports acts to enhance the effect of the treatment and often contributes to an increased maintenance of weight loss at follow-up.

The importance of incentives in facilitating behaviour change has been documented by several studies. Stanton (1976) assigned patients seeking a hypnotic treatment for weight control to one of two groups. Both groups were given the same audiotaped presentation. One group paid for the treatment while the other did not. All ten members of the fee paying group lost at least 14 pounds whereas only five members of the free group were as successful. Abrahms and Allen (1974) compared behaviour therapy and social pressure to a similar group who also had a monetary deposit contract for weight loss. Weight loss was enhanced through the use of the monetary incentive procedure. Coates et al. found a significant positive correlation between weight loss and the amount of money deposited for contractual refund (Coates, Jeffery, Slinkard, Killen &

Danaher, 1982). Wing and Jeffery (1979) concluded in their review of 145 obesity outpatient studies that external reinforcements are an important part of the treatment program. Programs which encourage participants to lose weight by providing external support, as in frequent therapist contact, social pressure or monetary incentives, generally are more successful.

Monetary incentives have been used effectively in the modification of health behaviours in both business settings, and by therapists in the context of structured programs. Business smoking cessation, weight control and exercise programs commonly use rewards as an incentive, either in the form of a monetary payment or a chance at a lottery draw for a prize (Fisher, Lowe, Levenkron & Newman, 1982). For example, employees and their families at Schwartz Meat Company were eligible to earn several weeks pay for meeting minimal exercise goals (Shepard & Pearlman, 1983) while employees at General Motors Technical Laboratories who followed through on their pledge to wear their seatbelts were eligible for a lottery which included a weekend vacation or the use of a company car for a week (Warner & Murt, 1984). The business community has recognized the importance of tangible incentives in promoting program participation and facilitating behaviour change (Crapnell, 1982; Herzlinger & Calkins, 1986). Many therapist-based health promotion programs use both rewards

and aversive procedures (Epstein & Wing, 1984). The basis for the incentive is often a refundable deposit paid by the client. When specified goals are achieved, a portion of the deposit is returned; when target behaviours are not reached, a part of the deposit is lost by the client.

The efficacy of incentives in producing behavioural change has also been illustrated through the use of minimal intervention behavioural weight management programs (Black & Friesen, 1983; Brownell, Cohen, Stunkard, Felix & Cooley, 1984; Castro & Rachlin, 1980; Colvin, 1979; Colvin, Zopf & Myers, 1983). In each of these programs the amount of actual therapist contact was minimal. The duration of the studies ranged from 5 to 38 weeks with mean weight losses of 5 to 15 pounds. All but one study cited above incorporated some sort of monetary incentive procedure, usually a refundable deposit contract. A single study (Colvin, 1979) relied on social support and pressure at the worksite to maintain participant motivation.

Deposit Contracts and Monetary Incentives

The most common method of administering a monetary incentive procedure to facilitate behaviour change has been through deposit contracts. Their use has been explored in the context of a variety of behaviour modification programs, including weight control (Rozenky & Bellack, 1976), smoking cessation (Lando, 1977), and exercise

(Epstein, Wing, Thompson & Griffin, 1980). The modification of health behaviours by behavioural contracting has been reviewed by Epstein and Wing (1984). The behavioural contract is a powerful tool in the modification of problem behaviours due to its structure, which contains many of the elements known to facilitate behaviour change (Rimm & Masters, 1974). The contract delineates specific commitments for behaviour change by the client. The method of treatment, target behaviours and reinforcement contingencies involved are also specified in the contract. Having these details clearly outlined allows for an accurate assessment of whether the terms of the contract have been met and the consequent delivery of reinforcement contingencies.

In the case of weight management programs, the typical deposit contract is a written document drawn up between a therapist and the client which stipulates that a given portion of the fee will be returned to the client when a predetermined target weight is reached. Often there are also time constraints specified in the contract. A contract might require the loss of a pound and a half every week or the maintenance of the current weight for five weeks.

The findings of several research studies indicate the power of behavioural contracting in modifying health-related behaviour. A review by Shepard and Pearlman (1983)

indicates that programs which incorporate behavioural contracts typically produce results superior to those without contracts. An experimental study conducted with volunteer subjects confirms this finding (Coehlo, 1983). A meta-analysis of 97 weight control studies found significantly lower attrition rates in those studies incorporating the use of deposit contracts (Eufemia & Wesolowski, 1985). In fact, there appears to be a linear relationship between the effectiveness of the contracting procedure and the amount of money on deposit: larger monetary deposits are associated with better program performance (Fisher, Lowe, Levenkron & Newman, 1982; Hagen, Foreyt & Durham, 1976; Jeffery, Thompson & Wing, 1978). Available evidence indicates that the effects of behavioural contracts are highly specific. That is, if the contract specifies weight loss, then weight loss will be achieved; if it stipulates the completion of a food diary, then food diaries will be completed (Hagen, Foreyt & Durham, 1976). Fisher et al. have found that contracts result in behavioural changes even in the absence of detailed instruction in self-management techniques (Fisher, Levenkron, Lowe, Loro & Green, 1982).

The Limits of External Reinforcement

The importance of external incentives such as monetary rewards has been demonstrated in their power to increase program participation and facilitate goal attainment.

Though many studies support these findings, there is at least one report where participants did not perceive contingency contracts as helpful.

Fisher and associates reported that participants in a smoking cessation program rated the helpfulness of contingency contracts ninth out of eleven procedures, although there were clear outcome differences related to contract adherence (Fisher, Lowe, Levenkron & Newman, 1982). Often, successful program participants do not spontaneously notice any differences in their experience of daily life. However, prompting and reports from other program members lead them to realize that they too have experienced changes. The authors reached an important conclusion in their review of external incentives and behavioural change. Although incentives are a powerful energizing program component, they should be implemented in such a way so as not to distract participants from naturally occurring consequences associated with success. Incentives should be used to promote social support and encouragement and/or to facilitate other behavioural changes through increased personal agency.

The Role of Self-efficacy

Once a program has terminated, therapist support and external reinforcement are no longer available. In order for behavioural changes to be maintained beyond the program, responsibility for initiating and sustaining

change must be adopted by the participant (Kanfer, 1979). An important goal for the program should be for clients to develop the motivation and self-regulation necessary to maintain changes. A key component in this model of behavioural self-regulation has been conceptualized by Bandura (1977). A person's expectations of efficacy represent a cognitive construct necessary for sustained behavioural change: expectations of success are instrumental in predicting if coping behaviours will be maintained in the face of obstacles. This sense of "I can do" is an important integration of personal agency and environmental cues which acts to influence emotional arousal, actions and thought patterns across the continuum of human experience (Franks, 1984).

Self-efficacy is a personal judgement of one's ability to carry out certain roles or activities under a variety of conditions (Bandura, 1981). Persons with a low sense of self-efficacy for certain behaviours tend to avoid situations which require the problem response: individuals successful in managing their weight may avoid situations which would put their success in jeopardy; individuals who have never been able to lose weight might avoid subsequent attempts to manage their weight.

A personal sense of self-efficacy is based on an integration of several sources of information (Bandura, Adams & Beyer, 1977; Schunk & Carbonari, 1984). Personal

performance is the most reliable indicator of self-efficacy. Repeated successes in a situation or task promotes a sense of confidence and ability whereas repeated failure leads to a sense of helplessness or hopelessness. Vicarious learning also provides knowledge about one's abilities: in watching the activities of others we learn more about what we can and cannot accomplish ourselves. Greater perceived similarity between the individual and the model observed increases the likelihood that the model's successes will be seen as potential successes for the observer. In some situations, social pressure can act to increase a sense of ability in a person: specific orders from a physician implies that the patient has some ability to carry out these changes. Finally, physiological changes can provide feedback of success or failure about a plan of action. When cravings for sweets stop or clothes begin to fit differently, these tangible indicators represent success and provide positive reward for the efforts expended.

Many overweight individuals can document a long history of efforts to manage their weight. This history is itself indicative of many failures and more often than not, a sense of hopelessness about one's ability to be successful. It is important that weight programs address the issue of self-efficacy to maintain the morale of a group which faces countless daily cues associated with food consumption.

Promoting self-efficacy provides motivation to attempt new weight control efforts and the confidence necessary to resume these efforts in the face of temporary setbacks and failures.

Research in Support of Self-efficacy

Since its inception, there has been some debate about the conceptual clarity of the self-efficacy model proposed by Bandura (1977). Much of the debate is focused on the distinction between efficacy expectations and outcome expectations, which Bandura suggests are relatively distinct. At this time, there is no obvious resolution to the debate. However, both critics and advocates of the model recognize the importance of self-efficacy as a construct in the integration of cognition and behaviour (Eastman & Marzillier, 1984). For a complete discussion of the current controversy, interested readers can refer to the first volume of Advances in Behaviour Research and Therapy, (1979) in which two-thirds of the issue is devoted to a critique of the theory. In addition, the sequence of papers by Eastman and Marzillier (1984), Bandura (1984), and Marzillier and Eastman (1984) are of keen interest.

In a review of the research literature on self-efficacy and health behaviour, O'Leary (1985) concluded that perceived self-efficacy plays a consistent mediating role in the effectiveness of therapeutic interventions. Citing research from smoking cessation, weight control,

pain management, and cardiac rehabilitation, she reaffirms the importance of enhancing self-perceptions of efficacy in health-related interventions.

With respect to the application of self-efficacy theory to the problem of obesity and weight control, few studies have been identified. Chambliss and Murray (1979) provided a placebo medication to weight program clients, indicating that the medication was a metabolic stimulant. After two weeks, they manipulated self-efficacy by revealing to some subjects that the medication was inert: they encouraged the attribution of successful weight loss to the efforts of the client. Post-treatment results indicate that for those subjects with an internal locus of control, attributions of self-efficacy increased the clients' ability for weight control.

In another study, participants were assessed to determine pre-existing levels of self-efficacy; they were divided into high and low self-efficacy groups (Weinberg, Hughes, Critelli, England, & Jackson, 1984). All participants were tested to assess their exercise self-control: false feedback related to the degree of exercise self-efficacy was provided. The results of the study indicate that pre-existing self-efficacy was significantly related to weight loss: those with higher initial self-efficacy lost more weight. In addition, subjects given high self-efficacy feedback lost more weight than those given low

self-efficacy feedback.

In a study of the causes and attributions associated with obesity, Hartigan et al. suggested four categories of attributions which can mediate goal achievement: variations in client ability, effort expended, task difficulty and the influence of random factors (luck) were identified. Using a three group design of (a) behaviour modification and diet, (b) diet and (c) delayed treatment control, they found support for self-efficacy theory. Perceptions of victimization were related to a belief of lack of personal ability and undercut the treatment effects. Successful weight loss was perceived to be a function of ability, but not expended effort. They suggest that for successful treatment, clients need to be persuaded that they can lose weight and not to feel victimized by the problem. Clients must also except some degree of responsibility for the problem. Those with pervasive feelings of helplessness in their lives require a broader based program focused on simple task mastery (Hartigan, Baker-Strauch & Morris, 1982).

Dissertation research by Van Koten Chappell (1982) found that subjects could be reliably classified into high and low weight loss groups by a discriminant function analysis based on ratings of family environment and self-efficacy. In contrast to the prior studies, individuals with lower levels of self-efficacy and less supportive family

environments were members of the high weight loss group; members of the low weight loss group had higher ratings of positive family environment and self-efficacy. Several hypothetical explanations are provided. She attributes these apparently discordant findings to the nature of the treatment, which was a hospital outpatient program which combined fasting and protein supplements, and to the relationship between self-efficacy and other personality characteristics. She suggests that less self-efficacious individuals had more dependent personalities and thus performed more successfully within the confines of the tightly structured medical intervention, compared to more independent individuals. Combined with a positive family environment, which was possibly supportive of the obese individual and did not place pressure on him/her to lose weight, there was less motivation to be successful.

The research reviewed on the role of self-efficacy in mediating behaviour change is in agreement insofar as the construct seems useful in explaining outcome. The conflicting research findings suggest that the nature of the intermediary role is less readily apparent. However, differences in treatment populations and the type of program used may explain the varied findings. At this point, a reasonable conclusion might be that in more traditional behavioural treatment settings for weight control, there is a positive relationship between self-

efficacy and successful weight loss.

Summary

From the background literature reviewed, several conclusions about the treatment of obesity can be drawn:

1. Obesity is a complex problem with many contributing factors which makes treatment difficult.
2. The behavioural treatment of obesity is at least comparable to most other forms of treatment, and often superior in terms of maintenance.
3. Chronic problems plaguing obesity treatment include high levels of attrition, emotional disturbance and relapse. Improving program adherence is of primary importance in the effort to enhance treatment effects.
4. The use of external reinforcers and incentives to augment individual motivation have proven effective in promoting program participation and goal attainment.
5. Providing awareness and increasing the strength of client self-perceptions of efficacy is an important objective for treatment programs. This process facilitates the maintenance of behavioural changes beyond the confines of treatment.

The Current Research

While considerable evidence has been found to suggest that monetary incentives increase the effectiveness of weight management programs, very little research is reported comparing the relative efficacy of various types of incentive strategies. The question arises: given a sum of money as an incentive, what is the most effective way of using it? That is, which monetary incentive plan will promote program adherence as well as reduce attrition to

facilitate goal attainment among the participants?

While each of the four principle operant procedures (Reese, 1966) can be applied to contingency contracts, positive reinforcement is the incentive procedure most commonly used (Epstein & Wing, 1984). Each time the participant is successful in meeting the criteria defined in the contract, a portion of the deposit is refunded. The refund can be contingent on weight loss, program attendance, or habit change. According to learning theory, such a procedure encourages rapid acquisition of the target behaviour, although satiation and rapid extinction are also likely (Reese, 1966). In practical terms this suggests that participants initially would show a high degree of adherence to program requirements, which over time would diminish; few behavioural changes would expected to be maintained at the conclusion of the program.

Another procedure, response cost, has been used in therapist-based programs. Based on aversion techniques (Weiner, 1962), the participant loses money each time he/she does not comply with the conditions of the contract. In effect, each time the participant fails to lose weight according to the agreement, they are fined and a portion of their deposit is lost to them. A review of the use of response cost attendance contracts in weight management programs has illustrated the superiority of these procedures over no-contract control groups (Epstein and

Wing, 1984). At present the research is unclear as to the efficacy of response cost compared to continuous reinforcement. While Kazdin (1972b) found that response cost procedures were superior to reinforcement in the modification of speech problems, a study by Sindelar et al. of distractable children in a tutorial setting did not report any significant differences (Sindelar, Honsaker & Jenkins, 1982). Aragona, Cassady and Drabman (1974) compared response cost procedures with a combination of response cost and reinforcement in the treatment of 15 obese children. Although there was no difference between the two experimental groups, both lost more weight than the control group. The similarity of outcomes between the two groups may have resulted from treatment contamination, since parents in the response cost condition were reported to have spontaneously reinforced their daughters' weight loss, creating conditions similar to the response cost-reinforcement contract of the other parents. These inconclusive results illustrate the need for further research on the use of such procedures in the treatment of obesity.

Both response cost and continuous reinforcement as described above rely on a payoff which is predictable. However according to basic learning theory, the use of unpredictable payoff intervals elicit higher behavioural response rates which are more durable over time (Reese,

1966). The results of variable interval and variable ratio learning trials with animals have provided the basis for the theory; the attraction of gambling and games of chance for many people illustrates the power of the unpredictable payoffs.

The use of unpredictable payoff schedules, such as lotteries, has been well documented in the employee health promotion literature as a way of promoting behaviour change and reducing absenteeism (Fisher, Lowe, Levenkron & Newman, 1982; Washington Business Group on Health, 1986). However, behavioural research providing controlled evaluation of the strategy is limited (Epstein, Wing, Thompson & Griffin, 1980; Foxx & Schaeffer, 1981; Iwata, Bailey, Brown, Foshee & Alpern, 1976; Muir & Milan, 1982; Nord, 1969; Osborne, Powers & Anderson, 1974; Pedalino & Gamboa, 1974). Very few of these studies have investigated the use of lotteries in the modification of health-related behaviours. Five of the seven studies listed involved a simple comparison of a lottery reinforcement procedure to a no-treatment control: in all cases the lottery reinforcement increased the incidence of the desired response, and was uniformly viewed as favourable by the participants. The two studies which compared lottery procedures to the more traditional continuous reinforcement procedures reported that the lottery was at least as effective as reinforcement in producing behavioural change (Epstein et al. 1980; Osborne

et al. 1974).

Purpose

The primary purpose of this study is to assess the relative efficacy of several monetary contingencies in the modification of a specific health risk. A six group design is used to compare reinforcement procedures and type of reinforcer. Four weight-contingent conditions are compared: (a) continuous positive monetary reinforcement, (b) monetary response cost, (c) positive reinforcement with a lottery system, and (d) response cost with a lottery system. Two comparison groups are used. An attendance contingent group is used to test for differences associated with the specific contingencies: group members received monetary reinforcement for attending the program meetings. In addition, a no-incentive group is used to permit a test of the effectiveness of the program without any incentive scheme.

Weight control is chosen as the vehicle for this study of incentives because it is a recognized health problem, there is a substantial body of previous research regarding behavioural treatments of the problem, and the outcome measure of weight loss can be reliably determined.

Hypotheses

Most of the research presented has shown the advantage of reward-based programs over no-incentive programs.

Little research has been done on the relative effectiveness of these incentive procedures; each has characteristic strengths and weaknesses in their practical applications. The hypotheses related to comparisons among weight-contingent incentive conditions were stated in terms of the null hypothesis since there is little conclusive evidence a priori as to which effects would be significant. Conversely, weight-contingent incentives were believed to generally produce superior effects when compared to attendance-contingent or no-incentive programs.

Hypothesis One

1a. The four groups with weight-contingent incentives will be more effective than either attendance or no-incentive groups in promoting weight loss, defined in terms of total weight loss at the end of the program and the rate of weight loss during the program.

1b. There will be no differences among the four weight-contingent incentive groups in promoting participant weight loss.

Hypothesis Two

2a. Weight-contingent incentive procedures will result in lower attrition rates than attendance or no-incentive procedures.

2b. There will be no differences in participant attrition rates among the four weight-contingent incentive groups.

Hypothesis Three

Acceptance of the program, measured in terms of program satisfaction, group process, and program reactance will be related to the incentive procedures implemented.

3a. Program satisfaction will be highest in the four weight-contingent incentive conditions, compared to the attendance-contingent and no-incentive conditions. There will be no difference in program satisfaction among participants in the weight-contingent incentive groups.

3b. There will be no differences in group process among the any of the six study groups.

3c. Reactance to the program will be greater for the no-incentive group when compared to the attendance- and weight-contingent incentive groups. No differences among the participants in the four weight-contingent incentive groups with respect to program reactance will be identified.

Hypothesis Four

4a. Perceived self-efficacy will be lowest for the no-incentive group and successively increase for participants in the attendance-contingent and weight-contingent incentive groups.

4a. Perceptions of self-efficacy will be the same in each of the four weight-contingent incentive groups.

Hypothesis Five

5a. Risk-taking is related to program acceptance in the lottery incentive conditions. Individuals who score higher on a measure of risk-taking will rate program satisfaction higher and rate reactance lower in comparison to low risk-taking individuals in the lottery groups. There is no relationship between risk and program acceptance in the other groups studied.

CHAPTER III

Method

Overview

The primary goal of this research is to determine the relative effectiveness of various incentive strategies in the modification of a health-related behaviour, specifically weight control. Four weight-contingent incentive conditions were compared: (a) continuous positive monetary reinforcement, (b) monetary response cost, (c) positive reinforcement with a lottery system, and (d) response cost with a lottery system. Two comparison groups were used. An attendance contingent group was used to test for differences associated with the specific contingencies: group members received monetary reinforcement for attending the program meetings. In addition, a no-incentive non-random group was used to permit a test of the effectiveness of the program without any incentive scheme. Twenty subjects were recruited for each of the groups participating in the research.

Administrative Process

Administrative details proved vital to the success of the program. The research design was reviewed and approved

by the University Committee on Research Involving Human Subjects. This approval later became very important in the resolution of an issue of participant confidentiality with the Controller's Office, related to the release of money for the purposes of subject payment.

Arrangements were made with the Director of the Center for the Study of Human Performance for the use of the Center to conduct the weight management program. This location was ideal for several reasons: there was a large meeting space available for the participants; a very accurate weight scale was available for use by the experimenter for the duration of the study; free parking for program participants was easily accessible. The ambiance of the room was ideal. The presence of treadmills, exercise bicycles and a hydrostatic weighing tank helped to lend an aura of seriousness to the project--face validity as it were.

Design

This research was carried out as two sequential studies. The first study was a comparison of the six monetary incentive strategies: no incentive and attendance-contingent groups were used as comparisons to four groups comparing the monetary and lottery weight-contingent incentives based on reward and response cost procedures. Thus Study I required a total of 120 participants, randomly assigned to five experimental conditions. A separate non-

randomly assigned no-incentive cohort was created for comparison purposes.

Based on the results of Study I, a second study was conducted to specifically compare the effects of incentive-based programs to a randomly created no-incentive program. The design of this subsequent study had a total of 40 participants, 20 in each of two groups. The two studies, as designed and executed followed each other logically. To this end, the methods used in each study are discussed in sequence.

Experiment I

Recruitment of Participants

Several methods were employed in the recruitment of subjects for this research project. The recruitment effort had two goals: to insure a sample of sufficient size for the research design, and to extend the focus of recruitment beyond the confines of the university community. There was a genuine concern on the part of the researcher regarding the feasibility of recruiting 120 subjects for a weight control study, given the numerous commercial programs competing for a share of the market. A display advertisement for a "Dollars for Pounds" weight loss program was placed in the Sunday edition of the local newspaper, The Lansing State Journal, on January 12 and again on February 2, 1986. The first advertisement was run

in the "Today" section of the paper; the second was located in the "Metro/Michigan" section. A press release from the College of Osteopathic Medicine resulted in a short article in the faculty-staff paper The MSU Bulletin (January 30), as well as an interview and front page story in the February 7 edition of the school newspaper The State News. The press release also prompted the broadcast of public service announcements on local radio and television stations.

A local weekly paper (Towne Courier) carried a notice of the research project in the "Community Datebook" section. The notice appeared for three consecutive weeks.

This notice was used to recruit subjects for the free, no-incentive cohort. A different telephone number was listed for perspective participants to receive additional information.

All announcements provided a telephone number for more information. Often the participants heard a recorded message inviting them to leave their name and telephone number so that the experimenter could return their call. The display advertisement also provided an address where participants could write for further information. Those who sent in for information were mailed a one page summary of the study and eligibility criteria, as well as a campus map indicating the time and location of the registration meetings. Appendix A contains a copy of the newspaper

advertisements used for recruitment.

The media campaign resulted in a total of 357 responses, primarily from the display ads in the Sunday edition of the daily paper. During the initial contact with the experimenter, subjects recruited for incentive-based programs were given the following information:

"I am interested in finding ways of helping people stay with weight loss programs, because as you may have noticed if you have gone to a program before, many people seem to drop out. There are any number of reasons why people drop out, but if people drop out of the program there is no way that they can truly benefit from the program.

I am offering a ten session program, which is spread out over 14 weeks. The program meets once a week in the evening at 7:00 or 8:30 pm here on the MSU campus. The program covers basic information on behaviour modification, nutrition education, exercise and social support. The program is open to anyone 18 years of age or over who is not diabetic, pregnant or under medical care for high blood pressure. Do you still qualify?

I am trying to promote a steady but sustained weight loss of one to two pounds per week. Since this is a 14 week program, you can expect to lose about 14 to 30 pounds. It is ok if you have more to lose, as long as you understand that the expectation for the program is no more than 30 pounds. May I ask how many pounds you have to lose?

What I ask you to do is to pay \$40 for the program. I am going to match that money with \$40 more, so that the program starts out with \$80 per person. Then, each week there will be a goal for the program, and each week that you successfully reach that goal, you will increase your chances of getting some money back.

What I am looking at is the most effective way of using that \$80 per person as an incentive to stay with the program, so different payback schemes will be used for each of the groups. I can't tell you in advance which group you will be in and so I can't tell you how much money you stand to make, or even guarantee that you will make money. All I can say is that the more successful you are, the better your chances of getting

some money back. Do you have any questions?"

Subjects in the no-incentive comparison cohort received the same explanation, except that no mention was made of a monetary deposit or incentives. Subjects interested in attending the registration meetings were given the necessary information and if requested, a map of campus and the surrounding area was mailed to them.

Subjects

In order to recruit the subjects necessary for the research project, a total of 278 individuals were contacted by telephone or mail with information about the program and registration meetings. This large number of contacts was necessary due to several factors which influenced eligibility or motivation to participate. These factors included the medical criteria for subject eligibility, scheduling conflicts, people unwilling to "risk" \$40 for the program, and people whose height and weight information indicated that they did not merit inclusion in the study.

A total of 123 volunteers initially registered for the program: one person did not pay a \$40 deposit and never came to a session; one person registered but never came to a class, despite a telephone reminder; one came only to the first class, but never completed a pre-test questionnaire; the monetary deposits of two women who became pregnant in the time between registration and the first class session were refunded. The remaining 118 volunteers were

characterized as follows:

1. The age ranged from 17 to 71 years of age, with a mean of 41.7 years and a standard deviation of 9.78.
2. Seventeen (14.4%) of the participants were male.
3. Marital status indicated that 67.5% were married, 13.3% were single, 17.5% were divorced, and 1.7% were widowed.
4. Most of the participants were white (95%); 4.2% were black.
5. The mean number of years of education was 15.7 with a standard deviation of 2.57 years.
6. Employment information indicated that 71.7% were employed full time whereas 22.5% were unemployed; the remainder (5.8%) were employed part time.
7. Based on self-reported age of onset for obesity, 27% indicated age 5 to 12 years, 24% indicated age 13 to 19 years, while the remaining 49% indicated an onset from 20 to 50 years of age: the mean was 21.4 years.
8. Thirty-nine percent indicated that their weight gain was associated with a specific event.
9. Based on self-reported weight trends for the 12 months prior to this program, almost half (47.8%) had gained weight, 3.5% loss weight, 22.6% remained stable, and 26.1% had a weight trend which fluctuated.
10. The three major reasons listed for trying to lose weight were appearance (39.3%), health (32.5%), and self-esteem (23.1%).
11. The number of types of diets tried in the past ranged from 0 to 7 with a mean of 2.7; the number of weight loss methods tried, including dieting ranged from 0 to 6 with a mean of 2.1 methods.
12. At the first weigh-in, weights ranged from 134.9 to 358.2 pounds, with a mean of 205.6 pounds and a standard deviation of 43.48 pounds: the participants ranged from 5% to 115% overweight, with a mean of 35.9% and a standard deviation of 26.73%.

Assignment to Conditions

Several constraints to random assignment required

consideration. The six conditions of the study necessitated six concurrent weight management programs. These programs were offered three evenings each week (Tuesday, Wednesday, Thursday), at two different times each evening (7:00 pm and 8:30 pm). Those who registered for the program were asked: (a) which program slots (time and day) they could not attend, and (b) if they wished to be placed in the same group as another person, eg. a spouse or family member.

Consideration of the first issue was deemed important in an effort to reduce program attrition. It was thought that placing members in groups which made attendance difficult would likely promote dropout. Similarly, it was hoped that placing family members together would act to reduce dropout, as well as the likelihood of treatment contamination across the groups. This procedure was used by Harris and Bruner (1971). The number of occasions where family members followed through in their initial interest to participate was small: these eight family groups were randomly assigned to conditions. Since the small number of family units was not large enough to permit a specific analysis of family effects, the data for the family members were excluded from comparative analyses of the hypotheses.

Participants were randomly assigned to one of five incentive-based groups, stratified on the basis of percentage overweight. The determination of the percentage

overweight was based on weight and self-reported height. The 1982 revision of the Metropolitan height-weight tables was used to provide height-weight norms (Metropolitan Insurance, 1983). These tables are the most commonly used method of determining obesity (Abrams, 1984). For any individual, the "ideal" weight was taken as the upper most bound of acceptable weight for a given height and frame size. With this information a percentage deviation from ideal weight was calculated. The use of the upper bound rather than the midpoint of the acceptable range represents a conservative estimate of obesity. This conservative estimate was used for two reasons. First, it would provide them with a more reasonable target weight than might otherwise be indicated through the use of the midpoint or lower bound. Second, the tables indicate a wide degree of variability within any particular frame-sex-height group. The use of the upper bound insured that anyone over this limit was likely to be overweight by almost any standard. The research design and the assignment of subjects to groups are shown in Table 1. All clients recruited as part of the no-incentive cohort were not randomly assigned; being members of the same group, they did not have a choice with regards to the time or day for the meeting of their group.

Table 1

Characterisitics of Experimental Subjects

Incentive Condition		Mean Sample Characteristics			
Reinforcement Procedure	N	Percentage Overweight	Weight	Body Mass Index *	
Reward:	Money	18	35.1	204.3	35.11
	Lottery	17	48.0	210.2	35.35
Response Cost:	Money	18	32.5	199.4	32.38
	Lottery	16	35.5	213.0	35.67
Attendance Contingent		16	38.5	212.5	35.13
No-incentive		16	24.4	190.6	32.37

* Calculated as $(\text{WEIGHT})/(\text{HEIGHT}^2)$

The Behavioural Weight Control Program

In order to test for the effects of the various incentive strategies, it was necessary that all participants receive the same treatment program. Since the development of a behavioural weight control program was not part of the research question, an existing program with demonstrated merit was used for the intervention. Several noted researchers in the field of behavioural weight control were contacted and permission sought for the use of their programs in this research. Dr. Kelly Brownell of the University of Pennsylvania was the only researcher to respond to this request. He was most encouraging and readily permitted use of his program. The program manual

he provided (Brownell, 1979) has since been modified and expanded (Brownell, 1985b). His program, as described in the manual, is comprised of 16 weekly units which cover nutrition information, self-monitoring, stimulus control, social support, exercise information and problem-solving strategies. This program was modified for use in the current study by combining and deleting sections to accommodate a 10 session program.

The complete program implemented in this study was comprised of several component parts. These are the program materials, monetary deposit, contracts, and social support as described below. A syllabus of the complete program and materials distributed is provided in Appendix B.

Program Resources. The program materials were of central importance in providing participants with information about various topical areas related to behavioural intervention. In addition, the materials and resources were used in a general health education effort to disseminate information about broader issues related to weight control.

All participants received a program manual at registration. This manual was based on the program provided by Brownell (1979). Material in the manual was supplemented with information from Stuart and Davis (1972), as well as Nash and Ormiston, (1978).

Health education materials from the American Heart Association were also distributed throughout the program, often in response to inquiries from program participants. These materials included Exercise and Your Heart, A Guide to Dining Out, and Walking and Your Heart.

Guest speakers were invited to talk with participants. A psychiatrist specializing in eating disorders answered questions related to the medical aspects of obesity and weight control. An exercise physiologist responded to questions about exercise and weight control. A similar session was held with a registered dietitian who answered questions about nutrition, food allergies, food additives and weight control.

Contracts. All participants completed a behavioural contract at the first meeting of the program. The contract specified a weekly weight loss goal, and the outcome contingent upon the goal as determined by group membership. The contracts for all members remained in the custody of the experimenter. At the beginning of each session during the program, clients were weighed and the current weight indicated on the contract. Participants signed the contract each week, acknowledging success or failure at achieving their weight loss goal. The contract was modeled after material presented in Epstein and Wing (1984). A sample contract is shown in Appendix C.

The weekly weight loss goal was based on the percent-

age overweight of each participant. Two goals were used since it is easier for very heavy people to lose moderate amounts of weight. The goal was set at 1.5 pounds per week for those participants 20% or more overweight. For the 19 people less than 20% overweight the weekly goal was one pound. This procedure was explained to the participants. One person from each of the two weight goal groups requested that the goal be modified to the other value.

For purposes of equivalence, money was paid out only at the end of the program. Participants in monetary contingency conditions received a weekly update indicating the amount of money they were eligible to receive at the last program session. Lottery participants each week received a tally of the total number of lottery tickets available to them, for the draw at the last session.

Incentive Money. All participants in the attendance and weight contingent groups were required to deposit \$40 to be used as monetary incentive throughout the program. The money was deposited with the University and administered by them. The experimenter matched each of the \$40 deposits with another \$40 so that a total of \$80 per participant was available for use as a monetary incentive. These matching funds were provided by a grant from the College of Osteopathic Medicine.

Several ideas are reflected in the above procedure. A deposit of only \$40 was charged to participants so that the

cost of the program would not be prohibitive to a large number of people. The effectiveness of a deposit contract increases as the contingent monetary amount increases (Fisher, Lowe, Levenkron & Newman, 1982; Wing, Epstein, Marcus & Shapira, 1981). Therefore, a matched contribution was made in an effort to increase the significance of the per capita monetary amount. This provided an incidental parallel to worksite health promotion programs where the incentive money is often provided by the employer. The procedure permits some degree of investment by the participants as well as a chance to make money in return: it was thought that this procedure would enhance participant motivation.

Six incentive conditions were created for research purposes. The free group represented a no-incentive condition: group members did not have to pay for the program, nor did they have an opportunity to make money from the program. Participants in the attendance-contingent group were rewarded with \$8 each week that they attended the program regardless of their weight, therefore they were in a position to receive \$80 for simply attending all 10 sessions. The monetary reward program was similar to the prior group described except that in order to receive the \$8 reward, the participant had to achieve their weekly weight loss goal as set out in the contract. Conversely, members of the monetary response cost group were

initially credited with \$80, and \$8 was removed each week that a participant did not achieve their weekly weight loss goal, that is they were fined \$8 for their lack of success. The two lottery payback conditions were parallel to the monetary conditions, in that a member of the reward group earned a chance in a lottery each week they achieved their weight loss goal, and in the response cost group, they were fined a ticket from their original ten lottery tickets when they were unsuccessful. In the lottery groups, the money for all of the participants was pooled so that each group initially had \$1600. A lottery was held at the last class session, and for each group a drawing for \$1000 first prize, \$400 second prize and \$200 third prize were awarded. Thus in the lottery conditions, each participant started the program with a 1-in-20 chance of winning \$1000.

Social Support. Social support was facilitated during the program through group discussions. When time allowed, the experimenter opened the discussion to group members and encouraged them to share questions, successes and failures with the other members. This time was important for the sharing of strategies, and to further the recognition of each participant that they were not alone in their efforts to make changes in their lifestyle.

Procedures

Registration Meetings

The registration meetings were held three nights a

week for a three week period until enough people had registered for the program. At each meeting, the experimenter reiterated the information provided during the initial telephone contact, explaining the nature of the research. The content and duration of the program was explained. It was also explained that the program was funded by a research grant from the College of Osteopathic Medicine through the Department of Psychiatry, and that the deposit money collected was not intended for any purpose other than for incentives. All money deposited would be available for refund as earned incentives. Information concerning informed consent procedures, Human Subjects Committee approval and participants' rights within the study was presented. The volunteers were told that the complete design of the study would be revealed to them at the last session of the program and that further information would be available thereafter for anyone interested.

After all questions had been answered, the experimenter read aloud the registration and informed consent form (Appendix D). These forms, along with an intake questionnaire were distributed to all volunteers. When completed, the volunteers returned the forms to the experimenter along with the \$40 deposit. Volunteers initialed a form indicating receipt of the deposit by the experimenter, and were given a program manual and food

diaries to be completed for the first program meeting. Registrants were informed that they would receive a telephone call the week before the start of the program, indicating the day and time of their program meetings.

Two registration meetings were held specifically for the no-incentive cohort. These meetings were conducted as described above however no monetary deposit was collected. These volunteers were told of the other groups who were paying for the program, and that they were receiving the program the way it was originally designed, ie. without monetary incentives. Most volunteers seemed to appreciate the opportunity to receive the program without charge.

Program Sessions

The sessions were 60 minutes in length, with the first 15 minutes dedicated to weigh-ins and contract assessment. The scale was near the door as participants arrived. They were weighed by the experimenter and their current weight indicated on their contract. Their progress was then assessed in terms of their weekly weight loss goal, and their success or failure at meeting the goal was indicated. Clients signed the contract and then moved to a larger area where a circle of chairs had been placed. After 15 minutes, the experimenter began the program. Anyone who arrived after this time would be weighed-in after the session. Each session the experimenter spent five minutes reviewing the progress of the group overall, and the

material covered in the prior session. The next 20-30 minutes were spent in a presentation of material by the experimenter and a review of the related material in the manual. In sessions 7 through 10 these presentations were reduced to 15-20 minutes. The remainder of the time was spent in group discussion.

The Follow-up of Dropouts

In order to gain insight regarding the circumstances surrounding participant dropout, and to have information about the success of those individuals who discontinued the program, dropouts from the program were mailed a questionnaire after the last program session. Two questionnaires were used based on the number of sessions the person had attended before dropping out. Those members who dropped out before the midprogram assessment were mailed a three page questionnaire containing: (a) the self-efficacy measure used in the study, (b) a space to indicate their current weight, and (c) a question probing the reasons behind their decision to discontinue with the program. The longer version of the questionnaire contained the above items as well as the items related to program and group satisfaction, and program reactance.

Initially a total of 15 (45.5%) of the 33 dropouts responded to the survey. All those who had not responded after three weeks were mailed a second survey: at that time everyone was sent the short version with the hope that they

would be more likely to respond. After the second mailing, 81.8% (27) of the dropouts had returned their surveys. These follow-up procedures resulted in efficacy and weight self-reports for 110 (93%) of the original group of 118 participants.

Measurement

A description of the instruments used in the study is given below. Many of the measures have been used in prior research studies, and the psychometric characteristics of the measures are readily available. The major assessment questionnaires focused on participants' past weight loss attempts and circumstances surrounding their weight control efforts, as well as perceptions of support, self-efficacy and satisfaction with the intervention. All measures used in this study are presented in Appendix E.

Demographic and Past History

A Personal Nutrition and Diet Profile questionnaire was used to elicit information related to the participant's background, and past history of weight management intervention. In addition, ratings of perceived support from family and friends, reasons for losing weight, and current physical activity levels were measured. This questionnaire was based on the format used by Van Koten Chappell (1982), with modifications from Snetselaar (1983). The items from the Eating Restraint Scale created by Herman and Polivy (1975) to assess hyperplastic obesity were also included.

Weight Loss

The two primary dependent measures with respect to weight control were total weight loss and rate of weight loss. Total weight loss was determined as the difference between weight at the end of the program and weight at the first session of the program. This was expressed both as total pounds lost and as a percentage of the total pre-program weight ie. relative weight loss.

The rate of weight loss was a count of the number of times the participant was able to reach the weekly goal weight as specified in their contract. Given that the participant was weighed ten times during the program, a range of 1 to 10 was possible.

Weight was measured at each class session. When participants could not stay for a session they either weighed-in and left, or scheduled to weigh-in at another time. Participants were weighed wearing normal indoor clothing without shoes. The scale was calibrated in kilograms, so a conversion factor of 2.2 was used to convert the measurements to pounds.

Attendance

Attendance was taken at every class session. For each participant a record of the number of times they attended class was available, as an indicator of interest in the program. Since behavioural management skills were being taught, the number of class sessions attended influenced

the participants' ability to learn and practice new skills (Parkinson, 1984).

Program Acceptance

Program acceptance was measured in terms of two related constructs: reactance and satisfaction. Both measures were used in an effort to determine separate sources of satisfaction and reactance from the various program components. A possible situation in this study is a high degree of satisfaction with the program material and presentations in the presence of a high degree of reactance due to the incentive system used. The items related to satisfaction and reactance required participants to rate various program components on a five point scale.

Reactance, as conceptualized by Brehm (1966), represents a perception on the part of the participant of being too highly controlled within the program. These perceptions can lead to resistance or rejection of the program by the participant. Six questions assessing the perceived inflexibility of various program requirements were included. Given that this study was an investigation of incentive systems, a likely source of reactance on the part of some subjects would be the payback contingency condition that they found themselves in.

It was possible that some individuals would not like the risk inherent in the lottery condition, even though adherence to the program produced very good odds for a

payoff. Therefore a 20 item measure of risk-taking from the Jackson Personality Inventory was administered to participants at intake (Jackson, 1976).

Satisfaction with the program, although measured separately, can result from the same factors which determine reactance. Therefore satisfaction with the instructor, program content, and incentive procedures was assessed. The satisfaction items used were modified from the work of Coelho (1983).

Self-efficacy

The self-efficacy scale used in this study was based on a Weight Loss Self-efficacy Measure developed by Van Koten Chappell (1982). The original measure presented respondents with 49 situations typically associated with eating, and asked respondents to rate the percentage probability that they could restrain from eating in each situation. The ratings of self-efficacy are elicited using a certainty scale ranging in 10 unit intervals from 0 to 100%. This assessment method is consistent with Bandura's formulation of self-efficacy theory: it is implied that the respondent is required to make two judgments for each activity in the scale (Bandura, 1984). First there is a judgement of whether or not one can accomplish a given performance. For those situations which one can not resist eating, a rating of zero was used to indicate total inefficacy. The remaining items were judged

in terms of the strength of perceived self-efficacy, where 10 was a low efficacy rating. Bandura suggests that the 0 to 100 format is the preferred method of measurement in studies where the effects of efficacy strength are of central concern (p. 241).

In this research, the original 49 item scale was shortened to reduce the tedium and response time needed. A sample of 30 items from the original scale was used.

Group Support

Since a group context was used for the delivery of the program, characteristics of the group may have played an important modifying role in outcomes associated with the intervention. Two techniques were used to provide indicators of group process and group support. A twelve-item rating scale was used to assess individual perceptions of the treatment group in terms of the cooperation, support and morale of the members. This scale, modified from Coelho (1983), was based on the work of Fairweather and associates (1960).

A sociometric technique was also used to provide measures of group cohesiveness. Six items were used in the construction of the sociometric scale. The items were chosen to sample a range of intimacy from "To whom would you say 'hello' if you saw them on the street?" to "whom would you consider a close friend?" Participants were given a list of the names of group members and asked to

indicate the names appropriate for each of the items. Two dimensions of group cohesiveness were calculated based on ideas expressed by Jackson (1959). He postulated that group cohesiveness was a combination of an individual's acceptance by a group as well as an individual's attraction to the group. Following the example of Fairweather, an attraction score was derived as the number of people who were chosen for the sociometric items divided by the total number of potential choices (Fairweather, Sanders, Maynard, & Cressler, 1969). Similarly, the number of times an individual was nominated by other group members divided the total number of possible nominations was used to indicate acceptance.

Money Attitudes

The power of the intervention strategy is based on monetary incentives, therefore an indicator of individual concern about money was included as a potential moderator of the effects of the intervention. The anxiety subscale from the Money Attitude Scale developed by Yamauchi and Templer (1982) was used in this study. This scale was designed to determine the degree to which money is viewed as both a source of anxiety as well as a source of protection from anxiety. The scale is comprised of six items rated on a five point scale from "always" to "never".

An additional item related to the weekly family expenditure on groceries was included; the information was

used to determine the weekly grocery expenditure per family member. This number provided an indication of the availability of family monetary resources, when considered in relation to the \$40 deposit.

Program Components

At the last program session, participants were asked to rate the importance of specific program components for their contribution to individual satisfaction with the program. A list of nine program components were rated on a three point scale of importance.

Scheduling of Measures

A time table indicating the sequencing of the various measures used in this research is found in Appendix F. The intake (pretest) assessment occurred during program registration. The midprogram assessment was during session session six (week 6). The last assessment was during the tenth session (week 14).

Experiment II

The second study was conducted in essentially the same manner as the first study. This subsequent study involved an experimental comparison of an incentive based weight loss program with a no-incentive program. After an analysis of the data from the initial research, the "best" incentive procedure was compared to a no-incentive condition to assess the relative advantage. Random

assignment was used since the control condition in the first study was not created by random assignment. The purpose of this was to discover if results equivalent to those of the first study would be obtained with a completely randomized design. Based on the data collected, a monetary reward incentive procedure was utilized as a comparison for the no-incentive group.

Participant Recruitment

For the recruitment of 40 subjects for the second study a display advertisement was placed in the Sunday edition of the local newspaper, The Lansing State Journal, on February 1 1987. The advertisement was located in the "Metro/Michigan" section of the newspaper and provided a telephone number where respondents could call for more information.

This media campaign resulted in over 300 responses. During the initial contact with the experimenter, subjects recruited for incentive-based programs were given program information comparable to that of the first study, except that no mention was made of a program cost or monetary incentives. Those who were eligible and expressed an interest were given information for an orientation session. It was explained that they would then receive more information about the program and some preliminary paperwork would be completed.

Orientation sessions were held on two week nights and

a Saturday. The sessions were done individually or in small groups. The time was used to once again go over the intent of the program, to complete the informed consent procedures and the pre-test survey. Volunteers were told that there would be two groups and that they would receive a post card in the mail indicating the time their group would meet. If they inquired about a cost for the program, they were told that the experimenter did not know at this time but would let them know on the post card and that if there was a fee that it would be no more than \$40. Two people indicated that they would not participate if they were required to pay for the program. Both were referred to another campus program.

Subjects

In order to recruit the subjects necessary for the research project, a total of 60 individuals were contacted by telephone with information about the program and registration meetings. Again, several factors as previously mentioned influenced the participation of volunteers. A total of 52 people initially registered for the program: twelve were nonrandomly assigned family members. Of these twelve people, four did not show up for the first program meeting, and two did not return after the first session. The remaining six people remained in the study, however their data were only included in the correlative analyses and not in the testing of the

hypotheses. Thus there were a total of 40 experimental subjects included in the second study. They were characterized as follows:

1. The age ranged from 20 to 67 years of age, with a mean of 42.1 years.
2. Five (12.5%) of the participants were male.
3. Marital status indicated that 67.5% were married, while the remainder were single.
4. Most of the participants were white (93%); 3 were black.
5. The mean number of years of education was 14.6.
6. Employment information indicated that 65.0% were employed full time with the remainder (35%) employed part time.
7. Based on self-reported age of onset for obesity, 15% indicated age 5 to 12 years, 36% indicated age 13 to 19 years, while the remaining 49% indicated an onset from 20 to 47 years of age: the mean was 23.8 years.
8. Forty-nine percent indicated that their weight gain was associated with a specific event.
9. Based on self-reported weight trends for the 12 months prior to this program, over half (62%) had gained weight, none had lost weight, 13.5% remained stable, and 24.3% had a weight trend which fluctuated.
10. The three major reasons listed for trying to lose weight were health (42.5%), appearance (27.5%), and self-esteem (27.5%).
11. The number of types of diets tried in the past ranged from 0 to 7 with a mean of 2.2; the number of weight loss methods tried, including dieting ranged from 1 to 4 with a mean of 2.4 methods.
12. At the first weigh-in, weights ranged from 139.0 to 290.4 pounds, with a mean of 195.6 pounds and a standard deviation of 38.57 pounds: the participants ranged from 4% to 74% overweight, with a mean of 31.2%.

Assignment to Groups

Participants were randomly assigned to one of the two experimental groups. Again, spouses and family members were assigned to the same group to reduce treatment contamination and demoralization.

In comparing the two groups, the mean weight of the no-incentive group was 190.4 pounds; the mean body mass index was found to be 33.97 with the average percentage overweight 30.25%. For the comparison monetary incentive group, the mean weight was 200.9 pounds with a mean body mass index of 34.86 and mean percentage overweight of 32.11%. The two groups did not differ significantly on any of these measures.

The Behavioural Weight Control Program

In order to test for the effectiveness of the incentive strategy compared to a no-incentive strategy, participants received the same treatment program used in the Study I. The same manuals, presenters, questionnaires and materials were used to duplicate a 10 session, 14 week program. The only difference in the two groups was that members in one program paid \$40 and received an \$8 credit each week they achieved their weight goal, replicating the monetary reward group of Study I. The no-incentive group did not pay for the program and did not receive any monetary incentives.

Representativeness of the Participants

The subject pool recruited for this research seemed to be representative of the general population of obese clients in that they varied in age, age of problem onset, and breadth of past efforts of weight control. In fact, the sample seems remarkably representative of prior weight loss studies. Wilson (1985) comments that reviews of behavioural obesity programs have shown that women are four times more likely to participate than men, and that the average client is 40 years old, weighs 200 pounds, and is approximately 50% overweight. The Experiment I subject data revealed that the average participant was female, 41.7 years old, weighed 205.6 pounds and was 36% overweight. In the second study, the average participant was a 42.1 year old woman, weighing 195.6 pounds and 31% overweight. Given the conservative nature of the percentage overweight estimate, these samples are quite "average". The clear bias towards women as subjects in the research is obvious. There are several reasons for the small number of male participants. Due to the medical eligibility criteria for participation, more men than women who inquired were refused entry because of hypertension. Nevertheless, more women called to inquire about the program than did men. This is probably related to the fact that it is socially acceptable for women to be concerned about their weight, and that women are more likely to act upon these concerns

(Ritenbaugh, 1982).

Instrumentation

Given the large number of items used in this research to assess participants' perceptions of the intervention process, rational-empirical scaling procedures were used to consolidate the information into cohesive domains. The BC-TRY program, based on the clustering techniques advocated by Tryon and Bailey (1970), was used for this purpose. The program generates empirical oblique factor solutions which can readily be modified according to rational criteria specified by the researcher. While the program uses a minimal inclusion criteria of 0.20, for scaling purposes a minimal loading of 0.40 was used as the limit for the inclusion of an item in a scale. All scaling of the questionnaire items was based on the data collected in the first experiment.

Group Satisfaction

Twelve items were used to assess participants' reactions to the other members of their group. A single group satisfaction scale comprised of 10 items emerged. The factor loadings and the alpha coefficient estimates of internal consistency (Allen & Yen, 1979) for these scales are presented in Table 2.

Program Acceptance

An analysis of the program acceptance items revealed four subscales representing (a) satisfaction with the

Table 2

Factor Loadings of the Group Satisfaction Scale

<u>Items</u>	<u>Loading</u>
* The social atmosphere of the group is cooperative	.74
* The group members cooperate with each other	.73
* The group is receptive to members' suggestions	.64
I am satisfied with group discussions	.58
I enjoy being a part of the group	.57
The group is serious about losing weight	.56
As a whole, I like the group very much	.55
I receive a great deal of support from the group	.52
* Group morale was high throughout the program	.48
I felt I could depend on most members for support	.42

Alpha= 0.75

* Denotes a key defining variable in the cluster. Items rated on a 5 point scale: 1=strongly disagree, 5=strongly agree.

incentive procedure, (b) program satisfaction, (c) program reactivity, and (d) perceived program effectiveness, as presented in Table 3.

Perceived Self-efficacy

The thirty items used to measure perceptions of self-efficacy in terms of the ability to restrain from eating were analyzed. Table 4 presents the results of the analysis indicating the four self-efficacy clusters derived. Based on the definers of each cluster, they can

interpreted as: (1) emotional eating; (2) situational eating; (3) eating associated with social anxiety/emotional disequilibrium; and (4) appetitive behaviours. The structure of these clusters resemble the categories derived by Marlatt and Gordon (1980) in their taxonomy of addiction relapse episodes. They found that most relapse episodes could be classified in terms of either intrapersonal or social determinants. The emotional eating cluster is very similar to the emotional eating factor identified by Hoiberg et al., although their cluster also included items found in the situational factor (Hoiberg, Berard & Watten, 1980).

Test-retest Reliability Estimates

For the purpose of establishing the temporal stability of the measures a small subsample of participants agreed to complete the intake measures a second time. Although they were informed of the motives underlying the request, these participants were urged not to "remember" what they had answered before, but simply to complete the questionnaire again. Twelve of the 17 subjects who agreed to participate in the reliability study returned a usable second questionnaire within the prescribed period of time. The mean and modal time interval between assessments was 14 days. A summary of the test-retest reliability estimates for these measures are presented in Table 5.

Table 3

Item Content of Program Acceptance Scales

<u>Scale</u>	<u>Loading</u>
1. Incentive Satisfaction (Alpha= 0.86)	
* I like the monetary incentive system used	.97
* Incentive system provides motivation for me	.74
2. Program Satisfaction (Alpha= 0.86)	
* The materials are motivating	.80
* The materials are helpful	.72
* The leader is motivating	.71
* The materials are interesting	.70
* The leader is helpful	.65
* The leader is valuable	.62
The leader is actively involved	.46
The leader is pleasant	.40
3. Program Reactivity (Alpha= 0.79)	
* The dietary suggestions are rigid and limiting	.79
* The weekly weight goals are too difficult	.75
* The program overall is too restricting	.59
* The monetary incentive scheme is unfair	.54
4. Program Effectiveness (Alpha= 0.79)	
* The program is likely to help others lose weight	.83
* The program is helping me lose weight	.78

* denotes a key defining variable of the cluster.
 Items rated on a 5 point scale: 1=strongly disagree,
 5=strongly agree

Table 4

Scales Developed from the Perceived Self-efficacy Items

<u>Scale</u>	<u>Loading</u>
1. Emotional Eating (Alpha= 0.92)	
* When you feel angry	.87
* When you feel frustrated	.86
* When you feel upset	.79
When you feel depressed	.70
* When you feel annoyed	.69
When you feel anxious	.68
* When you are worried	.67
When a crisis occurs	.64
When you are nervous	.62
When you are angry with yourself	.59
When you want to cheer up	.52
When you are thinking of money problems	.51
2. Situational Eating (Alpha= 0.83)	
* When someone offers you food	.80
* When you want to take a break from some activity	.64
* When you feel bored	.63
* When you see others eating	.62
When you want to relax	.56
When you want to reward yourself	.52
When you feel you need more energy	.49
On special occasions like Christmas or birthdays	.46
When you are waiting for someone or something	.43

Table 4 (continued)

<u>Scale</u>	<u>Loading</u>
3. Emotional Disequilibrium (Alpha= 0.82)	
* When you feel embarrassed	.71
* When you feel uncomfortable	.68
* When you are overly excited	.68
* When you feel tired	.63
When you want to sit back and enjoy a cigarette	.54
When you feel overwhelmed	.51
4. Appetitive Behaviours Eating (Alpha= 0.63)	
* When you are drinking an alcoholic beverage	.69
* When you want to avoid smoking or drinking	.66
* Denotes key defining variables in the cluster	

Table 5

Test-retest Reliability Estimates of the Intake Measures

<u>Scale</u>	<u>Reliability</u>
Cumulative Weight Change (Past 12 months)	.92
Diet History (Prior methods and types of diets)	.96
Restrained Eating Scale	.97
Risk-taking	.99
Self-efficacy	
Emotional Eating	.91
Situational Eating	.71
Emotional Disequilibrium	.55
Appetitive Behaviours Eating	.80
Money Anxiety	.78

CHAPTER IV

RESULTS

Since the second study was based on the findings from Experiment I, the data for each of the studies are reported separately. The data from Experiment II follows the presentation of data from the initial research.

Experiment I

The results of the current research are reported in four sections: (a) a determination of the comparability of the groups, (b) tests of the hypotheses, (c) correlative analyses, and (d) an investigation of program attrition. Again, only data based on randomly assigned participants are reported for the comparative analyses.

Comparability of the Groups

The random assignment of subjects to conditions is a technique often used to control the effects of extraneous variables in experimental investigations. Kerlinger (1964) has indicated that randomized assignment is the best way of achieving this type of control. In the current study, random assignment to treatment conditions was used for five of the incentive groups under consideration. The sixth group was not created through random assignment and was

used as a comparison cohort.

The intake questionnaire administered at the registration meetings, before participants were assigned to groups, was used to determine the similarity among program groups. The questionnaire gathered background and demographic information, as well as data related to prior attempts at weight control, perceived self-efficacy, perceived social support, reasons for losing weight, risk-taking, money anxiety, and eating restraint. Group comparisons based on analysis of variance (ANOVA) are presented in Table 6; similar comparisons based on Chi-square analyses are shown in Table 7. Although full random assignment was constrained due to participant considerations and the conditions surrounding the no-incentive group, only two significant differences were discovered. Individuals in the lottery-reward condition reported the greatest prior experience with weight control methods ($F [5,63] = 2.49, p < 0.05$). The mean for this group was 3.4 methods compared to the other groups where the means ranged from 1.9 to 2.5. Differences were also found in mean ratings of self-efficacy in situations of social anxiety or disequilibrium ($F [5,65] = 3.13, p < 0.01$). The scores ranged from approximately 7.0 for the monetary response-cost and attendance groups to about 5.1 for the no-incentive and reward-based groups.

Table 6

Pretest Means and F Ratios by Incentive Condition

Variable	Incentive Condition						F Ratio
	Reward Money	Reward Lottery	Resp. Cost Money	Resp. Cost Lottery	Atten- dance	Free	
Age	48.6	40.4	48.0	42.2	42.7	42.5	2.19
Education (Years)	15.8	14.6	14.6	15.1	16.1	14.8	0.75
Life satisfaction score	2.5	2.0	1.8	1.9	1.9	1.8	1.64
Age of weight problem onset	21.8	21.4	29.8	26.6	21.6	17.5	1.08
Weight (Pounds)	193	212	206	190	205	196	0.70
Percent Overweight	31.1	49.1	34.6	23.6	38.1	35.0	1.53
Body mass index	33.8	36.3	34.0	32.1	34.4	34.7	0.78
Maximum past weight	210	222	207	222	221	200	0.77
Eating restraint score	24.8	29.8	25.0	27.4	30.8	27.8	0.99
Risk-taking score	6.6	8.9	10.1	9.3	8.9	1.3	2.04
Money anxiety score	16.4	18.1	18.0	18.1	17.4	16.8	0.33
Grocery expenditure weekly per person	25.2	24.3	29.5	20.1	25.1	23.8	1.92
Meals/snacks per day	4.4	3.9	3.8	3.7	3.6	4.5	0.89
Degree weight affects activities	2.8	2.7	2.4	2.7	2.5	3.0	0.40
Perceived personal attractiveness	1.9	1.9	1.8	2.1	2.0	2.0	0.35
Number of weight control methods used	2.5	3.4	2.2	2.6	1.9	2.0	2.49*

* $p < 0.05$, ** $p < 0.01$

Table 6 (continued)

Variable	Incentive Condition						F Ratio
	Reward Money	Reward Lottery	Resp. Cost Money	Resp. Cost Lottery	Atten- dance	Free	
Number of types of diets tried	1.6	2.3	1.3	2.1	2.0	1.3	1.26
<u>Physical Activity Levels (mean hours daily)</u>							
Sleep or still activity	8.5	8.5	8.3	8.6	10.0	7.5	1.23
Light activity	13.6	14.0	15.2	13.4	11.7	15.0	1.51
Moderate Activity	1.3	1.2	0.4	1.4	2.0	1.3	0.81
Intense activity	0.3	0.2	0.1	0.6	0.3	0.3	1.20
<u>Degree of Perceived Support</u>							
Spouse	2.9	2.8	2.8	2.6	2.8	3.0	0.71
Children	2.7	2.8	2.9	2.8	2.5	2.8	0.89
Mother	2.9	2.9	2.3	2.6	2.9	2.3	1.50
Father	2.6	2.7	2.0	2.0	2.6	2.3	0.85
Employer/supervisor	2.1	2.2	2.0	2.3	2.5	2.0	0.83
Best friend	2.9	2.9	2.8	2.7	2.8	3.0	0.40
<u>Perceived Self-efficacy</u>							
Emotional eating	3.3	3.2	4.8	3.7	4.3	2.4	1.71
Situational eating	4.1	4.0	4.0	4.5	4.7	2.4	1.64
Disequilibrium	5.2	5.3	7.0	6.3	7.1	5.0	3.13**
Appetitive-related	6.4	5.2	7.0	5.2	5.8	4.3	0.88
Subjects per Group	18	17	18	16	16	16	

* $p < 0.05$, ** $p < 0.01$

Table 7

Chi-square Tests Comparing Participants by Incentive Condition

Variable	Incentive Condition					
	Reward Money	Reward Lottery	Resp. Cost Money	Resp. Cost Lottery	Atten- dance	Free
<u>Marital Status</u> ($\chi^2 = 2.09$, $df=5$, $p < .80$)						
Currently married	13 72%	10 59%	13 72%	13 81%	11 69%	11 69%
Not married	5 28%	7 41%	5 28%	3 19%	5 31%	5 31%
<u>Employment Status</u> ($\chi^2 = 6.25$, $df=5$, $p < .32$)						
Work full time	11 61%	11 65%	15 83%	14 88%	11 69%	9 56%
Not employed full time	7 39%	6 35%	3 17%	2 12%	5 31%	7 44%
<u>Reason for Losing Weight</u> ($\chi^2 = 11.80$, $df=10$, $p < .25$)						
Health reasons	9 50%	9 53%	5 28%	6 38%	2 13%	3 19%
Appearance	7 39%	5 29%	9 50%	7 44%	9 56%	7 44%
Family pressure	2 11%	3 18%	4 22%	3 18%	5 31%	6 38%
Subjects per group	18	17	18	16	16	16

The likelihood of obtaining two significant results over a series of 35 comparisons at a probability level of .05 is approximately 50% (Sakoda, Cohen & Beall, 1954). Given that the chances of these findings did not reach a .05 level of significance, it is very likely that the differences identified are due to chance.

The initial assignment of participants to treatment groups appears to have resulted in equivalent groups based on the pretest characteristics. The groups were within acceptable limits of homogeneity in terms of demographic background, the magnitude of the weight problem, prior weight control efforts, perceived support, activity levels and several personality characteristics. There were no consistent differences associated with the non-randomly assigned no-incentive group.

Testing the Hypotheses

A probability level of .05 was used as the criteria for significance for each of the hypotheses tested. Simple univariate statistics were calculated using SPSS programs. For analyses related to changes over time, the program BMDP2V: Analysis of Variance and Covariance with Repeated Measures was used. Similarly, the General Univariate and Multivariate Anova program BMDP4V was used for tests of multiple dependent measures. The hypotheses refer to the effects of treatment outcomes, therefore all of the results

reported are based on the data for those participants who did not drop out of the program. The obvious exception to this is the discussion of program attendance and attrition.

The homogeneity of the variances across conditions was tested for each of the outcome measures used in this research. The variances and significance tests are presented in Appendix G. The homogeneity test is based on Cochran (1941): it is the ratio of the largest variance to the sum of all variances across conditions. Thus it is a test of the proportion of variance attributable to any single study condition. The results indicate that the hypothesis of homogeneous variances could be accepted for all but one of the outcome measures. The standardized measure of weight loss "Relative Weight Loss" was found to have heterogeneous variances. Kirk (1968) provides information on the use of transformations in cases where heterogeneity of variances is found. When the relative weight loss variable was transformed using a logarithmic function, the test for variance heterogeneity was not found to be significant.

Hypothesis One

The first hypothesis stated that (a) weight contingent incentives would be more effective than either attendance-contingent or no-incentive groups in promoting weight loss, defined in terms of total weight loss at the end of the program and the rate of weight loss during the program, and

(b) there would be no differences among the weight contingent incentive strategies in promoting participant weight loss.

Four outcome variables were used in the test of this hypothesis: actual weight, weight loss computed as the difference between posttest and pretest weight, relative weight loss indicated as the number of pounds lost divided by the total number of pounds overweight, and rate of weight loss, which was the number of times an individual achieved their weekly weight loss goal.

In order to compare the weight-contingent strategies with the two comparison procedures, a six group repeated measures analysis of variance was used, as presented in Table 8. The data indicate a significant time effect as well as a time by incentive condition interaction. The cell means illustrating these effects are shown in Table 9 and are presented in Figure 1. The no-incentive group did not manifest any appreciable weight loss over time in contrast to the incentive-based groups.

The data in Table 10 compare weight loss, relative weight loss and rate of weight loss for the six groups. They show that there was no difference in either raw or standardized weight loss indicators for participants in any of the groups. Given that the variances of the relative weight loss variable were found to be heterogeneous, the analysis of variance was repeated on scores transformed

Table 8

Repeated Measures Analysis of Variance for Weight by Condition

Source	df	MS	F
Condition	5	3461.47	0.82
Error	59		
Time	2	1126.80	53.16***
Time by Condition	10	44.44	2.10*
Error	118		

* $p < 0.05$

*** $p < 0.001$

Table 9

Cell Means for Weight Over Time by Incentive Condition

Condition	Session 1	Session 6	Session 10	N
Monetary Reward	192.4	185.2	181.6	14
Lottery Reward	212.5	202.4	199.1	15
Monetary Resp. Cost	209.0	199.7	193.7	8
Lottery Resp. Cost	190.5	184.5	179.5	14
Attendance	210.2	204.1	202.2	10
No Incentive	209.3	206.6	210.9	5

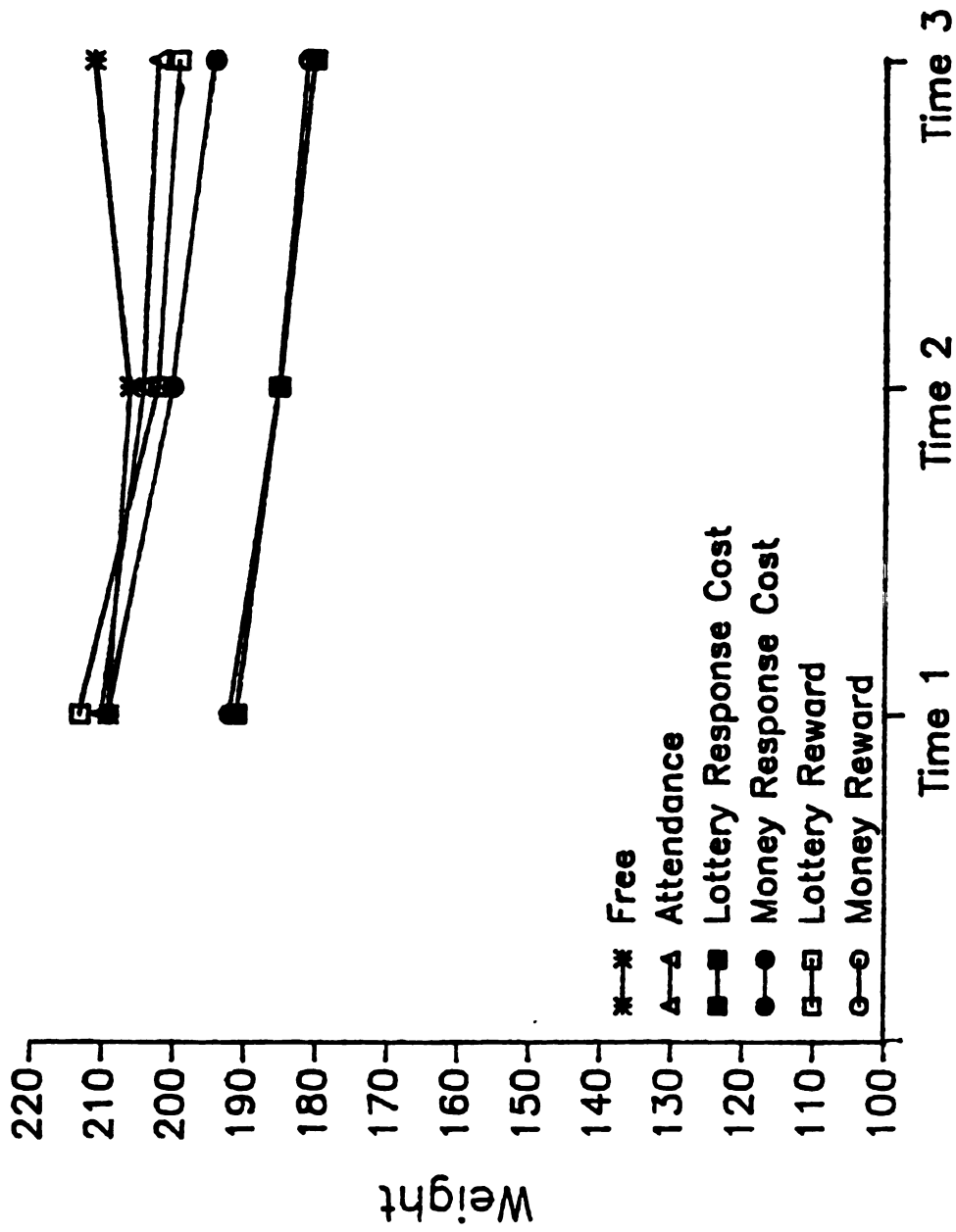


Figure 1: Weight loss over time by group

Table 10

Cell Means and Standard Deviations for Weight LossVariables by Incentive Condition

Incentive Condition	Weight ¹ Loss	Relative Wt. Loss	Rate of Wt. Loss ²
Monetary Reward	11.8 (7.7) ³	6.3 ⁴ (4.2)	4.2 (1.4)
Lottery Reward	13.4 (10.3)	6.4 (4.4)	4.4 (1.8)
Monetary Resp. Cost	13.9 (8.7)	6.7 (4.1)	4.4 (2.6)
Lottery Resp. Cost	11.0 (9.6)	5.7 (4.7)	4.2 (1.7)
Attendance	7.3 (5.1)	3.4 (2.2)	2.3 (1.1)
No Incentive	2.4 (14.0)	1.3 (7.7)	3.5 (1.7)
F Ratio ⁵	1.55	1.63	2.61 *

1 - Measured in pounds

2 - Number of sessions participant achieved weight goal

3 - Standard deviations in parentheses

4 - Percent

5 - (5,68) degrees of freedom

* $p < 0.05$

using a base 10 logarithmic function. The value of $F(5,63) = 1.12$ was found to be non-significant, verifying the results of the analysis of the non-transformed data. The fact that these indicators did not corroborate the repeated measures analysis of weight is likely due to the large within groups variation, particularly for the no-incentive group. This is in contrast to the small degree of variation for participants in the attendance-contingent group. The only significant difference found was for the rate of weight loss. The attendance-contingent group had the lowest rate of weight loss; this group had the smallest variance.

With respect to Hypothesis 1a the data are inconsistent. The repeated measures analysis of variance supports the hypothesis, whereas changes in the raw and standardized indicators of weight loss were not supportive. The data show that there is less variability in the weight loss attained for the weight-contingent incentive groups compared to the no-incentive group. The mean weight loss for the no-incentive group is smaller than those attained by the other groups, however the test statistic was not significant. One reason for this may be the large within-group variance which acts to obscure between-group differences. Thus based on the available data Hypothesis 1a cannot be accepted. There is no consistent evidence that differences weight loss exist with respect to the

incentive procedures under study. The data are ambiguous.

Given this finding, hypothesis 1b cannot be accepted. There is no evidence to conclude that the weight-contingent incentives are superior to other incentive conditions in promoting weight loss.

Hypothesis Two

According to the second hypothesis, (a) the weight-contingent groups will have lower attrition rates than the attendance-contingent and no-incentive groups, and (b) no differences in participant attrition rates were expected among the four weight-contingent incentive groups.

A dropout was defined as any participant who did not attend the last program session, or make alternative arrangements for completion of the weight contract. Related to the discussion of attrition is program attendance. Although a participant might not drop out, he or she might elect to attend few of the program sessions. The possibility of this was illustrated in at least one case where a participant did not like the group meetings, but came in early to talk to the instructor and weigh in before the others arrived. Most times she would leave before the group session started.

The issue of class attendance will be discussed first, followed by the attrition data and a test of the second hypothesis. Both issues are important, however program attrition is more directly concerned with the hypothesis

under consideration.

Program Attendance

Figure 2 illustrates program attendance for each group over the course of the 14 week program. The data represent those people who weighed-in for the week, although they may not have stayed for the weekly meeting. A comparison of the weight-contingent groups and the attendance and no-incentive groups revealed a significant group effect ($F_{[5,96]} = 6.83, p < .001$). Based on a Scheffe post hoc comparison procedure, the no-incentive group was found to differ from three of the four weight-contingent incentive groups: there was no difference reported between the free group and the monetary response cost group.

A Scheffe post hoc comparison procedure was used to compare the mean attendance data for the weight-contingent groups to the attendance-contingent and no-incentive groups combined. Based on calculations provided in Kirk (1968), the critical value of $F_S = 13.43$ was significant at the .05 level indicating that the mean weight-contingent class attendance rate was not equal to the mean attendance rate for the attendance-contingent and no-incentive conditions. The weight-contingent conditions had a higher mean attendance rate (Mean=7.33) than the mean of the other two groups (Mean=5.55).

In order to test the equivalence of attrition rates among the four weight-contingent incentive conditions, the

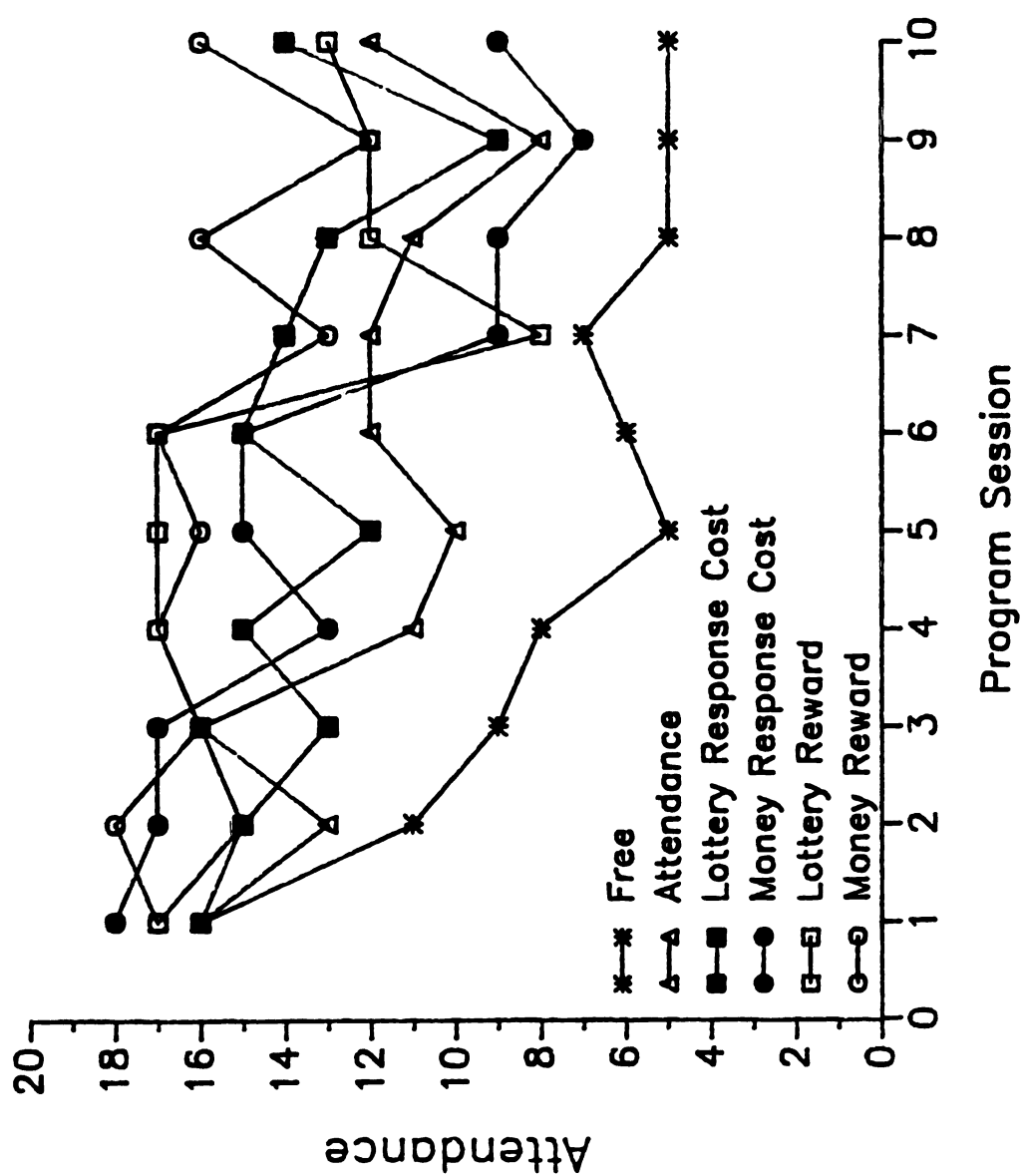


Figure 2: Program attendance over time by group

mean for the monetary response cost group was compared with that of the monetary reward group. These two means represent the highest and lowest rates; if they are found not to differ, then the means of the other groups which lie between them can be expected not to differ as well. The critical value of 8.54 was not significant at the .05 level supporting a conclusion that there is no difference among the four weight-contingent incentive conditions with respect to class attendance. A similar comparison for the attendance (Mean=6.8) and no-incentive conditions (Mean=4.3) indicates that they are not significantly different ($F_S=4.30$).

Attrition

The distribution of drop outs among the weight-contingent incentive groups is shown in Table 11. There were a total of 33 dropouts from the program for an overall attrition rate of 32%. To determine if attrition was related to group membership a Chi-square test of independence was used.

In comparing all six groups, the analysis indicates that there are significant variations from the what would be expected if attrition and group membership were independent ($\chi^2=19.35$, $df=5$, $p < .05$). The significant effects are due to three groups. The monetary reward group had a lower than expected attrition rate while the monetary response cost and no-incentive groups had higher than

Table 11

Participant Attrition Rates by Condition

Condition		Stayed In		Dropped Out	
Reward:	Money	16	89%	2	11%
	Lottery	13	79%	4	21%
Response Cost:	Money	9	50%	9	50%
	Lottery	14	88%	2	12%
Attendance Contingent		11	69%	5	31%
No Incentive		5	31%	11	69%

expected rates of dropout. The no-incentive group had made the largest contribution to the significance test, followed by the monetary reward group and the monetary response cost group respectively. The data indicate that the hypothesis of lower attrition rates for weight-contingent incentive groups cannot be accepted. There is a difference in participation rates among the six groups, however there is no consistent pattern across the conditions. While the high attrition rate for the no-incentive group is not surprising, the reason for the high drop out rate among participants in the monetary response cost condition as yet is unclear. Attrition and reasons underlying drop out will be discussed in more detail in a later section.

The data suggest that Hypothesis 2 be rejected. Two groups had higher than expected attrition rates: the

monetary response cost condition and the no-incentive condition. In contrast the monetary reward group had a lower than expected drop out rate. Thus the weight-contingent groups do not have a uniformly higher retention rate than the other groups, indicating that Hypothesis 2a cannot be accepted.

In addition, there is a wide degree of variation within the weight-contingent groups in terms of dropout. An analysis of the data for the weight-contingent conditions indicate that the attrition rate for the monetary response cost group is larger than would be expected by chance ($\chi^2=9.23$, $df=3$, $p<.05$), replicating the finding reported above. Thus Hypothesis 2b related to the equivalence of the weight-contingent conditions cannot be accepted.

Hypothesis Three

The third hypothesis states that acceptance of the program as measured by program satisfaction, group process and program reactance, is related to the incentives implemented. Specifically, (i) there is no difference in program satisfaction among the weight-contingent incentive groups, although these groups will be more satisfied with the program than the attendance and free groups respectively; (ii) no differences in group process among any of six conditions exist; (iii) the levels of program reactance will be similar among the weight-contingent incentive

groups. However, reactance will be greater for the no-incentive group compared to the incentive-based groups.

Indices of Program Satisfaction

Satisfaction with the program was measured in terms of (a) satisfaction with the incentive procedure, (b) satisfaction with program leader and materials, and (c) perceived effectiveness of the program.

Program Satisfaction. Program satisfaction was compared across the six groups. There was no difference in program satisfaction found ($F [5,66] = 1.45$) among conditions or over time ($F [1,66] = 2.07$): nor was the interaction effect significant ($F [5,66] = 0.74$). The mean satisfaction ratings by incentive condition over time are presented in Table 12.

Incentive Satisfaction. With respect to a six group comparison of satisfaction with the incentive procedures, no significant group ($F [4,62] = 0.81$) or time effect ($F [1,62] = 0.01$) was found. However, the time by group interaction was significant ($F [4,62] = 3.11, p < 0.02$), and is shown in Figure 3. The cell means reveal that satisfaction increased over time for those in the lottery conditions whereas it decreased for those in the monetary payback conditions (Table 12). The attendance contingent group shows a trend similar to the lottery-based groups. The net effect was that the initial reports of satisfaction with the incentives converged over time to a common rating

Table 12

Cells Means for Program Satisfaction Measures Over Time,
By Incentive Condition

Incentive Condition			Satisfaction Measures		
			Program Satisf.	Program Effect.	Incent. ¹ Satisf.
Reward:	Money	Time 1	4.07	4.16	4.00
		Time 2	4.35	4.28	3.53
	Lottery	Time 1	4.40	4.31	3.28
		Time 2	4.43	4.25	3.47
Resp. Cost:	Money	Time 1	4.30	4.75	4.05
		Time 2	4.40	4.25	3.50
	Lottery	Time 1	4.47	3.96	3.50
		Time 2	4.43	4.18	3.75
Attendance Contingent		Time 1	4.29	4.18	2.95
		Time 2	4.37	4.18	3.50
No Incentive		Time 1	3.90	3.30	----
		Time 2	3.98	3.60	----

¹ Incentive satisfaction was not measured for the No-Incentive condition.

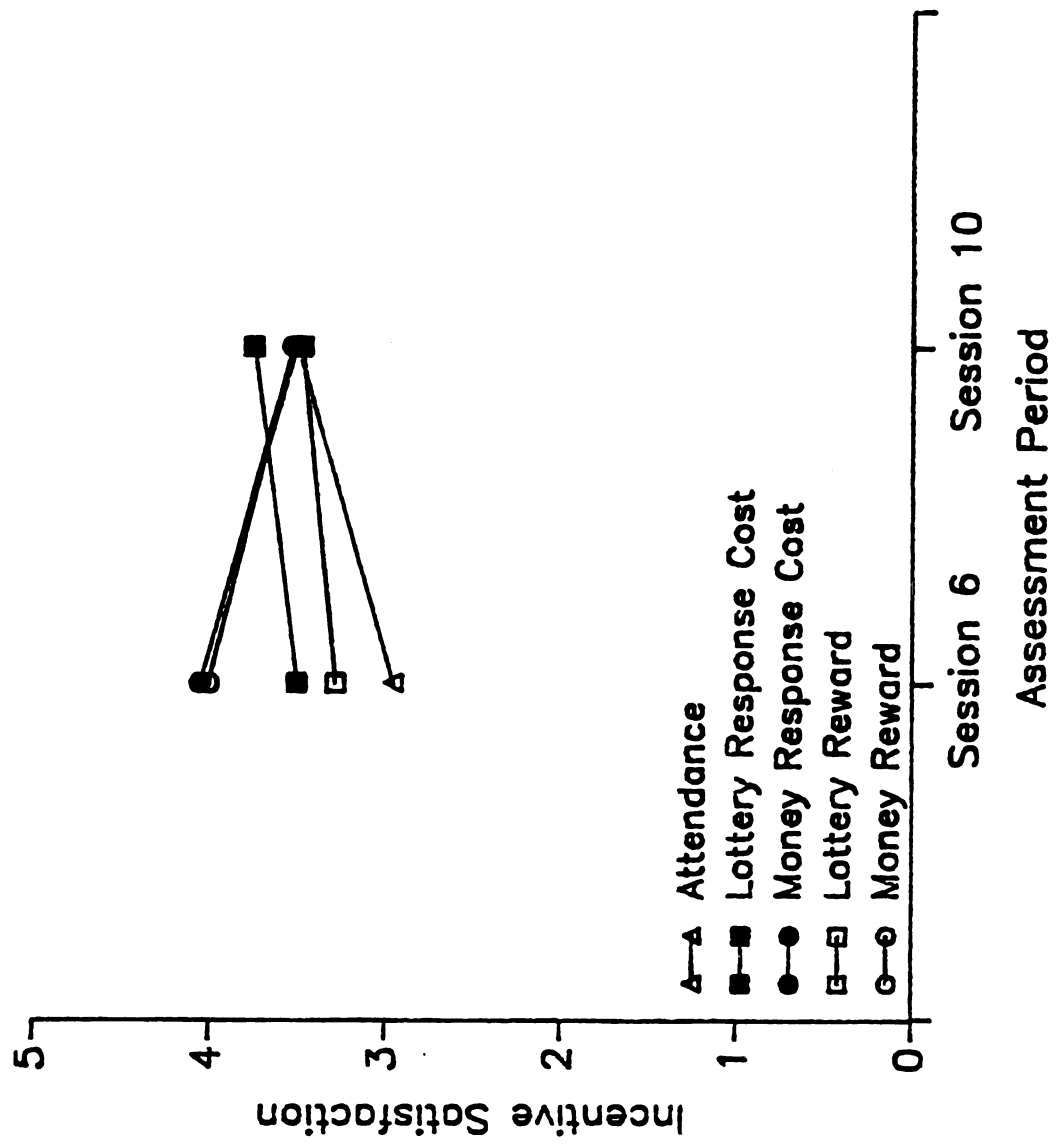


Figure 3: Incentive satisfaction by group

of approximately 3.55. There were no significant differences in incentive satisfaction across conditions at the time of the post test.

Program Effectiveness. Ratings of program effectiveness were not found to vary with respect to the six conditions under study ($F [5,66] = 1.79$) or over time ($F [1,66] = 0.02$); neither was there a significant interaction effect ($F [5,66] = 1.25$).

Summary. In comparing indicators of satisfaction among the weight-contingent incentive groups there were no net differences in program satisfaction, satisfaction with the incentive procedures, or perceived effectiveness of the program. The only effect found was related to incentive satisfaction, which converged over time. In evaluating the hypothesized relationship between incentives and program satisfaction, the ratings of satisfaction with the program leader and the materials were the same for all conditions, thus participants with weight-contingent incentives were no more satisfied with the program than those with attendance or no incentives. With respect to perceptions of the effectiveness of the program, the ratings were uniform and did not vary across groups; weight-contingent incentives were not responsible for higher ratings of program effectiveness. Satisfaction with the incentive itself converged over time for all of the groups. Hypothesis 3a was not confirmed. The superiority of weight-contingent

incentives over attendance and no-incentive procedures was not demonstrated. There was equal satisfaction across all incentive conditions with one proviso. The process of program satisfaction varies over time; ratings converge over time so that the net results appear comparable.

Indices of Group Process

Three indicators of group process were used in this study. The first was a group satisfaction questionnaire administered to the participants at the mid-program and post-program assessments. As reported in Chapter III, this questionnaire yielded a single index of group satisfaction. Two group cohesiveness indicators were derived from the sociometric questions administered during post testing. One was a measure of group attraction, that is the number of people in the group nominated by an individual; the other measured group acceptance, as the number of times an individual was nominated by other group members.

Group Satisfaction. In comparing group satisfaction across all six conditions, the group satisfaction measure showed a significant increase over time (Table 13). The group means are presented in Table 14. Satisfaction for all groups increased over time with the exception of the attendance-contingent condition, however this group difference was not significant.

Group Cohesiveness. The analysis of the two measures of group cohesiveness--attraction and acceptance--are

Table 13

Analysis of Variance for the Group Satisfaction Scale Over
Time By Condition

Sources of Variance	df	MS	F
Condition	5	0.33	0.58
Error	58	0.57	
Time	1	1.37	13.12***
Time by Condition	5	0.21	2.00
Error	58	0.10	

*** $p < 0.001$

Table 14

Cell Means for the Group Satisfaction Scale Over Time, By
Condition

		Group Satisfaction		
Condition		Time 1	Time 2	N
Reward:	Money	3.64	3.86	15
	Lottery	3.77	3.89	14
Response Cost:	Money	3.79	4.28	8
	Lottery	3.76	3.93	13
Attendance Contingent		3.81	3.69	12
No Incentive		3.30	3.77	4

presented in Table 15. In comparisons of the six study conditions, no differences were found in the perceived attraction of the group, measured as the number of group members chosen by each person. The mean scores are shown in Table 16. Acceptance by group members did vary by condition. Scheffe post hoc comparisons indicate that the acceptance score for the no-incentive group was significantly less than those for all of the weight-contingent incentive groups at the 0.05 level. In a contrast of the four weight-contingent groups to the attendance-contingent and no-incentive groups, a significant difference was found ($F_s=76.06$, $p < 0.05$). Weight-contingent monetary incentives were associated with higher group acceptance than the other two conditions. In addition, the monetary response cost group was found to have a significantly higher rating of acceptance than the three other weight-contingent incentive conditions ($F_s=46.30$, $p < 0.05$).

In evaluation of the hypothesis related to group process, no differences in group satisfaction were found for any of the conditions studied. No differences were found in group attraction ratings among the six conditions. The hypothesis of no differences in group process is accepted for two of the three indicators used. However with respect to group cohesion, the monetary response cost group was found to have a higher level of acceptance compared to the other groups; the no-incentive group had a

Table 15

F Values for Group Cohesiveness Measures by Condition

	df	MS	F
Acceptance			
Condition	5	187.46	14.12***
Error	68	13.28	
Attraction			
Condition	5	420.25	1.43
Error	62	293.01	

*** p< 0.001

Table 16

Cell Means for Group Cohesiveness Measures by Condition

		<u>Group Cohesiveness Measure</u>	
Condition		Acceptance	Attraction
Reward:	Money	21.07	25.36
	Lottery	23.85	32.91
Response Cost:	Money	29.77	40.23
	Lottery	24.00	25.23
Attendance Contingent		21.33	24.15
No Incentive		14.55	23.33

lower index of acceptance relative to most other groups. Weight-contingent incentives were associated with higher group acceptance than the comparison conditions; the monetary response cost incentive produced the a higher level of acceptance than the other weight-contingent incentive procedures.

Program Reactance

A single reactance scale was used to measure adverse reactions toward the program and incentive procedures. In comparing the degree of program reactance across the conditions under study, a significant condition effect was found, as shown in Table 17. The means reported in Table 18 indicate that the attendance-based incentive group had the lowest level of reactance for any group. A contrast of the four weight-contingent incentive conditions with the attendance and no-incentive condition was not significant, thus overall there were no differences in favour of the weight-contingent incentives. Hypothesis 3c is partially supported: no difference in reactance was found among the four weight-contingent incentive conditions as predicted, however there was no difference in reactance between the no-incentive and incentive-based procedures. The no-incentive group reported a level of reactance similar to that of the lottery reward group; the attendance-contingent group had the lowest level of reactance, compared to the other strategies.

Table 17

Analysis of Variance for Program Reactance Scale Over Time
By Condition

Sources of Variance	df	MS	F
Condition	5	2.21	3.98**
Error	71	0.55	
Time	1	0.04	0.19
Time by Condition	5	0.30	1.47
Error	71	0.20	

** $p < 0.01$

Table 18

Cell Means for Program Reactance by Incentive Condition

		<u>Reactance Score</u>		
Condition		Time 1	Time 2	N
Reward:	Money	1.42	1.74	18
	Lottery	2.03	1.93	17
Response Cost:	Money	1.37	1.42	8
	Lottery	1.78	1.58	15
Attendance Contingent		1.25	1.20	11
No Incentive		2.06	1.83	5

Multivariate Analysis

In testing the third hypothesis seven measures of program acceptance were utilized. The intercorrelations of these measures at the post test are presented in Table 19. Since these measures are not completely independent, the multiple univariate analyses presented in this section may not accurately reflect the effects associated with incentive conditions.

A multiple analysis of variance (MANOVA) was used to augment the series of univariate analyses. The underlying principle of MANOVA is that the aggregate properties of multiple dependent measures are investigated by converting the multiple measures to a linear composite. This conversion essentially changes a multivariate system to a univariate analysis of the linear composite: MANOVA can be viewed as ANOVA generalized to a analysis of multiple measures (Van Egeren, 1973). In ANOVA the test criterion is an F-ratio while in a MANOVA three common test statisitcs are used: Wilks' Lambda, Hotellings's trace criterion and Roy's largest characteristic root criterion. These three criteria are highly interrelated, and the relative comparative power of each is uncertain (Morrison, 1967; Van Egeren, 1973). Wilks' Lambda is a likelihood criterion calculated as the ratio of the within-groups sum-of-squares matrix to the total sum-of-squares matrix. This statistic is most often used since it can be most easily

Table 19

Intercorrelations Among Program Acceptance Measures

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
1. Program Satisf.	---	.31**	.04	.38**	.17	.01	-.07
2. Program Effect.		---	.29*	.13	.28*	.16	-.09
3. Incentive Satisf.			---	-.02	.03	.01	-.17
4. Group Satisf.				---	.35**	.14	.17
5. Attraction					---	.07	-.06
6. Acceptance						---	.06
7. Reactance							---

* p< 0.01

** p< 0.001

transformed to the familiar F-distribution (Dillon & Goldstein, 1984). Hotelling's T^2 is used to compare two groups, just as the t -distribution is used in univariate comparisons of two groups.

The MANOVA reported here provides only limited validation since this analysis was approached differently from the univariate analyses. Of the seven variables used to test the hypotheses related to program acceptance, the sociometric indicators of acceptance and attraction were measured at only one time period, therefore the MANOVA was calculated on only post test data so that these two variables could be included. No time effects were found. The measure of incentive satisfaction was not administered

to the no-incentive group, therefore it was excluded from the analysis to increase the available sample size.

A MANOVA comparing weight-contingent, attendance-contingent, and no-incentive groups revealed a significant difference among the conditions. The value for Wilks' Lambda ($WL=0.29$, $df=30,210$) and Roy's Greatest Root ($R=0.59$) were both significant at a 0.001 alpha level. The sociometric acceptance measure was responsible for the significant outcome. The no-incentive group had much lower ratings of acceptance than the incentive-based groups. The results of the multivariate analyses confirm the results of the prior analyses; the only significant indicator was group cohesion as measured by acceptance.

Hypothesis Four

The fourth hypothesis states that perceived self-efficacy is highest in the weight-contingent incentive groups, and decreases in the attendance contingent group and the no-incentive group respectively. In addition, perceptions of self-efficacy are the same in each of the weight-contingent incentive groups.

Four measures of self-efficacy were used in this study, as described in Chapter III. Perceptions of efficacy were measured at three time periods: pre-test, mid-program and post test. A summary of the repeated measures analysis of variance for the four self-efficacy measures by incentive condition is provided in Table 20.

Table 20

F Values For Self-efficacy Variables Over Time By Condition

Sources of Variance	Self Efficacy Measures			
	Emotion	Situation	Disequil	Appetit
Condition	1.64	2.86*	2.03	0.85
Error (df)	(60)	(60)	(60)	(53)
Time	24.66***	18.33***	7.12***	5.23**
Time by Condition	1.83	0.06	2.04*	0.88
Error (df)	(120)	(120)	(120)	(106)

* p< 0.05

** p< 0.01

*** p< 0.001

In comparing the weight-contingent incentives to the other procedures, only time effects were identified for ratings of emotional and appetitive self-efficacy. There was an increase in self-efficacy ratings from pretest to the midprogram assessment, with less change during the latter half of the program. Table 21 shows the means for the self-efficacy measures over time.

For self-efficacy ratings associated with situational eating and disequilibrium, significant group and time effects were found. Self-efficacy scores related to situational cues increased over time. The ratings for the no-incentive condition were lower than those for the other incentive conditions, whereas the ratings for the

Table 21

Cell Means for Self-efficacy Measures Over Time by
Condition

Condition	Time	Emotion	Situation	Disequil.	Appet
Reward Money (N=16)	Time 1	3.29	4.06	5.16	6.62
	Time 2	4.71	5.13	6.65	8.35
	Time 3	5.54	5.78	6.50	6.88
Reward Lottery (N=14)	Time 1	3.11	3.88	5.14	5.21
	Time 2	5.10	5.04	6.85	6.50
	Time 3	6.16	5.57	7.33	5.79
Response Cost Money (N=8)	Time 1	4.92	4.01	6.94	6.63
	Time 2	5.12	4.37	6.92	5.94
	Time 3	5.36	4.41	6.23	6.31
Response Cost Lottery (N=14)	Time 1	3.71	4.54	6.32	5.21
	Time 2	5.58	5.67	6.70	6.11
	Time 3	5.88	5.67	7.06	5.96
Attendance Contingent Incentives (N=10)	Time 1	4.12	4.77	7.10	5.56
	Time 2	4.71	5.53	7.42	7.31
	Time 3	5.51	6.08	7.77	7.00
No Incentives (N=4)	Time 1	2.36	2.42	5.01	4.25
	Time 2	2.82	3.11	5.18	6.25
	Time 3	3.00	3.67	5.80	6.75

attendance contingent condition were highest over time. The ratings for all groups increased over time. A post hoc comparison of the self-efficacy ratings at the end of the program, comparing the weight-contingent group to the other two conditions was not significant ($F_s=1.90$). Thus the weight-contingent incentive conditions were not associated with consistently different ratings than the other two groups.

Self-efficacy associated with perceptions of disequilibrium changed over time for each of the six study conditions. The reward-based incentives show a large increase from Time 1 to Time 2; from Time 2 to Time 3, the monetary-based groups show a decrease in perceived self-efficacy whereas the lottery groups' ratings continue to increase. The attendance-contingent group had the highest ratings whereas the free group's ratings were lowest (Figure 4). However, the differences identified may be an artifact of the differences found during the initial analysis of the comparability of groups following random assignment.

The univariate analysis of variance for self-efficacy associated with disequilibrium revealed significant differences at each time period. A repeated measures analysis of variance based on change scores of pre- to mid-program and mid- to post-program differences of disequilibrium self-efficacy is presented in Table 22. The results

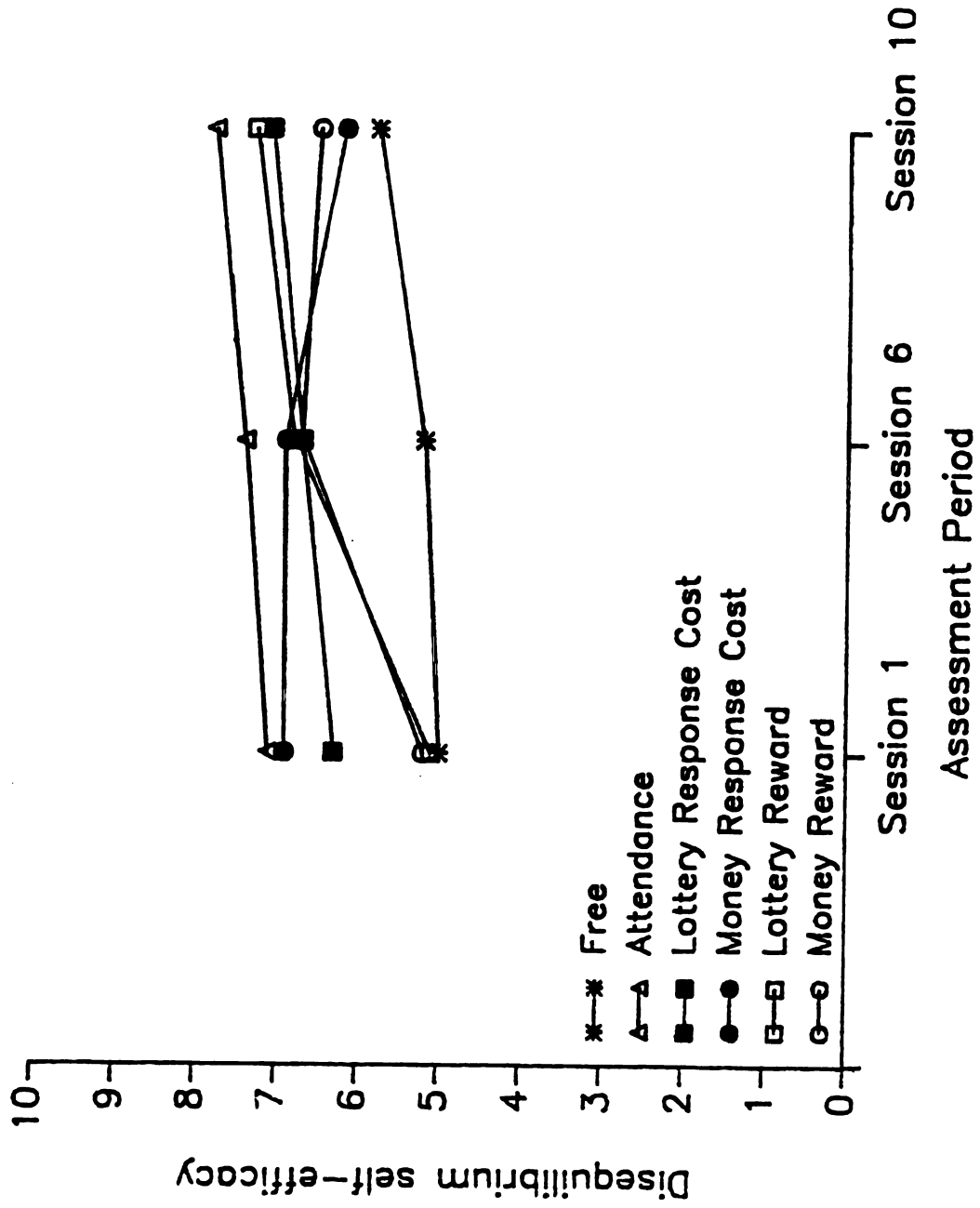


Figure 4: Disequilibrium self-efficacy by group

Table 22

Repeated Analysis of Variance for Disequilibrium Self
Efficacy Change Scores Over Time By Condition

Sources of Variance	df	MS	F
Condition	5	4.77	2.79*
Error	60	1.71	
Time	1	7.11	1.97
Time by Condition	5	3.54	0.98
Error	60	3.60	

* $p < 0.02$

indicate a significant difference associated with incentive condition. The mean difference over time for the lottery response cost condition of -0.36 was significantly different at the .05 level from the mean change score of 1.10 for the lottery reward condition, based on a Scheffe post hoc comparison procedure. No other significant differences were identified. The mean for the monetary reward condition was 0.67 compared to means of 0.37 for the lottery response cost condition, 0.34 for the attendance-contingent condition, and 0.40 for the no-incentive group.

Multivariate Analysis

The four measures of self-efficacy derived from the self-efficacy questionnaire are highly correlated, as Table 23 illustrates. The statistical assumption of the inde-

pendence of measures for multiple inferential tests cannot be met, therefore a multiple analysis of variance is appropriate. The self-efficacy scales were measured at three time periods, therefore a repeated measures analysis for the self-efficacy scales was calculated. Since weight was another dependent measure also assessed at three time periods it was included in this analysis. The analysis testing for differences related to group membership reported in Table 24 reveals significant time and interaction effects. Each of the measures change over time. The time by condition interaction is primarily a function of weight change, with the disequilibrium measure of self-efficacy also contributing. These results are consistent with the univariate analyses already reported. Given the non-comparability of the groups with respect to disequilibrium self-efficacy, the burden of the variance is caused by weight changes. This analysis supports the repeated measures weight analysis, previously discussed under Hypothesis One.

Summary

Hypothesis 4 suggested that perceptions of efficacy would be lowest for the no-incentive groups and highest for the weight-contingent groups. This hypothesis was not supported. Three of the four measures did not vary according to contingency condition. Only situational self-efficacy showed variation by group: the no-incentive group

Table 23

Intercorrelation of Pretest Self-efficacy Scales

	1	2	3	4
1. Emotional	---	.43	.50	.47
2. Situational		---	.16	.48
3. Disequilibrium			---	.38
4. Appetitive				---

Table 24

Multiple Analysis of Variance for the Weight and Self Efficacy Scales Over Time by Condition

Source	Wilks' Lambda	F	df
Condition	0.55	1.20	25,172
Time	0.42	10.37***	10,192
Time by Condition	0.20	1.59**	50,190

* p< 0.05

** p< 0.01

*** p< 0.001

had the lowest ratings over time however, it was the attendance-contingent group which had the highest ratings over time. The power of the weight-contingent incentives over the two comparison conditions was not supported.

Hypothesis Five

Hypothesis five stated that risk-taking is related to program acceptance in the lottery incentive conditions. Individuals who score higher on a measure of risk-taking will rate program satisfaction higher and rate reactance lower in comparison to low risk-taking individuals in the lottery groups. There is no relationship between risk and program acceptance in the other groups studied.

In order to validate this hypothesis, program participants were assigned to groups based on risk scores and reinforcer condition. Low and high risk-taking groups were defined on the basis of individual risk-taking scores. The mean and median risk-taking score for the entire sample was 8.7, therefore the sample was divided into two equal groups at this point. All participants were also assigned to either a lottery group or a non-lottery group as suggested in the hypothesis.

Several significance tests were examined, however no significant effects associated with risk-taking were identified. Repeated measures analysis of variance by lottery condition (lottery vs. non-lottery reinforcement) and risk-taking (high and low risk-taking) were calculated.

With the exception of time effects previously discussed, no significant variance related to risk-taking for incentive satisfaction, perceived program effectiveness, program satisfaction, group satisfaction and reactance--all measures of program acceptance--were found. In addition, univariate analyses of variance for weight change, relative weight change, and the sociometric indicators, attraction and acceptance, were also calculated, with no significant outcomes found.

The results indicate that risk is not associated with program acceptance for either lottery or non-lottery groups, as posited in Hypothesis Five. Ratings of risk-taking were not related to perceptions of the program: this hypothesis can not be accepted.

Correlative Analyses

Many of the client characteristics surveyed as part of this research were not directly considered in the testing of the hypotheses. However, the sheer number of measures makes the individual consideration of each prohibitive. To augment the principle results already presented, a correlative analysis was used to reduce the number of individual pieces of information available for consideration. The data for all participants were included in this analysis. An empirical variable analysis based on the algorithm described by Tryon and Bailey (1970) was performed on all of the major scales resulting from this research, excluding

program measures. For the variables which were assessed at more than one time period, the value for the last measurement period (post test) was used. The cluster analysis produced a set of six dimensions to characterize the client data: (a) weight loss; (b) self-efficacy; (c) parental support; (d) age of problem onset; (e) social support; and (f) global stability. These clusters are presented in Table 25 and are described below. The inter-correlations of these dimensions are presented in Table 26.

I. Weight Loss

The three outcome measures related to weight loss formed a single dimension of the number of pounds lost. A high score on this dimension indicates success in losing weight measured as both raw and standardized weight change. In addition, high scoring participants were more often successful in reaching their weekly weight loss goal. This dimension is related to the self-efficacy cluster and the age of onset cluster.

II. Self-efficacy

The four domains of self-efficacy created from the original 30 item questionnaire came together to form an integrated self-efficacy cluster. The mean correlation among the self-efficacy measures was 0.40. They represent a global construct of self-efficacy related to eating restraint, however each reflected a different cue-specific state. Together they provide an estimate of eating

Table 25

Six Cluster Dimensions

Cluster	Loading
I. Weight Loss (Alpha= 0.96)	
* Relative weight loss	.98
* Weight loss	.87
* Number of times achieved weekly weight goal	.67
II. Self-efficacy (Alpha= 0.81)	
* Disequilibrium self-efficacy	.84
* Emotional self-efficacy	.82
* Situational self-efficacy	.73
Appetitive self-efficacy	.39
III. Parental Support (Alpha= 0.69)	
* Support from mother	.82
* Support from father	.61
IV. Age of Problem Onset (Alpha= 0.86)	
* Participant is older	.86
* Later age of onset reported	.75
Children perceived as supportive	.48
Low restrained eating score	.48

* Denotes defining variable for the cluster

Table 25 (continued)

Cluster	Loading
V. Global Stability (Alpha= 0.77)	
Spouse is supportive of weight program	.99
Low degree to which weight influences life	.68
Employed full time outside of home	.61
Weight gain caused by a specific event	-.59
Weight stable for 12 months prior to program	.53
Number of meals consumed per day	-.51
Best friend is not overweight	.49
* High life satisfaction	.42
* Number of years of education completed	.40
VI. Social Support (Alpha= 0.66)	
* Best friend supports weight loss program	.73
* Participant is female	.65

* Denotes defining variable for the cluster

restraint self-efficacy across several domains. With the exception of the weight loss dimension, the intercluster correlations indicate that self-efficacy is relatively independent of the other cluster domains.

III. Parental Support

The items comprising this dimension are based on the degree of perceived support from the participant's parents. A high score indicates positive support from each of the family members. Perceived parental support was correlated to the stability cluster (VI. Global Stability) which suggests that participants with a more supportive and stable home environment also tend to have parents who were supportive of their weight loss efforts.

IV. Age of Problem Onset

The constituent items of this cluster define a participant who is older, reports a later age of onset for their weight problem, tends not to be a restrained eater, and has support from their children. Thus high scores represent the older individuals who most likely have been slowly gaining weight in their adult years. In combination with their low restrained eating scores it suggests that their weight problem can be characterized as hypertrophic (large cell size) obesity rather than hyperplastic (large number of cells) obesity. This cluster is positively related to weight loss and negatively correlated with the with stability cluster.

Throughout the weight control literature is found the suggestion that there is a difference in the nature of the weight problems of those who have been heavy since childhood and those who had an adult onset of obesity. Much of the discussion is related to the concepts of hyperplastic and hypertrophic already discussed. Those with juvenile onset of obesity tend to have more fat cells which makes weight control more difficult. Colvin and Olsen (1983) report that 60% of the individuals in their study who lost weight on their own without a program gained their weight between graduation from high school and age 35. Thus a later age of onset seems to be associated with a better prognosis.

V. Social Support

This social support measure reflects perceived support from the participant's best friend. The dimension is comprised of the participants' sex and rating of support from the best friend. A high score indicates a female participant and positive perceived support for the participant's weight control efforts. This dimension is largely unrelated to the other dimensions.

VI. Global Stability

This dimension reflects the various indicators of support and satisfaction in the participant's life, not restricted to weight control. A high score is indicative of a more educated participant with a supportive spouse,

who is employed full time outside of the home, and has a high level of life satisfaction. With respect to weight control, they perceive their weight problem as having little influence on their life. Their weight has been stable for the 12 months prior to enrollment in this program and their weight gain was not associated with a specific event. In addition, they do not eat many meals during the day, and their best friends are not overweight. This cluster suggests stability in that the composite items represent support, life satisfaction, prior weight stability, and some degree of control over their weight problem. That this dimension is also related to the parental support dimension is consistent with the name. This cluster is negatively related to the Age of Problem Onset dimension and is unrelated to weight loss.

Neither of the sociometric indicators used in the research loaded onto any of the derived dimensions. That group attraction or group acceptance did not emerge in any of the factors suggests that support within the group was not as important as external family and peer supports.

The relative ease with which these clusters lent themselves to interpretation implies a conceptual clarity inherent in their composition. The clusters represent a coherent set of characteristics which can be used to describe the resources and experience of the clients in this research project. Profiles of the participants based

Table 26

Correlations of Cluster Scores

	1	2	3	4	5	6
1. Weight loss	----	.33**	-.08	.31**	-.10	.04
2. Self-efficacy		----	.18	.20*	-.05	-.03
3. Parental support			----	-.07	-.02	.27
4. Age of problem onset				----	-.06	-.30**
5. Social support					----	.02
6. Global stability						----

* p< .05

** p< .01

on a these dimensions are shown in Figure 5. The data are based on three-way division of the weight loss cluster scores; a criterion of half a standard deviation on each side of the mean was used. Those subjects most successful in losing weight (*ie.* more than hal a standard deviation above the mean weight loss) can be characterized as high in self-efficacy, and as having a high degree of parental support and stability. In contrast, those who were below average in their weight loss had lower than average self-efficacy, were much younger with an earlier problem onset, and less stability. A high level of self-efficacy appears to very important in differentiating very successful weight loss participants; an early age of problem onset in important in defining those who had the most difficulties

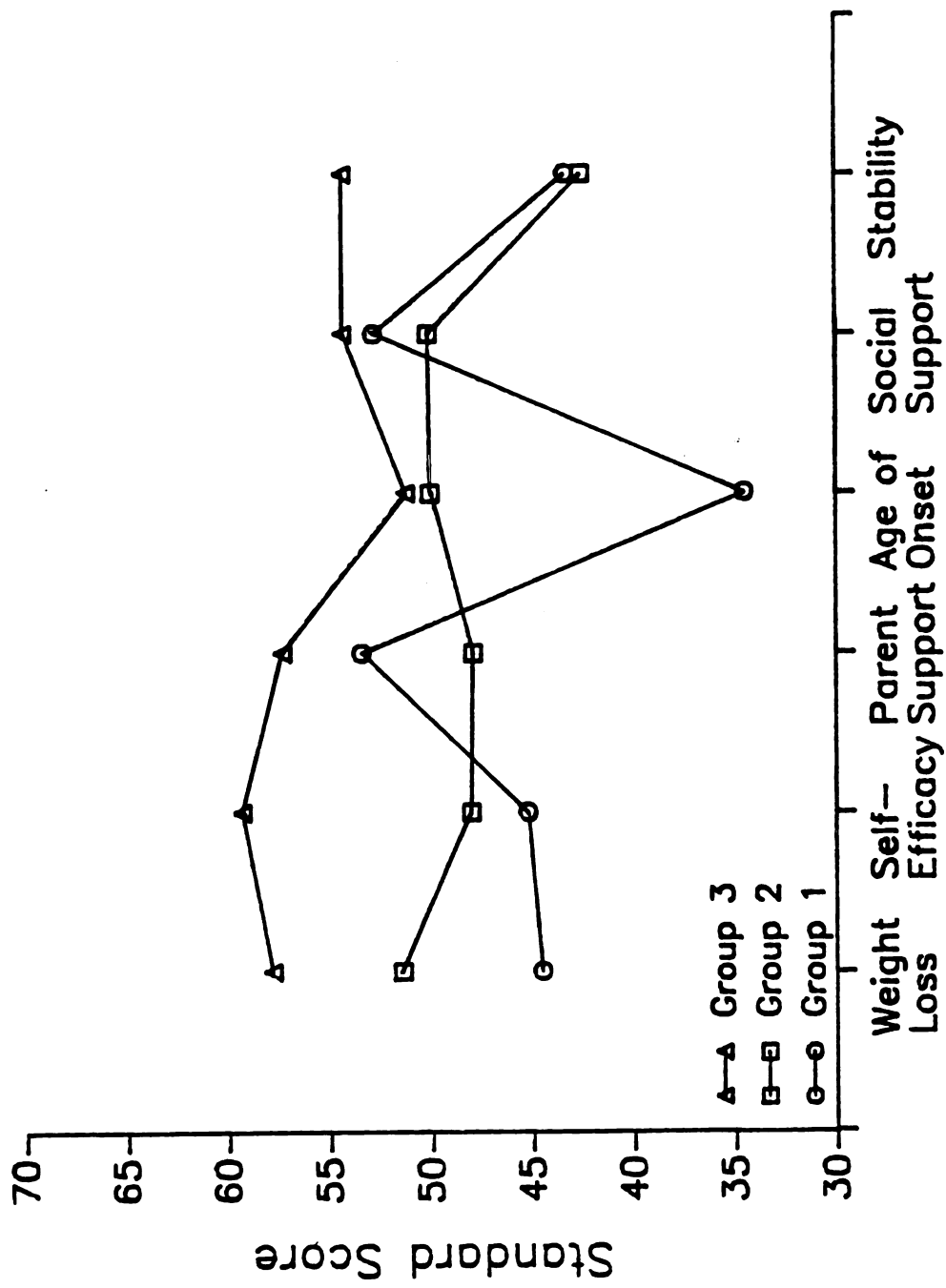


Figure 5: Factor Score Weight Loss Profiles

in losing weight. Overall, the degree of social support did not discriminate among the groups.

Factors Related to Program Attrition

A major theme underlying this research was the use of monetary incentives in an effort to reduce program attrition and thereby enhance the effects of the program. All of the groups studied were subject to participant attrition, although two groups in particular had significantly higher attrition rates.

Reasons for Dropout

Dropouts were asked, as part of the follow-up plan, the reasons underlying the decision to discontinue participation in the program. Table 27 provides a summary of all the responses elicited. Non-participants could list as many as three reasons for their decision: a total of 65 responses were provided by the respondents to this follow-up. Over 80% of the dropouts indicated that scheduling difficulties and other commitments influenced their decision to leave the program. This is substantiated by Table 28 which shows the reasons listed as most important in their decision: scheduling difficulties accounted for half of the reasons cited as the primary reason to quit. The other major categories cited for dropout are (a) low motivation at the onset, (b) discouragement due to poor initial success, and (c) personal reasons.

Table 27

Reasons Given for Dropping Out of the Program

Reason	Freq	% of All Responses	% of All Cases
Scheduling difficulties and other committments	22	33.8	84.6
I wasn't very motivated	13	20.0	50.0
I wasn't being successful with the program and was discouraged	10	15.4	38.5
Personal Reasons	8	12.3	30.8
Was not the type of program I wanted or expected	3	4.6	11.5
Problems finding a babysitter	1	1.5	3.8
It was too far to travel	1	1.5	3.8
Other	7	10.8	26.9
	----	-----	
Total Responses	65	100.0	

Note: Results based on 26 cases.

Seven respondents used the "other" category to describe the circumstances of their decision. Below is a summary of these responses.

1. "One lady ruined it for me with all the talking she did no one else got a chance to talk."
2. "I didn't have much to lose and that makes it hard to be motivated."
3. "I disliked the 'fat attitude' of everyone in the program."
4. "After not coming to class for two weeks it had been

several weeks and I just never returned."

5. "I was not able to concentrate on the program: too busy to monitor food and prepare appropriate diet."
6. "My mother had a heart attack and I was out of town for four weeks taking care of her during convalescence."
7. "I have overseas guests visiting and I can't maintain my program."

The themes underlying many of these responses are very similar to the major reasons provided by other respondents; they reflect low motivation and conflicting commitments.

Table 28

Primary Reason Given for Dropping Out of the Program

Reason	Freq	% of All Responses
Scheduling difficulties and other committments	13	50.0
I wasn't very motivated	4	15.4
I wasn't being successful with the program and was discouraged	4	15.4
Personal Reasons	4	15.4
Other	1	3.8
	-----	-----
Total Responses	26	100.0

Note: Results based on 26 cases

An examination of the temporal pattern of attrition presents an alternative perspective. A tabulation of the last session attended for each dropout, by study condition

is presented in Table 29. It is clear that 59% of the attrition occurred when the program started meeting every two weeks (sessions 7 through 10) instead of weekly; 17 participants never came back after the last weekly session. For the no-incentive group, moving from weekly to biweekly did not influence attrition as equal numbers of participants dropped out during the weekly and biweekly segments. For the attendance-contingent group, a majority of the dropouts left the program during the weekly sessions. In contrast, among the weight-contingent groups, 13 (76%) of the dropouts discontinued the program after the last weekly session.

Table 29

Distribution of Attrition Over Time by Condition

Condition	Session Number									N
	1	2	3	4	5	6	7	8	9	
No Incentive	4	1	0	1	0	1	4	0	0	11
Attendance Contingent	0	0	1	1	1	0	2	0	0	5
Monetary Reward	0	0	0	0	0	0	1	1	0	2
Lottery Reward	0	0	0	0	1	2	1	0	0	4
Monetary Resp. Cost	0	0	1	1	0	7	0	0	0	9
Lottery Response Cost	0	0	0	1	0	0	0	1	0	2
Total:	4	1	2	4	2	10	7	2	0	33

No differences were found between participants and dropouts with respect to pretest characteristics. At the first program meeting, participants were asked if they knew any of the other people in the group. Sixty-seven participants indicated that they did not know any other person in the group. A total of 36 (31%) participants were in a group with one other person they knew: 15 (13%) said that they knew two other people in the group. Twenty-six participant groups were formed through this nomination process. Considering these 26 groups of people, dropout occurred in only eight of the groups: in four instances the whole group discontinued participation. The eight couples in the study are a subset of these groups. Only one couple dropped out, that is, both partners left the study. A comparison of attrition reveals a 12.5% dropout rate for couples, 27.3% for groups and 29.9% for individuals attending by themselves. These rates reflect the dropout of individual participants, rather than couples or groups.

Final Words

The results indicate that in many ways weight-contingent incentives are of equal power in motivating weight loss among the program participants. They also appear to be relatively independent of participant ratings of program acceptance. In terms of program attrition, the monetary response cost procedure is a less powerful incentive in that a high attrition rate was evident among

group members. From the experimenter's point of view, the remaining three weight-contingent incentive procedures--monetary reward, lottery reward and lottery response cost--are of similar value.

Subject's Perceptions of the Incentives. The perception of equal value was not shared by the participants. The last question of the post test assessment (before the experimental debriefing) asked each participant to choose the incentive system which was most appealing. The choices given were the incentive strategies used in this research project. The responses are presented in Table 30, and indicate that procedures based on reward were the overwhelming favourite.

Table 30

Response Frequencies by Preferred Incentive Strategy

Group	Participant Preference	
Monetary Reward	36	45.6 %
Lottery Reward	20	25.3 %
Monetary Response Cost	4	5.1 %
Lottery Response Cost	5	6.3 %
Attendance Contingent	13	16.5 %
No Incentive	1	1.3 %
TOTAL	79	100.1 %

This was true regardless of the actual incentive condition of the participant. There is a clear preference for positive reinforcement procedures, regardless of the predictability of the reinforcer. The response cost procedures in general were not highly regarded.

The participants were also asked to rate the importance of nine components of the program. The data presented in Table 31 indicate that monetary incentives were not viewed to be important by program participants. This is contrary to the data collected insofar as the use of a monetary incentive was generally found to be important in reducing program attrition rates. These ratings reflect the opinions of those program participants who did not drop out, therefore the retention value of the incentive is lost on the participants.

The weigh-ins were almost uniformly regarded as very important (Mean=2.97): this is corroborated by many reports from the clients that the weigh-in is "a time of reckoning" and it is the accountability of the weigh-in, not the money, which motivates the weight loss. This is not entirely true however, since weight-contingent incentives resulted in greater weight loss than the attendance contingent incentives.

Other components receiving high ratings of importance relate to the philosophy of the program. The program was designed around an underlying theme of sustainable weight

Table 31

Mean Importance Ratings of Program Components

Program Component	Mean Importance Rating ¹
Weigh-in each session	2.97
The "slow and steady" weight loss philosophy of the program	2.79
Program leader	2.66
The "don't deprive yourself" philosophy of the program	2.62
Program materials	2.52
Group discussions	2.50
Meeting with others with similar concerns	2.41
Exchange diet system	2.30
Monetary incentives	2.26

1 Not at all important=1; Very important=3

loss. This was operationalized through the goal of a slow but steady weight change, and by having participants take a realistic approach to foods--not to deprive themselves and make resolutions no mortal could keep, eg. "I'll never have ice cream again!" The more tangible aspects of the program generally were viewed as less important.

Participation in a Maintenance Program. At the conclusion of the study, all remaining participants were invited to continue with their weight control efforts with the help of a six month maintenance program. While the

results of the maintenance program are beyond the scope of this research, the question of the influence of the incentive procedures on participation in a continuing maintenance program is of interest. A total of 24 subjects (35%) attended two or more sessions of the maintenance program (Table 32). In comparing the rates among the four weight-contingent incentive conditions, a significant relationship was found ($\chi^2=10.10$, $df=3$, $p<.05$). A greater than expected proportion of those in the monetary reward group continued with the follow-up program whereas only one person from the lottery response cost continued.

In comparing all six groups together, the results did not change, *ie.* the significant Chi-square value was attributable to the monetary reward group and the lottery response cost group ($\chi^2=15.78$, $df=5$, $p<.01$).

In an effort to identify characteristics of those who would continue in a maintenance program, t-tests were used to explore numerous measures collected as part of this research. Of the 47 variables covering demographic, personal history, weight and program experience collected at various time periods, only a single item was significant. The data indicate that those who attend more weight program sessions are also more likely to continue with a subsequent maintenance program ($t= 2.79$, $df=67$, $p<.005$). However, even this difference seems small: those who continued with the maintenance program attended an

average of 8.75 weight program sessions, whereas those who did not continue on average had participated in 7.80 weight class sessions.

As a final comparison, the weight of those who participated in the maintenance program was compared to those who did not participate in the program. For the nonparticipants, this was equivalent to a 7 month follow-up. The data do not indicate that there was any difference in weight at the post-program follow-up for those who continued with a maintenance program. The mean weight for 23 individuals who took part in the 6 month maintenance program was 195.05 pounds ($s = 35.93$) while for the 17 respondents who did not participate in the maintenance program the average weight was found to be 193.15 pounds ($s = 49.10$). Comparisons of the distributions for both group indicate no differences. There are limitations with respect to this follow-up data. The data for those in the maintenance program are based on actual measurements and represent a 77% response rate. The data include all participants who attended at least two sessions of the maintenance program. In comparison, for those who did not participate in the maintenance program, the data was collected via self-report survey and represents only 44% of the sample.

Table 32

Subject Participation in the Maintenance Program

Group		Maintenance		Did Not Continue	
Reward:	Money	10	63%	6	38%
	Lottery	5	33%	10	67%
Response Cost:	Money	3	33%	6	67%
	Lottery	1	7%	13	93%
Attendance Contingent		2	18%	9	82%
No Incentive		3	60%	2	40%

Experiment II

The purpose of the second study was to test the generalizability of the results obtained in the first study with respect to the no-incentive group. In the first study, the no-incentive group was not a product of random assignment and thus can be considered non-equivalent. The current research replicates many of the measures of the first study, comparing a randomly assigned no-incentive group to a similar group with a monetary incentive.

An incentive based on the monetary reward strategy was chosen for the second study, since the prior results indicated that in the few instances where differences among the weight-contingent incentives were found, these differences were more often in favour of the monetary reward contingency. In addition, this strategy was rated as among the most favorable by the participants. Four of the five major hypothesis in the previous study will be tested. Hypothesis five regarding the relationship between risk-taking and lottery-based incentive procedures was not tested since a lottery-based incentive was not part of this study.

Comparability of the Groups

The first issue to be considered was the comparability of the two groups comprising the second study. Based on information from the intake questionnaire, the two groups were compared on 28 criteria, as listed in Table 33.

Table 33

Pretest Characteristics by Incentive Condition (Study II)

Variable	No Incentive	Monetary Reward	Test Statistic ¹
Age	38.3	46.0	2.25*
Life satisfaction score	2.0	2.2	0.78
Age of problem onset	22.9	24.8	0.54
Weight (Pounds)	190.4	200.9	0.88
Percentage Overweight	30.3	32.1	0.28
Body mass index	34.0	34.9	0.42
Eating restraint score	27.6	28.6	0.39
Meals/snacks per day	3.8	3.6	0.54
Degree weight affects activities	2.8	2.4	1.17
Perceived personal attractiveness	1.8	2.1	1.41
Number of weight control methods used	2.4	2.4	0.00
Number of types of diets tried	2.4	2.0	1.09
<u>Physical Activity Levels (Mean Hours Daily)</u>			
Sleep or still activity	8.3	8.7	.71
Light activity	12.9	14.3	1.27
Moderate activity	2.0	0.8	1.63
Intense activity	0.6	0.3	1.10

1 t-test, df=38* $p < 0.05$

Table 33 (Continued)

Variable	No Incentive	Monetary Reward	Test Statistic ¹
<u>Degree of Perceived Support</u>			
Spouse	1.9	2.1	0.60
Children	1.5	1.8	0.80
Mother	1.9	1.4	1.10
Father	1.5	0.7	1.90
Employer/supervisor	1.7	1.4	0.72
Best friend	2.6	2.6	0.32
<u>Perceived Self-efficacy</u>			
Emotional eating	4.9	4.1	1.54
Situational eating	4.6	4.3	0.60
Disequilibrium	6.8	6.4	0.96
Appetitive-related	6.6	6.9	0.30
<u>Marital Status</u>			
Currently married	13 (48%)	14 (52%)	0.00 ²
Not married	7 (54%)	6 (46%)	
<u>Employment Status</u>			
Working full time	12 (46%)	14 (54%)	0.11 ²
Not employed full time	8 (57%)	6 (43%)	

1 t-test, df=382 Chi-square, df=1* $p < .05$

The only difference identified between the two groups was based on age of the participants. Members of the no-incentive group were on average eight years younger than the members of the monetary reward group. Thus with the exception of age, the participants in each group seem to be comparable. In the first study, age was significantly related to weight loss, insofar as older participants with a later age of problem onset were more successful in losing weight. The significance of these findings with respect to the pre-test group differences will be discussed later.

Hypothesis One

The first hypothesis dealt with the relationship between incentives and weight change. A repeated measures analysis of variance for weight by group indicates only a time effect (Table 34); no differences with respect to the incentive procedures were found. The mean weight for both groups at pretest was 203 pounds. This decreased successively during the midprogram and postprogram assessments to 197 and 191 pounds respectively. This finding is confirmed by the analysis of the data for the other weight loss indicators: weight loss, relative weight loss and rate of weight loss. Table 35 shows that no differences were found between the incentive and no-incentive groups. Thus the data do not support the hypothesis of the efficacy of weight-contingent incentives in promoting weight loss. This clarifies the ambiguous findings from the first study

Table 34

Repeated Measures Analysis of Variance of Weight by
Condition (Study II)

Sources of Variance	df	MS	F
Condition	1	238.05	0.05
Error	21	4336.55	
Time	2	818.65	29.27***
Time by Condition	2	15.06	0.54
Error	42	27.97	

*** $p < .001$

Table 35

T-Tests for Weight Loss Indicators by Condition (Study II)

Variable	Mean		t Value ¹
	No-Incentive	Monetary Reward	
Weight Loss (pounds)	13.8	10.6	0.73
Relative Weight Loss (%)	6.5	5.3	0.59
Rate of Loss (sessions)	5.4	5.1	0.41

¹ degrees of freedom=38

with respect to differences in weight loss. There were no differences in weight loss with respect to the use of monetary incentive procedures.

Hypothesis Two

The second hypothesis tested was concerned with attendance and attrition rates with respect to incentive conditions. In comparing the mean number of classes attended by members of the no-incentive group (Mean=6.70) with the attendance rates for the incentive condition (Mean=7.65), there was no significant difference ($t=1.04$, $df=38$, $p < .30$). Thus there was no difference in class attendance between the two groups.

The attrition rate for the no-incentive group was 50%, since 10 of the initial 20 participants dropped out of the program. In comparison, 5 (25%) of the initial 20 participants in the monetary reward group discontinued with the program. The calculated Chi-square value indicates that the rates of dropout are not significantly different ($\chi^2 = 1.71$, $df = 1$, $p < .19$) between the groups. No difference was found in the attrition rates between the incentive and no-incentive condition.

In light of the non-significant finding, the attrition rate for the no-incentive group is twice that of the monetary reward group and the difference is in the same direction as that of Experiment I. Unlike the first study, most of the dropout in these two groups occurred while the

program was meeting in weekly sessions. The reasons underlying the difference in the timing of dropouts between the two studies is not apparent.

Hypothesis Three

The third hypothesis dealt with three indicators of program acceptance. Indices of program satisfaction were predicted to be higher for incentive conditions compared to a no-incentive group. No differences between the groups were predicted for group process, whereas program reactance was thought to be greater for the no-incentive group relative to the weight contingent group.

Program Satisfaction

Two indicators of program satisfaction were measured: satisfaction with the program, and perceived effectiveness of the program. A repeated measure analysis of variance was used to test for time and group effects, as presented in Table 36. The results indicate that no time or group effects were evident. In considering program satisfaction, these data are consistent with the results reported in Experiment I where both measures--satisfaction and effectiveness--did not vary with respect to time or group membership. The mean scores by time and group are presented in Table 37.

Group Process

Group process was measured through the use of three indicators: group satisfaction, attraction and acceptance.

Table 36

F Values for Satisfaction Measures Over Time, By Condition
(Study II)

Sources of Variance	F Values	
	Program Satisfaction	Program Effectiveness
Condition	0.04	0.14
Error (df)	(20)	(20)
Time	0.01	0.78
Time by Condition	0.63	2.01
Error (df)	(20)	(20)

Table 37

Cell Means for Program Satisfaction Measures

Condition		Program Satisfaction	Program Effectiveness
No Incentive	Time 1	4.61	4.72
	Time 2	4.68	4.56
Monetary Reward	Time 1	4.65	4.54
	Time 2	4.59	4.58

The repeated measures analysis of variance presented in Table 38 for group satisfaction indicates no significant effects related to time or group membership. The analysis of the Experiment I data indicated a time effect which was not found in the current data. This difference may be due to differences in the levels of group satisfaction reported in the two studies. In the first study the mean group satisfaction score for all groups was 3.7 at the midprogram assessment and 3.9 at posttesting. In the second study, the levels of group satisfaction were higher, such that the mean midprogram assessment value was 4.1 and the posttest value for both groups was 4.2. This may reflect a ceiling effect in the second study, where the high level of group satisfaction at the midprogram assessment did not allow for significant change over time. However, both studies confirm that there were no differences in group satisfaction with respect to incentive procedures.

Group Cohesion. The two measures of group cohesion used, derived from sociometric analyses, were attraction and acceptance. Table 39 shows that no significant difference was found between the two groups in ratings of attraction, however there were higher ratings of acceptance in the monetary reward group. These data are comparable to Experiment I data insofar as the effects identified are the same: the levels of acceptance and attraction are higher in Experiment II.

Table 38

F Values for Group Satisfaction and Program Reactance Over Time, By Condition (Study II)

Sources of Variance	F Values	
	Group Satisfaction	Program Reactance
Condition	0.38	0.10
Error (df)	(20)	(20)
Time	1.01	2.89
Time by Condition	1.95	0.76
Error (df)	(20)	(20)

Table 39

T-Tests of Group Cohesiveness by Condition (Study II)

Variable	Condition		t Value
	No-Incentive	Monetary Reward	
Attraction	25.01	28.44	0.61
Acceptance	18.55	23.07	2.30*

* $p < .05$

Program Reactance. A single measure of reactance toward the program was used. The analysis by time and group membership (Table 38) indicates no significant sources of variation. The mean program reactance score for the no-incentive group was 1.4 and 1.3 respectively for midprogram and posttest assessments. The means for the monetary reward group for midprogram and posttest assessments were 1.6 and 1.3 respectively. Again, these findings are similar to those of Experiment I in that no difference was found between the weight-contingent strategies and the no-incentive group. In the first study, the significant effect was due to the attendance-contingent incentive procedure.

Summary. The data do not provide support for the third hypothesis. There were no differences in program satisfaction or program reactance associated with the incentive procedures, as hypothesized. The superiority of the incentive-based program in producing greater satisfaction and lower reactance was not confirmed. Differences were found in group acceptance contrary to the expectations expressed in the hypothesis. The monetary reward strategy produced a higher level of mutual acceptance among the members of the group. These data support most of the findings of the initial study.

Hypothesis Four

According to the hypothesis under consideration, members of the no-incentive group will perceive lower levels of self-efficacy than those in the monetary reward group. Four measures of self-efficacy, as described in Chapter III, were used to test the hypothesis.

Table 40 provides a summary of the repeated measures analysis of variance by condition for each of the self-efficacy measures. No differences were found with respect to the measures of situational, disequilibrium or appetitive self-efficacy. The only indicator to show significant variation was the measure of emotional self-efficacy. Both a group and a time effect were identified.

Contrary to the hypothesized relationship, the no-incentive group indicated a higher rating of emotional self-efficacy than the incentive-based group, as shown in Table 41. Both groups show an increase over time; the ratings of the no-incentive group are consistently greater.

These findings are different than those identified in Experiment I, where situational self-efficacy was behind the group effects found. The data for both studies do not support the hypothesis with regard to the power of incentive procedures to promote perceptions of efficacy. However, the studies refute the hypothesis on different grounds.

Table 40

F Values for Self Efficacy Measures Over Time By Condition
(Study II)

Sources of Variance	F Values			
	Emotion	Situation	Disequil	Appet.
Condition	6.71*	1.62	2.62	0.08
Error (df)	(20)	(20)	(20)	(20)
Time	7.81***	1.24	0.78	1.02
Time by Condition	1.44	2.85	1.30	0.90
Error (df)	(40)	(40)	(40)	(40)

* p < .05

*** p < .001

Table 41

Means for Self Efficacy Measures Over Time By Condition
(Study II)

Condition		Emotion	Situation	Disequil	Appet.
No-Incentive	Time 1	5.03	4.68	6.98	7.50
	Time 2	6.55	5.82	7.74	7.44
	Time 3	6.29	5.61	7.69	7.44
Monetary Reward	Time 1	4.08	4.59	6.72	7.46
	Time 2	4.60	4.36	6.82	7.42
	Time 3	4.81	4.38	6.29	6.54

Correlative Analysis

Correlative procedures similar to those described in Experiment I were used to analyze the data for Experiment II. In effect, this provides an opportunity for a cross-validation (Kerlinger & Pedhauzer, 1973) of the factors derived in the initial study. The same procedures described in the first were used; the resulting factors are different. A five factor solution emerged from the data collected in the second study. Table 42 illustrates the similarities between the two sets of factors: the factor in the first study on which an item loaded is indicated in the last column of the table. The factors from the two studies are listed below:

<u>Experiment I</u>	<u>Experiment II</u>
I. Weight Loss	I. Weight Loss
II. Self-efficacy	II. Spouse Support
III. Parental Support	III. Self-efficacy
IV. Age of Problem Onset	IV. Work Environment
V. Social Support	V. Weight History
VI. Global Stability	

Weight loss, as a dimension, emerged first in both studies although the composition of the factors are slightly different. In the first study the three weight loss indicators comprised the dimension whereas in the second study, the raw weight change measure is replaced by the item asking if weight gain followed a specific event.

Table 42

Five Cluster Dimensions from Study II Data

Cluster	Loading	Study I Cluster
I. Weight Loss (Alpha= 0.89)		
* Relative weight loss	.96	Weight
* Success in reaching weekly weight goal	.95	Weight
Weight gain related to a specific event	-.43	Stabil.
II. Spouse Support (Alpha= 0.90)		
* Spouse supports program	.91	Stabil.
* Spouse is average or under weight	.90	--
III. Self-efficacy (Alpha= 0.85)		
* Situational self-efficacy	.95	Efficacy
* Appetitive self-efficacy	.77	Efficacy
Disequilibrium self-efficacy	.63	Efficacy
* Emotional self-efficacy	.61	Efficacy
IV. Work Environment (Alpha= 0.81)		
* Support from employer for weight program	.98	--
* Works full time	.67	Stabil.
* Employer is average or under weight	.54	--

* Denotes defining variable for the cluster

Table 42 (Continued)

Cluster	Loading	Study I Cluster
V. Weight History (Alpha= 0.77)		
* Years of school completed	.92	Stabil.
* Number of diet plans tried before	.57	--
Number of methods tried before	.57	--
Mother is average or underweight	.54	--
Support from mother for program	.40	Parents
Participant age	-.40	Onset

* Denotes defining variable for the cluster

The Self-efficacy factors remained intact in the second study. The factor represents a global construct of self-efficacy in several domains of eating restraint. In the second study, the high negative correlation between this factor and Worksite Support indicates that those participants who do not work in a supportive environment outside of the home have lower perceived self-efficacy.

In the first study social support for weight control was represented by the Parental Support and the Social Support clusters. Neither cluster from the first study emerged in the second. Instead, a factor representing spouse support emerged. The item related to Spouse Support coupled with the weight status of the spouse to create this

factor. The loadings suggest that a high score is indicative of a supportive spouse who is not overweight. In addition, a Worksite Support factor was found, indicative of a participant who works full time outside of the home in an environment where the supervisor is perceived as supportive of the weight control program. The correlations in Table 43 indicate that those with supportive spouses are less likely to perceive the workplace as supportive.

No factor equivalent to the Age of Onset factor was found in the second study. Similarly, the Global Stability factor was not represented in the second study: several items from this factor became parts of the factors derived in Experiment II.

The Weight Control History cluster represents a subject who has tried many types of diets and many different methods to lose weight. This subject tends to be younger and well educated, with a supportive mother who herself is not overweight.

The contribution of participant age is reversed for the current dimensions when compared to those from the first study. In Experiment I, participant age was part of the Age of Problem Onset factor significantly related to weight loss. It was interpreted that older participants were more successful in their weight control efforts. In the current study, participant age was related to prior weight loss: younger participants with a more intensive

Table 43

Correlations of Study II Factors

	1	2	3	4	5
1. Weight Loss	----	.08	.20	.13	-.18
2. Spouse Support		----	.08	-.31*	.14
3. Self-efficacy			----	-.35*	-.10
4. Work Environment				----	.22
5. Weight History					----

* $p < .05$

history of weight control efforts. This cluster was not related to weight loss. This suggests that the pre-test group difference with respect to age is not of importance.

Perceptions of the Participants

Those who participated in the second study were asked which of the six Experiment I incentive conditions was most appealing. The results are very similar to those of the first study: 18 (75%) of the participants indicated that the monetary reward condition was most desirable; 4 (17%) favoured the no-incentive condition; and 2 participants (8%) indicated a preference for the attendance-contingent incentive. The overwhelming choice was the monetary reward incentive procedure.

A follow-up of the dropouts from the second study was based on a 53% response rate ($N=8$). A total of 17 reasons

were given for terminating the program. Breaking down the 17 responses: 35% were due to scheduling difficulties and other commitments; 24% were related to low participant motivation; 12% suggested that it wasn't the type of program they expected; a similar number listed "other" as a reason. Single endorsements were received for each of the following reasons: "personal reasons", "discouraged with progress", and "too far to travel". The response patterns are quite similar to those found in Experiment I. Participants were asked to rate the importance of various components of the program. The ratings mirror those of Experiment I: regular weigh-ins (Mean=2.92); the "slow and steady" weight loss philosophy of the program (2.83); program leader (2.79); the "don't deprive yourself" philosophy (2.71); program materials and information (2.71); meeting with others (2.54); group discussions (2.46); and the exchange diet system (2.21). The only difference is the higher rating of importance for the program leader and the lower importance rating for the exchange diet system found in the second study.

CHAPTER V

DISCUSSION

The purpose of the current research was to determine the power of incentive over non-incentive procedures, as well as the most effective way of using a given sum of money as incentive to promote weight loss. The study investigated four weight-contingent incentive systems based on commonly employed behavioural reinforcement strategies, as well as two comparison conditions. Aside from the behavioural changes related to weight control, participant perceptions with regards to personal efficacy and program acceptance were examined.

This chapter reviews the data with respect to the five hypotheses, the correlative analyses, and attrition. This is followed by a discussion of the limitations of the study and a critique of the method.

The first hypothesis was related to the influence of monetary incentives on weight control. Several measures of weight loss were used to test this hypothesis. Although many studies simply use weight change from pre- to post-test, the many physiological factors which influence weight may yield misleading results when a heterogeneous sample

such as the one employed in this research is used. Chronically obese individuals are more likely to be hyperplastic, which indicates that greater efforts are required to achieve and maintain normal weight. Similarly, heavier individuals have a higher basal metabolism due to the energy required to maintain their mass. Based on these characteristics, heavier individuals lose weight more easily than those who are lighter during most short term weight loss efforts. To account for these variations in body weight and composition a measure of relative weight change was also used, represented as the percentage of body weight lost.

The average weight loss of 12.98 pounds and 12.31 pounds for the two studies respectively compare favourably to the results reported by other studies. Of 21 behavioural weight loss studies reviewed by Jeffery, Wing and Stunkard (1978), the average attained weight loss was 11.04 pounds. Foreyt, Scott and Gotto (1982) found an average weight loss of 7 pounds over 11 studies; Brownell, Heckerman and Westlake (1979) achieved an average weight loss of 11.01 pounds with a behavioural intervention. Wing et al. (1981) compared attendance- and weight-contingent incentives during the treatment and maintenance phases of a weight control program and found no significant differences between the incentive procedures.

The four weight-contingent incentive schemes produced

equal weight loss over the 10 session/14 week program. The weight loss measures employed in this research indicate that weight-contingent incentives are not superior in promoting weight loss. The data from these two studies did not support the use of incentives to facilitate weight loss.

In the first study, the significant condition effect in the repeated measures analysis of variance was associated with the no-incentive condition. This finding was not replicated in the second study. A major difference in the two studies was related to the nature of the no-incentive condition. In the first study the no-incentive group was not created through the use of random assignment whereas in the second study, random assignment was used. The use of random assignment in the second study created a more powerful test of the efficacy of incentives, and reaffirms the desirability of experimental evaluations over quasi-experimental designs (Campbell & Boruch, 1975).

Other factors can also account for some of the inconsistencies found in the data. The use of difference scores to measure weight change may not be as sensitive a measure of program outcome as a repeated measures analysis of variance. The nature of the change score is such that the measurement error is larger than the individual measurement errors associated with the scores from which it is derived. Therefore, when the magnitude of change is

small it may be lost in an analysis due to measurement error (Allen & Yen, 1979).

Within-group variance is another factor which affected the sensitivity of the analyses. An examination of mean weight loss for the weight-contingent incentives compared to the attendance-contingent and no-incentive groups indicates that the mean weight loss for weight-contingent conditions was greater. One possible reason for the non-significance of the weight-loss results is that for most cases the variances of the groups are of the same magnitude as the means. The problem of large within group variability has been discussed in a paper by Wing and Jeffery (1984). In reviewing 32 treatment groups from nine published studies, they estimated "typical" rates of weight loss, within-group variance, and attrition rates for outpatient treatment programs. Using a power analysis based on these estimates, they calculated that a sample size of 45 participants was needed for each treatment group in order to find a five pound posttest difference between two groups significant when the alpha level (Type I error rate) was .05 and the beta level (Type II error rate) was .20. This number increases to 114 participants per cell when the design includes a 12 month follow-up! They conclude that the problem of small sample sizes is a major obstacle in assessing the effectiveness of weight control treatment programs. In summarizing their sobering analysis

the authors present three suggestions on how this problem may be addressed. First, increasing the size of the treatment groups would provide a better estimate of treatment effects especially in light of participant attrition. However, they are sympathetic to the resources required when a multigroup longitudinal study is considered. The second option is to reduce within-group variability through the creation of more homogeneous treatment groups. The authors acknowledge that the current state-of-the-art has not demonstrated much success in predicting outcomes or providing indicators with which homogeneous groups can be created. As a final suggestion, conventional values of statistical significance might be reconsidered (eg. $p = .10$) which, while increasing the chance of a Type I error, would provide sufficient power to detect promising effects without inordinate increases in sample sizes.

A power analysis (Kirk, 1968) of the significance test for weight change reported in Table 10 indicates that there was about a 40% chance of detecting treatment effects, when alpha was set to a 5% level. Thus given the initial size of the treatment groups and the presence of attrition the current study was not sensitive enough to detect any real differences in weight loss attributable to the incentive conditions.

The rate of weight loss was measured as the number of times an individual achieved their weekly weight loss goal.

The rate of weight loss was monitored to prevent participants from losing weight too quickly. Fast weight loss typically involves a degree of caloric restriction that requires medical supervision, which was not available in this program. In addition, quick weight loss often causes the body to physiologically compensate through a reduction in the basal metabolic rate. This defense mechanism enables the body to withstand fasting conditions; weight loss attained in a semi-fasting state is difficult to maintain over time (Stunkard, 1983). The weight-contingent groups were effective in maintaining the desired rate of weight loss; no differences were found between the no-incentive and weight-contingent incentive groups. However, the no-incentive group was more successful than the attendance-contingent group. The superiority of the no-incentive group over the attendance-contingent group may reflect the high attrition of the no-incentive group and a resultant motivational bias. The reason for this difference is not apparent from the data.

The next three research hypotheses were related to other outcomes associated with the incentive procedures: attendance and attrition, program acceptance, and self-efficacy.

Attrition was influenced by the use of incentive procedures. The monetary response cost group and the nonrandom no-incentive group both had significantly higher

attrition rates compared to the other conditions in the first study. On the other hand the data from the second study did not indicate a significant difference in attrition related to a monetary incentive, although the randomized no-incentive group had an attrition rate double that of the incentive condition. If there is a lower attrition rate related to incentive procedures it may have pragmatic significance from a programmatic perspective. In fact, the suggestion that obesity be redefined as an adherence problem (Brownell, 1983b) highlights the importance of the issue. If the Experiment I no-incentive group is used to indicate the base rate for attrition (69%), the weight-contingent incentives (excluding monetary response cost) resulted in an average 75% decrease in attrition! Even the attendance-contingent incentive reduced attrition to 31%. These findings are in accordance with those of Follick, Fowler and Brown (1984) who reduced attrition by 50% through the use of a monetary incentive procedure. This is similar to the results from the second study where the attrition rate for the monetary-incentive group was found to be 50% of that for the no-incentive condition.

The potential of the incentive in reducing attrition is evident whereas the underlying explanation is not as clear. The idea of commitment to the program has been used in the past to explain the effects of monetary deposits or

fees. Participants who pay for a program may feel that they should at least "get their money's worth" by attending the sessions if nothing else (Black & Friesen, 1983); in contrast, those attending a free program may feel less commitment to the program (eg. Meinberg & Yager, 1985). That motivation is related to paying for a program is not unlikely. A selection bias may exist where only those individuals with some degree of motivation would be willing to pay the required fee (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). Thus in a free program, less motivated individuals are more likely to enroll. Compensation in the form of additional screening of the clients is possible. Brownell has suggested the use of established entrance criteria for clients wishing to join a program. As an example, he requires prospective participants to lose a pound a week and complete self-monitoring diaries for two weeks prior to the beginning of the program (Brownell, Marlatt, Lichtenstein, & Wilson, 1986). In combination with a monetary deposit, this procedure screens out those individuals who do not have the commitment necessary to lose weight at the time of the program.

The monetary response cost group was plagued by a high rate of attrition. None of the analyses reported shed any light on the reason underlying this finding. The comparability of groups following random assignment did not reveal any characteristics to explain the differences.

Examination of the experimental and correlative data were equally unfruitful. Given that the attrition rate seems to be the product of an interaction which did not influence the other monetary and response cost groups, and that no alternative explanation was found, a conclusion that the monetary response cost procedure resulted in a high dropout rate seems warranted.

The only information which may be instructive is based on Figure 2, which suggests that attrition for the monetary response cost condition was contingent to the timing of the program sessions. That is, when the program sessions changed to a biweekly schedule, seven of the nine dropouts discontinued with the program at that time. Response cost is a punishment procedure, and thus its use may elicit many of the side effects associated with punishment procedures (Kazdin, 1972a). Aggression, response suppression, inflexible behaviour, avoidance, generalization and modeling of punishment are some of the effects associated with aversive control procedures (Balsam & Bondy, 1983).

Kazdin (1972a) identified only two side effects related to the implementation of response cost procedures: escape (avoidance) and emotional effects. In the current research, there is no indication of, or method of verifying, the existence of negative emotional consequences resulting from the monetary response cost procedure among those who terminated the program. However, the attrition

rate observed may be an indication of avoidance, where the lack of success in achieving a weekly weight goal and the contractual contingency were sufficiently overwhelming that subjects did not come to class and simply dropped out.

The effectiveness of the response cost procedure is related to the cost magnitude represented by the fine or loss, according to Kazdin (1972a). This idea might help clarify both the attrition rate associated with the biweekly schedule and the comparison with the lottery response cost group. Almost all of the study participants indicated that when the program moved to a biweekly schedule, it was much more difficult to maintain their rate of weight loss. Many indicated that they had adopted a perspective where they could "take the first week off" from their weight control efforts, and then "get back on track" for the second week in time for the class meeting. They reported that this idea was resistant to change. For monetary response cost participants perhaps the weekly loss of \$8 was sufficient to counterbalance the difficulty in reaching the weight loss goal, and therefore they were motivated to continue in the program with some success. However during the biweekly program, the difficulties encountered in maintaining the rate of weight loss may have seemed much greater than the perceived reward of not losing \$8. That the incentive was stated in aversive terms added to the difficulties and avoidance was the alternative

adopted. Again, there are no hard data to buttress this explanation, however the explanation is satisfying to the experimenter in light of his encounters with the participants. Several participants reported that they would probably perform better if they were rewarded for their successes rather than punished for their failures. There was not a comparable attrition rate in the lottery program which may reflect the differences in the magnitude of the costs and benefits of success. The long term benefit of success was much greater for the lottery group compared to the monetary group, albeit the probability for payoff involved some degree of chance.

In conclusion it seems that the monetary response cost procedure was not powerful enough to maintain the motivation of the subjects during the biweekly sessions, and many opted to avoid the situation. Monetary response cost procedures may be useful in a weekly program; the magnitude of the cost should be increased for longer time intervals. The low attrition rate in the lottery response cost condition tends to support these findings.

Program acceptance was measured in terms of: (a) program satisfaction, (b) incentive satisfaction, (c) perceived program effectiveness, (d) group process and (e) reactance. Program satisfaction, based on a five-point scale of satisfaction with the program leader and materials, increased over time but did not vary across any

of the conditions. The post test ratings for both studies ranged from 4.2 to 4.7 indicating a uniformly high degree of satisfaction with the program. Ratings of incentive satisfaction indicated a convergence of participant perceptions over time: initially recipients of the monetary incentives were more satisfied than those receiving lottery and attendance incentives. The interaction with time indicates a process, where lottery participants needed time to get used to incentive procedures. However, like program satisfaction, ratings of incentive satisfaction were similar between the groups--the use of monetary incentives was viewed positively. Perceptions of program effectiveness were not related to the presence of incentives. Although the no-incentive group in Experiment I rated the program as less effective than the other groups, this difference was neither significant nor replicated in Experiment II. However the mean weight loss of the no-incentive group members in the first study suggest that their perceptions of effectiveness were accurate in that they perceived the program was less effective. Incentive-based programs received high ratings of effectiveness: members of the attendance-contingent group rated the program as effective as those in weight-contingent groups.

Three indicators of group process were used in this research: group satisfaction, acceptance and attraction. Ratings of group satisfaction increased over time for all

of the Experiment I groups; the lack of confirmation by the Experiment II data may be due to a ceiling effect related to the high midprogram assessments of group satisfaction.

In the first study, the no-incentive group was a striking contrast to the monetary response cost group, which had the highest ratings of group satisfaction and acceptance in spite of a high attrition rate. The surviving members of the monetary response cost group formed a close relationship, where participants would often go out together after the session and all of the members knew each other by name. The surviving members attended regularly. It was the small size of the group which facilitated the development of this high degree of cohesion. Although the no-incentive and monetary response cost groups both had very high attrition rates, the monetary incentive lead to more regular attendance which facilitated the development of group cohesion; the sporadic attendance patterns of members in the no-incentive group, particularly in Experiment I, did not foster the development of cohesion.

That no differences in group process were identified between the monetary and lottery reinforcers was somewhat of a surprise. The lottery could be viewed as a competitive reinforcer in that only three people could win in any lottery condition. One could see where a nonsupportive situation might develop as competition for the \$1000 first

place prize escalated over time. No evidence to support this notion was found.

Reactance to the program was minimal. Initially high levels of reactance for the lottery reinforcement groups abated over time, coinciding with the slowly increasing reactance scores of the monetary reinforcement group. This temporal trend had the net result at post testing of uniformly low level ratings of reactance, which were similar to those of the no-incentive group. Again, the possibility of higher levels of reactance associated with the lottery conditions were not manifest. Unpredictable payback conditions did not foster any uniform negative reactions to program. The attendance contingent group reported the lowest level of reactance. The predictability of the attendance-based payoff might be perceived as the simplest contingency and is a possible explanation for the low level of reactance.

Four dimensions of self-efficacy were used in this research. The findings from Experiment II are quite different from those of the initial study. Self-efficacy increased over time for all participants in the first study, indicating that they had strengthened perceptions of their ability to restrain from eating in many situations. In comparison, the only significant findings with respect to self-efficacy in Experiment II were a condition and time trend for emotional self-efficacy. One possible explana-

tion for the inconsistent findings may rest on the difference in the magnitude of self-efficacy ratings between the two studies: the ratings of self-efficacy were consistently higher in the second study and thus there was less opportunity for a measurable time trend.

In comparing the findings, the measure of appetitive self-efficacy in Experiment I demonstrated a simple increase over time; this did not occur in Experiment II. The measure of disequilibrium self-efficacy did not change over time or with respect to group membership; this is confirmed by the data from the second study. In comparing situational self-efficacy across the six conditions, there was an increase over time. In addition, the no-incentive condition had the lowest ratings. There were no significant group differences or time effects found in the second study. With regards to the measure of emotional self-efficacy only a time effect was found. In contrast, the data from the second study found a significant group effect as well as a time trend, with the no-incentive group having consistently higher ratings than the incentive-based condition.

The major discrepancies between the two studies are concerned with emotional and situational self-efficacy. In both cases, the disagreement implicates the no-incentive group. The lack of a randomly assigned no-incentive group in the first study supports an interpretation based on the

data from Experiment II. However, given that no pretest differences were found in the Experiment I groups with respect to emotional and situational self-efficacy, and given the pretest differences in the magnitude of the ratings between the two studies, a conservative conclusion would probably indicate that further research is needed to clarify the relationship between incentive and no-incentive groups with respect to these measures of self-efficacy. Until further research is available, the data from Experiment II indicates that incentives are associated with lowered perceptions of emotional efficacy among the participants but have no influence on individual perceptions of situational self-efficacy.

According to Bandura's theory (1977), attribution plays a role in moderating the perceptions of efficacy related to performance. If members of the weight-contingent incentive groups attributed their success to the incentive system, then their locus of control was external and their feelings of personal agency were less likely to increase. Members of the no-incentive group were not responding to a contingency, therefore any weight lost would be attributed to their own efforts. This supports the tentative conclusions with respect to emotional self-efficacy reported above.

In conclusion, the monetary incentive systems under study had limited influences not directly related to weight

loss. Overall, the role of monetary incentives with regard to the outcomes measured can be considered minimal. More often, temporal effects were found rather than effects related to experimental conditions. Evidence of the influence of the monetary incentives were found with respect to attrition and group acceptance. The results indicate that the monetary response cost incentive was not powerful enough to sustain the motivation of participants during biweekly sessions. Weekly sessions or an incentive of greater magnitude seems necessary for this procedure to be effective. The use of an incentive has no net influence on perceptions of program satisfaction, perceived effectiveness, group satisfaction or incentive satisfaction: no differences were evident at the posttest assessments. The sociometric ratings of group acceptance were consistently lowest for participants in the no-incentive groups. Based on the data from the first study, this seems largely due to the irregular attendance patterns of the members since another small group, monetary response cost, developed a high degree of cohesion among the members. There was no appreciable reactance aroused by the various incentive procedures: low ratings of reactance were found for all conditions. Given the inconsistencies found between the two studies for some of the outcome variables of interest, further research seems necessary to better understand the role of incentives in behaviour modification programs.

The last hypothesis, related to the role of risk-taking in moderating the effects of the incentive procedures, indicates that self-reported risk-taking was unrelated to any of the measures used in this study.

Reporting on two studies related to the use of monetary incentives in weight management has provided a unique opportunity to examine a methodological issue fundamental to basic science. At issue is the use of random assignment in the creation of control groups. Many of the findings with respect to the no-incentive control group were not consistent across the two studies reported. One of the major differences and a difference to which some of these inconsistencies should be attributed is the nature of the control groups used, *ie.* random versus nonrandom assignment. Are those people who are willing to pay for a program or willing to participate in university sponsored research different from those attracted to a free program?

In a review of the literature cited throughout this paper, among 18 studies found involving group comparisons data, 14 (78%) indicated the use of random assignment in the research design. This suggests that just over 20% of the studies involved comparisons based on procedures other than random assignment, such as cohorts, and non-random assignment procedures. A small number of studies did not provide sufficient information regarding the research design and the formation of comparison groups.

Given the inconsistencies between the two studies presented and the within-group variability discussion described earlier by Wing and Jeffery (1984), the importance of a powerful experimental design is evident. For progress to be made in the area of weight management, researchers should take every reasonable precaution in the design of their research projects. Designs which rule out competing hypotheses and have the sensitivity to detect treatment effects are necessary.

Turning now to the consideration of the correlative data, the analysis of the participant characteristics resulted in six dimensions. The domains of these composites were: weight loss, self-efficacy, parental support, age of problem onset, social support, and overall life stability. These domains were largely independent of each other. A cross-validation of the dimensions on a smaller sample indicates a general consistency in the domains tapped by the measures. There was not a perfect replication in the second study, however the data supports the patterns found in the first experiment.

The dimension in Experiment I representing "Age of Problem Onset" seems to differentiate those people who gained weight later in life from those who have been overweight most of their life. In addition, this cluster represents individuals with a low restrained eating score. Based on the work of Herman and Polivy (1975; 1980) it

seems reasonable that this dimension is related to the Fat Cell Theories of obesity (eg. Bjorntorp et al. 1975; Keesey & Powley, 1986) and may distinguish between individuals with hyperplastic (many fat cells) and hypertrophic (enlarged fat cells) obesity. Consistent with this belief, this dimension is correlated to the Self-efficacy and Weight Loss factors. The difficulty in managing hyperplastic obesity would suggest that individuals with a later onset of obesity would be more successful and with this success would come stronger perceptions of personal efficacy. Generally the correlations among the six clusters derived from the analysis are independent: only two have any nontrivial correlation with weight loss. This relative independence of the dimensions is consistent with the findings of Wilson (1985) who concluded in a review of prognostic factors for the treatment of obesity that physiological factors such as pretreatment body composition (percentage of body fat) remain the most powerful predictors of treatment outcome. No purely physiological measures were employed in this study.

Social Support was not related to any of the clusters derived in Experiment I: spouse support was related to both self-efficacy and a worksite support in Experiment II. As suggested in the last chapter, the data from the second study represents situations where participants with normal weight spouses report a high degree of support from the

workplace. When the spouse is not involved the participant may compensate by seeking support elsewhere.

The three profiles of weight loss indicate that very successful participants perceived a high degree of personal efficacy, as well as support from parents and peers, and a stable life situation. Their weight problem was a more recent concern for them. Thus a high score on the weight loss factor is indicative of high scores on the other factors as well. In comparison, the medium and low weight loss groups do not show the same ordering on the other factors: the most significant discriminating factor is related to age of problem onset. The profiles emphasize the importance of efficacy attributions and age of onset relative to perceived support from others. The importance of discriminating early and late onset weight problems, and empowering the individual to change the problem are major concerns for a successful weight control program.

A central thesis to this research was the use of monetary incentives to reduce program attrition and thereby improve an individual's chances for success in weight control. Data related to the reduction in attrition attributable to the use of incentives have already been presented (eg. Colvin, Zopf & Myers, 1983; Brownell, Heckerman & Westlake, 1979; Hagen, Foreyt & Durham, 1976; Sperduto & O'Brien, 1983), although some exceptions have been reported (eg. Black & Friesen, 1983).

While the number of studies reporting a follow-up of participants to investigate maintenance is small (Wilson, 1985), the number of studies reporting a follow-up of program dropouts to investigate the causes of attrition is even smaller! Not surprisingly, very little is known about the decision to terminate. It has been discussed earlier that better screening procedures at intake would likely eliminate those individuals who are less motivated from participating in the program. Waning motivation was the second most cited reason for dropping out. When considered in combination with the third most endorsed choice, discouragement due to lack of success, these two reasons account for a large number of the decisions to dropout. It could be argued that attrition due to being discouraged with poor progress is a variant of the issue of motivation.

A follow-up of dropouts at the conclusion of this weight management program indicated that almost everyone cited "scheduling difficulties and other commitments" as a reason underlying their decision to quit; half of those who dropped out indicated that this was the primary factor influencing their decision. Overall, the number of dropouts who cited other commitments was about equal to those who cited motivational reasons. Wankel (1979) reports that studies of exercise program dropouts consistently indicate a lack of time or inconvenience as the major reason given for termination. While this may

simply be a convenient excuse or rationalization, it may also reflect a real concern to be addressed. Many programs are offered at a fixed time period which extends over many weeks at a location which is as often as not, more convenient for the researcher. Given that these programs typically attract women rather than men, and that women still maintain many of the family household and child care duties, such program characteristics are likely to promote attrition. The current program was offered over a 14 week period from February to May. There is a distinct possibility that weather further confounded scheduling. The available data do not permit a determination of where the truth lies on this issue--whether time constraints are a reason or rationalization. However, the possibility of such time conflicts raises many issues in the delivery of programs which should be addressed in the future.

Brownell, Heckerman and Westlake (1979) were unsuccessful in discerning those individuals "at risk" for dropout. Their analysis was based on demographic information, weight history, eating behaviour and psychological factors. The only difference they identified was a increased likelihood for those individuals with juvenile onset obesity to discontinue.

Pekarik, Blodgett, Evans and Wierzbicki (1984) distinguished between early and late dropouts: they found that early dropouts differed from late dropouts and program

completers on a measure of depression and the Jackson Personality Inventory (Jackson, 1976) scales of Breadth of Interest, Energy Level, Organization, and Responsibility. Their sample of dropouts was small, and the results based on a single behavioural weight control program. Their results do indicate that dropouts themselves are not a homogeneous group, and that the early identification of a subgroup of dropouts may be possible at intake.

A similar analysis of the dropouts in this program is complicated by the program design which involved a switch from weekly to biweekly session half way through. In addition, most of the dropouts are from two of the treatment groups supporting the idea of incentive-related attrition. Most of the early dropouts were in the weekly no-incentive group, whereas a majority of the late dropouts were from the biweekly monetary response cost group.

Considering the information presented about attrition, non-outcome client characteristics were not particularly useful in predicting dropout. Clearly the high rate of endorsement for "scheduling difficulties and other commitments" as a reason for termination indicates that influences external to the client may be salient in determining dropout. In light of the differences in dropout related to the weight-contingent incentives, a monetary response cost procedure did not provide sufficient motivation to overcome some of these difficulties.

The participants least likely to drop out were those who attended the program with their spouse or spouse-equivalent. The dropout rate of couples was half that of those attending in groups or as individuals. This suggests that a certain degree of support at the home or strong commitment with the significant other promotes attendance. This is certainly not a new idea. This commitment to the program may work to give participants added motivation and or resources to overcome inconveniences suggested by "scheduling difficulties and other commitments". A couple committed to the same goal may be more resourceful and dedicated to overcoming difficulties blocking their progress.

The evidence suggests that there is a place for monetary incentives in a behaviour modification program. With the exception of a monetary response cost incentive procedure, incentives can act to moderate attrition increasing the number of participants who can benefit from the program. The use of incentives did not produce negative side effects on the part of the participants in terms of program acceptance, or self-efficacy. The use of incentives were associated with greater perceptions of personal agency when compared to no-incentive participants. Nonetheless the strength of these perceptions increased over time. In terms of weight loss the type of incentive scheme used was not very important, particularly with

respect to the predictability of the payoff. When asked their preference, participants overwhelmingly indicated that reward was the procedure of choice; almost half indicated a preference for a system of monetary reward. The final evidence in favor of a monetary reward incentive system was found in the analysis of participant maintenance. For many people a maintenance program is essential for long term success in weight control: participants in the monetary reward group were more likely to continue with a subsequent maintenance program. Although no differences were found in the follow-up comparing those in the maintenance program with others, it is possible that this is related to the content or intensity of the maintenance program.

From the perspective of the experimenter, the importance of the incentives was clear. This perception was not shared by the program participants. The weigh-ins and program philosophy were rated as most important whereas other more tangible aspects of the program were less important. Monetary incentives were rated as the least important component of the program by the participants. Fisher et al. (1982) reported a similar finding: the helpfulness of a contingency contract was rated ninth out of eleven procedures employed in a smoking cessation program. Participants in a study by Chapman and Jeffrey (1978) indicated that self-reward and rewards by others

were not very helpful techniques in their weight control program.

In any research effort, many factors influence the generalizability of the results obtained. This was no less true in this research. Due to the nature of the incentive procedures chosen, the contingencies upon which the incentives were based, the type of program offered, the subject pool, and the comparison groups used in the programs, several limitations should be evident.

The incentive procedures used in this research were based on fundamental principles in the learning literature related to reinforcement. They were also chosen on the basis that variations of these principles had been used in prior research. The purpose of the research was to determine the most effective way of using a specific sum of money to provide incentive for an individual to stay with the program and to promote weight loss. The evidence indicates that a large sum of money is not required to motivate individuals. These results are derived from the implementation of a single incentive procedure. However, the use of a combination of approaches may be successful in further enhancing the motivation of the participants. The use of both an attendance-contingent and weight-contingent incentive may provide additional motivation for participants. An alternative strategy would be to redistribute money lost by unsuccessful participants to those who

attained some predefined measure of success (eg. Coelho, 1983). The coupling of such strategies provide further directions for research in motivating client participation.

The contingencies of the strategies employed for the experimental groups were related to individual weight change. Other contingencies could have been used such as reduced caloric intake, or the maintenance of an exercise program. However, these outcomes are difficult to monitor by anything other than self-report data, and their ultimate outcome remains weight contingent. Nonetheless, the importance of increased physical activity or exercise in weight control cannot be overstated and an investigation of the effects of incentives on adherence to an activity program is a logical continuation of the present research effort.

The use of group contingencies instead of individual performance criteria is another possible incentive strategy. While the team approach has been explored in other contexts such as smoking cessation (Stachnik & Stoffelmayr, 1983), little research on the team approach to weight control has been published. A potential advantage of such an approach might be the development of a support network among the group members. This supportive network might act to prevent relapse between group meetings and extend the influence of the intervention beyond the duration of the program. The same strategy implemented

within the context of a work setting might initiate the development of a lay health network or informal support group at the worksite to maintain the momentum achieved during the program. A strong network might over time change formal and informal health norms at the worksite which could lead to a reduction in the availability of problem foods or support for a worksite fitness program. Again, the movement from individual contingencies to group contingencies may increase the power of the program.

The monetary contingencies were used as an external motivation to support the intrinsic motivation of the participants to lose weight. Encouraged by their success under the motivation for monetary gain, it was envisioned that over time there would be an increase in the intrinsic incentives for weight loss among participants. Thus a possible confound occurs in truly determining the effectiveness of the monetary incentive strategies. Successful participants may well have been those individuals who developed intrinsic incentives to carry on their efforts over the duration of the program. The success of an incentive strategy may be related to the participant's ability to develop their own incentives for controlling their weight. Fisher and associates (1982) warned that while helpful in energizing a program, incentives ideally should not distract participants from naturally occurring consequences of program maintenance. Limited data related

to perceptions of efficacy and the importance of various program components suggest that the external incentives did not undermine all internal motivations of the participants.

The program offered in conjunction with this research was a standard group behavioural weight control program. Associated with this approach is a group presentation, which limits the ability of the program leader to focus on individual problems or concerns, and fixed meeting times which require a degree of commitment and flexibility from the participants.

As with any group, a single program cannot adequately address all the needs of all the members. Group members bring with them many varied situations and concerns. Some members may feel frustrated because unique features they feel are associated with their weight control problem may not be mentioned in the group. The diversity of the group members often prohibits certain activities which would otherwise prove useful, for example an exercise component to the program. The reason for a group program is more often than not a question of economics: a group format permits a larger number of clients to be serviced per unit of resources.

The program meets at a predetermined time on a regular basis for some number of weeks. This necessitates that participants keep this block of time free over an extended period. That this was problematic appeared evident by the

frequency with which scheduling difficulties was elicited as a reason for terminating the program. An individually-based program would be much more adaptable to the lifestyles of the participants. Such a program could be offered as individual treatment sessions, through cable television or as a correspondence course. In opposition, the opportunities for developing a supportive relationship with others experiencing the same problem decreases. Given these considerations, the relative power of the monetary incentive procedures is not known.

The last area of limitation for the current research is the nature of the comparison groups used in the study. Members of the attendance-contingent comparison group were randomly assigned and were required to pay the same deposit as the experimental groups. No pre-test differences were uncovered thus the treatment effects identified appear reliable. Another test of the no-incentive condition might involve asking group members to pay \$40 to participate without revealing that the money would be refunded at the end of the program. This changes the nature of the comparison group with respect to participant motivation and commitment.

Many have lauded the importance of incentives in health promotion and other behaviour modification programs in their power to attract participants and reduce attrition throughout the program. Regardless of the benefits which

can be accrued from a behaviour modification program, if no one is attracted to the program, no one is helped and therefore the program is of little utility. Similarly, if the nature of the program is such that it does nothing to motivate participants and hopefully reduce the baseline attrition rate found in programs, these people cannot benefit from the program. Incentives can act to attract participants to programs through their novelty and by the opportunity for participants to get something tangible for their efforts. The rewarding aspects of incentives can also make increase the interest and motivation of participants during a program to promote goal attainment. The uncertainty in the conclusions of the two studies reported suggest that the true importance of incentives is unclear, given the few consistent findings between the two studies. The only consistent incentive-related findings are related to attrition and group acceptance. Even here, further research is highly desirable.

The findings with respect to the first and second experiments are different in several instances. The purpose of the second study was to replicate the findings of Experiment I with respect to the no-incentive group, which in the first study was not created by random assignment. The data for the no-incentive group in the second study often were not comparable to those of the first study. One of the reasons for the findings reported

may be that no real differences existed as a result of the incentive procedures used. The power analysis reported indicates that even if differences did exist the study was probably not sensitive enough to detect it. Another explanation is likely related to the different recruitment and assignment procedures used. Participants in the Experiment I no-incentive group responded to an advertisement for a free program. In the second study, no mention was made of differing monetary incentives and participants did not know until the first meeting whether or not there would be a fee. This likely produced groups with different motivations, and expectations. This may account for some of the differences found. Another factor which may account for differences between the two studies was the experience and resources of the program leader--in this case the experimenter. In the first study the program leader was conducting six groups a week, using a program which was new to him. In the second study, the more leisurely pace of two groups per week and having had prior experience with the program likely produced a "better" program the second time around. There is some evidence to support this in the higher ratings of perceived program effectiveness and group satisfaction found in the Experiment II data.

Several directions for future investigations have been suggested by the findings of this study. Research efforts could be directed at combining incentive procedures for

multiple contingencies to assess the truth behind the maxim "more is better". Another line of research involves group contingencies to facilitate the development of group support. Finally, the use of incentive procedures in less regimented treatment settings and/or minimal intervention situations might prove fruitful in reaching those people with many commitments in their lives. This approach might prove useful in worksite programs where naturally occurring supports exist.

APPENDICES

APPENDIX A

Advertisements Used in Recruiting Participants

Lansing State Journal, 1986.

Sunday, Feb. 2, 1986

St. Johns students giv

By BETTY JANE MINSKY
Lansing State Journal

ST. JOHNS — Eighteen youths from Rodney B. Wilson Junior High School in St. Johns plan to converge on the Maple River

State Game Area today laden with 14 wood-duck houses.

Jerry Nichols, vocational teacher at the school, said the students built the houses as part of an outreach project headed by Jim Armantrout, a Clinton County

DOLLARS FOR POUNDS-- WEIGHT LOSS CHALLENGE

Persons who want to lose weight are invited to participate in a weight management project which provides participants with a chance to make money as they lose weight.

If you are interested in learning more about the project, return the bottom portion, or call 371-5487 (9 a.m. to 7 p.m.). You will be contacted and informed of the time and place of the introductory meeting. Those attending the meeting will not be obligated in any way to participate in the project.

Return to:

Brian Mavis
Weight Loss Program
Department of Psychiatry
Michigan State University
East Lansing, MI 48824

NAME _____

ADDRESS _____

PHONE: WORK _____ HOME _____

MSU Bulletin, 1986.

Jan. 30, 1986

Around the

Win by losing in weight program

You can win by losing at the MSU College of Osteopathic Medicine, where researchers are looking for people who would like to be paid for losing weight.

The program, developed by faculty in the Department of Psychiatry, will study incentives to help people maintain their weight loss. It uses a comprehensive approach including behavior modification, nutrition education, diet, exercise and social supports, in addition to the monetary incentives.

Participants must be at least 18 years of age and not hypertensive, diabetic or pregnant.

The 10-session program, which begins the first week in February, will be held at 7 p.m. and 8:30 p.m. Tuesdays, Wednesdays and Thursdays at MSU's Center for the Study of Human Performance. Five groups, with 20 participants in each, will be formed.

Each participant will be asked to pay \$40, which will be matched by the program. Meeting or exceeding weekly weight loss goals will increase the individual's chances of winning money.

For more information, call Brian Mavis at 371-5457.

STUDY II

Lansing State Journal, 1987.

Nation Lansing State Journal ■ Sunday, Feb. 1, 1987 16A

NEED TO LOSE WEIGHT?

Persons who want to lose weight are invited to participate in a weight management project sponsored by the Michigan State University Depts. of Psychology and Psychiatry.

If you are interested in learning more about the project, call 353-5035 on Tuesday or Thursday during regular business hours. You will receive an appointment for an introductory meeting. Those attending the introductory meeting are under no obligation to participate in the project.

APPENDIX B

Weight Control Program Outline

Program Schedule

Week 0	Program Overview; Questionnaires
Week 1	Facts About Weight Control; Food Diary Analysis
Week 2	Foods Facts; The Exchange System
Week 3	Why Do You Eat: Emotions and Food?
Week 4	Managing Eating Behaviours; Changing Your Environment; Problem Solving Exercise
Week 5	Managing Your Success; Building Social Support
Week 6	Physical Activity and Weight Management; Questionnaires
Week 7	-----
Week 8	Discussion; Food Diary
Week 9	-----
Week 10	Discussion; Eating out
Week 11	-----
Week 12	Reading Package Labels; Registered Dietician
Week 13	-----
Week 14	Final session; Monetary payback; Questionnaires

PROGRAM OUTLINE

Orientation Sessions will be held several evenings two weeks before the scheduled start of the program. These sessions will largely be devoted to discussing the program in general. The monetary deposit will also be explained. Those interested in participating will be asked to complete the intake assessment survey. In addition, the addresses and phone numbers of participants will be taken so that notification of meeting group assignment can be made. All participants will complete an informed consent form.

All those interested in participating will be asked to complete a three day food diary prior to the first meeting of their group.

- Week 1** **Program Overview:** the first session will again describe the content of the program as well as the incentive scheme which will be used. Contracts will be completed and questions answered about the incentive scheme.
- The first session also features a presentation by a physician on the physiology of obesity and weight control. The ensuing discussion permits participants to ask questions about physiological aspects of losing weight, eating disorders and health risks associated with obesity.
- Week 2** **Food Facts:** Basic nutrition information will be reviewed. Concerns which will be covered will include: (a) what makes up a balanced diet? (b) what are calories? (c) what is a safe diet? In addition, individuals will be shown how to analyze their food diaries to look for problems in their food consumption patterns.
- Week 3** **Breaking Behavioural Chains:** Behaviour chains associated with snacking and consumption will be discussed. Management of these antecedents to eating will include managing the urge to eat, moods and emotions associated with eating, and alternative activities to eating.
- Week 4** **Managing Eating Behaviour:** Strategies dealing with meal-related behaviour will be the focus, including meal planning and preparation, portion control, and slowing down at mealtimes. A problem solving worksheet which allows participants to prioritize problem behaviours and devise solutions for the problems will be introduced.
- Week 5** **Managing Your Success:** Once some basic behaviours have been targeted, generalizing to other situations is possible. Techniques for planning in advance, and building social support will be presented.
- Week 6** **Physical Activity and Weight Management:** Guidelines for safely increasing one's level of activity will be presented as a supplemental weight management technique. Information from the American Heart Association will be provided to participants. A food diary will be assigned for the next session (2 weeks). Midprogram assessment questionnaires will be distributed.

For sessions during weeks 8, 10 and 12 the format will move to a more interactive format. After the weigh-in, a short presentation on some topic of interest to the group will be made by the program leader. Most of the time will focus on a group discussion of problems and strategies used by individuals in their own programs.

- Week 8** Having been two weeks since the last session, a discussion of some of the problems encountered will be the main focus to assist individuals in problem-solving. In addition, food diaries completed during the prior two week period will be compared to those completed at Session 1. This will provide feedback on the success of individual behaviour modification efforts and highlight areas which still require active intervention.
- Week 10** A discussion of how to eat at restaurants and stay on track will accompany the discussion and weigh-in segments. A handout about dining out created by the American Heart Association is also distributed.
- Week 12** A short presentation on reading package labels will be given, accompanied by a handout from the FDA on packaging regulations. Most of the program will be a question-and-answer session given by a registered dietitian.
- Week 14** During this final class session, posttest questionnaires will be completed by all participants after the weigh-in. This will be followed by a debriefing of the purpose of the study and an explanation of the various incentive conditions used in the research. Finally, behavioural contracts will be evaluated and monetary payoffs completed.

APPENDIX C

Sample Behavioural Contract

WEIGHT MANAGEMENT CONTRACT

I, _____ agree to deposit \$40, which will be matched by the project leader, as part of a program to help me lose weight at a rate of _____ pound(s) per week. The program will run for 10 sessions and each session during which I have shown a successful reduction in my weight I will be credited with _____. The final determination of my success is based on the scale used by the program leader for all participants.

A record of my achievement is given below:

	WEIGHT	CREDIT*	SIGNATURE
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____
8	_____	_____	_____
9	_____	_____	_____
10	_____	_____	_____

TOTAL: _____

* indicates the amount credited each week

The behavioural contract on the previous page was used for the lottery and monetary reward conditions. The client's name is written in the first space; the weight loss goal of 1.0 or 1.5 pounds per week is indicated in the second space. In the last space, the reinforcer is indicated: either a lottery ticket or credit for \$8.

The contract for the response cost conditions was similar except that the second sentence reads, "The program runs for 10 sessions and _____ will be deducted each session during which I do not show a successful reduction in my weight." Again the blank is completed to indicate that \$8 or a lottery ticket is forfeit.

For participants in the attendance-contingent condition, the text of the contract reads, "I, _____, agree to deposit \$40, which will be matched by the program leader, as part of a program to help me lose weight at a rate of _____ pound(s) per week. The program will run for ten sessions and I will receive \$8 credit for each session which I have attended, to be paid at the last session."

In the no-incentive group, the contract read as follows: "I, _____, participate in this behaviour modification and nutrition education program, with the goal of losing weight at a rate of _____ pound(s) per week. The program will run for ten sessions which are spread out over 14 weeks."

APPENDIX D

Registration and Consent Form

Registration Form

Name: _____

Address: _____

_____ Zip _____

Telephone: Daytime _____ Evening _____

In order for the university to issue
money at the end of this program, _____
indicate your social security number.

Sessions for this program will be held on Tuesday,
Wednesday and Thursday evenings. If there is any evening
on which you CANNOT attend, please indicate below.

I cannot attend sessions on: _____ Tuesday evening
_____ Wednesday evening
_____ Thursday evening

Programs will be held at both 7:00 pm and 8:30 pm in the
evening.

We cannot guarantee the time of your program, however
please indicate below if one time is more convenient for
you to attend.

_____ I would rather attend the 7:00 pm session

_____ I would rather attend the 8:30 pm session

Is there someone you would like to be in the same program
with, that is, are you driving with someone or attending
with a family member?

_____ No

_____ Yes. If so, who? _____

Do you know anyone in any of the other groups?

_____ No

_____ Yes. If so, who? _____

Please read and sign the attached statement, which the
university research ethics committee requires for your
participation.

INFORMED CONSENT

1. I have freely consented to participate in this study being conducted by Brian Mavis. I understand that the study involves a comparison of the use of monetary incentives.
2. The study has been explained to me, although full disclosure of the complete design will not take place until the last session.
3. I understand that the \$40.00 I contribute to the program will be equally matched by the program leader, and that I will have a chance to receive money for my participation. All monies to be awarded will be distributed at the completion of the program. I must attend the last session or make prior arrangements with the program leader in order to receive money due to me.
4. I understand that I am free to discontinue my participation in the program at any time. However, if I decide not to continue I understand that the \$40 deposit I contributed will be forfeit. I also understand that only by participating fully in the program am I eligible for the \$40 contribution from the program leader.
5. I agree to complete questionnaires to be administered during the course of the program.
6. I understand that the results of the program will be strictly confidential. Only group results will be reported; no individuals will be identified.
7. I understand that my participation in the program does not guarantee any beneficial results to me.
8. I agree that at this time, I AM NOT (a) diabetic, (b) under medical supervision or treatment for high blood pressure, or (c) pregnant. Should this change during the course of the program, I will immediately notify the program leader.
9. I understand that, at my request, I can receive additional explanation of the study after my participation is completed.

Signed: _____

Date: _____

A similar informed consent and registration form were used for the Study I no-incentive group. The registration for included all of the information listed, except it did not provide a place for participants to indicate the evening or time of convenience to them. The consent form used for the no-incentive group did not contain any references to monetary deposits and reimbursements.

APPENDIX E

Measurement Instruments

PART I: BACKGROUND INFORMATION

1. Age: _____ 2. Sex: ____ (1) Male ____ (2) Female
3. Marital Status: ____ (1) Single, never married ____ (2) Married
 ____ (3) Divorced or separated ____ (4) Widowed
 ____ (5) Other: _____
4. Education: Number of years of school _____
5. Ethnic Background: ____ (1) Black ____ (2) White ____ (3) Hispanic
 ____ (4) Other: _____
6. Occupation: _____
7. How would you rate the degree of satisfaction you have with your life at this point in time?
 ____ (1) Below average ____ (2) Average
 ____ (3) Above average ____ (4) Exceptional

PART II: YOUR WEIGHT

8. Age of Onset: Please indicate the age at which you first became concerned about your weight _____
9. Did your weight gain appear to result from a specific event, such as the death of a loved one, serious illness, divorce, birth of a child, change in job, etc? ____ (1) No ____ (2) Yes
10. Weight trend: What is your present weight? _____
 What was your weight 1 month ago? _____
 What was your weight 3 months ago? _____
 What was your weight 6 months ago? _____
 What was your weight 12 months ago? _____
11. What is the maximum weight you have been? _____ pounds
12. What has been your maximum weight gain within a single week?
 _____ pounds
13. In a typical week, how much does your weight fluctuate (minimum-maximum) ? _____ - _____ pounds
14. Please indicate which of the following you eat regularly. (check all that apply):
- | | |
|--------------------------|------------------------------|
| ____ Breakfast | ____ Dinner |
| ____ Mid-morning snack | ____ Evening snack |
| ____ Lunch | ____ Snacks in middle of the |
| ____ Mid-afternoon snack | night when unable to sleep |

15. How would describe your present weight?
 ___ (1) Very overweight
 ___ (2) Slightly overweight
 ___ (3) About average weight
16. Do you feel that your weight affects your daily activities?
 ___ (1) No effect
 ___ (2) Some effect
 ___ (3) Often interferes
 ___ (4) Constantly interferes
17. Would a weight fluctuation of five pounds affect the way you live your life?
 ___ (1) Not at all
 ___ (2) Slightly
 ___ (3) Moderately
 ___ (4) Very much
18. Please rate how attractive you are.
 ___ (1) Below average
 ___ (2) Average
 ___ (3) Above average
 ___ (4) Quite attractive

PRIOR DIETS

20. How many serious attempts have you made at losing weight?
 ___ (1) A few (1-10)
 ___ (2) Several (11-20)
 ___ (3) Numerous (21-30)
 ___ (4) Too many to count (over 30)
21. How often are you dieting? ___ (1) Rarely
 ___ (2) Sometimes
 ___ (3) Usually
 ___ (4) Always
22. What is the maximum amount of weight you have ever lost within one month? _____ pounds
23. Do you eat sensibly when you are with other people and make up for it when you are alone?
 ___ (1) Never
 ___ (2) Rarely
 ___ (3) Often
 ___ (4) Always
24. Do you give too much time and thought to food?
 ___ (1) Never
 ___ (2) Rarely
 ___ (3) Often
 ___ (4) Always

25. Do you have feelings of guilt after overeating?

- ☐ (1) Never
- ☐ (2) Rarely
- ☐ (3) Often
- ☐ (4) Always

26. Which best describes your behaviour after you have eaten a "not allowed" food while on your diet?

- ☐ (1) Return to your diet.
- ☐ (2) Stop eating for an extended period of time to compensate.
- ☐ (3) Continue on a splurge, eating other "not allowed" foods.

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

- ☐ (1) Drugs/Amphetamines
- ☐ (2) Surgical (Bypass or Stapling)
- ☐ (3) Jaw wiring
- ☐ (4) Acupuncture
- ☐ (5) Psychoanalysis/Psychotherapy
- ☐ (6) Self-help groups
- ☐ (7) Behaviour modification
- ☐ (8) Specific diet plans:
 - ☐ (a) Beverly Hills Diet
 - ☐ (b) Fat Counter Guide
 - ☐ (c) Kemper Rice Diet or Duke University Diet
 - ☐ (d) Last Chance Refeeding Diet
 - ☐ (e) Pritikin Diet
 - ☐ (f) Scarsdale Diet
 - ☐ (g) Slim Chance in a Fat World
 - ☐ (h) Stillman Diet
 - ☐ (i) Weight Watchers
 - ☐ (j) Other (specify) _____
 - ☐ (k) Other (specify) _____
- ☐ (9) Some other method (specify) _____

28. How conscious are you of what you are eating?

- ☐ (1) Not at all
- ☐ (2) Slightly
- ☐ (3) Moderately
- ☐ (4) Extremely

29. The following is a list of factors which most people indicate are their reasons for losing weight. Please check the MOST IMPORTANT reason in your case.

- ☐ (1) Concern for your health
- ☐ (2) Personal appearance
- ☐ (3) Family pressure
- ☐ (4) Social pressure
- ☐ (5) Recommendations from your physician
- ☐ (6) Self-esteem

30. Consider an average day. How much time during a 24 hour period do you spend performing these various types of activities? Remember, the numbers should total to account for 24 hours.

Sleeping or lying still: _____

Light activity such as sewing, eating, writing, driving a car, walking, light housework, sweeping the floor, typing, etc. _____

Moderate activity, such as bicycling, dancing, gardening, walking fast, etc. _____

Intense activity, such as swimming, running, tennis, exercise, fast dancing, walking uphill, carrying heavy objects, digging, chopping wood, etc. _____

31. What is your height (without shoes)? _____feet _____inches.

32. Describe your build? _____small _____medium _____large

33. What is your current weight? _____

34. What is your target weight? _____

PART III: SOCIAL SUPPORT

What are the attitudes of the following people about your attempt(s) to lose weight? Would you say they are:

NEGATIVE -- They disapprove or are resentful,
 INDIFFERENT -- They don't care or don't help, or
 POSITIVE -- They encourage you.

(circle the number representing your response)

	NEGATIVE	INDIFFERENT	POSITIVE
Spouse	1	2	3
Children	1	2	3
Mother	1	2	3
Father	1	2	3
Employer/Supervisor	1	2	3
Best Friend	1	2	3

How would describe the WEIGHT of the following people in your life?

	Very Overweight	Slightly Overweight	About Average	Slightly Underweight
Spouse	1	2	3	4
Children	1	2	3	4
Mother	1	2	3	4
Father	1	2	3	4
Employer/Supervisor	1	2	3	4
Best Friend	1	2	3	4

PART IV: PERCEIVED RISK

Please read each statement and decide whether or not it describes you. If you agree with the statement or decide that it does describe you, circle T for true. If you disagree with a statement or feel that it does not describe you then circle F for false. Please answer each statement either True or False, even if you are not completely sure of your answer.

TRUE FALSE

- | | | |
|---|---|--|
| T | F | When I want something I sometimes go out on a limb to get it. |
| T | F | I rarely even make small bets. |
| T | F | If I invested any money in stocks, it would probably only be in safe stocks from large well-known companies. |
| T | F | When I was in school, I rarely took the chance of bluffing my way through an assignment. |
| T | F | If the possible reward was very high, I would not hesitate putting my money into a new business that could fail. |
| T | F | Skindiving in the ocean would be much too dangerous for me. |
| T | F | People have told me I seem to enjoy taking chances. |
| T | F | I would enjoy bluffing my way into an exclusive club or private party. |
| T | F | I rarely if ever take risks when there is another alternative. |
| T | F | The thought of investing in stocks excites me. |
| T | F | I enjoy taking risks. |
| T | F | I would prefer a stable position with a moderate salary to one with a higher salary but less security. |
| T | F | I consider security an important element in every aspect of my life. |
| T | F | Taking risks does not bother me if the gains involved are high. |
| T | F | I would enjoy the challenge of a project that could mean either a promotion or loss of a job. |
| T | F | I think I would enjoy almost any type of gambling. |

- T F In games I usually "go for broke" rather than playing it safe.
- T F I try to avoid situations that have uncertain outcomes.
- T F I would participate only in business undertakings that are relatively certain.
- T F I probably would not take the chance of borrowing money for a business deal even if it might be profitable.

PART V: SELF-CONFIDENCE

Below is a list of 30 situations in which people frequently eat. Please read each one carefully. Then circle the number which best describes THE PROBABILITY THAT YOU WOULD BE ABLE TO RESTRAIN FROM EATING IN THAT SITUATION. If you are absolutely certain that you would not eat in that situation if it should arise, circle 100%. If you have no confidence in your ability to resist the urge to eat in that situation, circle 0%.

More likely, your confidence will vary. For instance, if you are pretty sure you will be able to resist the urge to eat when you feel really happy, but not absolutely certain, you might circle 80%. On the other hand, if you are pretty sure you WOULD NOT be able to resist the urge to eat, but aren't absolutely certain, you might circle 20%.

1. When you feel really happy.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
2. When you feel anxious.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
3. When you want to sit back and enjoy a cigarette.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
4. When you are nervous.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
5. When you feel annoyed.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
6. When you want to relax.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
7. When you are worried.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
8. When you feel angry.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
9. When you feel tired.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
10. When you feel embarrassed.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
11. When you feel bored.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
12. When you feel you need more energy.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

13. When you are drinking an alcoholic beverage.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
14. When you see others eating.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
15. When you want to reward yourself for something you have done.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
16. When someone offers you some food.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
17. When you are waiting for someone or something.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
18. When you feel uncomfortable.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
19. When you want to cheer up.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
20. When you want to avoid smoking or drinking.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
21. When you feel depressed.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
22. When you want to take a break from work or some other activity.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
23. When you are overly excited.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
24. When you feel upset.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
25. When you feel frustrated.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
26. When you are angry with yourself.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
27. When you feel overwhelmed and don't know what to do first.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
28. When you are thinking of money problems
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
29. When a crisis occurs.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
30. On special celebrations like Christmas, birthdays or Thanksgiving.
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

PART VI: MONEY ATTITUDES

Below are several questions which are related to your attitudes toward money. Read each of the items and indicate the extent to which it describes you.

	Always	Often	Some- times	Seldom	Never
It is hard for me to pass up a bargain.	1	2	3	4	5
I am bothered when I have to pass up a sale.	1	2	3	4	5
I spend money to make myself feel better.	1	2	3	4	5
I show signs of nervousness when I don't have enough money.	1	2	3	4	5
I worry that I will not be financially secure.	1	2	3	4	5
I show worrisome behaviour when it comes to money.	1	2	3	4	5

How much do you spend on groceries for yourself and your family during a typical week? _____ dollars

How many people are you buying groceries for with this amount of money? _____ people

PART VII: PROGRAM ACCEPTANCE

Please complete the following scales, indicating how you perceive your program leader by putting an X in the appropriate space for each item.

The program leader is:

- | | | |
|---------------------------|--------------------------|----------------------------|
| 1. Pleasant | ____:____:____:____:____ | Unpleasant |
| 2. Valuable | ____:____:____:____:____ | Worthless |
| 3. Unhelpful | ____:____:____:____:____ | Very Helpful |
| 4. Not very knowledgeable | ____:____:____:____:____ | Very knowledgeable |
| 5. Supportive & caring | ____:____:____:____:____ | Unsupportive/disinterested |
| 6. Not very Motivating | ____:____:____:____:____ | Very Motivating |
| 7. Very actively involved | ____:____:____:____:____ | Passively involved |

The program materials are:

- | | | |
|-----------------------------|--------------------------|--------------------|
| 8. Unhelpful | ____:____:____:____:____ | Very Helpful |
| 9. Boring | ____:____:____:____:____ | Interesting |
| 10. Difficult to understand | ____:____:____:____:____ | Easy to understand |
| 11. Not very Motivating | ____:____:____:____:____ | Very Motivating |

12. The monetary incentive system used in the program provides motivation for me to lose weight.

Strongly agree ____:____:____:____:____ Strongly Disagree

13. I like the monetary incentive system used in the program.

Strongly agree ____:____:____:____:____ Strongly Disagree

14. The dietary suggestions of the program are rigid and very limiting.

Strongly agree ____:____:____:____:____ Strongly Disagree

15. The weekly weight goals are much too difficult to achieve.

Strongly agree ____:____:____:____:____ Strongly Disagree

16. Monitoring my food intake is very time consuming and tedious.

Strongly agree ____:____:____:____:____ Strongly Disagree

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

Strongly agree ____:____:____:____:____ Strongly Disagree

18. The program leader is not responsive to the needs of individuals in the program.

Strongly agree ____:____:____:____:____ Strongly Disagree

19. The monetary incentive scheme is unfair.

Strongly agree ____:____:____:____:____ Strongly Disagree

20. The program is helping me to lose weight.

Strongly agree ____:____:____:____:____ Strongly Disagree

21. The program is likely to help others lose weight.

Strongly agree ____:____:____:____:____ Strongly Disagree

22. Six months from now I expect I will:

- ____ (1) have lost even more weight than I have now.
- ____ (2) be at the same weight I am right now.
- ____ (3) have regained some of the weight I have lost.
- ____ (4) weigh the same as when I started the program.

PART VIII: YOUR REACTIONS TO THE GROUP

This questionnaire asks you about your opinion of the group you are participating in. For each of the following items, there are five descriptive phrases. Please place a check mark in front of the one which best describes your opinion.

1. I feel I could depend on
 - ☐ (1) none of the members of the group for support
 - ☐ (2) only one or two members of the group for support
 - ☐ (3) some of the group for support
 - ☐ (4) many members of the group for support
 - ☐ (5) most of the members of the group

2. Considering the group as a whole, I
 - ☐ (1) dislike everyone a lot
 - ☐ (2) dislike them more than I like them
 - ☐ (3) neither dislike nor like them
 - ☐ (4) like them more than I dislike them
 - ☐ (5) like them very much

3. How satisfied are you with general group discussions?
 - ☐ (1) not at all satisfied
 - ☐ (2) slightly satisfied
 - ☐ (3) somewhat satisfied
 - ☐ (4) quite satisfied
 - ☐ (5) very satisfied

4. How free did you feel to say what you think during group discussions?
 - ☐ (1) not at all free
 - ☐ (2) slightly free
 - ☐ (3) somewhat free
 - ☐ (4) quite free
 - ☐ (5) very free

5. How receptive is the entire group to suggestions about solutions offered by different participants?
 - ☐ (1) not at all receptive
 - ☐ (2) slightly receptive
 - ☐ (3) somewhat receptive
 - ☐ (4) quite receptive
 - ☐ (5) very receptive

6. Do you feel that your opinions and questions are given adequate consideration during group discussions?
 - ☐ (1) never
 - ☐ (2) rarely
 - ☐ (3) sometimes
 - ☐ (4) often
 - ☐ (5) almost always

7. All the members of the group cooperate with each other.
____ (1) never
____ (2) rarely
____ (3) sometimes
____ (4) often
____ (5) almost always
8. The amount of support I receive from the group is best described as
____ (1) none
____ (2) just a little
____ (3) an average amount
____ (4) quite a bit
____ (5) a great deal
9. I enjoy being a part of the entire group.
____ (1) not at all
____ (2) only slightly
____ (3) a little
____ (4) quite a bit
____ (5) very much
10. How would you rate the degree to which the entire group is serious about losing weight?
____ (1) not at all
____ (2) only slightly
____ (3) a little
____ (4) quite a bit
____ (5) very much
11. How would you rate the social atmosphere of the group with respect to cooperativeness (Members share goals and ideas to support one another rather than competing with one another).
____ (1) not at all
____ (2) only slightly
____ (3) a little
____ (4) quite a bit
____ (5) very much
12. How would you describe the morale of the group throughout the program?
____ (1) none
____ (2) just a little
____ (3) an average amount
____ (4) quite a bit
____ (5) a great deal
13. Have you made any friends with members of the group since the start of the program?
____ (1) No
____ (2) Yes

PART IX: PROGRAM COMPONENTS

The reasons a program is successful varies among individuals. Below is a list of reasons why someone might find the program useful. Circle the number which indicates how important each of these components were for you in terms of your satisfaction with this program.

	Not At All Important	Somewhat Important	Very Important
1. Regular weigh-ins	1	2	3
2. Seeing and meeting others who share the same concerns	1	2	3
3. The program leader as a person	1	2	3
4. The materials and information	1	2	3
5. Having group discussions	1	2	3
6. The exchange diet plan used	1	2	3
7. The "don't deprive yourself" philosophy of the program	1	2	3
8. The "slow and steady" weight loss philosophy of the program	1	2	3

PART X: GROUP COHESION

On the attached sheet you will find the names of all of the members of your group. For each of the activities listed below, please fill the names of the people from your group with whom you would feel comfortable. Write in as many names as you wish on each line: use first names or initials if you like.

- (a) To whom would you say "hello" if you saw them outside of class?

- (b) With whom would you carpool to group meetings?

- (c) Whom would you invite to share in a walking or exercise program?

- (d) If you needed support for your weight control efforts, who would you call?

- (e) Whom would you invite to a party you were giving?

- (f) Whom would you consider a close friend?

PART XI: INCENTIVE PREFERENCES

If you were given a choice of the following incentive procedures, which one of the six do you think would be most helpful to you. Choose only one!

- _____ (1) each week that you reach your weight goal you will have a portion of the deposit money returned to your account for refund at the end of the program.
- _____ (2) the money for all members in your group will be put into a jackpot. Each week that you reach your weight goal, you will receive a lottery ticket. At the end of the program a lottery will be held for the jackpot.
- _____ (3) each week that you do not reach your weight goal you will lose a portion of the deposit money in your account. What is left will be refunded to you at the last session.
- _____ (4) the money for all members in your group will be put into a jackpot. Each week that you do not reach your weight goal, you will lose a chance to participate in the lottery to be held at the last session.
- _____ (5) each week that you attend the program, a portion of the deposit money paid will be refunded to you regardless of whether or not you reached your weight goal.
- _____ (6) I would prefer to pay \$40.00 for a program which does not use monetary incentives of any kind.

PART XII: REASONS FOR STOPPING

I am interested in the reasons behind your decision to stop coming to the program meetings. Below are several commonly cited reasons people give for dropping out of a program. Please consider each one carefully and place the number of the statement which most describes your reason in the first box below. If appropriate, place the numbers indicating second and third choices in the boxes indicated. If a major factor which influenced your decision is not listed, use the number for "other".

COMMON REASONS FOR STOPPING

PLACE THE APPROPRIATE
NUMBER IN THE BOXES BELOW

1) Was not the type of program
I wanted or expected.

2) Personal reasons.

--

Major reason
for stopping

3) Scheduling difficulties and
other commitments.

4) Problems finding a babysitter.

--

Second reason
for stopping

5) Did not like the program leader.

6) I wasn't being successful with
the program and was discouraged.

--

Next reason
for stopping

7) I wasn't very motivated.

8) It was too far to travel.

9) Other: _____
 please specify

Use the space below for any additional comments or information
you wish to provide:

APPENDIX F

Timing of Program Measures

Timing of Measures Used in the Program

Questionnaire Items ¹	Orientation Session	Session 6	Session 10	Dropout Follow Up
	Week 0	Week 6	Week 14	Week 15
Demographic Information (I)	X			
Weight Loss History (II)	X			
Social Support (III)	X			
Perceived Risk (IV)	X			
Money Attitudes (VI)	X			
Restrained Eating Scale ²	X			
Weight	X	X	X	X ³
Self-efficacy (V)	X	X	X	X
Program Acceptance (VII)		X	X	
Group Support (VIII)		X	X	
Program Components Rating (IX)			X	
Sociometry (X)			X	
Incentive Preferences (XI)			X	
Reasons for Program Termination (XII)				X

1 Numbers in parentheses correspond to questionnaire section numbers in Appendix E.

2 Questions for the Eating Restraint Scale were inbedded with items from the Weight History Section (PART II).

3 Self-reported Weight

APPENDIX G

Variance Homogeneity of Outcome Measures

Variances of Outcome Measures by Incentive Condition

Outcome Variable	Incentive Condition						Cochran ¹ C
	Reward Money	Reward Lottery	Resp. Cost Money	Resp. Cost Lottery	Atten- dance	Free	
Weight (pounds)	1004.9	2030.4	336.7	1200.6	2480.0	151.0	0.34
Weight Loss (lbs.)	59.3	106.1	79.2	92.2	26.0	196.0	0.35
Relative Weight Loss (%)	17.6	19.4	19.8	22.1	4.8	59.3	0.42*
LOG of Relative Weight Loss	0.1	0.2	0.2	0.2	0.2	0.4	0.30
Success in Meeting Weekly Goal	2.0	3.2	6.8	2.9	1.2	2.9	0.35
Program Satisfaction	0.3	0.2	0.3	0.1	0.2	0.2	0.23
Incentive Satisfaction	0.9	1.7	0.8	1.2	1.0	---	0.30
Group Satisfaction	0.3	0.4	0.2	0.2	0.5	0.3	0.24
Program Effectiveness	0.5	0.7	0.5	0.6	0.6	0.5	0.19
Reactance	0.3	0.6	0.4	0.3	0.1	0.4	0.28
Emotional Self-Efficacy	2.1	2.4	4.7	3.8	5.8	0.8	0.30
Situational Self-Efficacy	1.5	1.7	3.0	2.8	3.7	1.0	0.27
Disequilibrium Self-efficacy	2.6	2.1	2.0	3.0	2.9	4.2	0.25
Appetitive Self-Efficacy	5.3	7.7	7.2	8.5	5.2	10.4	0.23

* $p < 0.05$

1 (6,10) degrees of freedom

Bibliography

Bibliography

- Abrahms, J.L. & Allen, G.J. (1974). Comparative effectiveness of situational programming, financial payoffs and group pressure in weight reduction. Behaviour Therapy, 5, 391-400.
- Abrams, D.B. (1984). Current status and clinical developments in the behavioural treatment of obesity. In C.M. Franks (Ed.), New Developments in Behaviour Therapy (pp. 21-55). New York: Haworth Press.
- Abramson, E.E. (1973). A review of behavioural approaches to weight control. Behaviour Research and Therapy, 11, 547-556.
- Abramson, E.E. (1977). Behavioural approaches to weight control: An updated review. Behaviour Research and Therapy, 15, 355-363.
- Allen, M.J. & Yen, W.M. (1979). Introduction to measurement theory. Monerey, CA.: Brooks/Cole Publishing Company.
- Aragona, J., Cassady, J. & Drabman, R.D. (1974). Treating overweight children through parental training and contingency contracting. Journal of Applied Behaviour Analysis, 8, 269-278.
- Balsam, P.D. & Bondy, A.S. (1983). The negative side effects of reward. Journal of Applied Behaviour Analysis, 16, 283-296.
- Bandura, A. (1984). Recycling misconceptions of perceived self-efficacy. Cognitive Therapy and Research, 8(3), 231-255.
- Bandura, A. (1981). Self-referent thought: A developmental analysis of self-efficacy. In J.H. Flavell and L. Ross (Eds.), Social Cognitive Development: Frontiers and Possible Futures. Cambridge, England: Cambridge University Press.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. Psychological Review, 84(2), 191-215.
- Bandura, A., Adams, N.W., & Beyer, J. (1977). Cognitive processes mediating behaviour change. Personality and Social Psychology, 35, 125-139.

- Bellack, A.S. (1975). Behaviour therapy for weight reduction. Addictive Behaviours, 1, 73-82.
- Beneke, W.M., Paulson, B., McReynolds, W.T., Litz, R.N. & Kohrs, M.B. (1978). Long-term results of two behaviour modification weight loss programs using nutritionists versus therapists. Behaviour Therapy, 9, 501-507.
- Bjorntorp, P., Carlgren, G., Isaksson, B., Krotkiewski, M., Larsson, B. & Sjostrom, L. (1975). Effect of an energy-reduced dietary regimen in relation to adipose tissue cellularity in obese women. American Journal of Clinical Nutrition, 28, 445-452.
- Black, D.R. and Friesen, J.G. (1983). Deposit money: A component in a self-directed minimal intervention program for weight control. Behaviour Therapy, 14, 333-340.
- Brehm, J.W. (1966). A Theory of Psychological Reactance. New York: Academic Press.
- Brownell, K.D. (1986). Weight control at the workplace: the power of social and behavioural factors. In M.T. Cataldo & T.J. Coates (Eds.), Health and Industry: A Behavioural Science Perspective. New York: John Wiley and Sons.
- Brownell, K.D. (1985a). The contribution of psychological and behavioural factors to a classification scheme of obesity. In J. Hirsch & T.B. Van Itallie (Eds.), Recent Advances in Obesity Research: IV, London: John Libbey.
- Brownell, K.D. (1985b). The LEARN Manual for Weight Control. Unpublished manuscript, University of Pennsylvania.
- Brownell, K.D. (1983a). Obesity: Behavioural treatments for a serious, prevalent and refractory problem. In R.K. Goodstein (Ed.), Eating and Weight Disorders. New York: Springer Publishing Company.
- Brownell, K.D. (1983b). Obesity: Treatment effectiveness and adherence to behavioural programs. In R.K. Goodstein (Ed.), Eating and Weight Disorders. New York: Springer Publishing Company.
- Brownell, K.D. (1982). Obesity: Understanding and treating a serious, prevalent, and refractory disorder. Journal of Consulting and Clinical Psychology, 50(6),

820-840.

- Brownell, K.D. (1979). Behaviour Therapy for Weight Control: A treatment manual. Unpublished manuscript, University of Pennsylvania.
- Brownell, K.D., Cohen, R.Y., Stunkard, A.J., Felix, M.R., & Cooley, N.B. (1984). Weight loss competitions at the worksite: Impact on weight, morale, and cost-effectiveness. American Journal of Public Health, 74(11), 1283-1285.
- Brownell, K.D., Heckerman, C.L., & Westlake, R.J. (1979). The behavioural control of obesity: A descriptive analysis of a large scale program. Journal of Clinical Psychology, 35, 864-869.
- Brownell, K.D., Heckerman, C.L., Westlake, R.J., Hayes, S.C. & Monti, P.M. (1978). The effects of couples training and partner cooperativeness in the behavioural treatment of obesity. Behaviour Therapy and Research, 16, 323-333.
- Brownell, K.D., Marlatt, G.A., Lichtenstein, E., & Wilson, G.T. (1986). Understanding and preventing relapse. American Psychologist, 41, 765-782.
- Campbell, D.T. and Boruch, R.F. (1975). Making the case for randomized assignments to treatments by considering the alternatives: Six ways in which quasi-experimental evaluations tend to underestimate effects. In C.A. Bennett & A.A. Lumsdaine (Eds.), Evaluation and experience: Some critical issues in assessing social programs. New York: Academic Press.
- Castro, L. and Rachlin, H. (1980). Self-reward, self-monitoring and self-punishment as feedback in weight control. Behaviour Therapy, 11, 38-48.
- Centers for Disease Control. (1980). Ten Leading Causes of Death in the United States, 1977. DHHS, July.
- Chambliss, C.A., & Murray, E.J. (1979). Efficacy attribution, locus of control and weight loss. Cognitive Therapy and Research, 3, 349-353.
- Chapman, S.L. & Jeffrey, D.B. (1978). Situational management, standard setting and self-reward in a behaviour modification weight loss program. Journal of Consulting and Clinical Psychology, 46(6), 1588-1589.

- Coates, T.J., Jeffery, R.W., Slinkard, L.A., Killen, J.D. & Danaher, B.G. (1982). Frequency of contact and monetary reward in weight loss, lipid change and blood pressure reduction in adolescents. Behaviour Therapy, 13, 175-185.
- Cochran, W.G. (1941). The distribution of the largest of a set of estimated variances as a fraction of their total. Annals of Eugenics, 11, 47-52.
- Coehlo, R.J. (1983). An experimental investigation of two multi-component approaches on smoking cessation. Unpublished Doctoral dissertation, Michigan State University.
- Colvin, R.H. (1979). Weight control on the job: Making use of the office environment. Journal of the American Dietetic Association, 74, 465.
- Colvin, R.H. & Olson, S.B. (1983). A descriptive analysis of men and women who have lost significant weight and are highly successful at maintaining the loss. Addictive Behaviors, 8, 287-295.
- Colvin, R.H., Zopf, K.J. and Myers, H.J. (1983). Weight control among coworkers. Behaviour Modification, 7(1), 64-75.
- Crapnell, S. (1982). For prize winning programs try awards and incentives. Occupational Hazards, August, 44, 35-40.
- Dillon, W.R. & Goldstein, M. (1984). Multivariate Analysis: Methods and Applications. New York: John Wiley and Sons.
- Dwyer, J. (1986). Reducing the great American waistline. American Journal of Public Health, 76(11), 1287-1288.
- Eastman, C. & Marzillier, J.S. (1984). Theoretical and methodological difficulties in Bandura's self-efficacy theory. Cognitive Therapy and Research, 8, 213-229.
- Eiseman, B. (1980). What Are My Chances? Philadelphia: Sanders Press.
- Epstein, L.H. and Wing, R.R. (1984). Behavioural Contracting: Health Behaviours. In C. Franks, (ed.), New Developments in Behaviour Therapy (pp. 409-449). New York: Haworth Press.

- Epstein, L.H., Wing, R.R., Thompson, J.K. and Griffin, W. (1980). Attendance and fitness in aerobic exercise: The effects of contract and lottery procedures on attendance and fitness in aerobics and exercise. Behaviour Modification, 4, 465-480.
- Eufemia, R.L. & Wesolowski, M.D. (1985). Attrition in behavioural studies of obesity: A meta-analytic review. Behaviour Therapist, 8, 115-116.
- Fairweather, G.W., Sanders, D.H., Maynard, H. & Cressler, D.L. (1969). Community Life for the Mentally Ill. Chicago: Aldine Press.
- Fairweather, G.W., Simon, R., Gebhard, M.E., Weingarten, E., Holland, J.L., Sanders, R., Stone, G.B. & Reahl, G.E. (1960). Relative effectiveness of psychotherapeutic programs: A multicriter in comparison of four programs for those different patient groups. Psychological Monographs, 74, No. 5.
- Ferster, C.B., Nurnberger, J.I. & Levitt, E.B. (1962). The control of eating. Journal of Mathetics, 1, 87-109.
- Fisher, E.B., Levenkron, J.C., Lowe, M.R., Loro, A.D. and Green, L. (1982). Self-initiated self-control in risk reduction. In R.B. Stuart (Ed.), Adherence, Compliance and Generalization in Behavioural Medicine. New York: Brunner/Mazel.
- Fisher, E.B., Lowe, M.R., Levenkron, J.C., and Newman, A. (1982). Reinforcement and structural support of maintained risk reduction. In R.B. Stuart (Ed.), Adherence, Compliance and Generalization in Behavioural Medicine. New York: Brunner/Mazel.
- Follick, M.J., Fowler, J.L. & Brown, R.A. (1984). Attrition in worksite weight-loss interventions: The effects of an incentive procedure. Journal of Consulting and Clinical Psychology, 52, 139-140.
- Foreyt, J.P. (1977). Behavioural Treatments of Obesity. New York: Pergamon Press.
- Foreyt, J.P., Scott, L.W. and Gotto, A.M. (1982). Weight control and nutrition education programs in occupational settings. In R.S. Parkinson and Associates (Ed.), Managing Health Promotion in the Workplace. Palo Alto, CA.: Mayfield Publishing Co.
- Foxx, R.M. and Schaeffer, M.H. (1981). A company based lottery to reduce the personal driving of employees.

Journal of Applied Behaviour Analysis, 14, 273-285.

- Franks, C.M. (1984). The place of theory and concept in a world of practice and doing: A clinician's guide to the behavioural galaxy. In C.M. Franks (Ed.), New Developments in Behaviour Therapy. New York: Haworth Press.
- Franks, C.M. and Wilson, G.T. (Eds.), (1975). Annual Review of Behaviour Therapy: Theory and Practice, Vol. 3. New York: Brunner/Mazel.
- Glasgow, R.E. and Rosen, G.M. (1984). Self-help behaviour therapy manuals: Recent developments and clinical usage. In C.M. Franks (Ed.), New Developments in Behaviour Therapy. New York: Haworth Press.
- Gormally, J., Rardin, D. & Black, S. (1980). Correlates of successful response to a behavioural weight control clinic. Journal of Counseling Psychology, 27, 179-191.
- Hagen, R.L., Foreyt, J.P. and Durham, F.W. (1976). The dropout problem: Reducing attrition in obesity research. Behaviour Therapy, 7, 463-471.
- Hall, S.M. and Hall, R.G. (1974). Outcome and methodological considerations in behavioural treatment of obesity. Behaviour Therapy, 5, 352-364.
- Halmi, K.A., Stunkard, A.J. and Mason, E.E. (1980). Emotional responses to weight reduction by three methods: gastric bypass, jejunoileal bypass and diet. American Journal of Clinical Nutrition, 33, 446-451.
- Harris, M.G. (1969). Self-directed programs for weight control: A pilot study. Journal of Abnormal Psychology, 74, 263.
- Harris, M.B. & Brunner, C.G. (1971). A comparison of a self-control and a contract procedure for weight control. Behaviour Research and Therapy, 9, 347-354.
- Hartigan, K.J., Baker-Strauch, D. & Morris, G.W. (1982). Perceptions of the causes of obesity and responsiveness to treatment. Journal of Counseling Psychology, 29, 478-485.
- Herman, C.P. & Mack, D. (1975). Restrained and unrestrained eating. Journal of Personality, 43, 647-660.

- Herman, C.P. & Polivy, J. (1980). Restrained eating. In A. Stunkard (Ed.), Obesity. Philadelphia: Sanders.
- Herman, C.P. & Polivy, J. (1975). Anxiety, restraint and eating behaviour. Journal of Abnormal Psychology, 84, 666-672.
- Herzlinger, R.E. & Calkins, D. (1986). How companies tackle health care costs: Part III. Harvard Business Review, Jan-Feb., 70-80.
- Hickey, J.S., Friedman, L.C., Harper, R.G., Foreyt, J. & Bornstein, P.R. (1985). Marital influences on behavioural weight control. Paper presented at the 93rd Annual Convention of the American Psychological Association, August 1985, Los Angeles.
- Hoebel, B.G. & Teitelbaum, P. (1966). Weight regulation in normal and hypothalamic hyperphagic rats. Journal of Comparative and Physiological Psychology, 61, 189-163.
- Hoiberg, A., Berard, S.P. & Watten, R.H. (1980). Correlates of obesity. Journal of Clinical Psychology, 36, 983-990.
- Iwata, B.A., Bailey, J.S., Brown, K.M., Foshee, T.J. and Alpern, M. (1976). A performance-based lottery to improve residential care and training by institutional staff. Journal of Applied Behavioural Analysis, 9, 417-431.
- Jackson, D.N. (1976). Jackson Personality Inventory Manual. Goshen, New York: Research Psychologists Press, Inc.
- Jackson, J.M. (1959). A space for conceptualizing person-group relationships. Human Relations, 12, 3-16.
- Jeffery, R.W., Thompson, P.D. and Wing, R.R. (1978). Effect on weight reduction of strong monetary contracts for caloric restriction or weight loss. Behaviour Research and Therapy, 16, 363-370.
- Jeffery, R.W., Wing, R.R. and Stunkard, A.J. (1978). Behavioural treatment of obesity: The state of the art, 1976. Behaviour Therapy, 9, 189-199.
- Kanfer, F.H. (1979). Self-management: Strategies and tactics. In A.D. Goldstein & F.H. Kanfer (Eds.), Maximizing Treatment Gains: Transfer Enhancement in Therapy. New York: Academic Press.

- Kanfer, F.H. & Karoly, P. (1972). Self-control: A behaviouristic excursion into the lion's den. Behaviour Therapy, 3, 398-416.
- Kazdin, A.E. (1972a). Response cost: The removal of conditioned reinforcers for therapeutic change. Behaviour Therapy, 3, 533-546.
- Kazdin, A.E. (1972b). The effect of response cost and aversive stimulation in suppressing punished and nonpunished speech disfluencies. Behaviour Therapy, 5, 343-372.
- Keesey, R.E. (1980). A set-point analysis of the regulation of body weight. In A. Stunkard (Ed.), Obesity. Philadelphia: Saunders Co.
- Keesey, R.E. & Powley, T.L. (1986). The regulation of body weight. Annual Review of Psychology, 37, 109-133.
- Kerlinger, F. (1964). Foundations of Behavioural Research 2nd Edition. New York: Holt, Rinehart and Winston.
- Kerlinger, F. & Pedhauzer, E. (1973). Multiple Regression in Behavioural Research. New York: Holt Rinehart and Winston.
- Keys, A., Brozek, J., Henschel, A., Mickelson, O. & Taylor, H.L. (1950). The Biology of Human Starvation. Minneapolis: University of Minnesota Press.
- Kingsley, R.B. & Wilson, G.T. (1977). Behaviour therapy for obesity: A comparative investigation of long-term efficacy. Journal of Consulting and Clinical Psychology, 45, 288-298.
- Knowles, J. (1977). Doing Better and Feeling Worse: Health in the United States. New York: W.W. Norton and Company.
- Lando, H.A. (1977). Successful treatment of smokers with a broad spectrum behavioural approach. Journal of Consulting and Clinical Psychology, 45, 361-366.
- Leon, G.R. (1976). Current directions in the treatment of obesity. Psychological Bulletin, 83, 557-578.
- Leon, G.R. and Roth, L. (1977). Obesity, causes, correlates and speculations. Psychological Bulletin, 84, 117-139.

- Levine, S. and Sorenson, J. (1984). Social and cultural factors in health promotion. In J.D. Matarazzo, S. Weiss, J.A. Herd, N.E. Miller, and S.A. Weiss (Eds.), Behavioural Health: A Handbook of Health Enhancement and Disease Prevention. New York: John Wiley and Sons.
- Loro, A.D., Fisher, E.B. & Levenkron, J.C. (1979). Comparison of established and innovative weight reduction treatment procedures. Journal of Applied Behaviour Analysis, 12, 141-155.
- MacCuish, A.C. & Ford, M.J. (1979). Dietary management of obesity and obesity-related diseases. In J. Munro (Ed.), The Treatment of Obesity. Baltimore: University Park Press.
- Marlatt, G.A. & Gordon, J.R. (1980). Determinants of relapse: Implications for the maintenance change. In P.O. Davidson & S.A. Davidson (Eds.), Behavioural Medicine: Changing Health Lifestyles. New York: Brunner/Mazel.
- Marzillier, J. & Eastman, C. (1984). Continuing problems with self-efficacy theory: A reply to Bandura. Cognitive Therapy and Research, 8, 257-262.
- Meinberg, R.A. & Yager, G.G. (1985). Effects of a workshop fee on women's stress management skills and evaluations. Journal of Counseling Psychology, 32(4), 626-629.
- Merbaum, M. & Rosenbaum, M. (1984). Self-control theory and techniques in the modification of smoking, obesity and alcohol abuse. In C.M. Franks (Ed.), New Developments in Behaviour Therapy. New York: Haworth Press.
- Metropolitan Insurance. (1983). 1983 Metropolitan and height weight tables. Statistical Bulletin, 64 (Jan-Feb), 2-9.
- Michigan Department of Public Health. (1983). Michigan Opinion: Behavioural Risk Factors. Division of Health Education, Risk Reduction Section, Lansing, MI.
- Morrison, D.F. (1967). Multivariate Statistical Methods. New York: McGraw-Hill.
- Muir, K.A. and Milan, M.A. (1982). Parent reinforcement for child achievement: The use of a lottery to maximize parent training effects. Journal of Applied Behaviour Analysis, 15, 455-460.

- Nash, J. & Ormiston, L. (1978). Taking Charge of Your Weight and Well-being. Palo Alto: Bull Publishing Co.
- Nisbett, R.E. (1972). Hunger, obesity and the ventromedial hypothalamus. Psychological Review, 79, 433-453.
- Nord, W.R. (1969). Beyond the teaching machine: the neglected area of operant conditioning in the theory and practice of management. Organizational Behaviour and Human Performance, 4, 375-401.
- O'Farrell, T. and Keuthen, N.J. (1983). The readability of behaviour therapy self-help manuals. Behaviour Therapy, 14, 449-454.
- O'Leary, A. (1985). Self-efficacy and health. Behaviour Research and Therapy, 23, 427-451.
- Osancova, K. & Hejda, S.T. (1975). Epidemiology of obesity. In T. Silverstone (Ed.), Obesity: Its Pathogenesis and Management. Lancaster, England: Medical and Technical Pub. Co.
- Osborne, J.G., Powers, R.B. and Anderson, E.G. (1974). A lottery to stop littering. Psychology Today, August, 8(3), 65-66.
- Parkinson, R. (1984). Participation: Keystone in health promotion evaluation. Corporate Commentary, 1(2), 30-35.
- Pedalino, E. and Gamboa, V. (1974). Behaviour modification and absenteeism. Journal of Applied Psychology, 59(6), 694-698.
- Pekarik, G., Blodgett, C., Evans, R.G. & Wierzbicki, M. (1984). Variables related to continuance in a behavioural weight loss program. Addictive Behaviours, 9, 413-416.
- Penick, S.B., Fillion, R., Fox, S. & Stunkard, A.J. (1971). Behaviour modification in the treatment of obesity. Psychosomatic Medicine, 33, 49-55.
- Reese, E. (1966). Human Behaviour, Second Ed. Dubuque, IA: W.C. Brown Company.
- Rimm, D.C. and Masters, J.C. (1974). Behaviour Therapy: Techniques and Empirical Findings. New York: Academic Press.

- Ritenbaugh, C. (1982). Obesity as a culture-bound syndrome. Culture, Medicine and Psychiatry, 6, 347-361.
- Rodin, J. (1980). The externality theory today. In A.J. Stunkard (Ed.), Obesity. Philadelphia: Sanders Press.
- Romanczyk, R.G. (1974). Self-monitoring in the treatment of obesity: Parameters of reactivity. Behaviour Therapy, 5, 531-540.
- Rozensky, R.H. and Bellack, A.S. (1976). Individual differences in self-reinforcement style and performance in self and therapist controlled weight reduction programs. Behaviour Research and Therapy, 14, 357-364.
- Sakoda, J.M., Cohen, B.H. & Beall, G. (1954). Tests of significance for a series of statistical tests. Psychological Bulletin, 51, 172-175.
- Schachter, S. (1982). Recidivism and self-cure of smoking and obesity. American Psychologist, 37, 436-444.
- Schachter, S. (1971). Some extraordinary facts about obese humans and rats. American Psychologist, 26, 129-144.
- Schunk, D.H. & Carbonari, J.P. (1984). Self-efficacy models. In J.D. Matarazzo, S. Weiss, J.A. Herd, N.E. Miller, and S.A. Weiss (Eds.), Behavioural Health: A Handbook of Health Enhancement and Disease Prevention. New York: John Wiley & Sons.
- Shepard, D.S. and Pearlman, L. (1983). Incentive-based programs for health promotion in the workplace. Boston: Center for the Analysis of Health Practices, Harvard School of Public Health.
- Simms, E.A.H. & Horton, E.S. (1968). Endocrine and metabolic adaptation to obesity and starvation. American Journal of Clinical Nutrition, 21, 1455-1470.
- Sindelar, P., Honsaker, M.S. and Jenkins, J. (1982). Response cost and reinforcement contingencies of managing the behaviour of distractible children in tutorial settings. Learning Disabilities Quarterly, 5, 3-13.
- Sjostrom, L. (1980). Fat cells and body weight. In A.J. Stunkard (Ed.), Obesity. Philadelphia: Saunders, Co.

- Snetselaar, L.G. (1983). Nutrition Counseling Skills. Rockville, MD: Aspen Systems Corp.
- Sperduto, W.A. & O'Brien, R.M. (1983). Effects of cash deposits on attendance and weight loss in a large scale clinical program for obesity. Psychological Reports, 52, 261-262.
- Stacknik, T. & Stoffelmayr B. (1983). Worksite smoking cessation programs: A potential for national impact. American Journal of Public Health, 73, 1395-1396.
- Stanton, H.E. (1976). Fee paying and weight loss: Evidence for an interesting interaction. American Journal of Clinical Hypnosis, 19, 47-49.
- Stuart, R.B. (1975). Behavioural control of overeating: A status report. In G. Bray (Ed.), Obesity in Perspective. DHEW Publication No. (NIH) 75-708. Washington, D.C.: Government Printing Office.
- Stuart, R.B. (1967). Behavioural control of overeating. Behaviour Research and Therapy, 5, 357.
- Stuart, R.B. and Davis, B. (1972). Slim Chance in a Fat World. Champaign, IL: Research Press Co.
- Stunkard, A.J. (1983). Biological and psychological factors in obesity. In R.K. Goodstein (Ed.), Eating and Weight Disorders. New York: Springer Publishing Company.
- Stunkard, A.J. (1978). Behavioural treatment of obesity: The current status. International Journal of Obesity, 2, 237-248.
- Stunkard, A.J. (1976). The Pain of Obesity. Palo Alto: Bull Publishing Co.
- Stunkard, A.J. (1958). The management of obesity. New York State Journal of Medicine, 58, 79-87.
- Stunkard, A.J. & Brownell, K.D. (1979). Behaviour therapy and self-help programs for obesity. In J.F. Munro (Ed.), The Treatment of Obesity. London: MIP Press.
- Stunkard, A.J. & MacLaren-Hume, M. (1959). The results of treatment for obesity. Archives of Internal Medicine, 103, 79-87.

- Stunkard, A.J. and Mahoney, M.J. (1976). Behavioural treatment of eating disorders. In H. Leitenberg (Ed.), Handbook of behaviour modification and behaviour therapy. Englewood Cliffs, NJ: Prentice-Hall.
- Ten State Nutrition Survey, 1968-1970. U.S. Department of Health, Education and Welfare, Publication Number (HSM) 72-8131.
- Tryon, R.C. & Bailey, D.E. (1970). Cluster Analysis. New York: McGraw-Hill.
- Ureda, J.R. and Taylor, R.B. (1982). Weight Control. In R. Taylor, J.R. Ureda & J.W. Denham (Eds.), Health Promotion: Principles and Clinical Applications. East Norwalk, CN: Appleton-Century-Crofts.
- Van Egeren, L.F. (1973). Multivariate statistical analysis. Psychophysiology, 10, 517-532.
- Van Itallie, T.B. (1979). Obesity: Adverse effects on health and longevity. American Journal of Clinical Nutrition, 32, 2723-2733.
- Van Koten Chappell, C. (1982). Self-efficacy as a predictor of weight loss. Unpublished dissertation, University of Oregon.
- Walen, S., Hauserman, N.M. and Lavin, P.J. (1977). Clinical Guide to Behaviour Therapy. Baltimore: Williams and Wilkins Co.
- Wankel, L.M. (1979). Motivating involvement in adult physical activity programs. Recreation Research Review, February, 40-43.
- Warner, K. and Murt, H. (1984). Economic incentives for health. Annual Review of Public Health, 5, 107-133.
- Washington Business Group on Health. (1986). Using Incentives to Promote Employee Health. WBGH Worksite Wellness Series, Washington, D.C.
- Weinberg, R.S., Hughes, H.H., Critelli, J.W., England, R. & Jackson, A. (1984). Effects of pre-existing and manipulated self-efficacy on weight loss in a self-control program. Journal of Research in Personality, 18, 352-358.
- Weiner, H. (1962). Some effects of response cost upon human operant behaviour. Journal of Experimental Analysis of Behaviour, 5(2), 201-208.

- Wheat Industry Council (1985). About 28% of all Americans... University of California Wellness Letter, June, 1(9), 1. University of California, Berkeley.
- Wilson, G.T. (1985). Psychological prognostic factors in the treatment of obesity. In J. Hirsch & T.B. Van Itallie (Eds.), Recent Advances in Obesity Research: IV. London: John Libbey.
- Wilson, G.T. (1978). Methodological considerations in treatment outcome research on obesity. Journal of Consulting and Clinical Psychology, 46, 687-702.
- Wilson, G.T. & Brownell, K.D. (1980). Behaviour therapy for obesity: An evaluation of treatment outcome. Advances in Behaviour Research and Therapy, 3, 49-86.
- Wilson, G.T. & Brownell, K.D. (1978). Behaviour therapy for obesity: Including family members in the treatment process. Behaviour Therapy, 2, 943-945.
- Wing, R.R., Epstein, L.H., Marcus, M. & Shapira, B. (1981). Strong monetary contingencies for weight loss during treatment and maintenance. Behaviour Therapy, 12, 702-710.
- Wing, R.R. and Jeffery, R.W. (1984). Sample size in clinical outcome research: The case of behavioral weight control. Behavior Therapy, 15, 550-556.
- Wing, R.R. and Jeffery, R.W. (1979). Outpatient treatments of obesity: A comparison of methodology and clinical results. International Journal of Obesity, 3, 261-279.
- Wollersheim, J.P. (1970). Effectiveness of group therapy based on learning principles in the treatment of overweight women. Journal of Abnormal Psychology, 76, 462.
- Wooley, S.C., Wooley, O.W. and Dyrenforth, S.R. (1979). Theoretical, practical and social issues in behavioural treatments of obesity. Journal of Applied Behaviour Analysis, 12, 3-25.
- Yamauchi, K.T. and Templer, D.I. (1982). The development of a money attitude scale. Journal of Personality Assessment, 46, 522-528.

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