1992

Problem-Solving and Problem-Solving Appraisal in Weight Loss Maintenance

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PROBLEM-SOLVING AND PROBLEM-SOLVING APPRAISAL IN WEIGHT LOSS MAINTENANCE

by

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A Dissertation Submitted to the Faculty of the Graduate School of Loyola University of Chicago in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

January

1992

ACKNOWLEDGEMENTS

For my parents, David B. Alford and Helen Z. Alford; my wife Jannene H. Alford; and my entire family, without whom this accomplishment would not have been possible.

Thank you also to my dissertation chair, Albert Agresti, S.J., Ph.D., and committee members Jack Kavanaugh, Ph.D., and Karen Lloyd, Ph.D.

CURRICULUM VITA

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CHAPTER I

INTRODUCTION

It is a commonly accepted notion that we are a diet conscious society. Many of us are willing to pay substantial amounts in terms of money, time, interest, and other resources towards a goal of not being viewed by ourselves or others as overweight. This apparent interest is not unfounded. The United States has one of the highest prevalences of obesity in the world (Keys, 1970), though exact estimates of the prevalence vary depending on the criteria used to define obesity. Obesity may be diagnosed using different criteria. The different criteria used to determine obesity will be dealt with in Review of the Related Literature (Chapter II). Some studies using actuarial standards (Abraham & Johnson, 1979; Steward, Brook, & Kane, 1980), have estimated that roughly 30% of the population is at least 20% above desirable weight levels.

For a number of health related reasons, the community of health care providers is interested in helping those identified as overweight to obese lose weight and maintain their weight loss. In a review of the related literature, Brownell (1982) noted some dispute over the function of excessive body weight as a risk factor in cardiovascular disease. The author identifies that the issue is whether excessive body weight is an independent risk factor for cardiovascular disease, or if it is a risk factor through

association with other risk factors including hypertension, hyperlipidemia, and diabetes. As for obesity being an independent health risk factor, there is evidence that obesity greatly increases the occurrence of hypertension, hyperlipidemia, and diabetes; thus most obese people are at a higher risk for these problems than those who are not obese (Andres, 1980; Keys, 1980). Additionally, reduction in weight for obese individuals is associated with reduction in cholesterol (Brownell & Stunkard, 1981; Thompson, Jeffery, Wing, & Wood, 1979), as well as substantial and consistent decreases in blood pressure (Reisen, Abel, Modan, Silverberg, Eliahou, & Modan, 1978; Tuck, Sowers, Dornfield, Kledzik, & Maxwell, 1981). Essentially, obesity does seem to be confounded with other factors such as cholesterol level and blood pressure and therefore it is difficult to view obesity as an independent variable.

Different segments of the population experiece varying degrees of obesity. Obesity is more prevalent among lower class women than it is among upper class women. Excessive body weight also appears to be more of a problem among middle and upper class men then among lower class men, but this relationship is not as strong as it is for women (Katahn, 1981).

Obesity among children and adolescents is also recognized as a serious health problem. Estimates of the

prevalence of obesity among children and adolescents range from 5% to 20% (LeBow, 1984). Even more serious, childhood obesity is significantly correlated with risk factors for cardiovascular disease (Lauer, Connor, Leaverton, Reiter, & Clarke, 1975). In their study of more than 4000 Iowa children, Lauer et al. (1975) determined that excess weight and high skinfold measures of fat were associated with high levels of coronary risk factors, including elevated blood pressure and lipoproteins. Once again, however, other factors such as socioeconomic variables may play important to mediating roles in the relationship between obesity and health.

The psychological consequences of obesity are equally as serious. Obese children are rejected by their peers more than children who suffer from some type of physical handicap, such as a disability requiring the use of a wheelchair or crutches (LeBow, 1984); they have lower levels of generalized self-esteem (Felker, 1968); and they appear to grow up to experience an array of discriminations and rejections as adults (LeBow, 1984). There is evidence which indicates that society has a strong bias against overweight persons (Allon, 1979).

More recently, in February 1985, a National Institute of Health Consensus Conference reviewed the evidence on obesity and disease. The conference concluded that obesity does indeed represent a significant public health problem

and that the risk of increased morbidity and mortality occurs at weights 20% over desirable levels. These conclusions are consistent with prior research which shows that within this weight range, overall death rates are elevated by about 20% (Build and Blood Pressure Study, 1960; Lew & Garfinkel, 1979).

Despite all the interest and attention, various treatment procedures for obesity have been judged as only producing modest success. The procedures most generally used all appear to meet with some initial criteria for success; that is, participants do experience a significant weight loss. However, when the criteria for success includes maintenance of the weight loss, the outcome is at best mixed, but most often less than satisfactory (Stunkard, 1984).

Even so, a variety of approaches to weight reduction exist. These range from the more medical procedures like surgery, stomach stapling, or drug therapy, to more psychological therapies like individual psychotherapy or group pysychotherapy, hypnotherapy, or behavioral modification (Wolman, 1982). Behavior modification programs have been shown to produce the most significant weight loss change overall, as well as longer duration of weight loss maintenance (Brownell, 1982). Still, the issue of weight loss maintenance remains key. Much remains to be learned about the maintenance of weight loss and how to

develop effective procedures for maintaining weight loss among those who are successful in losing weight.

To date, there have been few studies to investigate the differences between those who are successful at weight loss maintenance and those who are not. One problem is the apparent lack of any standard criteria in the literature for measuring successful weight loss maintenance. There is considerable variability with regard to both the amount or percentage of weight regained, as well as the interval of time considered for the measurement of maintenance. Through informal survey it appears, however, that sucessful maintenance is generally defined as maintaining a percentage of the weight loss, like 60% or 70%, over a specified period of time, usually 3 to 18 months, following a weight reduction (Hovell, et al., 1988; Colvin & Crist, 1983).

Despite the lack of standardization in this area, research in weight loss maintenance does provide some evidence regarding differences between successful versus unsuccessful weight loss maintainers. Ryden and Sorbris (1986) monitoring participants following a five week fasting program found that less successful maintainers of weight loss displayed more deviant eating behavior (ate to console self, ate at night, snacked more and ate very large meals), experienced more emotional responses to fasting (increased irritibility and less self-confidence), and

showed more signs of immature psychological defenses, on an objective test of defensive strategies, including evasiveness and attempts to avoid or deny perceived threat.

In another study, Snow and Harris (1985) conducted a survey of 139 females and 45 men in order to identify factors related to weight loss maintenance. The authors found that maintainers were more likely to be male, younger, weighed less as teenagers, had fewer overweight friends and sisters, and were better educated. These researchers found that successful maintainers had dieted less often in groups, used fewer other dieting procedures, were more likely to exercise, and weighed themselves more frequently. In addition, regainers ate more in response to emotions and indicated more concern in various ways about their weight. These findings seem to imply that successful weight loss maintainers may be apt to engage in some kind of self-initiated behaviors that are perhaps more success directed.

In essence, it appears that the nature of how stressors are perceived plus various coping skills may be important variables for the maintenance of weight loss. Marlatt and Gordon (1980) observed that training in problem-solving is necessary for weight loss maintainers to effectively deal with potentially high risk relapse situations. Also, in evaluating the outcome of maintenance research, Perri (1987) concluded that a high frequency of

client-therapist contacts, and focusing on problem-solving is highly effective in the maintenance of weight loss. Therefore, research (Perri, McAdoo, Spevak, & Newlin, 1984; Perri, Shapiro, Ludwig, Twentyman, & McAdoo, 1984) seems to suggest that the manner in which stress is dealt with, or the employment of problem-solving skills may have a significant bearing on successful weight loss maintenance.

The purpose of this study is to examine differences with regard to problem-solving for individuals who are successful and those who are not successful at maintaining a weight loss following participation in a weight loss program. This study will look at maintainers' self appraisal of their problem-solving ability as well as the number of problems being experienced. Since better coping skills, or better problem-solving abilities seem to be positively related to successful weight loss maintenance, those who perceive themselves as better problem-solvers than others, and who experience less problems than others may be more successful weight loss maintainers.

More specifically, this study will attempt to answer the following questions:

Does a relationship exist between problem-solving ability and maintenance of weight loss? Do individuals who perceive themselves as demonstrating better self-directed, general problem-solving ability tend to be more successful at maintaining a weight loss once they have lost a

significant amount of weight than those individuals who perceive themselves as demonstrating lesser general problem-solving abilities? Is there a difference between perception of problem- solving ability and the amount of problems experienced in a population of weight loss maintenance subjects?

Multivariate statistical procedures, namely multiple regression, will be used to analyze the data. A better understanding of the role of problem-solving skills with regard to weight loss maintenance will assist by giving direction to programmatic approaches for weight loss and maintenance of weight loss.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

Overview

This chapter will review the relevant literature with regards to weight loss maintenance. After defining obesity and weight loss maintenance, an overview of a typical very low calorie diet program will be presented. Theories regarding the difficulty with weight loss maintenance will follow. Finally studies focusing on weight loss maintenance and problem-solving will be presented.

Theories of Weight Maintenance

There are two general theoretical approaches which address the limited success and lack of durable weight loss evidenced in behavior modification and other treatments for obesity. The first of these theories has to do with an individual's physiological ability to sustain any significant weight loss, regardless of what method is used for weight loss. This view is related to set point theory which suggests that humans have some ideal weight which the body will defend, and eventually return to if a significant occurs (Keesey, 1980). In animal research studies, rats that were starved, or force fed returned to their normal, pretreatment weights when allowed to return to ad libitum eating (Cohn & Joseph, 1962; Brooks & Lambert, 1946). Among human subject studies, Sims and Horton (1968) studied prison volunteers who agreed to increase their weight by

20% to 25%. Some of these volunteers could not gain sufficient weight even though they ate large quantities of food. Those who did gain sufficient weight returned to their starting weights when allowed to eat normally without any restrictions or conditions on their eating behavior.

Although some animal and human research tend to support a set point theory (Cohn & Joseph, 1962; Sims & Horton, 1968), there is contrary evidence as well. For example, consistent with set point theory is the assumption that prolonged caloric restriction might not only increase taste responsiveness and pleasantness of sweet taste, but also hunger. Presumably, the degree of hunger induced would be proportional to the extent of caloric deprivation. However, Wooley, Wooley, and Dyrenforth (1979) have reviewed evidence supporting just the opposite conclusion. For example, animals that are reduced in weight by 6% will work harder than animals reduced by 20% or 30% to overcome constraints which limit their obtaining food. Furthermore, there is evidence that hunger responses to starvation decrease with time for both obese and normal weight persons.

Additionally, at a conceptual level, set point theory has been criticized as being tautological. There is no direct measure of set point, and it can only be inferred from the metabolic and behavioral occurrences that are observed. Moreover, set point theory is a much less

acceptable explanation of human weight stability because of other potent variables that are developmental and social in nature and have significant influence on human eating behavior and possible weight maintenance. For example, Snow and Harris (1985) found that weight loss maintainers were more likely to be male, weighed less as teenagers, were more likely to exercise, weighed themselves frequently and had made some permanent changes in their life style.

An extension of set point theory, referred to as restraint theory, provides evidence of a cognitive component and suggests that both physiological and cognitive reactions to dieting play major roles. Again, as is the case with set point theory, restraint theory attempts to provide an explanation for much of the observable outcome data which show that weight loss among human subjects is difficult to maintain once the subject has lost substantial weight. Restraint refers to the individual's strict vigilance over eating behavior, particularly the amount of food or calories consumed (Herman & Polivy, 1980). Research in this area has basically consisted of giving subjects a high calorie preload of one or two milkshakes, or no preload and then observing the subjects' intake of food. These observations were typically conducted under conditions in which the subjects did not know their food intake was being measured. For example, subjects were given the preload and then were

allowed to taste ice cream under the guise of a taste test (Herman & Mack, 1975). The findings in restraint research are fairly consistent. Unrestrained eaters consume somewhat less following a high calorie preload than they do without the preload. That is, they regulate their intake to account for the additional preload of calories and tend to eat significantly less ice cream than restrained eaters. Restrained eaters, on the other hand, are said to counterregulate their eating following a high calorie preload and tend to eat significantly more ice cream (Ruderman & Christensen, 1983).

Measurement of restraint has shown to be a good predictor of eating behavior in certain situations. What is most important here is evidence of a cognitive component in the regulation of food intake. Herman and Polivy (1980) speculate that the preload produced a "what-the-hell" effect in the restrained eater. With his or her diet undermined, the restrained eater begins to eat with abandon. Harowski and Jeffrey (1983) found that dieters who maintained a substantial weight loss scored significantly lower on the Restraint Scale (Herman & Mack, 1975). Harris and Snow (1984) compared weight loss maintainers, who had maintained a weight loss of at least 20 pounds for at least a year, with regainers. The investigators found that maintainers reported eating less often in response to negative emotion, thinking less often

about food and engaging in less binge eating. Since maintainers were an average of 36.6 pounds below their highest weight ever, compared to only 18.9 pounds for regainers, maintainers would have to be considered to be further below their set points for weight. Thus, while active dieting and weight loss may predispose dieters to counterregulatory eating (Polivy & Herman, 1985), cognitive, sensory and/or physiological changes may make for success in weight loss maintenance. In line with this hypothesis, Lowe & Kleifield, (1986) found that individuals who underwent a significant weight loss in the past ate significantly less ice cream following a milkshake preload, when compared to those who had not undergone a weight loss.

Importance of Maintenance

Despite any impressive demonstrations of the short-term effectiveness of very low calorie diets a handful of studies indicate that weight losses have been poorly maintained (Brownell, Marlatt, Lichtenstein, & Wilson, 1986; Smith & Fremouw, 1987). At a twenty-two month follow-up, 56% of Genuth, Vertes, and Hazelton's patients (1978) had regained more than half of their weight loss. In this study Genuth, Vertes, and Hazelton (1978) compared the effectiveness of two maintenance conditions. In one condition they augmented dietary instruction and frequent follow-up visits with one week of renewed fasting at regular intervals. In a second condition the researchers

reinstituted the very low calorie diet whenever participants' weights exceeded a preset level. Although there were some minor individual successes, neither group maintained its weight loss. These results have led Howard (1981) to propose that maintenance of weight loss be the top priority of research on the very low calorie diets.

More recent studies continue to show that despite the popularity of commercial, very low calorie weight loss programs, the issue of weight loss maintenance is a key factor in the overall success of such programs. In a recent follow-up study, Lavery, Loewy, Kapadia, Nichaman, Foreyt, and Gee (1989) cite the lack of follow-up studies on weight loss programs. These authors also gathered self reported body weights on 509 subjects two years after their participation in an eight week weight loss program. This study found that only approximately 16% of the subjects weighed at least 10% below their initial baseline wight after the two year follow up. The other 84% were either unable to achieve any weight loss, or unable to maintain a weight loss of 10% below their initial baseline weight. No difference was found between male and female subjects.

The authors (Lavery et al., 1989) concluded that their findings support the results found in previous studies which included far fewer subjects and only reported mean weight loss to assess the long-term effectiveness of weight loss programs. Though weight loss may be achieved during a

treatment period, most participants regain a significant portion of that weight back again. These authors only conclude that there is a need to identify who is more successful at long-term weight loss, and what are the variables related to long-term weight change. While these authors merely state their intention to provide future publications to address these needs, the literature already provides some directions for investigation.

In another recent study of the long-term effects of treatment in a commercial weight loss program, Fatis, Weiner, Hawkins & Van Dorsten (1989) found that only 28% of the participants maintained the designated "successful" maintenance results in a twenty month follow-up. Successful maintenance was defined here as no more than five pounds above the the initial weight loss goal. In this study, 31 clients who had claimed success in reaching their weight loss goal and whose photographs had appeared in the local newspaper were contacted by telephone and had agreed to a telephone interview. A structured interview format was used to obtain information about each client's current weight, initial goal weight or maintenance weight, the lowest and highest weights during the past year, any current involvement in the commercial weight loss program, and impressions of what aspects of the weight loss program may have been helpful in maintaining their weight loss. Of the 31 subjects included in this study, eight (28%)

maintained an average of 93% of their original weight loss at a twenty month follow-up. In discussing their findings, the authors point out that the 28% success rate may be due in part to non-treatment factors such as social pressure to maintain the weight loss since these participants publicly proclaimed their initial success in local newspaper advertisements. In addition, the authors indicate that clients who reported the least fluctuation in weight seemed more likely to maintain their weight loss. Perhaps the degree of weight fluctuation may be related to the degree of treatment compliance and/or some factors related to life style management or consistency in use of coping strategies. It is conceivable that those individuals who more consistently make use of good problem-solving strategies are also more stable with regard to weight fluctuations.

Weight Loss Versus Weight Maintenance

In weight reduction, there is often a negative correlation between initial response during active treatment and subsequent weight loss during follow-up (Kingsley & Wilson, 1977). There are a very few individuals who lose additional weight after termination of the active treatment, but those who are initially more successful in treatment generally show greater relapse during follow-up. This finding seems to suggest that the mechanisms or variables critical for maintaining a long-

term weight loss are different from those that are important for success in the actual weight loss phase of a weight loss program. The negative correlation is paradoxical if we fail to recognize that the activities, structure, and regimentation of a weight loss program may be critical during treatment or actual weight loss, and that unaided effort and self-regulation may be critical for maintaining weight loss during follow-up. Individuals who respond well to the program or therapist's interventions may show high recidivism because they have inadequate self-regulatory skills. In fact, the ability to monitor and reinforce one's own behavior has been found to be predictive of a better outcome in weight reduction programs (Cooke & Meyers, 1980).

So, while it has been suggested that initial weight loss may be dependent on changing eating behaviors, long-term change may involve a broader perspective, with alterations in perhaps personal habits, attitudes, and coping styles. Along these lines, Wilson (1976) has indicated that modification of behaviors which alter self-concept, such as assertiveness and social skills are effective in producing a sustained weight loss. That is, external rewards may work well for rapid weight reduction, but a permanent change in eating patterns requires a number of other changes, for example in activity patterns, as

well as a change in self-perception, for example defining oneself as a jogger.

Jordan, Canavan and Steer (1985) collected questionnaire data from a group of 111 subjects who had achieved a 15 pound weight loss in a 20 week cognitive behavioral program 6 to 10 years prior to their study. The questionnaire asked the respondents to state how frequently they used the behaviors and attitudes originally taught in the treatment program. The authors found that the 111 subjects would describe themselves as using the treatment approaches less frequently during times of weight gain as opposed to weight maintenance and still more frequently during times of weight loss. Jordan et al. (1985) further observed that only 36 or 32.4% of the respondents had actually maintained their weight loss 6 to 10 years after the treatment and concluded that many of the respondents had not consistently applied the behavioral interventions which they had learned in the treatment program. However, the respondents more uniformly knew which types of cognitive-behavioral interventions were appropriate for each stage (weight loss, weight maintenance) of the weight management and that their subsequent gains were not related to an inability to discriminate among stages. In other words, the subjects knew what to do but did not do it.

In a different vein of research, Schachter (1982) interviewed a group of 40 individuals who had once been

obese and tried to lose weight on their own. The percent who were considered to be successful, that is, going from more than 15% overweight to less than 10% overweight and staying there was 62.5%. This success rate is far better than long-term results achieved by organized weight reduction programs. Also, an average of eight years had passed since these successful dieters had initiated their weight loss efforts. The author suggests that these results may be explained in terms of self-selection. That is, only the most difficult cases seek help. He further speculates that success at what some may consider intractable addictive and appetitive disorders, namely smoking and overeating, may be tied to a repetitive sort of process where some subjects are eventually able to succeed after several attempts at a cure. The literature, on the other hand is focused on measuring the success rate of a single attempt and therefore gives an erroneous perception of a larger process.

In a related study, Jeffery, Folsom and Luepker (1984) collected data on weight and weight history from subjects and found that over one third of the respondents who reported being overweight had dieted and reached a normal weight range as of the time of the study. The authors concluded that their data "support the argument that successful weight control is more common among self-initiated dieters than it is among clinical populations"

(p. 352). It seems that at least some of the evidence points to a sort of individual self definition consistent with such behaviors as less food intake and more exercise. The evidence also suggests that there are differences between those who lose weight on their own and those who seek the help of some organized weight loss program. Could some of these differences also be important in distinguishing those individuals who are successful maintainers following participation in a weight loss program?

Snow and Harris (1985) surveyed 154 people who at one time in their life had lost at least 20 pounds. This research was conducted in order to see if a number of demographic or other factors could predict long-term weight loss. The basic results of this survey were presented in Chapter I (Introduction) of this paper. Of interest here, this survey suggested that people who have attended diet groups were less likely to maintain their weight loss. The authors discuss these results as perhaps deemphasizing the individual if the dieter takes part in a group. Snow and Harris (1985) also found that successful maintainers were more likely to exercise, make greater use of self-monitoring techniques such as weighing themselves more frequently, have less thoughts about food, and eat less in response to emotion. Based on these findings they conclude that people who maintain a weight loss are more likely to

have incorporated permament changes into their lifestyles which aid in their maintaining a weight loss.

These conclusions drawn by Snow and Harris (1985) seem at best wanting, not to mention contrary, when compared to other research findings concerning group treatment and maintenance of weight loss. Kingsley and Wilson (1977) conducted research on the effect of booster sessions to enhance maintenance for three different types of treatment conditions. Seventy-eight women responding to a newspaper article announcing a weight control program were assigned either to a behavioral treatment group, an individual behavioral treatment program, or a social pressure treatment program which met in groups. Following eight weeks of behavioral treatment in a group, in individual sessions, or meeting in a group to receive social pressure and no treatment, subjects were divided into booster and no-booster conditions across the three treatment conditions. The booster sessions were essentially an extension of the treatment which had taken place and were held 2, 5, 9 and 14 weeks after the initial 8 weeks of treatment. The authors hypothesized that behavioral treatments would be more effective than the nonbehavioral program (social pressure), and that individual therapy would be more effective than group behavioral treatment for weight loss and maintenance.

Kingsley and Wilson (1977) found that the booster

sessions following the termination of the 8-week treatment programs produced continued weight loss while they were in effect (weeks 8-22) for all treatment conditions. The booster sessions also significantly facilitated maintenance of weight reduction at the 3, 6, and 9 month follow-ups. Surprisingly, contrary to the prediction that individualizing behavioral treatment for the participants would facilitate maintenance of weight reduction, individual therapy resulted in significant relapse. At posttreatment, subjects in the individual behavioral treatment condition had lost the most weight. During the following 3 months, subjects in this condition who received booster sessions continued to lose weight, while the individual behavioral subjects not receiving booster sessions showed a weight gain over the same period. A planned comparison between the two behavioral treatments showed that group treatment was significantly superior to individaul treatment for maintenance of weight loss.

Kingsley and Wilson (1977) explain the group treatment superiority results in terms of subject motivation. That is, they argue that once subjects learn effective methods of losing weight, these new skills need to be generalized and implemented in a natural setting. The group atmosphere, cohesiveness and group pressure to adhere to weight reducing strategies probably makes for more sustained motivation and commitment. If this were the

case, and weight loss maintenance is a function of motivation, the behavioral treatments would not be expected to differ from the social pressure treatment.

On closer examination of the actual treatment conditions, there is another important difference that Kingsley and Wilson seem to have overlooked. In the individual behavioral treatment program, therapists were instructed to conduct an individual behavioral analysis of the obesity problem of each of their subjects and to conduct a treatment program dictated by their analysis. The therapists in the individual treatment condition were actually encouraged to go beyond the treatment methods used by the group treatment condition in order to provide more comprehensive treatment. The group treatment program was comprised of the sequential presentation of techniques for self-monitoring, relaxation training, stimulus control strategies, self-reinforcement, imagery techniques, and such behavior management methods as substitution of incompatible behaviors. The therapist strived to model an appropriate problem-solving approach to behavior control. Subjects were also encouraged to identify problems and group members were encouraged to participate in problem-solving. It seems highly likely that the rehearsal of problem-solving behaviors may have contributed to the improved maintenance of weight loss for the group treatment condition over the individual treatment condition. Perhaps

the rehearsal of problem-solving behaviors helped the group treatment subjects generalize the necessary behaviors and engage in more self-regulation of behaviors consistent with maintaining their weight loss.

There are some rather obvious similarities between the typical problem-solving steps commonly used to teach problem-solving skills and what Kirschenbaum (1987) refers to as "self-regulatory failure" in the relapse process of addictive behaviors. Typical problem-solving steps include: 1) identifying the problem, 2) listing alternatives or optional strategies to address the problem, 3) evaluate the alternatives listed, 4) choose one or more alternatives, 5) put a plan into action, 6) evaluate the outcome of the action taken, and 7) if the action is unsuccessful, make the necessary revisions (Black & Scherba, 1983). In defining "self-regulatory failure", Kirschenbaum (1987) states, "self-regulation involves establishing goals, and related processes such as expectancies and plans, monitoring one's behavior (self-monitoring), and evaluating observed performance relative to the goals (self-evaluation)" (p. 78). Though the problem-solving format may include more distinct steps, the processes of problem-solving and self-regulation seem quite similar. In self-regulation, establishing goals, expectancies and plans seems to overlap with the first five problem-solving steps outlined above. At this point

Kirschenbaum (1987) adds the aspect of self-monitoring to the process. Finally both problem-solving and self-regulation conclude with some type of evaluation relative to the success of the action taken. What seems important for the successful maintainer or self-regulator to do is manage his or her own goal directed behavior. For Kirschenbaum (1987), self-monitoring of goal directed or even perhaps problem-solving behaviors is an important component.

Kirschenbaum (1987) sees three basic factors which may potentially contribute to self-regulatory failure. The first of these he labels depressogenic cognitions and defines these cognitions as expectancies, attributions, self-evaluations and self-punishing patterns for failure. The second factor is difficulties coping with emotional stressors, and the third is disengagement from self-monitoring and other behaviors that are associated with habit change. In essence, he identifies problems in the areas of self-reward, coping, and self-monitoring as potentially contributing to self-regulatory failure. It is conceivable that problems in any of these three areas may be addressed by using the problem-solving approach.

While it is useful to note that self-monitoring may play an important role in self-regulation of behavior, Kirschenbaum (1987) places self-monitoring in a role of central importance. He argues that difficulties coping

with emotional upsets are central in self-regulatory failure, particularly for initial relapse episodes. He concludes, however, by calling for a kind of "healthy obsessive-compulsive" style of functioning for maintainers to be successful. This position seems to embrace the central importance of engaging in self-monitoring behaviors and engendering in the would-be successful maintainer or self-regulator a habitual vigilance for appropriate adherence behaviors. It seems that Kirschenbaum (1987) only addresses part of the equation and that coping skills, particularly with emotional difficulties, are important for self-regulation or maintaining a weight loss.

The above findings seem to suggest that some sort of permanent change in life style may be related to the successful maintenance of a weight loss. What appears to be important for successful maintenance is the need to generalize the behavior necessary for weight loss beyond the treatment condition so that these changes become more routine in their everyday lives. More specifically, there is some suggestion that competence in problem-solving may be an important factor in weight loss maintenance. The following section will review the studies to date which have more directly investigated problem-solving as a factor related to weight loss maintenance.

Problem Solving and Weight Loss Maintenance

To date there have been only a few studies that have

directly investigated the relationship between problem-solving and weight loss maintenance (Black, 1987; Black & Scherba, 1983; Fehrenach & Peterson, 1989; Graves, Myers & Clark, 1988; Perri, Shapiro, Ludwig, Twentyman & McAdoo, 1984; Perri, McAllister, Gange, Jordan, McAdoo & Nezu, 1988; Straw & Terre, 1983). All but one of these studies (Black & Scherba, 1983) suggest that problem-solving may play a role in the maintenance of a weight loss.

Perri et al. (1984) randomly assigned 14 males and 115 female volunteers to three treatment conditions; a behavior therapy group, a behavior therapy plus relapse prevention training group, and a nonbehavior therapy group. Treatment in the behavior therapy group consisted of a sequential presentation of the self-control techniques typically used in behavioral programs for weight reduction. These include self-monitioring, stimulus control strategies, self-reinforcement, relaxation training, and suggestions for exercise. These procedures were presented in the first 9 weekly sessions. Six additional weekly sessions were used to review and further discuss the use of these treatment procedures. In the behavior therapy plus relapse prevention group the first 9 weekly sessions were identical to those received by the behavior therapy group. The remaining 6 sessions for the behavior therapy plus relapse prevention group were devoted to problem-solving training. In these problem-solving sessions participants were trained

to recognize and identify situations posing a risk to slips and relapse. They were then trained to generate alternative solutions, evaluate the solutions, choose one or more alternatives and put the possible solutions into action before evaluating the results. Participants were encouraged to use problem-solving as a means to tailor treatment techniques to their own circumstances and generate appropriate coping strategies for potential risk situations. Finally, participants in this group received in vivo practice in coping with two risk situations; an actual dinner at an Italian restaurant and a party where high-calorie snacks were available. The nonbehavioral group meetings consisted of a 4 step format. Participants met briefly with an individual therapist to discuss problems or progress. Participants were weighed in front of the group and their weight changes were posted. Therapists provided lessons on nutrition supplemented with written handouts, and finally led discussion groups on the reasons people overeat. All three treatment groups met for 15 weeks.

Following the treatment groups, all participants were divided into two posttreatment conditions; a no further contact condition, and a client-therapist contact by mail and telephone condition. In the contact condition subjects were given postcards on which to record monitored weight information and were asked to mail these to the therapist

on a weekly basis. The therapist called the subject to briefly discuss the information received and provide support and advice consistent with the treatment the subject had received. All participants were to attend follow-up assessment meetings held at 3, 6, and 12-months post treatment.

Perri et al. (1984) found that the posttreatment client-therapist contact by mail and telephone significantly enhanced the maintenance of weight loss for groups that received nonbehavioral therapy or behavior therapy plus relapse prevention (problem-solving) training. The posttreatment contact did not, however, improve maintenance for the groups receiving behavior therapy only. For the nonbehavioral therapy groups, the posttreatment contact introduced the behavioral technique of self-monitoring. This introduction of self-monitoring may have served as an ongoing attentional and behavioral prompt for maintaining the dietary restrictions of the initial treatment plan. Also telephone contacts by the therapists may have served to reinforce the use of self-monitoring. However, subjects in the behavior therapy group who were also given follow-up contact did not show benefit from this follow-up procedure. Perhaps these follow-up contacts were viewed by the behavior therapy group as "more of the same" by suggesting further use of the initial treatment techniques. One inference that may be derived from this is

that after treatment for weight loss, subjects may need a new set of strategies to enhance coping with the novel problems of the posttreatment period. As for the lack of maintenance success in the behavior therapy group that did not receive follow-up contact, it seems that the 6 sessions of relapse prevention (problem-solving) were not sufficient to prepare the subjects even though there were two practice opportunities for relapse risk situations. So, it seems that the success of the behavior therapy plus relapse prevention group that received follow-up contact may be due to the novel posttreatment techniques introduced as well as the follow-up assistence which aided in generalizing these techniques beyond the treatment for weight loss.

In another study by Perri et al. (1988) 123 subjects who responded to advertisements for a weight control program were randomly assigned to five treatment groups. In the first group, a behavior therapy group (B), participants met for 20 weekly sessions and were given instruction in self-control techniques as were used in the above mentioned study (Perri et al., 1984). In addition, these participants were given instruction in aerobic exercise which consisted of brisk walking and stationary cycling. The target for the exercise was 20 minutes per day, 4 days per week. After the 20 weeks of treatment there was no additional contact except for follow-up assessments scheduled for 6, 12, and 18 months post

treatment. In the second group, a behavior therapy plus posttreatment contact (BC), participants were given the same treatment as the first group with the addition of 26 biweekly posttreatment sessions in which participants weighed in and took part in a therapist led discussion of problem-solving. The model used for problem-solving was the same one used in the above mentioned study as well (Perri et al., 1984). A third group was labeled behavior therapy plus posttreatment contact plus social influence maintenance program (BCS). This group received a social influence program in addition to the same treatment given to the second group. The social influence program included monetary rewards for program adherence and continued weight loss, active client participation in preparing and delivering lectures on maintaining weight loss, and instruction on how to provide peer support for weight loss through ongoing telephone contacts and peer group meetings during the posttreatment period. A fourth group was called behavior therapy plus posttreatment contact plus aerobic exercise maintenance program (BCA). Clients in this group received everything given to those in the second group. In addition, they received an aerobic exercise program consisting of a new set of goals for the posttreatment period. Essentially exercise was gradually increased from 20 minutes per day, 4 days per week to 30 minutes per day, 6 days per week. Finally, there was a fifth group called

behavior therapy plus posttreatment contact plus both aerobic exercise and social influence maintenance programs (BCAS). Clients in this condition received the same as those in the second group with the addition of both the aerobic exercise and social influence maintenance programs described above.

The results of this study (Perri et al., 1988) indicated that all four conditions which combined behavior therapy with a posttreatment maintenance program maintained significantly greater long-term weight losses than the behavior therapy only condition. It seems that the problem-solving strategies used in maintenance sessions assisted subjects in overcoming obstacles to maintaining the self-control techniques acquired in the initial sessions. The results suggest that problem-solving plays an overall role in helping prevent relapse by enhancing long-term coping skills.

Black (1987) conducted a successful weight loss program which primarily emphasized teaching problem-solving skills. A total of 7 subjects were first given a minimal intervention program for diet and weight loss instruction. This minimal intervention program consisted merely of continued verbal instructions to subjects regarding eating a well-balanced diet, increasing physical activity, and being reasonable and gradual with their weight loss, not exceeding a loss of two pounds per week.

Subjects also attended 20, 2-hour sessions, twice a week, for 10 consecutive weeks to receive counseling and training with regard to problem- solving around caloric intake and expenditure; that is, food consumption and exercise activity. For example, subjects were taught to evaluate their weight loss progress regularly by keeping track of their daily weight, calories consumed, and calories expended during routine daily activities. Subjects recorded this information daily finding calorie counting and expending information in the A to Z Diet Guide and Calorie Counter (1977). Subjects were taught to view a weight gain or maintenance weight at an undesirable level as a problem and as a cue to use problem-solving techniques. The problem-solving techniques these subjects were taught included problem identification, seeking solutions like consuming less calories or burning more through increased exercise, implementing and assessing the results. Subjects were also tested on their problem solving ability. Hypothetical Problem Situations (HPS) were used to evaluate the ability of the subjects to use the problem-solving steps in response to situations that might tempt them to overeat and underexercise. Subjects read vignettes of problem situations. Their answers to the problems were audio-recorded and scored on the basis of the number of problem-solving steps mentioned and the amount of detail used to describe each step. These vignettes were

presented initially, at the end of the problem-solving program, and at each follow-up meeting held 3, 6, and 12 months posttreatment.

The results show that 86% of the subjects continued to lose weight at a 3-month follow up, and 43% continued to lose weight at the 12-month follow-up. While most subjects continued to reduce their weight early in the follow-up and nearly half were reducing at the end of follow-up, weight loss variability became quite pronounced during this period. At the end of the 12 month follow-up pounds lost ranged from a gain of 29.5 pounds to a loss of 37.75 pounds. Also scores on the HPS suggested that there was a significant increase in problem-solving ability for the subjects during the problem-solving training session. However, at the 3 month follow-up, subjects' problem-solving ability significantly decreased and remained virtually unchanged during the rest of the follow-up. A strong negative correlation showed that weight loss was significantly correlated with HPS scores during the problem-solving program. However, there was no significance between weight lost and HPS scores during any of the follow-up assessments.

It is difficult to say what may be concluded from these results given that there were only 7 subjects in this study. Also it is difficult to conclude whether instruction in problem-solving played a role in enhancing

the weight loss maintenance of any subjects since maintenance of weight loss does not correlate with problem-solving ability as measured by scores on the HPS. Nonetheless Black (1987) concludes that his results suggest that problem-solving may be an important cognitive component in a behavioral weight loss program. The results of this study might be challenged, however, given the small number of subjects who were randomly selected from a group of 25 qualified applicants. Could it also be then that the outcome may be related to some other factors associated with the selection process of these subjects? Given this major concern regarding Black's (1987) study, his results should be taken cautiously.

In another study Straw and Terre (1983) recruited 49 women through newspaper announcements to participate in a weight loss program. Subjects were paired with one of three treatment conditions on the basis of scheduling preferences. Treatment sessions lasted an hour and were held once a week for 10 consecutive weeks. In the first and second groups subjects went through a standardized program which covered the topics of self-monitoring, stimulus control, eating style, problem-solving, activity management and social support. Depending on the condition assignment, subjects were either seen individually (IS), or in groups of 8 to 10 (GS). Subjects in the third treatment condition (II) were given an individualized treatment plan

based on the frequency of eating problems stated by each subject. Treatment was conducted on an individual basis using the same topics or techniques as conditions IS and GS were given. The authors state that these techniques were used within a "problem-solving framework in order to maximize the individuation" for each subject (p.259). During the seventh week of treatment subjects were asked whether they wished to participate in a maintenance program. Those subjects who were interested in maintenance were assigned to an individual problem-solving (IPS) condition. Those subjects who were not interested in maintenance were assigned to a weigh in only condition for maintenance. Subjects in the individual problem-solving condition were scheduled to attend individual sessions held approximately twice per month for the first 3 months of maintenance and then once per month for the remaining 9 months of follow-up. Subjects in the weigh in only condition were offered the opportunity to participate in a weight check once per month when they received some encouragement and feedback though these subjects did not receive any additional or specific problem-solving training.

The authors (Straw & Terre, 1983) found that subjects in all three treatment groups lost statistically significant amounts of weight during the treatment phase of the study, with no significant differences in the

effectiveness of the three treatments. However, during the maintenance phase, the individual problem-solving strategy (IPS) was clearly superior over the weigh in condition with 69% of the subjects in the problem-solving condition continuing to lose weight or maintain their weight loss at a one year follow up. Once again though, it is difficult to draw conclusions from these results with regard to problem-solving and weight loss maintenance. Since subjects were given the option of participating in maintenance and those who were not interested were put into the weigh in only condition for maintenance, it is possible that some motivational factor may be responsible for the maintenance results. Though these results are noteworthy, the maintenance outcome may be challenged with regard to the self-selection process for maintenance subjects.

Black and Scherba (1983) used a method of contracting with weight loss subjects to study the difference between behavioral weight loss skills and problem-solving skills. A total of only 14 subjects participated in this study. Ten subjects were randomly assigned to one of two treatment groups, while four subjects were not randomly assigned because two of these four had scheduling conflicts. In treatment program 1 (P1), subjects met for 7 weeks in 2 and 1/2 hour sessions in which a seven component behavioral treatment program was didactically presented. The seven components were self-monitoring, nutritional counseling,

physical activity, stimulus control, relaxation training, social support, and self-reinforcement. Following the presentation of one of the components each week, subjects completed behavioral contracts specifying how they were to implement the weight loss skill presented at that week's session. Contracts were reviewed weekly for successful compliance. In treatment program 2 (P2), subjects attended sessions identical in length and format to P1 subjects. However, P2 subjects contracted to implement at least one seven step problem-solving form for a current or anticipated weight-related problem. The standard seven step problem-solving model recommended by D'Zurilla and Goldfried (1971) was used. Subjects also attended a 3, 6, and 12 month follow-up session. At these sessions, subjects were weighed. If they were not losing weight, the subjects were encouraged to use contracts to aid in reducing as they had during the treatment sessions.

Black and Scherba (1983) found that the P2 subjects lost approximately two times more weight than the P1 subjects during the treatment and at the 3, and 6 month follow-up times. The authors conclude that problem-solving skills may be useful for weight loss subjects to learn in addition to behavioral weight reduction procedures. These results do not, however, indicate any particular advantage for problem-solving skills in the maintenance of weight loss. It is likely that the P2 subjects may have been more

successful because they were able to learn a general organizing skill, namely problem-solving, instead of many individual procedures that may have seemed to have less bearing on their weight loss problems. Once again, however, the sample size is small and the acceptance or generalizing of these results should be done cautiously. Also, the authors (Black & Scherba, 1983) admit that therapists who conducted the sessions had knowledge of the experimental design. This knowledge may have caused the sessions or treatments to differ in subtle ways and provide an explanation for the success of subjects in P2.

There have been other less related studies with regard to problem solving and dietary compliance. In one, Fehrenbach and Peterson (1989) studied 30 parents with phenylketonuria (PKU) children. Phenylketonuria is an inherited metabolic disease characterized by an inability to oxidize a metabolic product of phenylalanine (an essential amino acid), and by severe mental deficiency. These parents and children were classified as being in compliance with good dietary control, or in noncompliance and with poor dietary control. The results showed that compliant parents with good dietary control demonstrated better problem-solving abilities than noncompliant parents with poor dietary control. In another study, Graves, Meyers, and Clark (1988) included parental problem-solving training as part of an eight week treatment program for

obese children and compared the results with groups that did not receive parental problem-solving training. The authors (Graves et al., 1988) found that child weight loss was significantly correlated with increases in parental problem-solving ability from pretreatment to posttreatment and from posttreatment to a six month follow-up.

In summary, the literature with regard to problem-solving and weight loss maintenance seems unclear as to the relationship between problem-solving and weight loss maintenance. Some studies have indicated an important link between problem-solving and weight loss maintenance by suggesting that weight loss maintenance subjects may need a new set of strategies for dealing with the problems of maintenance, particularly those related to self-control and long-term coping skills in preventing relapse (Perri et al., 1984; Perri et al., 1988). Other studies seem to suggest that problem-solving may play a role in the maintenance of a weight loss, yet these studies are flawed in some way, by either a small number of subjects (Black, 1987), or there is some self-selection criteria with regard to maintenance which obscures the results (Straw & Terre, 1983). Yet another study suggests that problem-solving skills may be useful in weight loss though these problem-solving skills do not appear to be an advantage in the maintenance of weight loss (Black & Scherba, 1983). Finally, there are a couple less related studies which

indicate that better parental problem-solving skills are significantly advantageous for children with regard to the childrens´ compliance to a weight maintenance, or weight loss regime (Fehrenbach & Peterson, 1989; Graves et al., 1988).

Given the varied and questionable results in the literature with regards to problem-solving and weight loss maintenance, it seems important to consider what is meant by problem-solving. This will be dealt with in the next section.

Problem-Solving

Problem-solving has been an area of research for many years in psychology (Heppner, 1978). Theories and conceptions regarding the process of how individuals solve problems have ranged from various learning approaches (Gagne, 1964; Skinner, 1974) to cognitive Gestalt approaches (Kohler, 1925; Maier, 1970), as well as computer simulations and mathematical models (Newell & Simon, 1963; Restle & Davis, 1962). Other differences have divided psychologists with regards to problem solving. For example, at one extreme, Gagne (1964) and Skinner (1974) have concentrated their attention on and argued for the importance of past experiences for the individual in shaping problem solving behaviors. Others, like Kohler (1925) and Maier (1970) have contended that individual differences in perception of the whole situation are of

highest importance.

Another important distinction with regard to problem-solving was made by Wickelgren (1974) between what he called formal problems and informal problems. His term, formal problems refers to such problems as mathematical problems which contain specified givens and require certain operations to solve the problem or reach a specified goal. Conversely, informal problems have poorly specified characteristics which are more typical of real life personal problems or decisions. For example, should X marry Y? Others have stated that there are likely to be real differences between more hypothetical or predefined laboratory problems and real life personal problems (Heppner, 1978; Janis & Mann, 1977). These authors also note that how people solve predefined laboratory problems seems different and less complex than how they solve real life problems.

Some problem-solving investigators have proposed that several stages exist within the problem solving process (Clarke, Gelatt, & Levine, 1965; D'Zurilla & Goldfried, 1971; Goldfried & Goldfried, 1975). Approximately five stages seem to be common to most models of problem-solving. These stages are general orientation, problem definition, generation of alternatives, decision making, and evaluation. The general orientation refers to a mental set or predisposition on the part of the problem-solver. This

mental set influences the problem-solver to behave in a certain manner which may be either facilitative or disruptive regarding movement towards effective problem-solving procedures and solutions. In the problem definition stage, the problem-solver obtains information about the problem and translates this information into simple and concrete terms. Generation of alternatives involves generating a list of possible responses that are relevant and appropriate to the defined problem. The fourth stage, decision making, may be defined as the process of selecting one action from a number of alternative courses of action generated in the previous stage. The fifth stage of evaluation involves testing out the plan of action and matching the outcome of the response to some standard or criteria. In addition, training programs designed to enhance an individual's problem-solving skills are often developed around these stages (Dixon, Heppner, Petersen, & Ronning, 1979; D'Zurilla & Goldfried, 1971; Mendonca & Siess 1976).

More recently, investigators have provided evidence suggesting that how individuals appraise their problem-solving skills may be related to their problem-solving performance (Butler & Michenbaum, 1981; Heppner, Hibel, Neal, Weinstein, & Rabinowitz, 1982). Heppner and Petersen (1982) constructed an inventory consisting of thirty-five face valid items as measures of each of the five problem-

solving stages. Besides establishing test-retest reliability, concurrent and construct validity for this instrument, called the Problem Solving Inventory (PSI), the authors conducted a factor analysis on the items. The results of the factor analysis yielded three significant factors the authors labeled problem-solving confidence, approach-avoidance style, and personal control. The first factor, problem-solving confidence included items that seem to assess confidence in engaging in a wide range of problem-solving activities. The second factor, approach-avoidance, involved a central theme among the items as to whether an individual approaches or avoids different problem-solving activities. The third factor was labeled personal control since most of the items that loaded on this factor involved elements of self-control. Heppner and Petersen (1982) noted that the items depicting the five problem-solving stages loaded in an almost random fashion across each of these three constructs. They interpreted these results as suggesting the existence of underlying dimensions across stages and within the subjects' perception of their real life personal problem-solving. They concluded that describing applied problem-solving only in terms of content stages may be an oversimplification, and that underlying demensions may more accurately portray the complexity of real life problem-solving.

This higher order cognitive variable of how one

appraises his or her problem-solving skills has also been found to be significantly related to the number of personal problems reported (Heppner, Baumgardner, & Jackson, 1985). The results of this study also suggest that while problem-solving appraisal is related to both short and long term depression, it is perhaps more strongly related to long term depression. The authors reason that long term depression reflects a more pervasive phenomenon and may therefore be more strongly related to a general problem solving-appraisal. In another study, Heppner and Anderson (1985) obtained results to suggest that self appraisal of one's problem-solving ability is positively related to psychological adjustment as measured by the Minnesota Multiphasic Personality Inventory (MMPI).

In general, with regard to problem-solving and problem-solving appraisal, there seems to be an emerging body of data to suggest that the self appraisal of one's own abilities not only mediates performance, but also affects physical and psychological reactions to stressful events or personal problems. Problem-solving appraisal as well as other higher order cognitive variabilities related to personal problem-solving may additionally give more relevant data in the investigation of informal personal problem-solving as opposed to more formal laboratory problem-solving.

The following two sections will provide some

definitions for obesity and maintenance. Following these sections a third section will give a description of a typical low calorie weight loss program which was used in this investigation.

Obesity Versus Overweight

Obesity technically refers to an excessive accumulation of adipose tissue. Also, there is no single standard on which to base a diagnosis of obesity. Some methods used in the determination of obesity include skin caliper measurements of surface body fat (Sloan & Weir, 1970), underwater weighting, estimation of body fat from body potassium measurements (Grande, 1975), and body circumference measurements at various sites (Katch & McArdle, 1977). The term obesity is different from the descriptive term overweight, which merely refers to a plus deviation in weight from standards which are typically based on charts of desirable weights such as the median weight in for an individual in the 1983 Metropolitan Life Insurance Table. These charts are used for purposes of predicting longevity. Therefore, one can be overweight without necessarily being obese.

Because of the convience of height/weight charts, their presumed reflection of an acceptable ratio of fat to lean body mass, and their wide spread use in clinical and research settings, obesity is often judged by a 10, 15, or 20% plus deviation of weight over the desirable level even

though this may be technically wrong. For purposes of definition, in this dissertation, overweight instead of obesity will be used. Overweight will be judged as at least a 20% plus deviation in weight over the desirable level.

Definition of Weight Maintenance

There seems to be no standard in the literature for measuring success of maintenance after weight loss. Some commercial programs' criteria for success are defined as maintenance of a weight no greater than five pounds over the initial weight loss goal (Fatis, Weiner, Hawkins, & Van Dorsten, 1989). A large number of studies use a design that compares groups of weight loss maintainers by utilizing the average number of pounds regained or lost when compared to the post weight loss average weight of these two groups of subjects (Straw & Terre, 1983). Blackburn and Kanders (1987) suggest that rather than focusing on ideal body weight, decreases of 10% to 15% are sufficient to reduce the risk of medical illness. It seems then that maintained decreases of 10% to 15% below the baseline or pretest body weight are somewhat realistic standards by which to measure success of weight loss maintenance.

Overview of Typical Very Low Calorie Weight Loss Program

Several papers in the early 1960's described the use of intermittent fasting in the treatment of severe obesity

(Drenick, Sendseid, Blahd & Tuttle, 1964). Some complications such as irregular heart rate were associated with fasting and this led to the development of modified fasting or protein supplemented fasting techniques. A major advantage of this approach was the ability to treat patients out of the hospital. Two basic methods were used; a protein sparing modified fast using food substances, and a total fast with protein and necessary electrolytes provided in the form of a nutrition supplement (Genuth, Castro, & Vertes, 1974; Vertes, 1978). These early protein sparing modified diets led to the use by the lay public of fasting and liquid protein diets. Most of these individuals fasted on their own, purchasing the liquid protein in non-medical facilities and were not monitored during the course of their fasting. The occurance of some sudden deaths attributable to the unmonitored liquid protein fasting led to strong pressure by the medical community to remove these liquid protein diets from store shelves and to publicize that such unmonitored fasting is dangerous. A 1981 report (Sours, Frattali, Brand, Feldman, Forbes, Swanson & Paris, 1981) details 17 deaths associated with this form of therapy for obesity. Reputable medical programs have continued supplimental fasting with patients utilizing appropriate high biologic quality protein nutritional suppliments. Programs carried out under careful medical monitoring and appropriate replacement of

necessary high quality protein, electrolytes, and minerals have experienced no diet related deaths among the participants (Lazarus, et al., 1984).

The majority of clinical weight loss programs today are medically supervised and combine a mixture of a very low calorie diet with a protein supplement fast, cognitive behavioral training, exercise, and a quasi-therapeutic support group. These weight loss programs are available through hospitals, clinics, and agencies where medical supervision is provided or contracted for. The typical weight loss program integrates behavior change principles, including habit control, nutrition education, stress management, and physical activity combined with a low-calorie nutritional supplement. This low-calorie supplement, for example a product called HMR 500, is a protein-sparing modified fast diet. HMR 500, is a widely used supplement in many of these similar medically supervised weight loss programs. All participants are admitted into the program if they are at least 20% over their normal body weight and they are considered medically appropriate for such a program. Typical programs consist of about five phases: pre-enrollment, weight loss, refeeding, maintenance, and sometimes post maintenance. These phases will be described below.

A. Phase I. Pre-enrollment: In this phase, potential participants are given an orientation to the weight loss

program. Also, before individuals may begin the weight loss program, their medical status is determined by a physician. This examination includes a comprehensive history and physical examination, often including an electrocardiogram, urinalysis and blood tests. In addition, prospective participants are sometimes, though much less frequently, given a psychological screening assessment. Baseline data are collected and participants are given counseling to help determine realistic weight goals based on personal weight history, current body composition and measurements, lifestyle patterns, and physical activity capabilities. Once the physician determines that there are no medical problems limiting participation in the program, individuals are allowed to begin the weight loss program.

B. Phase II. Weight Loss: During the weight loss phase of the program, participants begin the supplemented fast. The supplemented fasting consists of a controlled calorie supplemented meal replacement diet (like a product called HRM 500, approximately 520 calories per day), and discontinue all food and beverages except water, coffee, tea, and diet beverages. This continues with weekly group meetings which cover a variety of topics such as stress management, time management, the need for exercise, as well as dealing more effectively with emotions, and a number of nutritional aspects. During this time monitoring of

participants' physical status continues with weekly physical examinations. Some examinations may include drawing blood, administering electrocardiograms, weight loss assessment and participant's progress toward their weight loss goal. Participants typically follow the supplemented fasting until reaching their predetermined weight loss goal.

C. Phase III. Refeeding Phase: In the refeeding phase, participants continue with weekly group meetings covering topics related to behavioral and lifestyle changes. Weekly medical examinations also continue in this phase of the program as in the weight loss phase. What makes the refeeding phase different from the weight loss phase is the gradual reintroduction of solid food over about a five week period. While participants eat increasing amounts of solid food, they are slowly taken off the diet supplement. During this phase, participants are also given consultation regarding refeeding and the establishment of new eating habits. This educational process takes place within the context of a support group atmosphere.

D. Phase IV. Maintenance Phase: The maintenance phase of typical very low calorie, clinically based programs usually lasts for approximately one year. During this time the medical monitoring may continue. This monitoring includes the laboratory tests that were previously

conducted weekly and bimonthly, though now on a less frequent basis; perhaps quarterly. Weekly or monthly group meetings usually continue with instruction and discussions on topics related to behavior modification and lifestyle changes. There is more of an emphasis on reinforcement of new and potentially enduring lifestyle changes. During this maintenance phase the group may even do such things as dine out as a way of rehearsing, supporting, and reinforcing lifestyle changes around eating behaviors.

The Current Study

The present study provides a step towards extending the understanding of problem-solving as an important cognitive component in successful weight loss maintenance. While there is evidence to suggest that problem-solving plays a role in the success of weight loss maintenance (Black, 1987; Perri et al., 1984; Perri et al., 1988), the extent of this role seems unclear. A current area of research in problem-solving focuses on an individual's self-appraisal of problem solving effectiveness. This line of investigation assumes that self-appraisal has a close relationship with the actual effectiveness of problem-solving behaviors (Heppner & Krauskopf, 1987). Therefore, it is reasonable to expect that a relationship exists between weight loss maintenance and problem-solving appraisal.

Using a measure of problem-solving appraisal, research

has been conducted on a clinical population of male alcoholics (Larson & Heppner, 1989). The results are inconsistent. Male alcoholics tended to perceive their problem solving skills as better than would be expected, and inconsistent with the larger number of personal problems acknowledged by this group. This mismatch of findings regarding self appraisal and reported performance is discussed by the authors in terms of the psychological similarity between male alcoholics and an adolescent population. These two groups, male alcoholics and adolescents, have been found to be similar with regard to level of emotional maturity and use of coping strategies and defenses like denial (Jones, 1968). It seems reasonable to think then that alcoholism may stunt or delay an individual's problem solving ability as well as distort the perception of problem solving ability. Nonetheless, these perhaps higher order findings may be more relevant given the complexity of informal personal problem solving as opposed to formal laboratory problem solving. While research in weight loss and weight loss maintenance has focused on problem solving, problem solving appraisal has not yet been a part of this research. It may very well be that similar dynamics apply to a chronically overweight population as they do for a population of male alcoholics.

This dissertation project investigates the relationship of problem solving self-perception or self-

appraisal and reported number of acknowledged personal problems in a population of weight loss maintainers. This group of subjects includes both successful and unsuccessful weight loss maintainers. It is hoped that the results will shed new light on this frontier of investigation and while providing a more complex picture, perhaps a more relevant one as well.

Hypotheses

Hypothesis 1. Those participants who are more successful at weight loss maintenance will have lower scores (better self-appraised problem-solving abilities) as measured by the Problem-Solving Inventory (PSI). The PSI scores will positively correlate with the dependent measures of weight loss maintenance.

Hypothesis 2. The results of the PSI will positively correlate with the results of the Mooney Problem Checklist (MPC). That is, participants who appraise their problem-solving abilities as better will acknowlwdge less problems being experienced.

Hypothesis 3. There will be a positive correlation between scores on the PSI, the MPC, and measures of weight regained during the maintenance period.

CHAPTER III

METHOD

Participants

The subject population for this study consisted of 18 adult males and 67 adult females who ranged in age from 25 to 68 years old with a mean age of 46 years. The subjects were predominantly middle class with an average of two years of education beyond high school. Five subjects had not completed high school. Sixty-four, or 75.3% of the subjects were married. Nine subjects reported themselves to be single while 8 reported being divorced and 4 stated they were widowed. Fifty-two of the subjects, or 61.2% reported being overweight in their teenage years by an average of 25.6 pounds, with a standard deviation of 29.2.

The subjects for this study were recruited from a hospital sponsored weight loss program in the suburban Chicago area. Those responsible for marketing and directing the weight loss program asked that the program not be specifically identified. The weight loss program was essentially identical to the one described in Chapter II. Subjects were recruited from those who had completed the weight loss program and were considered to be in the maintenance phase of the program.

Instruments

Demographic Data Sheet (Appendix A). This instrument was developed for this study. It was used to obtain such

information as subjects' age, gender, occupation, education level, marital status, if the subjects were overweight during their teen years and by how many pounds, and to report how many previous attempts they had made to lose weight.

The Problem-Solving Inventory (PSI). The publisher of this instrument did not grant permission to reproduce a copy of the PSI in the Appendices of this dissertation. Therefore it does not appear in the Appendices. This self-report instrument was developed by Heppner and Petersen (1982) to assess respondents' perception of their problem-solving behaviors and attitudes. The PSI is a 35-item instrument designed to measure how individuals believe they generally react to personal problems in their daily lives. With regard to this instrument, problems refer to personal problems such as getting along with friends, depression, career and marital decisions. Although the PSI does not measure actual problem-solving skills, it does measure the evaluative awareness of one's problem solving ability or style. The PSI comprises three subscales based on factor analysis: problem-solving confidence, approach-avoidance style, and personal control. The problem-solving confidence subscale (items 5, 10, 11, 12, 19, 23, 24, 27, 33, 34, and 35) assesses one's confidence in engaging in a wide range of problem-solving activities. The approach-avoidance subscale (items 1, 2, 4, 6, 7, 8, 13, 15, 16, 17,

18, 20, 21, 28, 30, and 31) assesses whether one's tendency is to approach or avoid problem-solving activities. The personal control subscale (items 3, 14, 25, 26, and 32) contains items related to self-control. The total score is viewed as a single, general index of one's perception with regard to problem-solving skills.

The PSI was developed and tested with several samples of 150 undergraduate university students enrolled in an introductory psychology class during the spring of 1980. Additional data were collected from 31 students to establish an estimate of test-retest reliability and from 62 students for estimates of concurrent validity. Based on the responses from 150 undergraduate students, the following normative data based on exact scores were obtained for each of the three factors and the total inventory: Factor 1 (problem-solving confidence) mean = 24.47, standard deviation = 7.53; Factor 2 (approach-avoidance) mean = 46.21, standard deviation = 11.51; Factor 3 (personal control) mean = 18.40, standard deviation = 5.06; total inventory mean = 91.50, standard deviation = 20.65. These normative data were cross-validated with a sample of 62 undergraduate students (Heppner & Petersen, 1982).

Estimates of internal consistency for each of the three factors and the total inventory are as follows: problem-solving confidence, $\underline{a}$ = .85; approach-avoidance

style, $\underline{a}$ = .84; personal control, $\underline{a}$ = .72; and total inventory, $\underline{a}$ = .90. The test-retest reliabilities were as follows: problem-solving confidence, $\underline{r}$ = .85; approach-avoidance style, $\underline{r}$ = .88; personal control, $\underline{r}$ = .83; and the total inventory, $\underline{r}$ = .89.

Validity estimates were established by correlating scores on the three factors of the PSI with the Level of Problem Solving Skills Estimate Form (LPSSEF) (Heppner, 1979). On the LPSSEF, subjects rate their level of problem-solving skills in addition to rating their level of satisfaction or dissatisfaction with their present level of problem-solving skills. The resulting correlations between the PSI and the self rating of skills on the LPSSEF were as follows: problem-solving confidence, $\underline{r}$ = -.44; approach-avoidance stlye, $\underline{r}$ = -.29; personal control, $\underline{r}$ = -.43; and total inventory, $\underline{r}$ = -.46. These correlations are negative because on the PSI lower scores are interpreted as reflecting greater perceived problem-solving abilities. The correlations for the perceived satisfaction/ dissatisfaction with problem-solving skills were as follows: problem-solving confidence, $\underline{r}$ = -.42; approach-avoidance style, $\underline{r}$ = -.24; personal control, $\underline{r}$ = -.39; total inventory, $\underline{r}$ = -.42. All of these correlations were statistically significant ($\underline{p} < .0001$).

Scores on the PSI were also correlated with scores on the first three stories of the Means-Ends Problem Solving

procedure (MEPS). The MEPS consists of 10 stories involving interpersonal problem solving situations and provides a measure of an individual's ability to conceptualize means of moving toward an effective solution (Platt & Spivack, 1975). All correlations between the PSI and MEPS were statistically nonsignificant. This finding may indicate that these two instruments measure different aspects of the personal problem-solving process. Conceptualizing means to a hypothetical problem situation is quite different from reflecting on what one actually does in solving real-life personal problems.

Validity coefficients were also computed by correlating the scores on the three factors and the total PSI with the Rotter Internal-External (I-E) Locus of Control Scale and the Myers-Briggs Type Indicator (MBTI). The I-E Scale measures a person's belief or expectations about how reinforcement is controlled; that is, an internal (self) or an external (environment) locus of control (Rotter, 1966). All correlations between the PSI and the I-E Scale were statistically significant ($p < .01$) as follows: problem-solving confidence, $r = .64$; approach-avoidance style, $r = .53$; personal control, $r = .40$; total PSI, $r = .61$. The MBTI is a personality inventory that asseses basic differences in the way people prefer to use perception and judgment (Myers, 1962). The indicator contains separate indices for determining each of four

basic preferences: extraversion or introversion, sensing or intuition, thinking or feeling, and judgment or perception. All correlations for the PSI factors and total score with the continuous scores of each of the four type indicators on the MBTI were statistically nonsignificant, except between scores on the personal control factor and the thinking-feeling scores (r = .25, p < .05).

In establishing construct validity Heppner and Petersen (1982) correlated the three PSI factors and the total PSI to the School and College Ability Test (SCAT, Series II), the Missouri College English Test (MCET), and the Missouri Mathematics Placement Test (MMPT). The SCAT, Series II is an intelligence test that provides estimates of basic verbal and mathematical ability (Educational Testing Service, 1967). The MCET is a test that assesses studends' knowledge of the mechanics of and their effectiveness with written communication (Callis & Johnson, 1965). The MMPT assesses the algebraic skills of entering college freshmen (Krauskopf, Burcham, & Willis, 1967). In addition, scores on the three factors and the total PSI were correlated with subjects' high school rank. All correlations here were statistically nonsignificant. Thus, the PSI is not correlated with intelligence measures or academic achievement.

Construct validity was additionally enhanced by correlating the three factors and the total PSI with the

Social Desirability Scale (SDS). The SDS identifies individuals who describe themselves in favorable, socially desirable terms in order to achieve the approval of others (Crowne & Marlowe, 1964). The correlations here were statistically nonsignificant, except with the personal control factor of the PSI (r = -.24, p < .05). Thus scores on the PSI do not seem to be highly correlated with scores on a general measure of social desirability.

Finally, a small study (n = 18) was conducted to support the construct validity of the PSI (Heppner & Petersen, 1982). This study involved a comparison of subjects who had received problem-solving training versus a control sample. Training consisted of a workshop emphasizing problem-solving. This workshop entailed six, one-hour sessions in which participants received group and individual instruction as well as homework assignments covering problem-solving skills. The results showed that the group receiving the training scored significantly lower than the control group on a posttest of the PSI, t (16), p < .05).

In summary, Heppner and Petersen (1982) conclude that the PSI is a needed and useful tool for research. They point out that there is an absence of instruments that attempt to measure constructs associated with applied problem-solving and that the PSI may serve as a tool for researchers who want to assess people's perceptions of the

problem-solving process.

The Mooney Problem Checklist (MPC). The publisher of this instrument did not grant permission to reproduce a copy of the MPC in the Appedices of this dissertation. Therefore it does not appear in the Appendices. The adult form of the MPC (Gordon & Mooney, 1950a, 1950b) assesses the number and nature of a wide range of personal problems. The instrument consists of 288 items, which constitute nine scales or major problem areas. These are health, economic security, self-improvement, personality, home and family, courtship, sex, religion, and occupation. Low scores indicate a low frequency of reported problems.

The MPC yields a count for each person for each of the areas, and for the total list of items. Though norms are available, the authors (Gordon & Mooney, 1950a) believe that local norms are the most valuable. The MPC has been used in conjunction with the PSI in previous research to assess the number of acknowledged probelms being experienced in relation to problem-solving appraisal.

The MPC is designed to reflect the problems which an individual senses and is willing to express at a given time. Since the problem world of any individual is a dynamic interrelation of changing situations and experiences, one would expect the number of items and the specific items checked to be somewhat different over time of administrations. Gordon and Mooney (1950a) do provide

data from two sources to support the reliability of the MPC. The first is from an unpublished study by Gordon in which the College form of the pre-1950 revision of the Problem Checklist was administered twice to 116 college students. The frequency with which each of the items was marked on the first administration was correlated with the frequency with which each of the same items was marked on the second administration. A correlation coefficient of .93 was found.

The second source of reliability data is a study of four educational groups in which the Problem Checklist was repeated from one to ten weeks after a first administration. The rank order of the problem areas, arranged by size of mean number of problems checked in the area, remained virtually the same from one administration to the other for each of the groups. The rank order correlation coefficients varied from .90 to .98.

Gordon and Mooney (1950a) indicate that the checklist is not built as a test but rather as a means of screening for real life problems currently being experienced by an individual or group. Therefore a single overall index of the validity of the checklist would be meaningless. Nonetheless, they present some evidence to indicate that the Problem Checklist covers the range of personal problems. Some of this evidence is with regard to responses to a question presented with the pre-1950

editions of the checklist: "Do you feel that the items you have marked on the list give a well-rounded picture of your problems?" In an unpublished study of college students, 92 percent of those who responded to the question felt that the items they had marked gave a fairly complete picture of their problems.

Gordon (1949) also conducted some research to determine the degree to which the Problem Checklist reflects statements of problem changes, with problem changes being determined by an independent measure. Gordon administered the checklist twice to a group of 70 men and 46 women with a 9-day interval. After the second administration, the subjects were asked to indicate on a special mimeographed form whether any of their problems had been solved, or whether new problems had arisen during the previous 9-day period, and if so, what these problems were. The checklist reflected approximately 83 percent of the changes reported on the mimeographed form.

Gordon and Mooney (1950a) conclude that while the Problem Checklist is designed to reflect changing situations and experiences in the individual case, this instrument also has sufficient stability and validity for use in research.

The Life Events Stress (Appendix B). An instrument was needed to see whether life stressors were relatively stable over the subject population in this study. The Life

Events Stress was selected because of its ease of administration (length = 30 items), and similarity to the Social Readjustment Rating Scale (SRRS) (Holmes and Rahe 1967). Much like the SRRS, the Life Events Stress uses a weighted score for items that are presumed to have greater physical or psychological change associated with the event. Test-retest reliability coefficients for the SRRS have ranged from .26 to .90 with the higher values associated with shorter intertest intervals (Rahe, 1974). This instrument was not, however, used as an independent measure in this study but merely to see if a measure of life stress was relatively stable for the participants in this study.

Procedure

Permission was received from the director of the weight loss program to collect data in the manner described below.

Questionnaire data were gathered on participants from the weight loss program from October of 1989 through June of 1990. Weight loss program participants who were in the maintenance phase of the program were recruited for possible participation in this study. The author attended maintenance group meetings to briefly explain the purpose of the study and request maintenance group members to participate in the study. Those who agreed to participate were given a packet containing an informed consent form (Appendix C), the Demographic Data Sheet, the PSI, the MPC,

and the Life Events Stress. Participants were also told prior to their involvement in the study, both verbally and on the informed consent form, that weight data would be gathered from their chart at the weight loss clinic. Data collected from the chart included each participant's weight just prior to beginning the weight loss program, his or her weight at the beginning of the maintenance phase of the program, and his or her recorded maintenance weight at one month intervals for 12 consecutive months. Those who agreed to participate in the study were asked to complete the consent form, the Demographics Data Sheet, the Life Events Stress, the PSI, and the MPC during the first part of their meeting. This took approxiamtely 30 to 40 minutes. The completed information was then collected.

A mailing was also sent to individuals who were in the maintenance phase of the weight loss program yet had not attended one of the maintenance group meetings in which data were collected. The packet for this mailing included all the same material that was given to those who attended the maintenance meetings with the addition of a letter co-signed by the weight loss clinic director which introduced the study, explained its purpose and requested their participation (Appendix D). This packet also contained a pre-addressed, postage paid envelope in which the subject could return the completed information.

Follow-up phone calls were made to those to whom the

mailing was sent to in order to personally request their participation and respond to any questions regarding the purpose of the study. One of these individuals who was called complained to the president of the hospital where the weight loss program was held stating that he or she did not like being asked to participate in the study. The hospital then requested that no more data be collected from any additional individuals in the weight loss program who had not yet consented to participate in the study.

All the data were scored and recorded on data sheets (Appendix E) along with each subject's weight just prior to weight loss, each subject's weight at the beginning of maintenance, and each subject's weight for 12 consecutive months of maintenance. Each participant was identified with a number which was not associated with his or her name and therefore each subject's confidentiality was maintained. Also, any identifying information was removed from all of the data collected except for the signed consent forms.

Independent Variables

The independent variables for this study included some of the information obtained from the demographic data sheet. These independent variables include age, gender, socio-economic status, years of education, if the participant was overweight as a teenager and by approximately how many pounds, and how many previous

attempts to lose weight were made by the participant. These demographic variables have been previously associated with successful weight loss maintainers (Snow & Harris, 1985). The remaining independent variables were composed of problem-solving appraisal (PSI) and the number of acknowledged problems being experienced (MPC). The problem-solving appraisal measure consisted of the PSI and the three PSI factors (problem-solving confidence, approach-avoidance, and personal control). The numbers of acknowledged problems were measured by the total MPC score and the nine problem area scales (health, economic security, self improvement, personality, home and family, courtship, sex, religion, and occupation.

Dependent Variables

Four indices of weight loss maintenance were used for dependent variables. These dependent measures were taken at 6 months and at 12 months, for a total of 8 dependent variables. The first dependent variable is the total number of pounds regained, or lost at 6 months and at 12 months of maintenance. The second dependent measure is the percent of weight regained or lost at 6 months and at 12 months of maintenance. This second dependent variable was arrived at by taking the amount of weight change during maintenance and dividing it by the total amount of weight lost during the weight loss phase. The third dependent measure is the average number of pounds gained or lost

during maintenance. Again, this measure was taken at 6 months and at 12 months. The forth dependent variable is the average amount of weight change during maintenance relative to the initial weight loss. This measure of weight gain or loss represents the average amount of maintenance weight change each month divided by the number of months in maintenance, 6 monthe or 12 months. This average of weight gain or loss is then compared to the initial weight loss.

Hypotheses

Hypothesis 1. Those participants who are more successful at weight loss maintenance will have lower scores (better self-appraised problem-solving abilities) as measured by the Problem Solving Inventory (PSI). The PSI scores will positively correlate with the dependent measures of weight loss maintenance.

Hypothesis 2. The results of the PSI will positively correlate with the results of the MPC. That is, participants who appraise their problem-solving ability as better will ackhowledge less problems being experienced.

Hypothesis 3. There will be a positive correlation between scores on the PSI, the MPC, and measures of weight regained during the maintenance period.

CHAPTER IV

RESULTS

Sample Description

The participants for this study consisted of 18 adult males and 67 adult females who ranged in age from 25 to 68 years old with a mean age of 46 years. These participants were predominantly middle class and had an average of two years of education beyond high school. Only five subjects had not completed high school. Sixty-four, or 75.3% of the participants were married. Nine participants reported to be single while 8 reported being divorced and 4 stated they were widowed. Fifty-two of the participants, or 61.2% reported being overweight during their teenage years by an average of 25.6 pounds. Ninety three percent of the participants indicated that they had made several prior attempts to lose weight.

Participants' responses to the Life Events Stress (LES) questionnaire showed that 36.5% reported little to no stress, 10.6% reported mild stress, 14.1% reported moderate stress and 38.8% indicated that they had experienced severe stress within the past year. This measure of stress may have implications with regard to perception of problem-solving ability and the number of acknowledged problems experienced. The possible implications will be discussed in the following chapter.

Preliminary Analysis

A correlation matrix was constructed in which all the possible independent and the dependent variables were intercorrelated. Table 1 (in Appendix F) presents the Pearson product-moment correlations for the ten independent variables of age, gender, socio-economic status, years of education, marital status, overweight as a teen, number of pounds overweight as a teen, number of previous weight loss attempts, the PSI (total score and the three factor scales), the MPC (total score and the nine subscales), and the eight dependent variables for weight loss maintenance. The eight dependent variables are:

1. number of pounds gained or lost after 6 months of maintenance
2. number of pounds gained or lost after 12 months of maintenance
3. percent of weight regained or lost after 6 months of maintenance
4. percent of weight regained or lost after 12 months of maintenance
5. rate of weight gain or loss after 6 months of maintenance
6. rate of weight gain or loss after 12 months of maintenance
7. rate of weight gain or loss after 6 months of maintenance, relative to the initial weight loss
8. rate of weight gain or loss after 12 months of

maintenance, relative to the initial weight loss.

This correlational analysis evidenced that scores for the PSI and the three factors (confidence in problem-solving ability, approach / avoidance, and personal control) were correlated with each other as were scores on the MPC and the nine scales comprising the total MPC score. In addition, PSI scores (total and the three factors) were correlated with MPC scores (total and nine subscales) which introduced the problem of multicollinearity (Wampold & Freund, 1987). In order to minimize the influence of multicollinearity an attempt was made to sum or omit highly correlated variables prior to the regression procedures. As a result the three factors of the PSI were omitted for the regression procedures as these three factors sum to the total PSI score. Also the nine MPC subscales were omitted prior to the regression analysis as these scores sum to the total MPC score.

As can be seen in Table 1 (Appendix H), the only independent variable other than problem-solving measures that significantly correlated with any of the dependent weight loss maintenance measures was gender. There was a significant positive correlation ($p < .05$) between gender and percent of weight regained or lost after 12 months of maintenance. This correlation indicates that females in this study gained a significantly larger percentage of weight as compared to males after 12 months of maintenance.

This finding will be discussed in the following chapter.

Table 2 presents the means and standard deviations for all the scales of the Problem-Solving Inventory (PSI) and the total score for the Mooney Problem Checklist (MPC). Though the three factors were omitted for the regression analysis, the means and standard for problem-solving confidence, approach / avoidance, and personal control were included in this table. The means for the PSI and the three factors are comparable to means reported in a previous investigation which used this instrument (Heppner, 1988).

Correlation Results for Hypothesis 1

With regards to the first hypothesis, the total measure of problem-solving appraisal (PSI) showed a significant positive correlation ($p < .05$) with each of the dependent weight loss maintenance measures. The results show that the participants in this study who tended to appraise their problem-solving ability as good gained fewer pounds during maintenance at both 6 and 12 months of maintenance, regained less of a percentage of their weight at 6 and 12 months of maintenance, had a lower rate of weight regained at 6 and 12 months of maintenance, and had a lower rate of weight regained at 6 and 12 months of maintenance in relation to their initial weight loss as compared to those participants who gave a lesser appraisal of their problem-solving abilities. Thus, Hypothesis 1 was

TABLE TWO

Means and Standard Deviations

of the PSI and MPC Scales

Scale	M	SD
PSI	94.34	26.27
Confidence	26.22	10.40
Approach/avoidance	50.07	13.73
Personal control	18.00	6.25
MPC	31.71	22.03

supported.

As for the three PSI factors of appraised confidence in problem-solving ability, appraised tendency to approach rather than avoid a problem-solving situation, and appraised personal control in a problem-solving situation, the results show significant positive correlations (all at $p < .05$) with some of the dependent measures of weight loss maintenance. Participants in this study who appraised themselves as more confident in their problem-solving ability gained significantly fewer pounds after 12 months of maintenance, gained a significantly smaller percentage of weight after 6 and 12 months of maintenance, showed a significantly lower rate of weight regained after 12 months of maintenance, and a significantly lower rate of weight regained relative to their initial weight loss after 6 and 12 months of maintenance than participants who appraised themselves as less confident in their problem-solving abilities. Those participants who appraised their problem-solving style as tending to approach rather than avoid problem-solving situations gained a significantly smaller percentage of weight after both 6 and 12 months of maintenance and showed a significantly lower rate of weight gain relative to their initial weight loss after 6 and 12 months of maintenance. A more positive appraisal of personal control in problem-solving situations was significantly correlated with fewer pounds gained after 6

months of maintenance, a lower percentage of weight gained after 6 and 12 months of maintenance, a lower rate of weight gain after 6 months of maintenance, and a lower rate of weight gain relative to initial weight loss after 6 and 12 months of maintenance than those participants who reported a less positive appraisal of personal control in problem-solving situations.

Correlation Results for Hypothesis 2

The results of the PSI including the total PSI score and the three factors significantly correlated with all (at $p < .01$) the total MPC score (number of acknowledged problems being experienced). These results indicate that participants who appraised their problem-solving abilities as good tended to acknowledge fewer problems they were experiencing as opposed to those who gave a more negative appraisal of their problem-solving abilities. Also, participants who appraised themselves as more confident in their problem-solving abilities, tending to approach rather than avoid a problem-solving situation, and having more personal control in problem-solving situations reported significantly fewer problems being experienced than those who reported less confidence, tended to avoid, and had less personal control in problem-solving situations. Therefore hypothesis 2 was partially supported by the data.

Correlation Results for Hypothesis 3

Though there were significant positive correlations (p

< .05) found for problem-solving appraisal as measured on the PSI and all eight measures of weight loss maintenance, and the total PSI and the three PSI factors significantly correlated ($p < .01$) with the number of acknowledged problems being experienced as measured by the total MPC, there were no significant correlations between the total MPC and the eight measures of weight loss maintenance. Participants in this study who appraised their problem-solving ability as better than those who appraised it more negatively tended to acknowledge significantly fewer problems being experienced. However, those participants who acknowledged fewer problems being experienced did not do any better with regard to weight loss maintenance than those participants who acknowledged experiencing more problems. Thus, Hypothesis 3 was not supported.

Results of Regression Procedures

As the purpose of this study was to identify those variables significant to weight loss maintenance, particularly variables related to problem-solving, a backward stepwise regression (SPSSX, 1983) procedure was utilized. A forced entry procedure was also utilized for the problem-solving independent variables, namely the PSI and MPC total scores. Specifically, stepwise backward elimination procedures were conducted using the independent variables of age, gender, socio-economic status, years of education, marital status, being overweight as a teen, the

number of pounds overweight as a teen, the number of previous weight loss attempts, PSI total, MPC total, with a forced entry of total PSI and total MPC. These independent variables were used in eight regression procedures utilizing each of the eight dependent variables at both six months and for twelve months. Tables 3 through 10 present the summary results of these regression procedures.

The stepwise backward elimination procedure for the dependent variable number of pounds gained or lost after 6 months of maintenance terminated after step 19. As can be seen in Table 3, at step 19 a multiple correlation coeficient of .301 resulting in an R^2 value of .091, indicating that approximately 9% of the variability in this dependent variable was accounted for. The resulting F test produced a respective p value of .052 indicating that the regression equation did not account for a significant amount of variability.

The variables in this first regression equation are also reported in Table 3. As can be seen from the p values, the only variable in this equation with a beta weight significantly different from 0 is perceived problem solving ability (PSI) ($p < .05$). Other variables in the equation that did not significantly contribute to the variability are gender and number of acknowledged problems (MPC).

Table 4 reports the summary results from the

TABLE THREE

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Number of Pounds Gained or Lost After 6 Months of Maintenance

R	R^2	Adj. R	F (Eqn)	Sig. F
.301	.091	.057	2.692	.052

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
Gender	-5.074	2.923	-.196	-1.736	.086
PSI	.101	.050	.250	2.027	.046*
MPC	.045	.057	.093	.799	.427
(Constant)	6.435	5.632		1.143	.257

Note. * = significant at .05

** = significant at .01

regression procedure for the dependent variable number of pounds gained or lost after 12 months of maintenance. This procedure terminated after step 20. At step 20 the multiple correlation coeficient, .228, resulted in an R^2 value of .052. Thus this second regression equation accounts for only 5.2% of the variability with regard to his dependent measure. The respective F test produced a p value of .111 indicating that this regression equation does not account for a significant amount of the variability for number of pounds lost after 12 months of maintenance.

The variables in the equation are also reported. The only variables left in the equation at step 20 were perceived problem-solving ability (PSI) and number of acknowledged problems (MPC). Neither of these two variables had a beta weight significantly different from 0.

Table 5 shows the summary results for the regression performed on the maintenance variable percent of weight gained or lost after 6 months of maintenance. This procedure terminated after step 19. At step 19 the multiple correlation coeficient of .459 resulted in an R^2 of .210 accounting for 21% of the variability for this dependent measure. The related p value of .000 indicates that this regression equation accounts for a significant amount of the variability in percent of weight gained or lost after 6 months of maintenance.

The variables in this equation are being overweight as

TABLE FOUR

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Number of Pounds Gained or Lost After 12 Months of Maintenance

R	R^2	Adj. R	F (Eqn)	Sig. F
.228	.052	.029	2.254	.111

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
PSI	.117	.067	.205	1.730	.087
MPC	.031	.080	.045	.381	.704
(Constant)	5.072	5.985		.847	.399

Note. * = significant at .05

** = significant at .01

TABLE FIVE

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Percent of Weight Gained or Lost After 6 Months of Maintenance

R	R^2	Adj. R	F (Eqn)	Sig. F
.459	.210	.181	7.186	.000**

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
Overweight as a teen	.062	.037	.165	1.671	.099
PSI	.003	.001	.454	4.165	.000**
MPC	-.001	.001	-.079	-.726	.470
(Constant)	-.210	.085		-2.462	.016*

Note. * = significant at .05

** = significant at .01

a teen, perceived problem-solving ability (PSI), and number of acknowledged problems being experienced (MPC). The only variable in this equation with a beta weight significantly different from 0 is PSI ($p < .01$).

Table 6 provides the summary results of the regression procedure for the maintenance variable of percent of weight loss after 12 months of maintenance. This procedure terminated after step 19 when the multiple correlation coeficient, .447, resulted in an R^2 of .200 indicating that the equation accounted for 20% of the variability with regard to this dependent measure. The F test produced a p value of .000 which indicates that this regression equation accounts for a significant amount of the variability for percent of weight gained or lost after 12 months of maintenance.

The only variable in this equation with a beta weight significantly greater that 0 is perceived problem-solving ability (PSI) ($p < .01$). Other variables in the equation without significant beta weights are being overweight as a teen and number of acknowledged problems being experienced (MPC).

The summary results from the stepwise backward elimination procedure performed for the maintenance variable rate of weight gain or loss after 6 months of maintenance are provided in Table 7. This procedure terminated after step 19 with a multiple correlation

TABLE SIX

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Percent of Weight Gained or Lost After 12 Months of Maintenance

R	R^2	Adj. R	F (Eqn)	Sig. F
.447	.200	.170	6.753	.000**

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
Overweight as a teen	.101	.059	.171	1.715	.090
PSI	.005	.001	.448	4.079	.000**
MPC	-.002	.001	-.117	-1.064	.290
(Constant)	-.234	.135		-1.735	.087

Note. * = significant at .05

** = significant at .01

TABLE SEVEN

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Rate of Weight Gained or Lost After 6 Months of Maintenance

R	R^2	Adj. R	F (Eqn)	Sig. F
.301	.091	.057	2.692	.052

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
Gender	-.848	.487	-.197	-1.743	.085
PSI	.017	.008	.251	2.035	.045**
MPC	.007	.009	.092	.784	.435
(Constant)	1.074	.938		1.146	.255

Note. * = significant at .05

** = significant at .01

coeficient of .301 resulting in an R^2 of .091, indicating that this equation accounted for approximately 9.1% of the variability for this dependent measure. The respective F test has a p value of .052 indicating that this equation does not account for a significant amount of variability for the dependent measure rate of weight gain at 6 months of maintenance. The variables in this equation are gender, perceived problem-solving ability (PSI), and number of acknowledged problems being experienced (MPC). The only variable with a beta weight significantly different from 0 is PSI ($p < .05$).

Table 8 shows the summary results for the regression procedure performed with the maintenance variable rate of weight gain or loss after 12 months of maintenance. This procedure terminated after step 20 with a multiple correlation coeficient of .232 resulting in an R^2 of .054. This equation accounted for approximately 5.4% of the variability with regard to this dependent measure. The resulting F test has a respective p value of .103 indicating that this equation did not account for a significant amount of the variability for the dependent measure rate of weight gain or loss after 12 months of maintenance.

The variables in the equation are listed in Table 8 as well. The variables in this equation are perceived problem-solving ability (PSI) and number of acknowledged

TABLE EIGHT

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Rate of Weight Gained or Lost After 12 Months of Maintenance

R	R^2	Adj. R	F (Eqn)	Sig. F
.232	.054	.031	2.335	.103

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
PSI	.010	.006	.208	1.757	.083
MPC	.002	.007	.047	.394	.695
(Constant)	.411	.497		.826	.411

Note. * = significant at .05

** = significant at .01

problems being experienced (MPC). Both of these variables have non-significant beta weights.

The summary results for the stepwise backward elimination procedure with the maintenance variable rate of weight gain or loss after 6 months of maintenance relative to initial weight loss are found in Table 9. The regression procedure terminated after step 20 with a multiple correlation coeficient of .427 resulting in in an $\underline{R}^2$ of .182 indicating that this equation accounted for approximately 18.2% of the variability with regard to this dependent measure. The resulting $\underline{F}$ test produced a $\underline{p}$ value of .000 indicating that this regression equation accounted for a significant amount of the variability with regard to the maintenance variable rate of weight gain at 6 months relative to the initial weight loss.

Table 9 also shows that perceived problem-solving ability (PSI) was again the most important variable in the equation and the only variable with a beta weight significantly different from 0 ($\underline{p} < .01$). The only other variable in this equation, MPC was not significant.

Table 10 shows the summary results of the regression procedure with the maintenance variable rate of weight gain or loss after 12 months of maintenance relative to the initial weight loss. The procedure terminated after step 20 with a multiple correlation coeficient of .403 which resulted in an $\underline{R}^2$ of .162, accounting for approximately

TABLE NINE

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Rate of Weight Gain or Loss After 6 Months of Maintenance Relative to the Initial Weight Loss

R	R^2	Adj. R	F (Eqn)	Sig. F
.427	.182	.162	9.136	.000**

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
PSI	.001	.000	.461	4.178	.000**
MPC	-.000	.000	-.105	-.954	.343
(Constant)	-.020	.011		-1.811	.074

Note. * = significant at .05

** = significant at .01

TABLE TEN

Summary Table of Stepwise Backward Elimination Procedure for the Dependent Variable Rate of Weight Gain or Loss After 12 Months of Maintenance Relative to the Initial Weight Loss

R	R^2	Adj. R	F (Eqn)	Sig. F
.403	.162	.142	7.936	.001**

Variables in the Equation

Variable	B	SE B	Beta	T	Sig. T
PSI	.000	.000	.440	3.946	.000**
MPC	-.000	.000	-.131	-1.174	.244
(Constant)	-.008	.009		-.829	.410

Note. * = significant at .05

** = significant at .01

16.2% of the variability with regard to this dependent measure. The resulting F test produced a respective p value of .001 indicating the regression equation accounted for a significant amount of the variability for the maintenance variable rate of weight gain at 12 months relative to the initial weight loss.

Once again, the most important variable in the regression equation, and the only variable with a beta weight significantly different from 0 is perceived problem-solving ability (PSI) ($p < .01$). Acknowledged problems being experienced (MPC) was the only other variable in the equation. MPC has a non-significant beta weight.

Summary of Results

The results indicated that appraised problem-solving ability as measured by the Problem-Solving Inventory (PSI) did form a significant positive correlation with all eight dependent measures of weight loss maintenance ($p < .05$). That is, participants in this study who appraised their problem-solving abilities as better tended to gain fewer pounds at 6 and 12 months of maintenance, gained a smaller percentage of weight at 6 and 12 months of maintenance, showed a smaller rate of weight gain at 6 and 12 months of maintenance, and showed a smaller rate of weight gain relative to initial weight loss at 6 and 12 months of maintenance as compared to those who appraised their problem-solving abilities as more negative.

With regard to appraisal of problem-solving abilities (PSI) and acknowledged problems being experienced (MPC), a significant positive correlation was also found ($p < .01$). Those participants in this study who perceived their problem-solving abilities as better than others in this study tended to report fewer problems being experienced. However, the number of acknowledged problems being experienced (MPC) by the participants in this study did not significantly correlate with any of the measures of weight loss maintenance. That is, the reported number of acknowledged problems being experienced by participants in this study did not seem to be related to weight loss maintenance.

As for the results of the regression analysis, perceived problem-solving appraisal (PSI) was the only variable that significantly contributed to the variability of weight loss maintenance measures. Specifically, better problem-solving appraisal, defined by responses to the PSI, as opposed to more negative self-appraised problem-solving abilities significantly contributed ($p < .05$) to the variability with regard to number of pounds lost at 6 months of maintenance and the rate of weight gain at 6 months of maintenance. Better self-appraised problem-solving abilities, defined by responses to the PSI, as compared to more negatively self-appraised problem-solving abilities also significantly contributed ($p < .01$) to the

variability with regard to the percentage of weight gained at 6 and 12 months of maintenance, and the rate of weight gain relative to the initial weight loss at both 6 and 12 months of maintenance. The number of acknowledged problems being experienced by participants in this study did not significantly contribute to the variability for any of the dependent measures of weight loss maintenance as shown by the results of the regression analysis.

CHAPTER V

DISCUSSION

Study Results

The goal of this study was to explore a possible relationship between problem-solving and maintenance of weight following a period of weight loss. More specifically, self-appraisal of problem-solving abilities as measured by the Problem-Solving Inventory (PSI), and acknowledged problems being experienced as measured by the Mooney Problem Checklist (MPC) were hypothesized to significantly correlate with eight dependent measures of weight loss maintenance. A significant ($p < .05$) correlation indicated that participants in this study who were successful at maintaining their weight loss self-appraised their problem-solving abilities as better than those in this study who tended to self-appraise their problem-solving abilities more negatively.

Hypothesis 1 predicted that participants who appraised their problem-solving ability as better than others who appraised their ability more negatively in this study would tend to be more successful at weight loss maintenance. This Hypothesis was supported by the data. Participants' scores on the PSI were found to significantly and positively ($p < .05$) correlated with all dependent measures of weight loss maintenance. In addition, PSI scores accounted for more variance on the dependent

measures of weight loss maintenance than any of the demographic variables or the number of acknowledged problems the participants reported they were currently experiencing.

These results are consistent with the findings of previous research which suggest that problem-solving plays a role in the success of weight loss maintenance. The results of studies conducted by Perri et al. (1984), Perri et al. (1988), Black (1987), Straw and Terre (1983), Fehrenbach and Peterson (1989), and Graves et al. (1988) all suggest that problem-solving plays some important role in weight loss maintenance.

The results of this current study extend the understanding of the relationship between problem-solving and weight loss maintenance. More specifically, the results of this current study include the concept of problem-solving appraisal and its possible relationship to weight loss maintenance. While Perri et al. (1984) and Perri et al. (1988) concluded that problem-solving abilities may be an important component for weight loss maintenance, the results of these two studies may also support the importance of problem-solving appraisal. While the post-treatment contact in the study conducted by Perri et al. (1984) may have contributed to better maintenance of weight loss, this post-treatment contact may have have been influencial in reinforcing participants' appraisal of their

problem-solving abilities. In brief, contact by the therapist may have reinforced, or confirmed the participants' problem-solving attempts and thus operated to enhance their problem-solving appraisal. Also the problem-solving strategies used in maintenance sessions in the Perri et al. (1988) study may have served to enhance the problem-solving appraisal of the participants via the instruction of problem-solving strategies in maintenance sessions.

Hypothesis 2 predicted that the PSI scores would significantly and positively correlate with the scores obtained from participants responses to the Mooney Problem Checklist (MPC). This Hypothesis was partially supported by the data. While the total PSI scores and the total MPC scores did signigicantly positively correlate ($p < .05$) with each other, the total MPC scores did not correlate with any of the dependent measures of weight loss maintenance. As mentioned above PSI scores did significantly positively correlate ($p < .05$) with the dependent measures of weight loss maintenance. These findings seems to indicate a confound.

Although total scores on the PSI and total MPC scores do correlate, these measures may well represent significantly differing constructs and for this reason total MPC scores do not correlate with measures of weight loss maintenance while total PSI scores do. Total PSI

scores which are a measure of self-perceived problem solving appraisal appear to be related to the dependent measures of weight loss maintenance in this study. While the number of acknowledged problems being experienced (MPC) appears to be related to self-perception of problem-solving appraisal (PSI), the number of acknowledged problems being experienced may be a significantly different construct in the realm of problems, and problem-solving so as to not be related to weight loss maintenance as measured in this study.

It is also possible that there are other intervening variables which played a role in the results obtained. For example differences in how participants experienced stress with relation to thenumber of problems acknowledged may be an important intervening variable. For example, some participants who acknowledged more problems may have experienced them as less stressful than others who acknowledged fewer problems and experienced these problems as more stressful.

These findings concerning the significant positive correlation between PSI and MPC scores differ from the results obtained by Larson and Heppner (1989). In the present study significant positive ($p < .01$) correlations were found between the total PSI score and the MPC as well as all three PSI factors with the total MPC score. Larson and Heppner (1989) failed to find a significant correlation

between the total PSI and total MPC scores. A possible reason for this difference may be explained by the different populations used as participants in the two studies. Larson and Heppner's study used 78 males from a Veterans Administration hospital 28-day in-patient alcohol treatment unit. All of the participants in the Heppner and Larson study carried a primary diagnosis of alcohol dependency or alcohol abuse. Although there is no mention of it, this alcoholic in-patient population may also consist of a rather substantial percentage of recidivists, perhaps having been treated 2 or more times for alcoholism. Given this strong possibility, it is likely that these alcoholic males utilized significant denial or other maladaptive defense mechanisms when responding to the MPC. As a result their responses may not have given a true picture of the number of problems they were currently experiencing.

The participants for this current study might be considered to be more normal in that they were not from an in-patient population which called for a psychiatric diagnosis. However, there was no formal or other screening conducted on participants in this current study for psychological problems or psychiatric diagnoses. Nonetheless, it is likely that the participants in this current study responded to the MPC more honestly because of the liklihood of their using less denial. Thus, their

responses represent a more typical population and resulted in a positive correlation between PSI and MPC scores. Therefore, it seems highly likely that self-appraisal of one's problem-solving abilities may indeed be related to the number of acknowledged problems being experienced, at least for some populations.

Hypothesis 3 predicted significant positive correlations among scores on the PSI, the MPC, and dependent measures of weight loss maintenance. This Hypothesis was not supported by the data. The results did not show any significant correlations between the total MPC score and the dependent measures of weight loss maintenance either at 6 months, or 12 months of maintenance. This is an important finding. While better self-appraisal of one's problem-solving abilities seems to be related to better weight loss maintenance and less acknowledged problems being experienced, the number of acknowledged problems being experienced does not seem to be related to weight loss maintenance. It is more than likely that other relavent variables operated to confound the relationship between number of acknowledged problems or self-appraisal of problem-solving abilities and weight loss maintenance. For example, the level of stress in one's life may be an intervening variable that affects either weight loss maintenance, the number of acknowledged problems, or both. In this example, those who experience greater amounts of

stress may acknowledge more problems being experienced, yet appraise their problem-solving abilities as good and be successful at maintaining a weight loss.

The findings with regard to the significant positive ($p < .05$) correlations between the PSI and weight loss maintenance, the PSI and the MPC, and yet no significant correlation between the MPC and weight loss maintenance may be understood in light of the previous research concerning problem-solving and weight loss maintenance. First of all, the current results showing no significant relationship between number of acknowledged problems being experienced and weight loss maintenance are similar to those found by Black (1987). Black (1987) used Hypothetical Problem Situations (HPS) to evaluate the problem-solving abilities of 7 participants in a minimal intervention weight loss program that included instruction in problem-solving. He found that the problem-solving abilities of the participants, as measured by the HPS, increased during the weight loss program though not during the maintenance follow-up periods of 3, 6, and 12 months. So, Black's (1987) findings do not show a relationship between problem-solving ability as measured by the HPS and weight loss maintenance.

However, the results of other studies demonstrate an important link between problem-solving and weight loss maintenance, and suggest that weight loss maintenance

subjects may need a new set of strategies for dealing with problems related to self-control and other coping strategies for preventing relapse (Perri et al., 1984; Perri et al., 1988). The results of the current study fail to show a direct relationship between the number of problems acknowledged being experienced and success at weight loss maintenance. The data indicate a significant ($p < .05$) positive relationship between problem-solving appraisal and weight loss maintenance, as well as problem-solving appraisal and number of acknowledged problems being experienced ($p < .01$).

Again, it is highly likely that a confound exists and other factors such as level of stress and factors relating to psychological adjustment, to name a couple, will need to be statistically controlled for in future investigations. With regards to this current study, the number of participants reporting levels of stress that are considered moderate to severe seemed high. A possible implication of this result is that some participants' high stress levels may have made for an increase in the number of acknowledged problems they were experiencing. Even so, these same participants were successful at weight loss maintenance and appraised their problem-solving abilities as better than others in the study who appraised their problem-solving more negatively.

The results of the regression analysis also show that

one's self-appraisal of problem-solving abilities accounts for more of the variability with regard to weight loss maintenance than any of the demographic variables including age, gender, socio-economic status, years of education, marital status, being overweight as a teen, the number of pounds overweight as a teen, and the number of previous weight loss attempts.

Cooke and Meyers (1980) reviewed the literature with regard to the role of predictor variables in the behavioral treatment of obesity. They concluded that only three factors appear to be useful in predicting a successful response to weight loss programs and maintenance of weight loss. The first of these factors is the subject's cognitions. Negative or self-defeating cognitive styles may tend to hamper compliance with treatment and maintenance of treatment effects. The second factor is family and social support. Greater social and family support tends to enhance participants' weight loss and the maintenance of weight loss. Finally, the third factor involves self-control, particularly in terms of the individual's ability to self-reinforce appropriate behaviors. With regard to one's self-appraisal of problem-solving abilities as measured by the PSI, it is likely that the factors comprising this measure, particularly confidence in problem-solving and personal control in problem-solving situations are highly positive reinforcing

cognitions. This being the case, it is easy to understand how self-appraisal of one's problem-solving abilities as measured by the PSI can be such a potent variable with regard to weight loss maintenance.

Recently, Larson, Piersel, Imano, and Allen (1990) sought to determine the contributions of several variables to problem-solving appraisal as measured by the PSI. Using the PSI as a dependent variable in a multiple regression technique, these investigators found that problem-solving appraisal incorporates positive, action-oriented coping strategies but does not necessarily incorporate negative cognitions or strategies. The authors conclude that PSI results, or one's perceived effectiveness as a problem-solver may have more to do with perceiving problems in a more positive, action-oriented manner. This recent investigation by Larson et al. (1990) points to positive cognitions and self-appraisals as being the significant contributors to problem-solving appraisal thus far. Moreover, these results support the idea that positive reinforcing cognitions may account for significant variance with regard to successful weight loss maintenance.

Finally, there is the finding that females in this study gained a significantly larger percentage of weight as compared to males after 12 months of maintenance. There is some evidence from previous research conducted by Snow and Harris (1985) which concludes that successful weight loss

maintainers are more likely to be male. So, it seems that the results from the current study concerning gender and successful weight loss maintenance are consistent with previous findings.

Limitations

It was the hope and intention for this investigation to obtain a larger number of participants. However, this was not possible. This is perhaps the most significant limitation to this study. As a consequence of the limited number of participants the variables in the regression equations were not exhaustive. A larger participant population in this study may have augmented the results by providing additional data and information regarding the relative contribution of the three PSI factors, namely confidence in problem-solving ability, approach/avoidance style with regard to perceived problem-solving, and perceived personal control in problem-solving situations to weight loss maintenance.

Another limitation to this study is that the participants were middle class adults in the Midwest. Therefore, the results may or may not be similar to those of other ages, ethnic groups, socio-economic classes, or geographic settings.

Other limitations include controlling for other potentially important factors such as screening for psychological problems and styles of psychological

functioning. Perhaps future studies might include measures for determining if participants are experiencing any significant psychological problems, or if there are any significant differences in how stress is perceived and dealt with. Inclusion of such factors in future studies may help illuminate possible confounds as well as provide a way to statistically control for such variables. Also, the inclusion of a number of actual problem-solving measures may shed light on the question of confounding between perception of problem-solving ability and actual problem-solving ability.

The lack of any pre-test measures for perceived problem-solving abilities is a limitation for this study. The inclusion of pre-test measures would provide a baseline to help determine if weight loss maintenance instruction or other weight loss maintenance group activities provide some measure of change in the perception of or actual problem-solving ability.

Other factors which may represent a limitation to this study may have to do with self-selection. That is, it is assumed that the participants in this study were all willing participants and volunteered to take part in the study. However, could the results be biased in some manner by participants entering the weight loss program because this was in some way demanded by their physician? Could the results also have been biased by some participants

being more medically at risk than others due to their being overweight?

Finally, this study is the first multiple regression study of its kind. Further studies will need to be done in order to replicate the results and expand the sample to include other demographic as well as potentially significant variables. Perhaps the use of other measures of problem-solving abilities in future investigations could further clarify the possible role problem-solving plays in weight loss maintenance.

Clinical Implications

It seems that current weight loss programs include some instruction in the basics of problem-solving steps. This instruction takes place as part of regular classes which meet during the weight loss phase and/or during the maintenance meetings. Some weight loss programs even provide opportunities for practicing problem-solving behaviors while participants are exposed to various situations involving food or choices in eating behaviors. These practice opportunities may include the class group planning a meal together or going to a restaurant tegether. While instruction in the basics of problem-solving and practicing problem-solving behaviors in various situations may be important, the results of this study seem to suggest some additional applications along the lines of enhancing weight loss participants' self-appraisal of problem-solving

abilities.

The results of the current study suggest that problem-solving appraisal may be an important factor with regards to weight loss maintenance. Those participants in this study who more positively appraised their problem-solving abilities tended to be more successful weight loss maintainers than those who appraised their problem-solving abilities more negatively. These results concerning problem-solving appraisal might be applied to weight loss programs by way of programmatic exercises and opportunities to enhance participant's perceptions of their problem-solving abilities. For example, the addition of feedback sessions and exercises for participants to receive positive reinforcement for problem-solving efforts may enhance their self-appraisal of problem-solving abilities. Follow-up contact with weight loss maintenance participants and maintenance meetings could include components which provide such positive reinforcement for problem-solving efforts.

Conclusion

With regard to weight loss, the maintenance of a weight loss is a key factor in determining the success of weight loss. While many weight loss programs may be successful in helping participants achieve a desired weight loss, the success of maintaining the weight loss is often much less successful. Some of the recent weight loss literature has suggested that problem-solving may play an

important role in the relative success of weight loss maintenance (Black, 1987; Graves, Myers & Clark, 1988). This study attempted to investigate the relationships of perceived problem-solving ability as measured by the Problem Solving Inventory (PSI), and the number of acknowledged problems being experienced as measured by the Mooney Problem Checklist (MPC) with regard to measures of weight loss maintenance.

It was hypothesized that 1) participants who were more successful at weight loss maintenance would self-appraise their problem-solving abilities as better than those participants who were less successful at weight loss maintenance, 2) participants who self-appraised their problem-solving abilities as better than others in the study would acknowledge less problems being experienced, and 3) participants who self-appraised their problem-solving abilities as better than others in this study would acknowledge less problems being experienced and be more successful at weight loss maintenance.

Correlational and multiple regression procedures were used to analyze the results. The results showed that overall, demographic data and the number of acknowledged problems being experienced did not correlate with, nor contribute significantly to weight loss maintenance. The results showed that problem-solving appraisal significantly correlated with weight loss maintenance ($p < .05$) and

significantly contributed ($p < .05$) to success at weight loss maintenance. Problem-solving appraisal also significantly correlated ($p < .05$) with the number of acknowledged problems being experienced by the participants. There was no significant relationship found, however, between the number of acknowledged problems being experienced and the success at weight loss maintenance.

The results of this study suggest that problem-solving appraisal may be an important factor with regards to weight loss maintenance. These results also suggest that problem-solving appraisal may be an important construct in the area of problem-solving. The potential usefulness of these results support the further investigation of problem-solving appraisal as an important construct in the area of problem-solving. These results also support the inclusion of problem-solving instruction and exercise in problem-solving experiences towards better self-appraisal of problem-solving abilities to possibly enhance weight loss maintenance for weight loss participants.

Despite its limitations, this study extends the literature and potential understanding of weight loss maintenance and problem-solving appraisal. First, this study utilizes multiple regression procedures that incorporate many variables that have been previously suggested to have some relationship to weight loss maintenance. Moreover, this study seems to corroborate the

current trend of findings in the literature with regard to problem-solving appraisal.

APPENDIX A

DEMOGRAPHICS DATA SHEET

Age: _____

Sex (circle one) M F

Occupation: _____

How many years of formal education did you complete?_____
(for example completion of high school = 12 years,
high school + 2 years of college = 14 years)

Marital Status (circle one): married single
divorced widowed

Did you consider yourself overweight as a teenager?

(please circle one) Yes No

By approximately how many pounds? _____

How many serious previous attempts have you made to lose weight prior to your present weight loss at this clinic?

_____

APPENDIX B

LIFE EVENTS STRESS

Circle the number that indicates the number of times that each of these events has occurred to you in the **past twelve months:**

Death of spouse or loved one	0	1	2	3	4	5	____
Divorce	0	1	2	3	4	3	____
Marital separation from mate	0	1	2	3	4	3	____
Death of a close family member	0	1	2	3	4	3	____
Major personal injury or illness	0	1	2	3	4	3	____
Marriage	0	1	2	3	4	2	____
Being fired or laid off from work	0	1	2	3	4	2	____
Major change in health or behavior of family member	0	1	2	3	4	2	____
Sexual difficulties	0	1	2	3	4	2	____
Gaining a new family member	0	1	2	3	4	2	____
Major change in business or line of work	0	1	2	3	4	2	____
Major change in financial status	0	1	2	3	4	2	____
Death of close friend	0	1	2	3	4	2	____
Major change in number of arguments with mate	0	1	2	3	4	2	____
Taking on a mortgage or major debt	0	1	2	3	4	1	____
Foreclosure on mortgage or loan	0	1	2	3	4	1	____
Major change in responsibilities at work	0	1	2	3	4	1	____
Son or daughter leaving home	0	1	2	3	4	1	____
In-law troubles	0	1	2	3	4	1	____
Outstanding personal achievement	0	1	2	3	4	1	____
Mate beginning or discontinuing work	0	1	2	3	4	1	____
Beginning or ceasing schooling	0	1	2	3	4	1	____
Major change in living conditions	0	1	2	3	4	1	____
Change in personal habits (eating, sleeping, etc.)	0	1	2	3	4	1	____
Troubles with boss or supervisor	0	1	2	3	4	1	____
Major change in working hours or conditions	0	1	2	3	4	1	____
Change in residence	0	1	2	3	4	1	____
Major change in usual type or amount of recreation	0	1	2	3	4	1	____
Major change in church or social activities	0	1	2	3	4	1	____
Trouble in paying debts	0	1	2	3	4	1	____

Scoring Key Multiply each number you circled by the number to its right outside the box. Place the result in the blank space. Add together all of these results and interpret the amount of potential stress your life events experiences are providing as follows:

0-7	Little	—Events should have little impact on your stress
8-10	Mild	—You have a mild amount of stressful events
11-14	Moderate	—Your coping energy is being challenged
15+	Severe	—Your coping energy is under a high strain

APPENDIX C

INFORMED CONSENT
for participation in:

Problem Solving and Problem Solving Appraisal in Weight Loss Maintenance

This research project will use the responses given by each participant to three questionnaires (the Mooney Problem Checklist, and the Problem Solving Inventory, and the Life Events Stress questionnare), as well as information listed on the Deomgraphic Data Sheet. The amount of weight you have lost and maintained will be gathered from your records at the clinic. The purpose of this research project is to investigate the role of problem solving in weight loss maintenance. There are no risks to the participants, and data will be coded in such a manner that confidentiality will be assured. This research project has the support of the director of this weight loss clinic.

I, _____, understand the purpose of the research project being conducted by Richard Alford, and consent to participating in it. In exchange for my participation, I am intitled to a brief summary of the results.

_____ _____
Signature of Investigator Signature of Subject

_____ _____
Date Date

Please check one of the two choices below:

_____ I would like to receive a summary of the results of this research once they are available. Please send summary to this address:

_____

_____

_____

_____

_____ I do not care to receive a summary of the research results.

APPENDIX D

March 26, 1990

Dear WCFL Participant,

I am a doctoral student at Loyola University of Chicago. As a final requirement for this degree, I am conducting a study at Mercy Center's Weight Management Programs. This research study has the approval and support of the Program Director, Linda Gerding. The project is designed to study the relationship between weight loss maintenance and problem solving. There are no risks to the participants and the data will be coded in such a manner that any names and identifying information will be deleted. Therefore, all data will be anonymous.

I would appreciate your participation in this study. There are three instruments to complete; the Mooney Problem Check List, the PSI, and the Life Events Stress. Each of these questionnaires have simple and complete instructions to follow. There is also a brief Demographic Data Sheet to be filled out. The total time to complete the three questionnaires and the Data Sheet should be approximately 30 minutes.

In order for the data to be used in this study you will need to read and sign the "Informed Consent" page enclosed. Your participation is voluntary and would be greatly appreciated. In exchange for your participation, I would be happy to send a summary of the results, if you so desire.

Please put all of the completed forms in the enclosed postpaid envelope and place it in the mail at your earliest convenience. If you have any questions, feel free to contact me at Mercy Center. My telephone number is (708) 859-2222 ex.2873.

Thank you,

Richard Alford, M.S.
Staff Psychologist

Linda Gerding, M.S., R.D.
Program Director

APPENDIX E

Subject #:

DEMOGRAPHICS

Age :

Sex:

Occupation :

Education:

Marital Status :

Overweight as Teen: Y N # of lbs.

# of Previous Attempts:

INSTRUMENTS

Problem Solving Inventory :

Confidence Approach-Avoidance Personal Control

Mooney Problem Checklist:

H ES SI P HF C S R O

Life Events Stress:

WEIGHTS

Before Wt Loss:

Start of Mnt:

6 mo of mnt:

12 mo of mnt:

APPENDIX F

TABLE ONE

Pearson Product-Moment Correlations of the Independent and Dependent Variables

	2	3	4
1. Age	.018	.069	-.063
2. Gender	---	.283**	-.043
3. Socio-economic status		---	-.579**
4. Years of education			---

	5	6	7
1. Age	.039	.119	-.175
2. Gender	.227*	.118	-.168
3. Socio-economic status	.155	-.121	-.021
4. Years of education	-.050	-.075	.113

	8	9	10
1. Age	.146	.020	-.132
2. Gender	.178	.343**	.316**
3. Socio-economic status	.267*	.274*	.147
4. Years of education	-.177	-.245*	-.186

TABLE ONE CONTINUED

	11	12	13
1. Age	.174	-.102	-.340**
2. Gender	.321**	.204	.140
3. Socio-economic status	.284**	.250*	.127
4. Years of education	-.161	-.333**	-.202

	14	15	16
1. Age	-.118	-.277*	-.182
2. Gender	.177	-.075	.203
3. Socio-economic status	.097	.018	.065
4. Years of education	-.236*	-.075	-.067

	17	18	19
1. Age	-.375**	-.129	-.438**
2. Gender	.139	.147	.086
3. Socio-economic status	.160	.127	.012
4. Years of education	-.199	-.226*	.035

	20	21	22
1. Age	-.117	.041	-.244*
2. Gender	-.389**	.189	-.023
3. Socio-economic status	.013	.125	.044
4. Years of education	-.133	-.171	.001

TABLE ONE CONTINUED

	23	24	25
1. Age	-.040	-.005	-.076
2. Gender	-.098	-.021	.155
3. Socio-economic status	.013	.057	.126
4. Years of education	-.059	-.066	-.069

	26	27	28
1. Age	-.006	-.038	-.005
2. Gender	.218*	-.098	-.020
3. Socio-economic status	.180	.013	.057
4. Years of education	-.121	-.058	-.063

	29	30
1. Age	-.051	.004
2. Gender	.132	.207
3. Socio-economic status	.114	.187
4. Years of education	-.103	-.137

	6	7	8
5. Marital status	.086	-.008	-.045
6. Overweight as teen	---	-.703**	-.119
7. # lbs. teen overweight		---	.110
8. # pervious attempts			---

TABLE ONE CONTINUED

	9	10	11
5. Marital status	.161	.059	.158
6. Overweight as teen	.001	.048	-.024
7. # lbs. teen overweight	-.139	-.079	-.151
8. # previous attempts	.120	.034	.205

	12	13	14
5. Marital status	.168	.148	.161
6. Overweight as teen	-.019	-.030	.093
7. # lbs. teen overweight	-.091	.080	-.002
8. # previous attempts	.012	-.060	-.049

	15	16	17
5. Marital status	.163	.113	.126
6. Overweight as teen	-.027	.047	-.134
7. # lbs. teen overweight	.227*	-.021	.109
8. # previous attempts	-.100	.063	-.047

	18	19	20
5. Marital status	-.051	.349**	.011
6. Overweight as teen	.002	-.106	-.119
7. # lbs. teen overweight	.061	.122	.056
8. # previous attempts	-.034	-.007	-.103

TABLE ONE CONTINUED

	21	22	23
5. Marital status	.046	.084	-.048
6. Overweight as teen	.132	.029	-.111
7. # lbs. teen overweight	-.106	-.134	.081
8. # previous attempts	.030	-.213*	-.105

	24	25	26
5. Marital status	-.068	.115	.089
6. Overweight as teen	-.148	.168	.174
7. # lbs. teen overweight	.123	-.167	-.179
8. # previous attempts	.027	.015	.081

	27	28	29
5. Marital status	-.048	-.063	.011
6. Overweight as teen	-.110	-.145	.102
7. # lbs. teen overweight	.080	.120	-.103
8. # previous attempts	-.105	.024	.027

	30
5. Marital status	.031
6. Overweight as teen	.137
7. # lbs. teen overweight	-.154
8. # previous attempts	.069

TABLE ONE CONTINUED

	10	11	12
9. PSI	.811**	.8961**	.844**
10. Confidence	---	.513**	.633**
11. Approach/avoidance		---	.662**
12. Personal control			---

	13	14	15
9. PSI	.424**	.406**	.165
10. Confidence	.363**	.353**	.187
11. Approach/avoidance	.274**	.313**	.046
12. Personal Control	.528**	.374**	.282**

	16	17	18
9. PSI	.340**	.436**	.254*
10. Confidence	.188	.395**	.231*
11. Approach/avoidance	.285**	.274**	.158
12. Personal control	.429**	.533**	.315**

	19	20	21
9. PSI	.123	.109	.182
10. Confidence	.187	.019	.159
11. Approach/avoidance	.004	.094	.114
12. Personal control	.201	.232*	.230*

TABLE ONE CONTINUED

	22	23	24
9. PSI	.016	.222*	.225*
10. Confidence	.024	.206	.262*
11. Approach/avoidance	-.046	.150	.156
12. Personal control	.098	.260*	.182

	25	26	27
9. PSI	.421**	.398**	.223*
10. Confidence	.359**	.421**	.205
11. Approach/avoidance	.369**	.331**	.151
12. Personal control	.355**	.255*	.260*

	28	29	30
9. PSI	.228*	.416**	.385**
10. Confidence	.268*	.379**	.428**
11. Approach/avoidance	.157	.349**	.306**
12. Personal control	.183	.348**	.242*

	14	15	16
13. MPC	.699**	.652**	.734**
14. Health	---	.358*	.476**
15. Economic security		---	.328**
16. Self-improvement			---

TABLE ONE CONTINUED

	17	18	19
13. MPC	.886**	.687**	.521**
14. Health	.514**	.487**	.198
15. Economic security	.414**	.498**	.493**
16. Self-improvement	.610**	.432**	.198

	20	21	22
13. MPC	.374**	.495**	.470**
14. Health	.242*	.353**	.266*
15. Economic security	.256*	.283**	.350**
16. Self-improvement	.247*	.426**	.234*

	23	24	25
13. MPC	.172	.132	.109
14. Health	.194	.110	.191
15. Economic security	.118	.179	.070
16. Self-improvement	.040	-.028	.112

	26	27	28
13. MPC	.068	.171	.135
14. Health	.170	.195	.109
15. Economic security	.080	.117	.181
16. Self-improvement	.061	.039	-.028

TABLE ONE CONTINUED

	29	30	
13. MPC	.090	.056	
14. Health	.236*	.181	
15. Economic security	.042	.059	
16. Self-improvement	.077	.030	
	18	19	20
17. Personality	.479**	.513**	.273*
18. Home & family	---	.213	.285**
19. Courtship		---	.018
20. Sex			---
	21	22	23
17. Personality	.319**	.326**	.112
18. Home & family	.411**	.185	.251*
19. Courtship	.234*	.381**	.029
20. Sex	-.008	.206	.298**
	24	25	26
17. Personality	.044	.037	-.039
18. Home & family	.277*	.050	.098
19. Courtship	.006	.092	.005
20. Sex	.281*	.115	.091

TABLE ONE CONTINUED

	27	28	29
17. Personality	.110	.047	.009
18. Home & family	.251*	.277*	.086
19. Courtship	.028	.016	-.023
20. Sex	.299**	.278**	.122

	30
17. Personality	-.049
18. Home & family	.120
19. Courtship	-.050
20. Sex	.089

	22	23	24
21. Religion	.336**	.052	-.033
22. Occupation	---	.066	.050
23. # lbs. regained or lost at 6 months		---	.702**

	25	26	27
21. Religion	.120	.057	.050
22. Occupation	.016	-.001	.067
23. # lbs. regained or lost at 6 months	.614**	.380**	.999**

TABLE ONE CONTINUED

	28	29	30
21. Religion	-.021	.010	.046
22. Occupation	.052	.012	.002
23. # lbs. regained or lost at 6 months	.702**	.671**	.393**

	25	26	27
24. # lbs. regained or lost at 12 months	.427**	.650**	.702**
25. % of weight regained or lost at 6 months	---	.768**	.614**
26. % of weight regained or lost at 12 months		---	.380**

	28	29	30
24. # lbs. regained or lost at 12 months	.999**	.509**	.678**
25. % of weight regained or lost at 6 months	.433**	.911**	.702**
26. % of weight regained or lost at 12 months	.653**	.760**	.977**

TABLE ONE CONTINUED

	28	29	30
27. Rate of weight regain or loss at 6 months	.702**	.671**	.393**
28. Rate of weight regain or loss at 12 months	---	.509**	.679**
29. Rate of regain or loss at 6 months relative to initial weight loss		---	.778**
30. Rate of regain or loss at 12 months relative to initial weight loss			---

Note. * = significant at .05

** = significant at .01

(2 - tailed)

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The final copy has been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the committee with reference to content and form.

The dissertation is, therefore, accepted in partial fulfillment of the requirements for the degree of Ph.D.

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