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THE EFFECT OF SELF-EFFICACY, OUTCOME EXPECTATIONS, AND SOCIAL COMMUNICATION ON ADHERENCE TO A MEAL REPLACEMENT PROGRAM

By

Merissa Hart Ferrara

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ABSTRACT

THE EFFECT OF SELF-EFFICACY, OUTCOME EXPECTATIONS, AND SOCIAL COMMUNICATION ON ADHERENCE TO A MEAL REPLACEMENT PROGRAM

By

Merissa Hart Ferrara

Weight-loss is a chronic health issue. The current investigation used the framework of chronic disease self-management to assess the effect of past behavior, vicarious experience, and interpersonal influence on efficacy and adherence to diet and physical activity. Three treatment groups (meal replacement participants attending weekly group meetings, meal replacement participants in an individualized, medially supervised program and a control group of people trying to lose weight through any commercial program) participated in a time-series, quasi-experiment. Path analysis showed that while the proposed models were not consistent with the data, other models suggested better fit. The control condition experienced the highest levels of efficacy, yet the group condition, followed by the individual program participants reported the highest levels of social support and adherence to diet. This study presents interesting results and discussion on past behavior, vicarious experience, social undermining, and efficacy.

To anyone who wakes up today and decides to take action to improve their health.

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INTRODUCTION

In August 2004 the National Institute of Health (NIH) announced: "Obesity is one of the most daunting challenges of the 21st century. On the surface, it may seem that the solution to the obesity epidemic is obvious: 'Get people to eat less and exercise more.' The reality is that this change is very difficult to accomplish, and research is critical to address the issue successfully. Given the complexity and multiplicity of the forces driving the obesity epidemic, the NIH recognizes that it cannot, by itself, solve this major public health problem (NIH, 2004, p. 5)."

Over 65 percent of U.S. adults are overweight or obese, with almost 31 percent of adults maintaining the criterion for obesity (Flegal, Carroll, Ogden, Johnson, & 2002; NIH, 2003). Body mass index (BMI), a measure of weight relative to height, dictates these percentages. In adults, overweight is defined as a BMI $\geq$25, obesity as a BMI $\geq$30, and morbid (severe) obesity as a BMI $\geq$40 (NIH, 2004). Assessments of the BMI categories indicate that while the U.S. has shown increases in BMI, the most prominent raise observed over the past two decades is in the morbid obesity group (with current estimations placing 4.7% of adults in the morbidly obese category) (Flegal et al., 2002; Flegal & Troiano, 2000). Furthermore, approximately 16 percent of children and teens ages 6 through 19 are now overweight, with an additional 15 percent considered at risk (Ogden, Flegal, Carroll, & Johnson, 2002).

The increase in obesity is fueled by an interaction of environmental, social, economic and behavioral factors and genetic vulnerability (NIH, 2004). The biomedical rationale for why people are overweight is relatively simple. The energy balance equation

proposes that increasing adiposity is the net result of inadequate energy expenditure for the energy being consumed. However, achieving energy balance (maintaining weight) or tipping the balance toward weight loss becomes more complicated when psychosocial variables are considered. For instance, a lower income reduces the range of healthy choices, such as adding fresh fruits and vegetables to the diet or engaging in sometimes costly recreational pursuits (Reidpath, Burns, Garrard, Mahoney, & Townsend, 2002). For other individuals, body dissatisfaction, job stress, family/marital unhappiness, and social criticism can trigger depression, anxiety, feelings of low self esteem, and guilt which may increase energy intake (i.e., binge or comfort eating, excess alcohol consumption) or reduce physical activity (Wardle, 1999).

Obesity takes a substantial toll on health. It is a major risk factor for such serious diseases as type 2 diabetes, heart disease, and stroke, and is associated with certain cancers, liver disease, osteoarthritis, urinary incontinence, back pain, knee problems, and sleep apnea (NIH, 2003; 2004). Obesity also shortens life expectancy; on average, people who are moderately obese have a life expectancy 2 to 5 years less than those who are not overweight or obese; and those who are morbidly obese have an average life expectancy 5 to 20 years less than those who are not overweight or obese (Fontaine, Redden, Wang, Westfall, & Allison, 2003).

Obesity is correlated with reduced quality of life and economic cost (NIH, 2004). Heavier individuals are more likely to experience depression (Roberts, Strawbridge, Deleger, & Kaplan, 2002; Stunkard, Faith, Allison, & Kelly, 2002), anxiety (Becker, Margraf, Turke, Soeder, & Neumer, 2001) , low self-esteem, less satisfying social relationships (Hill & Williams, 1998; Wadden & Phelan, 2002) , and generally inferior

mental health-related quality of life and psychosocial functioning (Brown, Mishra, Kenardy, & Dobson, 2000). Further, cross-sectional evidence reveals that overweight people are subject to discrimination related to employment and promotion opportunities (Rothblum, Miller, & Garbutt, 1988), health care (Hoppe & Ogden, 1997), education (Falkner, Neumark-Sztainer, Story, Jeffery, Beuhring, & Resnick, 2001), income (Pagan & Davila, 1997), friendships (Falkner, French, Jeffery, Neumark-Sztainer, Sheerwood, & Morton, 1999), and monetary support within families (Crandall, 1994). Finally, weight gain also exacts a substantial economic toll; the combination of direct healthcare costs plus indirect expenses, such as lost wages due to illness, employee absenteeism and decreased productivity, were approximately $117 billion in the U.S. for the year 2000 (Thompson & Wolf, 2001).

Scientific evidence in the last decade has demonstrated that physical activity and balanced diet can improve the quality of life for all ages and conditions. Unfortunately, it has not translated into consistent action. Dieting has become America's new national pastime; $33 billion is spent annually on weight loss products and services (NIH, 2004). Approximately 45% of women and 30% of men report that they are trying to lose weight each day, and 70% of adults agree that they should exercise more frequently (Serdula, Mokdad, Williamson, Galuska, Mendlein, & Heath, 1999). Despite the benefits of regular physical activity, less than 25% of adults report achieving the Center for Disease Control's recommended amounts of physical activity (30 minutes of moderate-intensity activity on 5 or more days per week, or 20 minutes of vigorous-intensity activity on 3 or more days per week); 29% report no leisure-time regular physical activity; and

approximately 27% of students (grades 9 through 12) engage in moderate-intensity physical activity (30 minutes, 5 or more days per week) (CDC, 2001; 2003).

Most individuals who try to lose weight have trouble with program adherence. For instance, comprehensive behavioral programs providing weekly group treatment of 20 to 26 weeks produce average losses of 8 to 10 kg (approximately 9% of initial body weight) and have attrition rates ranging from 15% to 20% (Phelan & Wadden, 2002). Less intensive interventions provide patients with treatment manuals and minimal or no therapist contact, and produce weight reduction of only 1 to 5 kg over 6 months (Phelan & Wadden, 2002; Wing, Venditti, Jakicic, Polley, & Lang, 1998).

Health researchers have suggested that it may be requesting too much for overweight individuals to exert constant control in the face of unremitting biological factors and an environment that supplies an abundance of ready-made high-calorie, high-fat foods, as well as a multitude of energy-saving devices (Bauer, Yang, & Austin, 2004; Phelan& Wadden, 2002; Wilson, 1994). Unlike other health problems such as smoking and alcoholism where individuals are taught to avoid the addictive substance, a person cannot (and should not) avoid eating and drinking. It will require more than the overweight individual's knowledge and attitude to change. Interventions which ease the day-to-day work of weight control are needed (Phelan & Wadden, 2002).

One specific group of people that this issue affects is individuals in a medically supervised weight-loss, meal replacement program. Meal replacement programs (MRP) offer positive, minimal-choice, healthy results. Yet, MRP are controversial, receiving criticism for being unnatural, nutritionally inadequate, and difficult to maintain. People undertaking MRP are likely challenged in their environments as individuals around them

react to the lifestyle change. For example, a businessman may get teased for bringing in a nutritious meal replacement shake instead of going to the local diner with the rest of the office team. Studying this population and the challenges they face will increase our understanding of ways to address this social health problem.

Two recent systematic literature reviews of weight loss programs called for three advancements to further our knowledge (Nothwehr; 2004; Tsai & Wadden, 2005). First, the authors asked for an agenda assessing modifiable weight loss variables (e.g., self-efficacy) rather than relatively fixed variables that could not be altered within a program (e.g., genotype, gender, ethnicity, age). Second, the authors challenged researchers to organize their efforts under a unified framework (Tsai & Wadden, 2005; Nothwehr, 2004). Specifically, they called for research to use a conceptual framework of chronic disease self-management proposed by Clark, Gong, & Kaciroti (2001). Weight management is an ongoing, complicated process that is increasingly likened to the behavioral management of a chronic disease (Goodrick, Poston, & Foreyt, 1996). This framework has been employed to describe management of heart disease (Clark, et. al, 2001), asthma (Clark & Nothwehr, 1997), and weight management (Nothwehr; 2004; 2005; Nothwehr & Stump, 2002). In this framework (see Figure 1) predisposing factors such as past behavior along with external resources such as social support and vicarious experience are believed to influence the self-regulation activities of the individual. The self-regulatory process including self-efficacy and outcome expectations lead the individual undertake certain disease management strategies (including adherence to diet recommendations, exercise, and modification of the physical and social environments) so as to achieve a desired end point or goal. Over time, continuous observation, judgment,

and reaction lead to modification of management strategies and sometimes modification of the goal itself. Third, the authors challenged researchers to develop more sophisticated research investigations based on time series designs.

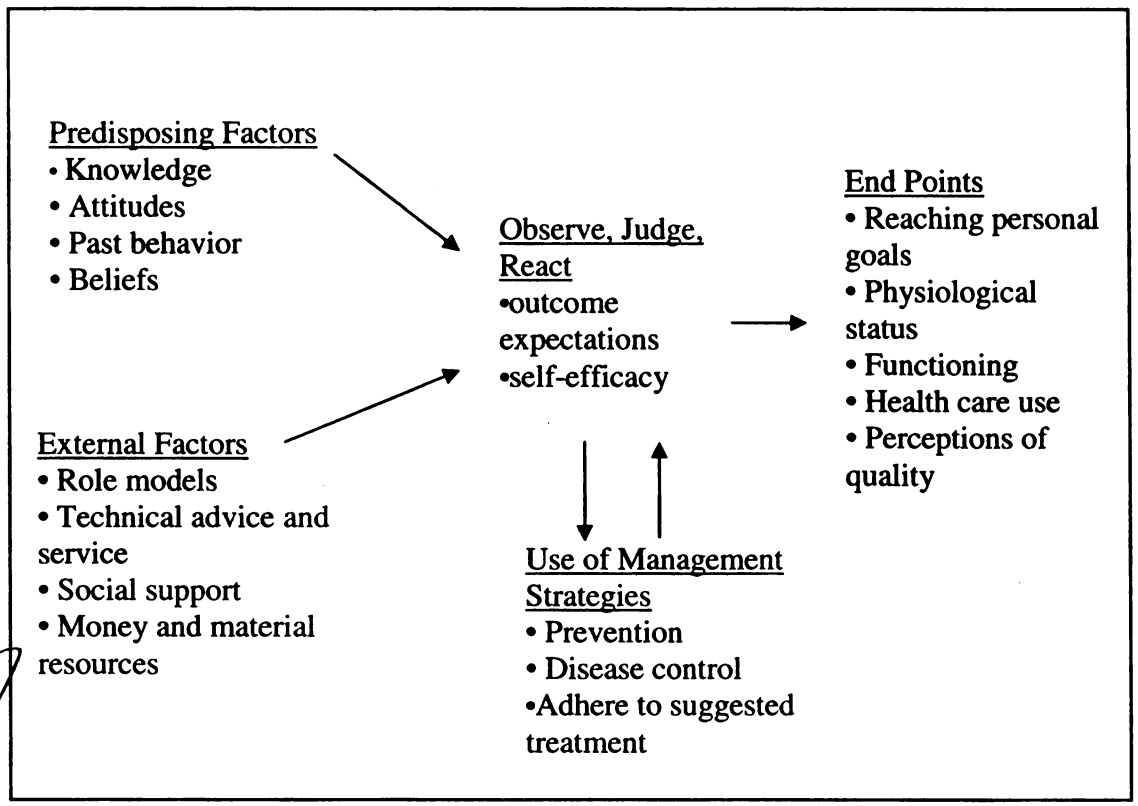

Figure 1. Framework of chronic disease self-management (Clark et at., 2001).

This research is designed to address these three concerns. In this paper I will propose a model testing the modifiable variables, use a time series design to assess the model, and collect data through field research of three different groups of people currently trying to lose weight through diet and exercise. I begin by reviewing the literature on the modifiable variables of concern in current weight loss programs organized within the chronic illness framework: behavior adherence, outcome expectations, self-efficacy, past behavior, vicarious experience, and social support.

Chapter 1

REVIEW OF LITERATURE

Adherence

People start weight reduction programs daily. While understanding the factors that motivate people to begin an exercise and/or diet program is important, this investigation focuses on people who already are part of a diet program. Adherence is the extent to which a person continues the decided mode of treatment or intervention as prescribed whether pursuing a program on their own or taking part in a commercial or medically-supervised program. This research examines the factors that motivate people to adhere to programs. I propose in this section that outcome expectations, self-efficacy, past behavior, vicarious experience, and social support directly or indirectly affect adherence to a diet program and calories burned due to physical activity[1].

Outcome Expectations

Outcome expectations are the results that a person expects to occur from a particular action. People consider the effectiveness of a program and what the outcome will be if it is adopted and maintained. For example, "I believe exercise 3 days a week for 30 minutes a session creates chiseled abs" and "Meal Replacement programs are effective in reducing weight." are outcome expectations. It is not surprising that program creators and implementers believe that outcome expectations are vital for success. If

[1] Physical activity is defined by Bouchard and Shephard (1994) as "any body of movement provided by skeletal muscles that results in a substantial increase over the resting energy expenditure." Under this broad rubric active physical leisure, exercise, sport, occupational work and chores are all considered and tested. In the survey (see Appendix A) the word exercise is used because the initial focus group preferred to read the word "exercise" over the phrase "physical activity." The questions did test the broader rubric as defined by physical activity.

people do not believe in a product (e.g., Weight Watchers; Optifast; the Atkins Diet) how can they be expected to adhere to it over time?

Outcome expectations should be positively and directly related to action and adherence. Seydel, Taal and Wiegman (1990) report that outcome expectations are a significant predictor of intent to partake in behaviors to detect breast cancer (e.g., breast self-examination). Outcome expectations have predicted dropout from a weight control program (Mitchell & Stuart, 1984), weight loss (Weinberger, Hughes, Critelli, England, & Jackson, 1984), and the maintenance of that weight loss (Blair, Booth, Lewis, & Wainwright, 1989). They are discussed in the literature as important determinants in the formation of intentions, but are considered less significant in action control (Bandura, 1992; Maddux, 1995; Witte, 1992). Thus, positive outcome expectations encourage the initial decision to change one's behavior, but thereafter, may be dispensable because a new problem arises, namely the continued performance of the behavior. However, under conditions where individuals have no experience with the behavior they are contemplating, outcome expectations may have a stronger direct influence. Also, within the context of weight-loss, people may give up if they do not see weight-loss outcomes (or other healthy results such as lower cholesterol) that are consistent with their expectations. Surprisingly, outcome expectation is still considered a predominantly theoretical concept that appears to be important but has been understudied in the health domain, particularly in the area of weight reduction. In contrast, self-efficacy has been studied extensively and is viewed as a significant direct predictor of health behavior.

Self-Efficacy

Self-efficacy, is defined as an individual's beliefs in his/her capabilities to perform a course of action to attain a desired outcome (Bandura, 1992; Maddux, 1995; Witte, 1992). Bandura, (see Social Cognitive Theory, 1977), views self-efficacy as the driving force of human behavior. "Efficacy expectations are a major determinant of people's choice of activities, how much effort they will expend, and how long they will sustain effort in dealing with stressful situations" (Bandura, 1977, p. 194). Efficacy involves organizing cognitive, social and behavioral skills and strategies into action. Judgments are not based on what those skills are; rather they are based on what one can do with whatever skills one possesses.

Self-efficacy should be positively and directly correlated to action and adherence. Individuals with high self-efficacy choose to perform more challenging tasks. They set higher goals and stick to them (Dawson & Brawley, 2000; Locke & Latham, 1990). A strong sense of efficacy is related to better health, higher achievement, and more social integration (Dawson & Brawley, 2000; Marlatt, Baer & Quigley, 1994; Wallston, 1994). A low sense of self-efficacy is associated with depression, anxiety, and helplessness (Jenkins, Goodness, & Buhrmester, 2002). Such individuals also have low self-esteem and harbor pessimistic thoughts about their accomplishments and personal development. Perceived self-efficacy has become a widely applied theoretical construct in models of addiction and relapse (e.g., Majer, Jason, & Olsen, 2004; Marlatt, Baer, Andquigley, 1994). This view suggests that success in coping with high-risk situations depends partly on people's beliefs that they operate as active agents of their own actions and that they possess the necessary skills to reinstate control should a slip occur.

A number of studies on adoption of health practices have measured the direct impact of self-efficacy on behavioral change. Seydel, Taal, and Wiegman (1990) report that perceived self-efficacy is a significant predictor of intent to partake in behaviors to detect breast cancer (i.e., breast self-examination). High efficacy individuals are more capable of controlling pain than those with low self-efficacy (Altmaier, Russell, Kao, Lehmann & Weinstein, 1993; Litt, 1988; Piira, Taplin, Goodenough, & von Baeyer, 2002). Self-efficacy has been shown to vary heart rate, blood pressure, and serum catecholamine levels in coping with difficult or intimidating situations (Bandura, Cioffi, Taylor & Brouillard, 1988; Bandura, Reese & Adams, 1982; Bandura, Taylor, Williams, Mefford & Barchas, 1985; Gerin, Litt, Deich, & Pickering, 1995). Similarly, recovery of cardiovascular function in postcoronary patients is enhanced by beliefs in one's physical and cardiac efficacy (Taylor, Bandura, Ewart, Miller & DeBusk, 1985). Perceived self-efficacy has predicted therapeutic change in an array of contexts (Bandura, 1992, 1995; Wise, 2002).

Self-efficacy beliefs also affect weight control (i.e., Bagozzi & Edwards, 1998; Bernier & Avard, 1986; Dawson & Brawley, 2000; Humphries & Krummel, 1999; McAuley, 1992; Sallis, Hovell, Hofstetter, & Barrington, 1992; Shannon, Bagby, Wang & Trenkner, 1990; Wise & Trummell, 2001). Clark and Dodge (1999), when examining self-efficacy as a predictor for prescribed medicine use, getting adequate exercise, managing stress, and following a recommended diet among a sample of women, found that the variable was a significant predictor for the diet and exercise models (at 4 and 12 months). Specifically, women who at baseline had confidence in their ability to maintain their prescribed diets or exercise were more likely at follow-up to believe the diet and

exercise was useful to their health. Further, Dunn, Marcus, Kampert, Garcia, Kohl, and Blair (1997) demonstrated that change in self-efficacy was significantly associated with achieving the CDC/ACSM criteria for accumulated physical activity on most days of the week. In a two year longitudinal study from the Stanford Five-City Project, the effects of demographics, exercise knowledge, and exercise self-efficacy on exercise behavior were analyzed through structural equation modeling techniques (Rimal, 2001). Education, income, age, and sex were significant predictors of exercise behavior, with self-efficacy discovered to be the most significant predictor (Rimal, 2001).

Efficacy to resist the urge to overeat increases during the course of treatment (Forster & Jeffrey, 1986; Glynn & Ruderman, 1986). Most studies that use efficacy to resist the urge to eat or refrain from overeating have found such efficacy evaluations to be predictive of weight loss during the active phase of treatment (Forster & Jeffrey, 1986; Glynn & Ruderman, 1986). In addition, post-treatment efficacy evaluations have been related positively to maintenance of weight loss (DiClemente, Fairhurst, & Piotrowski, 1995; Rodin, Elias, Silberstein, & Wagner, 1988). Self-confident clients of intervention programs are less likely to relapse to their previous unhealthy diet.

According to several existing health models (e.g., Bandura's Social Cognitive Theory, 1986; Bandura's Self-Efficacy Model, 1997; Witte's Extended Parallel Process Model, 1992; Azjen's Theory of Planned Behavior[2],1985), self-efficacy and outcome expectations are two distinct variables (for reviews see Lapinski & Witte, 1998). A person can believe that certain actions lead to particular outcomes (outcome expectations), but this individual may doubt his or her ability to perform the actions

[2] Theory of planned behavior describes similar variables to efficacy outcome expectation in perceived behavior control and attitudes.

(efficacy expectations). For instance, if outcome expectation is high, self-efficacy expectations may be low (e.g., "I know that running 3 miles a day will help me lose weight, but I'm not capable of exercising that much."). The opposite relationship also may hold, where an individual perceives efficacy but does not perceive outcome expectations for that behavior.

Some researchers found that self-efficacy and outcome expectations, when tested in the same study, both have individual relationships with health outcomes. Among adults, self-efficacy is more strongly associated with planning to carry out healthy eating practices than outcome expectations. Additionally, perceived self-efficacy and outcome expectations are significant instigating forces in forming intentions to and in maintaining an exercise program (Dzewaltowski, Noble & Shaw, 1990; Feltz & Riessinger, 1990; McAuley, 1992, 1993; Resnick, Magaziner, Orwig & Zimmerman, 2002; Rimal, 2001; Weiss, Wiese & Klint, 1989).

Past Behavior

Past behavior refers to one's previous attempts at mastering experiences (failures or accomplishments). Past behavior success is predicted to positively affect a person's mental state, namely outcome expectations and self-efficacy (e.g., "I have lost weight by exercising before, I can do it again.");while past behavior failure is predicted to negatively affect a person's mental state (e.g., "I tried this program before and it did not work.") (Bandura, 1997).

In a meta-analysis of studies that examined the direct and indirect effects of past behavior on future responses, Oulette and Wood (1998) found strong support for the idea that past behavior has a significant impact on present and future behavior. According to

Oulette and Wood (1998), past behavior affects future responses through one of two mechanisms. First, well-rehearsed actions performed in familiar or constant contexts return because the processing that initiates and controls their performance becomes routine, affecting future actions (Calderon & Varnes, 2001). Second, when behaviors are not well-practiced or when they are performed in unstable or difficult contexts, conscious decision-making is likely to be necessary to start and accomplish the act (Calderon & Varnes, 2001). If efficacy is connected with healthy behavior adoption and maintenance, and if past performances are repeated failures, such as continued weight gain or "yo-yo" dieting, then people may not adhere to their program. To summarize, the most effective way of creating a strong sense of efficacy is through mastery experiences. Successes build a robust belief in one's personal efficacy. Failures undermine it, especially if failures occur before a sense of efficacy is firmly established.

Vicarious Experience

Vicarious experience involves observation and comparison of another's performance on a task. Most weight loss programs include pictures and testimonials of people who enjoy and have successfully lost weight on their program. Vicarious experience is an alternative way that humans acquire competences and knowledge. Bandura (1977) found that, in addition to cultivating new competencies, modeling alters motivation by instilling behavioral outcome expectations. Visualizing or watching other people perform successfully can increase self-efficacy, while seeing others perform unsuccessfully can lower expectations (Bandura 1977). These modeling effects are more potent when one is similar to the model. Self-efficacy also can be evaluated by making social comparisons in terms of other's performance. Weight-loss testimonials are likely

influential. They may raise efficacy (i.e., "if she can do it, then I can too") or they may lower efficacy (i.e., "my weight is not dropping as much as his is"). While vicarious experiences are believed to be weaker than performance accomplishments, they can be an influential source.

Interpersonal Influence

Social Support. Social support is found in the form of physical and emotional feedback from significant others. Several decades of research reinforce the value of having a supportive social network (Cohen, Underwood, & Gottlieb, 2000; Goldsmith, 2004). When people are uncertain or need advice they often observe, consider the opinions and/or talk with others to make decisions about what to do. For instance, House, Landis, and Umberson (1988, p. 541) concluded, "social relationships, or the relative lack thereof, constitute a major risk factor for health- rivaling the effects of well-established health risk factors such as smoking, high blood pressure, blood lipids, and obesity." Many social support scholars have called for a closer examination of social network interactions. Goldsmith (2004) notes, "calls to study the communication of social support are not limited to those in the communication discipline, but instead come from all quarters and from some of the most influential social support researchers" (p. 20).

The interpersonal influence concept is broad, yet most of the literature regarding health has a limited scope. It has focused on a) the relationship between the number of social nodes and health outcomes; b) perceived social support; and c) the effects of perceived social support on health (Cohen et al., 2000; Goldsmith, 2004). Further, researchers who study enacted social support have thus far focused on how much of it a person reports and have overlooked the actual messages (Goldsmith, 2004). Two topics

that have been overlooked in the interpersonal influence literature are how actual support is measured and the influence of non-supportive networks.

Perceived vs. Enacted Support. Perceived support is the belief that support generally is (or would be) available when needed. The perception, or belief, that others are available to provide emotional comfort or practical assistance in times of need appears to be particularly beneficial for mental health, but not as helpful for physical health (Wethington & Kessler, 1986). Individuals with high amounts of perceived support are more resistant to the adverse psychological effects of environmental stressors than are people with comparatively low levels of perceived support (for a review see Cohen & Wills, 1985). Specifically, perceived social support may safeguard individuals from the unfavorable psychological consequences of exposure to stressors.

Enacted support refers to support that has already been given or is in the process of occurring. One may imagine that perceptions of available support would reflect summary judgments of enacted support, but studies comparing measures of enacted support and perceived support have produced weak correlations between the two (for a review see Dunkel-Schetter & Bennett, 1990; Goldsmith, McDermott, & Alexander, 2000). In addition, measures of enacted support and perceived support have different relationship outcomes (Goldsmith, 2004). Although the study of how enacted social support is communicated is relatively new, several promising lines of research show that what the sender says, how s/he says it, how the receiver interprets the message, and the feedback provided by receivers are all important facets of social support (Burleson & Goldsmith, 1998; Burleson & MacGeorge, 2002). Enacted support has been studied much less extensively than network ties or perceived support (Goldsmith, 2004). Current

measurement approaches often fail to account for messages or acts that illustrate lack of support from social networks and their outcomes on well-being.

Influence of Non-Supportive Networks. Social networks may not consistently produce positive results because enacted support does not always help individuals cope. For instance, some words may be positive, while others are meant to be critical. Some emotional support attempts may come across as sincere, whereas other attempts may seem shallow and obligatory. Some offers of aid may be skillful, whereas others may produce more burden than they alleviate (Goldsmith, 2004). There is a need for more research on transactions between support providers and recipients.

This investigation takes an approach that recognizes the potential significance of negative aspects of social relationships, or what Vinokur, Price, and Caplan (1996) refer to as social undermining. Vinokur and van Ryn (1993) defined social undermining as "behaviors directed toward the target person that display (a) negative affect (anger or dislike), (b) negative evaluations of the person in terms of his or her attributes, actions, and efforts (criticism), and (c) behaviors that make difficult or hinder the attainment of instrumental goals" (p. 350).

In recent years, researchers have supplemented work on the benefits of social support by focusing on the adaptational significance of the negative aspects of social relationships. Manne et al. (1997) found that withdrawal/avoidant and overtly critical spouse behaviors had stronger correlations with psychological distress than did the measure of spouse supportive behaviors. Other studies, however, have failed to find evidence for the negativity effect (e.g., Druley & Townsend, 1998; Lepore, 1992; Okun & Keith, 1998). A recent meta-analytic review concluded that the main effects of social

support and undermining on psychological distress are comparable in magnitude; however, effect sizes appear to vary as a function of how support and undermining are assessed (Finch, Okun, Pool, & Ruehlman, 1999).

Memorable Messages

The current study also seeks to examine the actual communicative processes that occur during the ongoing weight loss process. Rather than attend only to the outcomes (e.g., whether the individual adheres to MRP), the current study focuses on how communication affects the weight loss process. For example, what does a husband say about his wife's decision to try MRP and how does that affect her program success? Individuals' desire for connection with others often manifests in communication (Heisler, 2000), thus the communication that will be examined includes messages regarding exercise, nutrition, and weight attitudes and behaviors.

Messages from others can be memorable, powerful influences on attitudes and behaviors. Goldsmith (2004) states, "not surprisingly, individuals coping with a wide variety of life stresses and daily hassles can recall not only instances when enacted support was appropriate and effective but also times when it was ill-fitted to their needs and not helpful at all" (p. 27). Further, the effects of enacted support do not come about mechanistically through the supportive act but rather through participants' interpretations and evaluations. Participants in conversations differentiate among utterances that count as advice, expressions of concern, offers, tangents, subject changes, jokes, criticism, and so on (Goldsmith, 2004). Since we know little about what is communicated to those undergoing MRP, the memorable message research questions are proposed in chapter two.

Participant Condition Variation

The meal replacement program (MRP) offers two choices for participants, an individual program or a program that includes support group meetings. The MRP support group program goal is to increase participants' behavioral skills and provide them an outlet through which they may discuss their challenges. An evaluation of commercial weight loss programs in the United States shows that Weight Watchers, a group-based program, is "the only commercial weight loss program whose efficacy has been demonstrated in a large randomized controlled trial. It produces a mean loss of approximately 5% of initial weight loss..." (p. 64, Tsai & Wadden, 2005). Alternatively, individually medically supervised meal replacement programs like Optifast can produce 21.8% of weight loss, though they maintain a loss of 9% of their initial weight after one year (Tsai & Wadden, 2005). A logical next question to explore is the impact of a support group program on a medically supervised meal replacement treatment. People in the medical group condition should report significantly higher levels of social support and self-efficacy than those in a private or control group condition. Furthermore, if Clark et al.'s (2001) framework is correct, increases in social support and self-efficacy should lead to increased program adherence. The participant condition hypotheses are detailed in the following chapter.

Chapter 2

HYPOTHESES AND RESEARCH QUESTIONS

Prominent weight reduction authors asked for future research to assess modifiable weight loss variables that are already popular in current weight loss programs; namely vicarious experience, efficacy, social support, and outcome expectations (Tsai & Wadden, 2005). Also, researchers have been encouraged to organize their efforts under a unified framework, the framework of chronic disease self-management proposed by Clark et al. (2001). The first idea is that a person's confidence in his/her ability to carry out a program and confidence that the program will yield positive outcomes that directly affect program adherence. A person's beliefs about outcome expectations and self-efficacy can be developed by three sources of influence: past behavior, vicarious experience, and interpersonal relationships. People's beliefs about their efficacy can be developed by four main sources of influence. First, past behavior- successes build a robust belief in one's personal efficacy, while failures undermine it. The second way of strengthening outcome expectations and self-efficacy is through the vicarious experiences provided by similar social models. Seeing people similar to oneself succeed (or be rewarded for their efforts) raises observers' beliefs that they too possess the capabilities to master comparable activities and succeed. Likewise, observing others fail (or be punished for their attempts) despite high effort lowers observers' judgments of their personal efficacy and undermines their efforts. Interpersonal influence is a third way of strengthening people's beliefs that the program works and that they can do it. People who are shown and told that they possess the capabilities to lose weight, that they are doing a

wonderful job, and that the program they are on is a good one should experience higher perceptions of self-efficacy and outcome expectations, leading people to adhere to their program. Because the current investigation is assessing two dependent variables- adherence to diet and level of physical activity (PA)- through a specific framework, the following hypotheses are proposed (see Figure 2 and Figure 3):

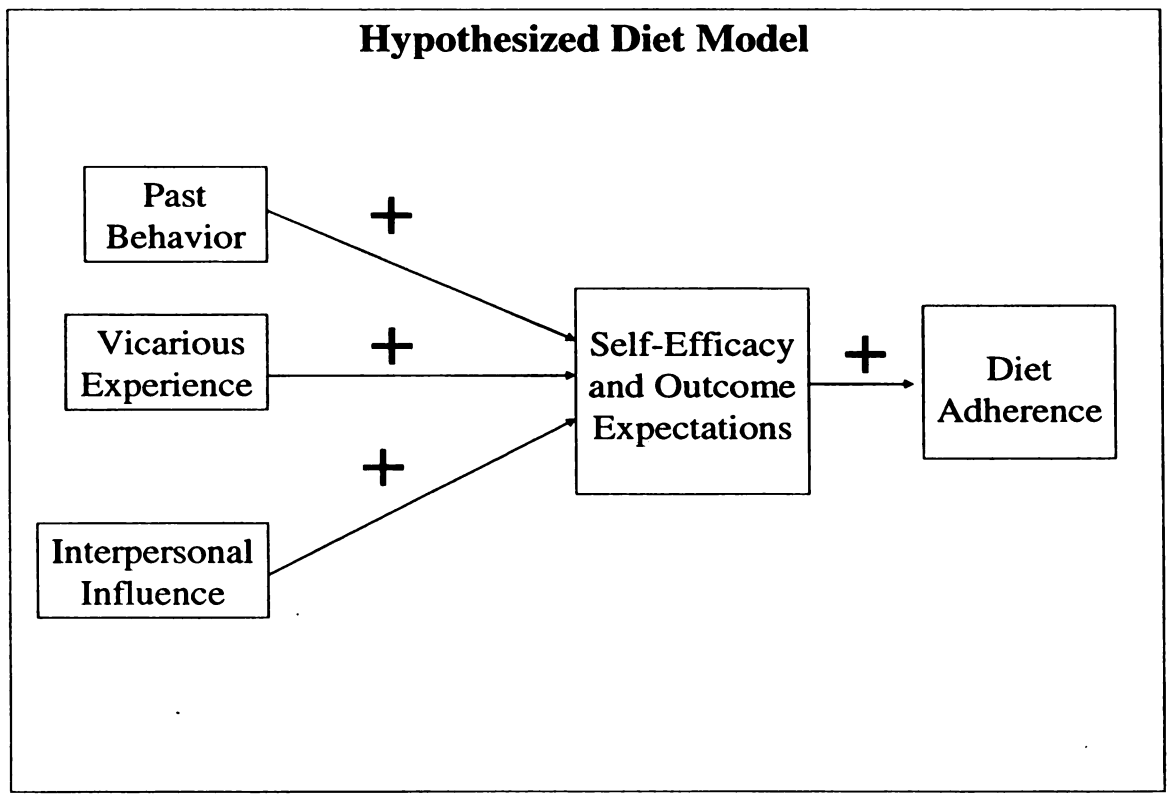

Figure 2. Hypothesized Diet Model.

Diet Adherence Hypotheses

Hypothesis 1: Diet past behavior (1a) diet vicarious experience (1b) and diet interpersonal influence (1c) each will have positive direct effects on diet outcome expectations.

Hypothesis 2: Diet past behavior (2a) diet vicarious experience (2b) and diet interpersonal influence (2c) each will have positive direct effects on self-efficacy.

Hypothesis 3: The effects of past behavior, vicarious experience, and interpersonal influence on diet adherence are mediated through outcome expectations, which has a direct effect on diet adherence.

Hypothesis 4: The effects of past behavior, vicarious experience, and interpersonal influence on diet adherence are mediated through self-efficacy, which has a direct effect on diet adherence.

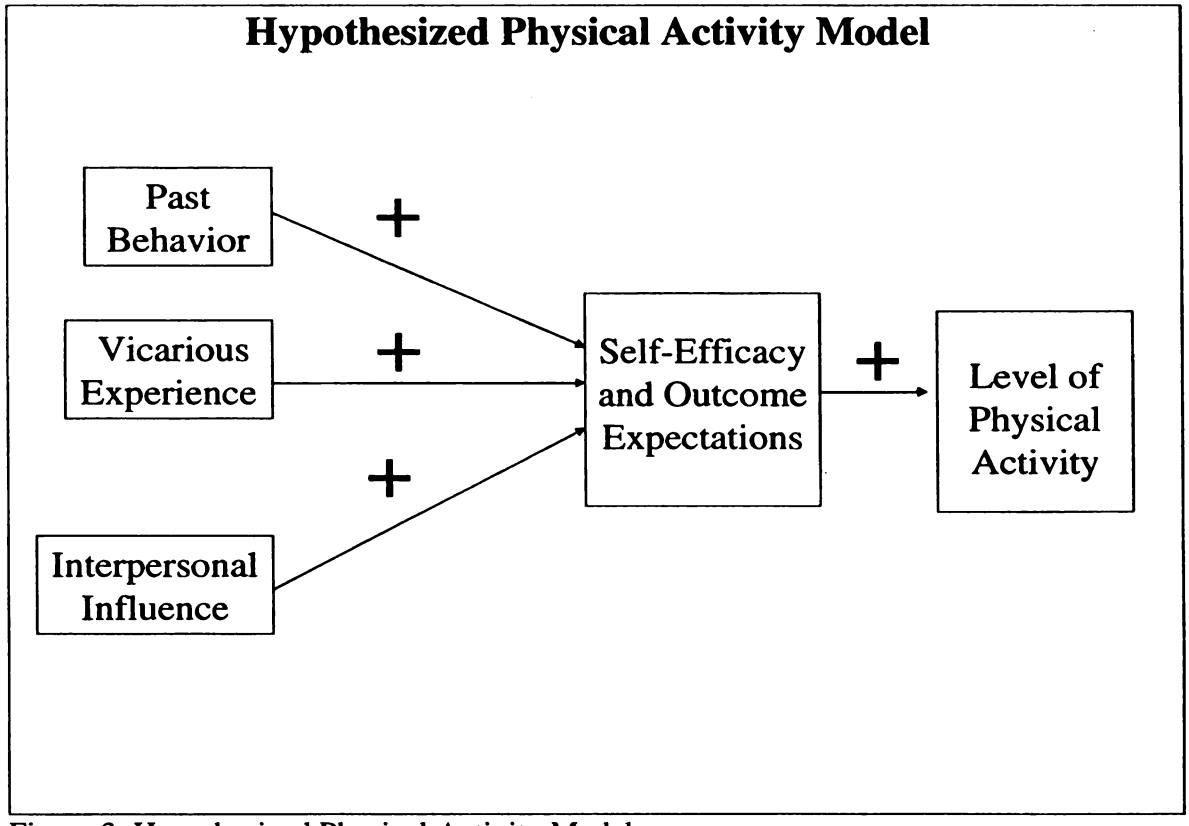

Figure 3. Hypothesized Physical Activity Model

Level of Physical Activity Hypotheses

Hypothesis 5: PA past behavior (5a) PA vicarious experience (5b) and PA interpersonal influence (5c) have positive direct effects on PA outcome expectations.

Hypothesis 6: PA past behavior (6a) PA vicarious experience (6b) and PA interpersonal influence (6c) have positive direct effects on PA self-efficacy.

Hypothesis 7: The effects of PA past behavior, PA vicarious experience, and PA interpersonal influence on level of PA are mediated through PA outcome expectations, which has a direct effect on level of PA.

Hypothesis 8: The effects of PA past behavior, PA vicarious experience, and PA interpersonal influence on level of PA are mediated through PA self-efficacy, which has a direct effect on the level of PA.

Memorable Message Research Questions

RQ1: What is the content of positive memorable messages received by participants during the treatment program?

RQ2: What is the content of negative memorable messages received by participants during the treatment program?

RQ3: How do participants respond to these messages?

Participant Condition Hypotheses

H9: The group program participants should report more perceived support compared to the individual program and control group participants.

H10: The group program participants should have higher reported levels of self-efficacy compared to the individual program and control group participants.

H11: The group program participants should have stronger diet adherence compared to the individual program and control group participants.

Chapter 3

METHOD

The purpose of this study was to assess the impact of several psychosocial variables on adherence to diet and level of physical activity by testing two models through a time series design. This chapter outlines the methodology and procedures used in this study. Prior to the study taking place, four conditions were met, (a) approval for the project was obtained from Royal Oak Beaumont Weight Loss Center, (b) approval for the project was obtained from Beaumont's human subjects review committee, (c) contact was established with psychologists who run the support groups, and (d) approval was obtained from the human subjects review committee at Michigan State University.

Participants

Participants were 322 people trying to lose weight. Subjects participated on a voluntary basis. Respondents were offered a chance to win one of twelve gift certificates to a local shopping mall for their efforts. When signing up, participants were told that their responses would remain confidential, would be analyzed only after participants signed the consent form, and could discontinue at any time. Of the total number of participants, 299 completed all of the survey information necessary for analysis. There were three groups of participants: the control group, treatment group 1, and treatment group 2.

One hundred and one participants acted as the control group. They were volunteers found at health fairs in the Detroit area. Inclusion criteria were as follows,

participants: (a) must be currently in weeks 3-4 of trying to lose weight[3]; (b) must be trying to lose weight through diet (i.e., calorie reduction, healthier food, slim-fast, Jenny Craig, etc.).; (c) may or may not be trying to lose weight through exercise; (d) willing to participate in a follow-up survey; (e) were not part of Royal Oak Beaumont's weight loss program. The control group ranged in age from 22 to 65 years (M= 42.5, SD= 11.0), 77.2% were female, 83% were Caucasian, 6.1% were African American, and the majority reported having had some college courses (57.4%), a college degree (17.8%), or an advanced degree (12.9%).

The remaining subjects were part of the Royal Oak Beaumont Weight Loss Center program. As part of the Weight Loss Center's philosophy, patients select which program they would like to partake in: individual treatment or group treatment with a weekly group counseling component (See Appendix A). When signing up, participants were told that their responses would be confidential and would be analyzed only after participants signed the approved consent form. Inclusion criteria were as follows, participants: (a) must be currently in week 3-4 of trying to lose weight; (b) must be trying to lose weight through diet; (c) may or may not be trying to lose weight through exercise; and (d) willing to participate in a follow-up survey.

Treatment group one, the individual treatment group, consisted of 101 volunteers. The individual treatment group ranged in age from 24 to 71 years (M= 44.19, SD= 11.769), 78.8% were female, 74.7% were Caucasian, 17.2% were African American, and

[3] The investigator selected this time frame because Beaumont Weight Loss Clinic suggested that the first 8 weeks of their program requires participants to make several adjustments. Participants are going to incur most questions about diet, lifestyle changes, and personal challenges during this period of time.

the majority reported having had some college courses (26.3%), a college degree (25.3%), or an advanced degree (37.4%).

Treatment group two, the group treatment group, consisted of 97 volunteers. The second treatment group ranged in age from 27 to 74 years (M= 47.24, SD= 10.28), 76.3% were female, 85.6% were Caucasian, 11.3% were African American, and the majority reported having had some college courses (34%), a college degree (26.8%), or an advanced degree (28.9%).

Procedures

The data were collected through field investigations. Participants obtained questionnaires at the reception desk (treatment groups) to complete in the waiting room or during health fair expo presentations (control group). A cover letter explained the nature of the research and assured respondents of confidentiality. Participants completed questionnaires requiring them to recall their experience with previous weight loss attempts and their current diet experience (See Appendix B). McCornack and Levine (1990) recommend a one month recall limit in order to make sure that the experiences and emotions are still fresh. Following the completion of the questionnaire, participants were thanked and asked to complete two follow-up questionnaires 4 weeks and 5 weeks from the day of the initial survey. Respondents returned their completed questionnaires through locked drop boxes. To ensure that researchers could match up the three different surveys for each participant, subjects created their own unique code that they reused at the top of each survey. After the completion of each survey the participant names were automatically put into a drawing for gift certificates to a local shopping center. Twelve certificates were awarded.

Each participant received a packet of questionnaires containing scales assessing diet and physical activity, as well as scales assessing: at time one- past behavior, perceptions of vicarious experience, enacted social support; at time two (four weeks after original survey) - perceptions of self-efficacy, perceptions of outcome expectations; at time three (five weeks after original survey) - level of physical activity, and perceptions of adherence to the meal replacement program/diet. The qualitative portion of the survey was offered at time one and time two. The qualitative section explores in more detail the memorable messages reported from participants' social networks specific to weight and their meal replacement program, how they were perceived by the recipient, and what the recipient said in reply to the memorable message.

Initially participants were going to complete all of the measures at the three different time points. However, focus groups conducted prior to data collection reported unanimously that this would be incredibly difficult and time-consuming. The entire survey took them about 45-60 minutes to complete. The researcher opted to have this be a limitation of the study rather than have insufficient time series data.

Instrumentation

Questionnaire order varied such that half of the surveys asked diet questions first, while remaining surveys began with the physical activity questions. Several scales were created for this research, which are described below. All scales consisted of 5-point Likert type items (1= strongly disagree, 5 = strongly agree), unless otherwise noted. When assessing each scale's reliability, the investigator used three criteria to determine whether an item should be excluded from data analysis: a) face validity, b) inter-item correlations, and c) .4 as a cut-off for scale variance if item deleted. See Appendices C

and D for all original scales and the items deleted under the three criteria. Also, scale means and standard deviations are reported in Table one.

	M (SD)		M (SD)
1. Diet past behavior	3.02 (1.02)	1. Exercise past behavior	2.73 (.95)
2. Diet vicarious positive	4.12 (.83)	2. Exercise vicarious positive	4.09 (.78)
3. Diet vicarious negative	3.79 (1.29)	3. Exercise vicarious negative	3.75 (1.81)
4. Diet social support	2.87 (1.02)	4. Exercise social support	2.52 (1.13)
5. Diet social undermining	2.36 (1.36)	5. Exercise social undermining	2.59 (1.38)
6. Diet efficacy	2.85 (1.26)	6. Exercise efficacy	3.31 (1.34)
7. Diet adherence (DV)	2.88 (1.09)	7. Calories burned in one week of physical activity (DV)	1499.3 (1504.1)

Table 1. Diet and Physical Activity Variable Means.

Diet Past Behavior. Five items were created to assess diet past behavior. Example items include "On past weight lost diets I have been successful," and "I have successfully lost weight on previous weight loss diet attempts." One item was deleted to improve the scale's internal consistency (See Appendix C). For the remaining past behavior items acceptable internal consistency was obtained for the diet past behavior measure (α= .85).

Diet Vicarious Experience. Five items were created to assess diet vicarious experience. Example items include "I have seen people like me cheered on for their weight loss," and "I have seen people like me treated badly because they are not losing weight" (reverse coded). During scale reliability assessments, it was evident that the original measure was testing two distinct variables, thus two separate measures were created: (a) diet positive vicarious experiences and, (b) diet negative vicarious experiences. For the current study acceptable internal consistency was obtained for the positive vicarious experience measure (α= .97) and for the negative vicarious experience measure (α= .67).

Diet Interpersonal Influence. The Social Support and Hindrance Inventory (SSHI) (Ruehlman & Wolchik, 1988) consists of ten support items and ten hindrance items. The SSHI has a reliability of .93 and good internal consistency (α = .88) (Ruehlman & Karoly, 1991). Before completing the scale, participants were required to consider their dieting project. This scale was originally designed to assess support and undermining in personal projects (e.g., support: "Seemed pleased with my progress on the project"; hindrance: "Made me feel worse when I felt discouraged about the project"). The wording was altered slightly to apply to diet and exercise projects. During data analysis it was evident that the original measure was testing two distinct variables rather than one scale, thus two separate measures were created; diet social support, and diet social undermining. Of the original ten support items, four were dropped due to the internal consistency guidelines aforementioned. Of the original ten undermining items, six were excluded (Appendix C). Acceptable internal consistency was obtained for the social support measure (α= .89) and for the undermining measure (α= .92).

Diet Self-Efficacy. Four items were used to assess diet self-efficacy. Respondents indicated how confident they were that they are succeeding in the Meal Replacement Program: "I am able to use the Meal Replacement Program," "It is easy for me to use the Meal Replacement Program," "I can stick to the Meal Replacement Program," and "I am confident that I can carryout my Meal Replacement Program." Acceptable internal consistency was obtained for the diet self-efficacy measure (α= .89).

Diet Outcome Expectations. Four items assess diet outcome expectations. Respondents completed the following items regarding the Meal Replacement Program: "The Meal Replacement Program helps people lose weight," "The Meal Replacement

Program works in deterring health issues associated with unhealthy weight," "The Meal Replacement Program is effective in getting rid of unwanted pounds." Acceptable internal consistency was obtained for the diet outcome expectations measure (α= .88).

Further analysis revealed that the self-efficacy items and the outcome expectation items were highly correlated such that they appeared to measure one, not two distinct variables. Upon discovery, the self-efficacy items and the outcome expectation questions were combined into one efficacy scale. Acceptable internal consistency was obtained for the new diet efficacy measure (α= .92).

Diet Adherence. Participants' reported their abilities to adhere to their diet programs with five items that were created for this research. A sample item was "I have stayed on track with my weight loss program meals this past week." All items were retained and acceptable internal consistency was obtained for this measure (α= .93).

Exercise Past Behavior. A five item scale was developed to assess past behaviors regarding exercise. One sample item was "On exercise programs in the past, I have not done well." After data analysis one item was deleted to improve the scale's internal consistency (See Appendix D). Acceptable internal consistency was obtained for the four item measure (α= .80).

Exercise Vicarious Experience. The level of vicarious experience measure was developed for the present investigation. This scale consisted of five items, including "I have seen people like me rewarded for exercising," and "I have seen people like me treated badly because they don't exercise" (reverse coded). During data analysis it was evident that the original measure was testing two distinct variables, exercise positive vicarious experiences and exercise negative vicarious experiences, thus two separate

scales were created. Acceptable internal consistency was obtained for the two item positive vicarious experience measure (α= .74) and for the two item negative vicarious experience measure (α= .89).

Exercise Interpersonal Influence. The Social Support and Hindrance Inventory (SSHI) (Ruehlman & Wolchik, 1988) consists of ten support items and ten hindrance items. The SSHI has a reliability of .93 and good internal consistency (α = .88) (Ruehlman & Karoly, 1991). Before completing the scale, participants were required to consider their exercise plan. This scale was originally designed to assess support and undermining in personal projects (e.g., support: "Seemed pleased with my progress on the project"; hindrance: "Made me feel worse when I felt discouraged about the project"), thus the items were altered to address exercise.

During reliability analysis it was evident that the original measure was testing two distinct variables, exercise social support and exercise social undermining. Of the original ten support items, five were dropped due to the internal consistency guidelines aforementioned. Of the original ten undermining items, four were excluded (Appendix D). Acceptable internal consistency was obtained for the five item social support measure (α= .91) and for six item undermining measure (α= .92).

Exercise Self-Efficacy. Respondents answered four items concerning how confident they were that that can succeed at achieving the program's recommended exercise duration and frequency, including "I can stick to exercising for at least 30 minutes three times a week," "I am able to exercise for at least 30 minutes three times a week," "It is easy for me to exercise for at least 30 minutes three times a week," and "I am confident that I can exercise for at least 30 minutes three times a week." All items

were retained, and acceptable internal consistency was obtained for the exercise self-efficacy measure (α= .93).

Exercise Outcome Expectations. Participants answered four items concerning their expectations regarding physical activity, including "Physical Activity helps people lose weight," "Physical activity works in deterring health issues associated with unhealthy weight," "Physical activity is effective in getting rid of unwanted pounds." All items were retained and acceptable internal consistency was obtained for the exercise self-efficacy measure (α= .85).

However, further analysis revealed that the self-efficacy items and the outcome expectation items were highly correlated such that they were measuring one, not two distinct variables. Upon discovery, the self-efficacy items and the outcome expectation items were combined into one eight item diet efficacy scale. Acceptable internal consistency was obtained for the new diet efficacy measure (α= .93).

Level of Physical Activity. A subset of the Behavioral Risk Factor Surveillance System Survey (BRFSS) Questionnaire developed by the Centers for Disease Control and Prevention (CDC) was used to assess participant physical activity (CDC, 2000). The BRFSS, created in 1984, monitors state-level prevalence of the major behavioral risks among adults associated with premature morbidity and mortality (CDC, 2005). The CDC developed the BRFSS for states to use to provide data that could be compared across states. An estimation of participant caloric expenditure due to one week of physical activity was calculated using the items.

Memorable Messages. In order to assess the extent to which network communication reflects support, participants were asked to describe interpersonal

communication episodes specific to their diet and physical activity. Participants were instructed to focus on the communication that occurred during this interaction, including what was said by each individual. Instructions were as follows:

We are interested in the comments that you receive from other people regarding your CURRENT attempt to lose weight. Please think of a memorable time when you discussed weight and/or your specific diet. This may have been informal, such as while at a restaurant, or more formal "talk" perhaps prompted by a health issue. We are interest in WHAT WAS SAID TO YOU and WHAT YOU SAID BACK. This may have been instructive (what should or should not be done) or may have been informative (information and facts). We realize that you may or may not be able to recall one conversation, but only pieces of several conversations you have had. Any information you can recall would be useful. In the space provided below, please recall the actual words spoken. In the PAST MONTH, have you received any **POSITIVE** comments from others regarding your meal replacement program? If yes, please write exactly what was said:

The next series of questions asked about a negative message as well. This same set of instructions was repeated specific to physical activity.

Chapter 4

RESULTS

Diet

The current investigation proposed that the effects of past behavior, vicarious experience, and interpersonal influence on diet adherence are mediated through outcome expectations and self-efficacy, which have direct effects on diet adherence (H1-4). Hypotheses 1-4 are rejected due to the discovery that self-efficacy and outcome expectations appear to be measuring the same construct. Also, the vicarious experience and interpersonal influence scales were divided into four distinct variables- positive vicarious experience, negative vicarious experience, social support, and social undermining.

The original predictions were reworded to adjust for the scale alterations such that (a) diet past behavior, positive vicarious experience, negative vicarious experience, diet social support influence, and diet social undermining have positive direct effects on diet efficacy; (b) the effects of diet past behavior, diet positive vicarious experience, diet negative vicarious experience, diet social support, and diet social undermining on level of diet adherence are mediated through diet efficacy, which (c) has a direct effect on diet adherence.

Correlations, regression, and path analysis were used to test the predictions. When considering the zero-order correlations (i.e., Pearson's correlation coefficients), past behavior, r (297) =.28, p<.001, social support, r (297) =.39, p<.001, social undermining, r (297) = -.26, p<.001, and efficacy, r (297) =.37, p<.001 all are

significantly correlated with diet adherence, while positive vicarious experience, r (297) =.03, ns, and negative vicarious experience, r (297) =-.03, ns, are not significantly correlated with diet adherence (see Table 2). So, the more the dieters reported successful past dieting attempts, positive social support, high efficacy in their ability to diet, and experienced less diet undermining, the more likely they were to adhere to their diet plans.

	M (SD)	1	2	3	4	5	6	7
1. Diet past behavior	3.02 (1.02)	1	.017	-.069	.366**	-.412**	.358**	.281**
2. Diet vicarious positive	4.12 (.83)		1	.41**	.209**	-.091	-.22**	.031
3. Diet vicarious negative	3.79 (1.29)			1	-.07	.213**	-.393**	-.034
4. Diet social support	2.87 (1.02)				1	-.369**	.393**	.389**
5. Diet social undermining	2.36 (1.36)					1	-.406**	-.262**
6. Diet efficacy	2.85 (1.26)						1	.370**
7. Diet adherence (DV)	2.88 (1.09)							1

** Correlation is significant at the 0.01 level (2-tailed).

Table 2. Diet Variable Means, Standard Deviations, and Zero-order Correlations.

Regression analysis tested the predicted effects for diet past behavior, vicarious experience, and social influence on efficacy. The effect of past behavior on efficacy was significant, $\beta = .16$, t (297) = 2.94, $p < .01$. The effect of positive vicarious experience on efficacy was significant, though not in the direction one would expect, $\beta = -.20$, t (297) = -3.85, $p < .0001$. The effects of negative vicarious experience, $\beta = -.24$, t (297) = -4.40, $p < .0001$; social support, $\beta = .29$, t (297) = 5.44, $p<.0001$; and social undermining, $\beta = -.21$, t (297) = -3.76, $p < .0001$, also were found to be significant. Regression analysis also revealed that diet efficacy was predictive of the level of diet adherence $\beta = .26$, t

(297) = 3.87, $p < .0001$. However, social support also had a direct positive effect on diet adherence $\beta = .25$, t (297) = 3.93, $p < .0001$.

Path analysis indicated that the model was not consistent with the data, thus this model was rejected. This was evidenced by the chi-square goodness-of-fit test [χ^2 (5, 295) = 18.30, $p<.05$], the small size of the path coefficients, and the error term for the predicted versus obtained correlation between social support and diet adherence significantly differing from zero (see Figure 4 and Table 3).

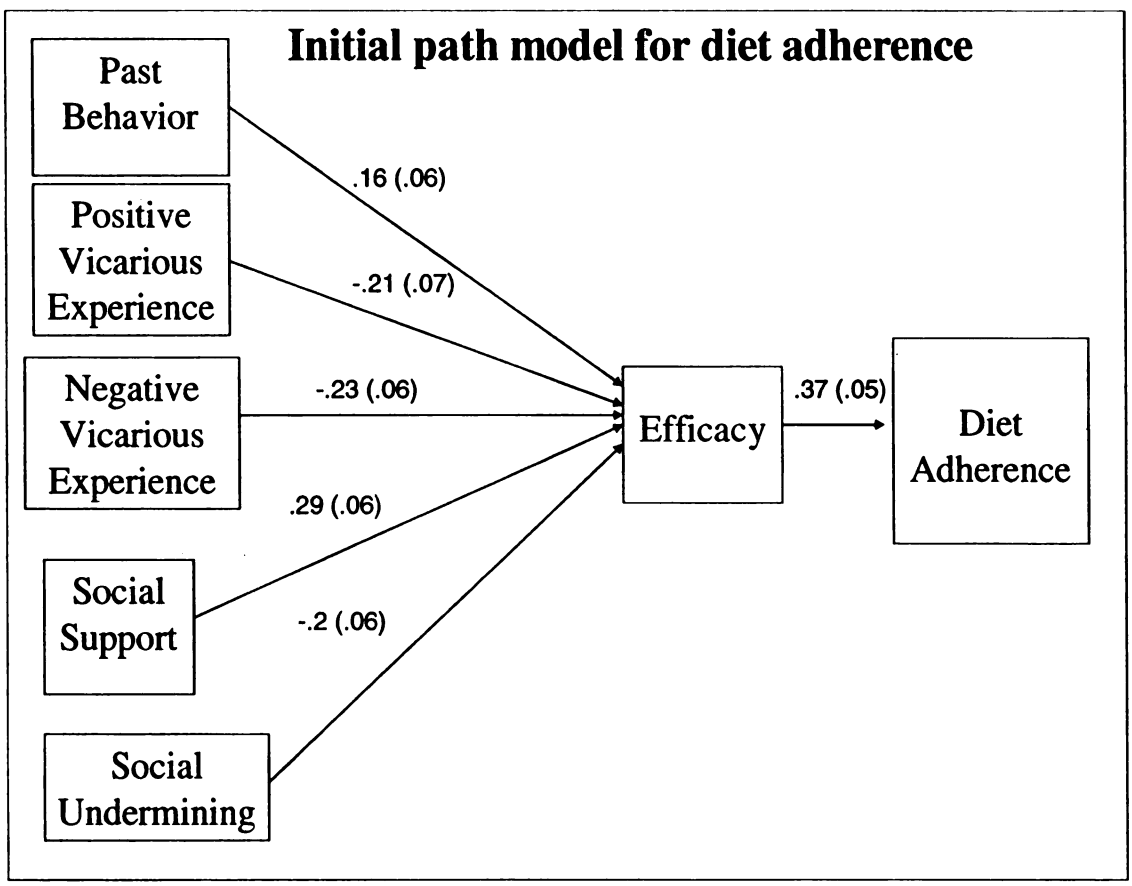

Figure 4. Initial path model for diet adherence.

Diet Post Hoc Analysis.

Because social support was correlated more strongly with adherence than efficacy, a new model was tested which excluded the social support variable. Path analysis indicated that the data were consistent with the revised model, thus the model was not rejected. This was evidenced by the chi-square goodness-of-fit test, χ^2 (4, 295) = 9.13, p<.06, the larger size of the path coefficients, and the reduced size of the error terms, none of which significantly differed from zero (see Table 3 and Figure 5).

Diet Original Path Variables	Error	Diet Modified Path Variables	Error
1. Past behavior	.15	1. Past behavior	.15
2. Vicarious positive	.11	2. Vicarious positive	.11
3. Vicarious negative	.11	3. Vicarious negative	.11
4. Social support	.24		
5. Social undermining	-.11	4. Social undermining	-.11
6. Efficacy	0	5. Efficacy	0

Table 3. Error values for diet path coefficients.

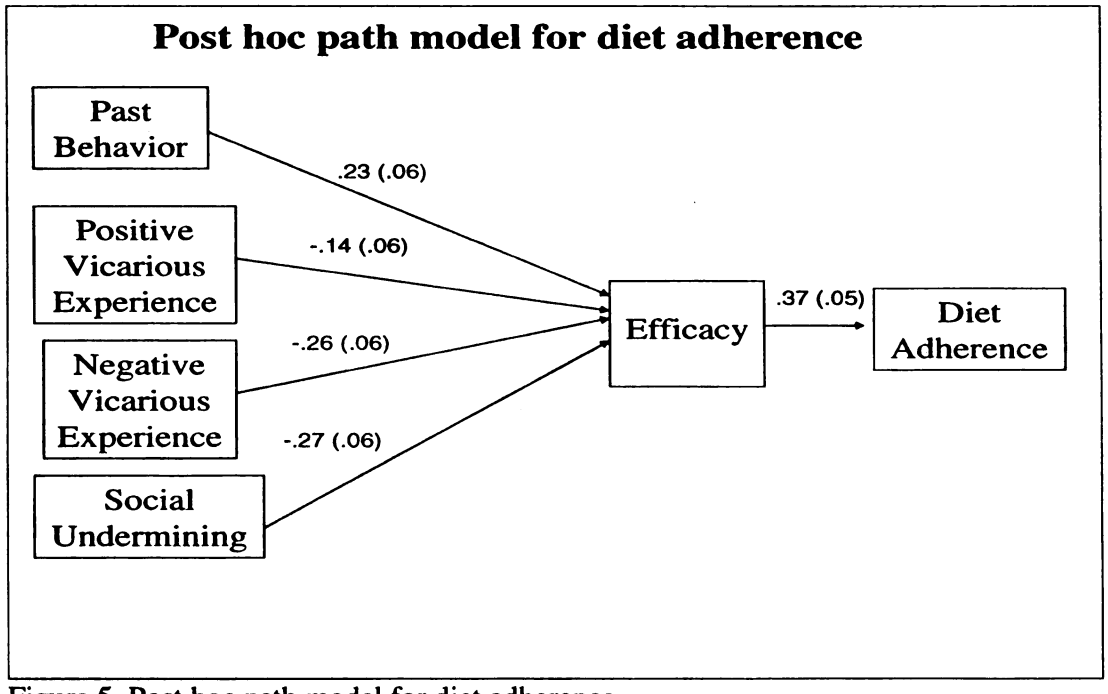

Figure 5. Post hoc path model for diet adherence.

Physical Activity

It was proposed that the effects of PA past behavior, PA vicarious experience, and PA interpersonal influence on level of PA are mediated through PA outcome expectations and self-efficacy, which have direct effects on level of PA (H5-8). Hypotheses 5-8 are rejected due to the discovery that self-efficacy and outcome expectations appeared to be measuring the same construct. Also, the vicarious experience and interpersonal influence scales were divided into four distinct variables- positive vicarious experience, negative vicarious experience, social support, and social undermining.

The original predictions were reworded to adjust for the scale alterations such that (a) PA past behavior, PA positive vicarious experience, PA negative vicarious experience, PA social support influence, and PA social undermining have positive direct effects on PA efficacy; (b) the effects of PA past behavior, PA positive vicarious experience, PA negative vicarious experience, PA social support, and PA social undermining on level of PA are mediated through PA efficacy, which (c) has a direct effect on the level of PA.

Correlations, regression, and path analysis were used to test the predictions. When considering the zero-order correlations (i.e., Pearson's correlation coefficients), past behavior, r (297) =.17, p<.01; social support, r (297) =.23, p<.001; social undermining, r (297) = -.22, p<.001; and efficacy, r (297) =.38, p<.001 all are significantly correlated with amount of physical activity, while positive vicarious experience ,r (297) =.03, ns, and negative vicarious experience, r (297) =-.06, ns, are not significantly correlated with amount of PA (see Table 4). So, the more the participants reported successful past exercise attempts, positive social support, high efficacy in their

ability to exercise, and experienced less exercise undermining, the more likely they were to report being physically active.

	M (SD)	1	2	3	4	5	6	7
1. Exercise past behavior	2.73 (.95)	1	.011	-.13*	.34**	-.331**	.39**	.169**
2. Exercise vicarious positive	4.09 (.78)		1	.555**	-.101	.232**	.138*	.026
3. Exercise vicarious negative	3.75 (1.81)			1	-.410	.487**	-.054	-.058
4. Exercise social support	2.52 (1.13)				1	-.552**	.301**	.226**
5. Exercise social undermining	2.59 (1.38)					1	-.358**	-.219**
6. Exercise efficacy	3.31 (1.34)						1	.382**
7. Calories burned in 1 week of PA (DV)	1499.3 (1504.1)							1

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4. Physical Activity Variable Means, Standard Deviations, and Zero-order Correlations.

Regression analysis also tested the predicted effects for exercise past behavior, vicarious experience, and social influence on efficacy. The effect of past behavior on efficacy was significant, $\beta = .23$, $t\ (297) = 4.78$, $p < .0001$. The effect of positive vicarious experience on efficacy also was significant, $\beta = .18$, $t\ (297) = 2.71$, $p < .007$, as was social undermining, $\beta = -.28$, $t\ (297) = -4.21$, $p < .0001$. Amount of negative vicarious experience ($\beta = .04$, $t\ (297) = .80$, ns) and social support ($\beta = .08$, $t\ (297) = 1.55$, ns), however, were not predictive of efficacy level. Regression analysis also revealed that exercise efficacy was predictive of amount of reported physical activity $\beta = .38$, $t\ (297) = 7.21$, $p < .0001$.

Path analysis indicated that the data were consistent with the model, thus the model was not rejected. This was evidenced by the chi-square goodness-of-fit test, χ^2 (5, 295) = 3.51, ns, the size of the path coefficients, and the small size of the error terms, none of which significantly differed from zero (see Figure 6 and Table 5). While this model was acceptable according to the criteria listed above, the small size of the path coefficients between negative vicarious experience and physical activity (.07) and between social support and physical activity (.09) prompting testing a revised model that excluded these variables from analysis.

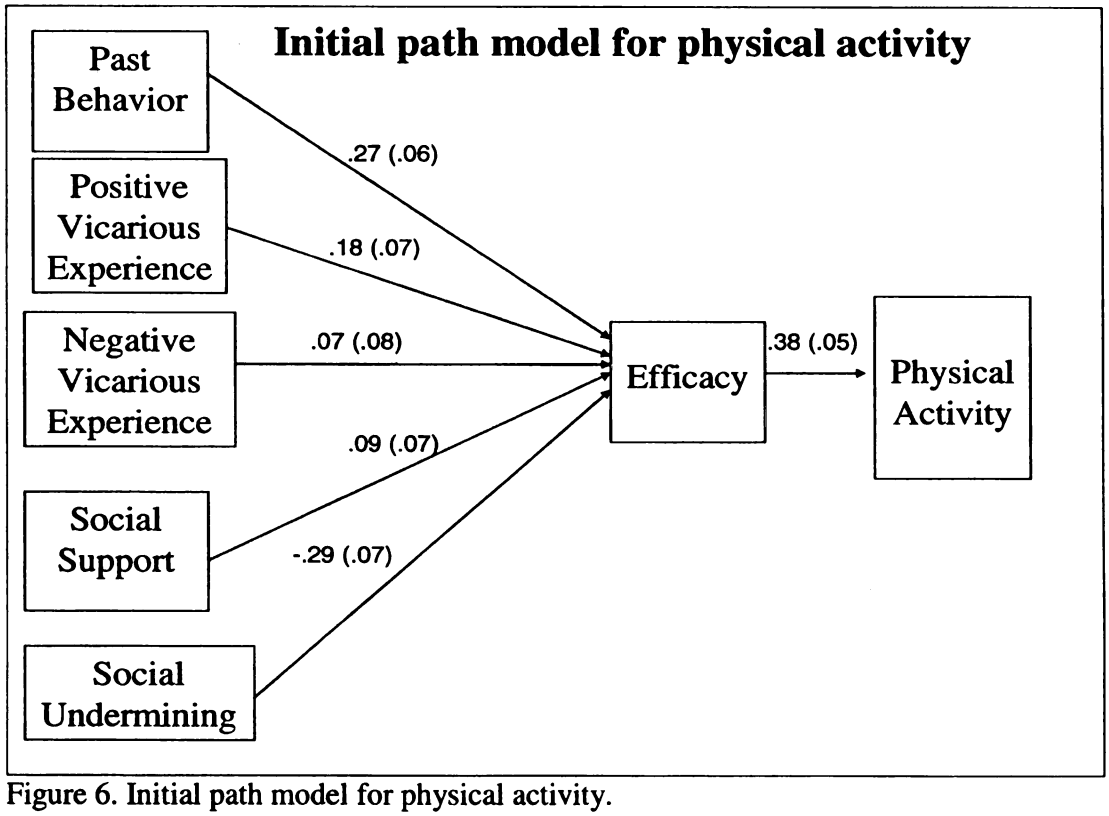

Figure 6. Initial path model for physical activity.

Exercise Original Path Variables	Error	Exercise Modified Path Variables	Error
1. Past behavior	.02	1. Past behavior	.02
2. Vicarious positive	-.02	2. Vicarious positive	-.02
3. Vicarious negative	-.04		
4. Social support	.12		
5. Social undermining	-.08	3. Social undermining	-.08
6. Efficacy	0	4. Efficacy	0

Table 5. Error values for exercise path coefficients.

Physical Activity Post Hoc Analysis.

Path analysis indicated that the data were consistent with the revised model, thus the model was not rejected. This was evidenced by the global chi square goodness-of-fit test, χ^2 (7, 295) = 4.67, p=<.05, the size of the path coefficients, and the small size of the error terms, none of which significantly differed from zero (see Figure 7 and Table 5).

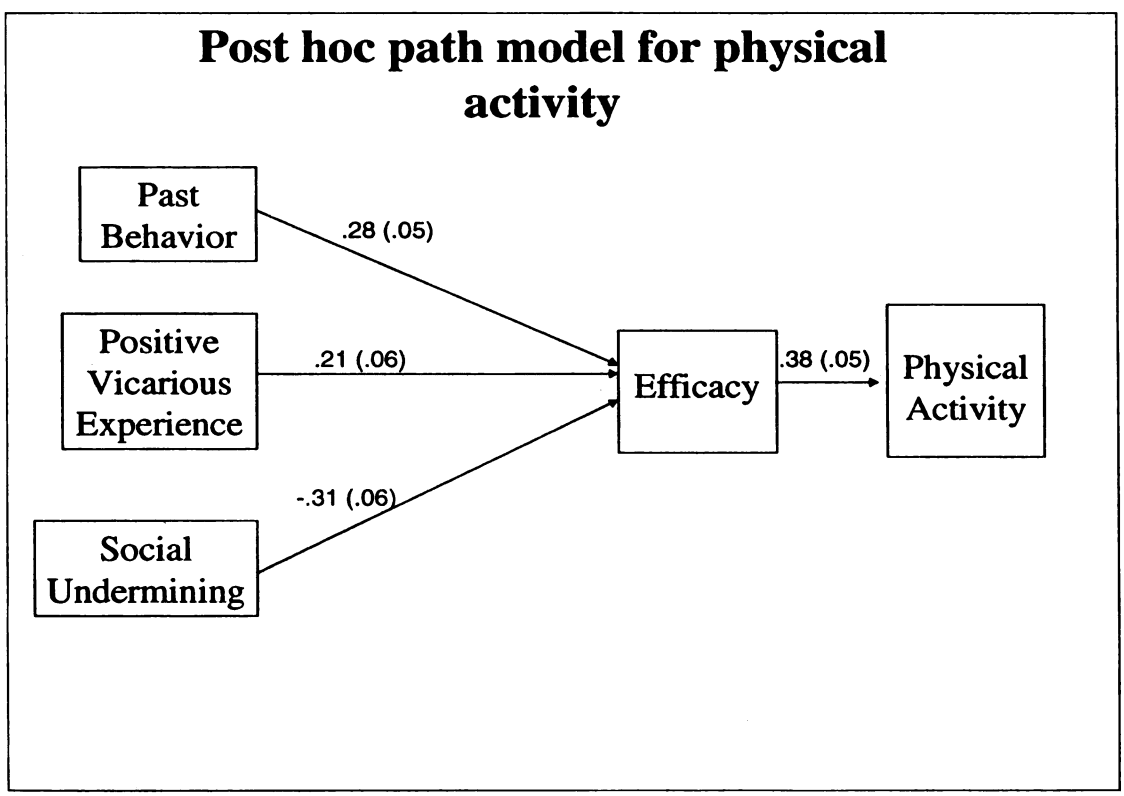

Figure 7. Post hoc path model for physical activity.

Memorable messages

One aim of the current investigation was to explore actual messages - positive and negative- heard by people trying to lose weight and their responses to these messages. Approximately three quarters (72%) of the participants recorded at least one positive or negative message for diet, whereas less than half of the respondents (38%) recalled at least one positive or negative message for exercise. The large difference in recall percentages could be explained by the fact that this study sample consisted primarily of persons who were dieting, with exercise being ancillary. Also, the exercise open-ended items were at the end of the survey. Appendix E provides examples for the categories that emerged from the data. The messages will be assessed in greater detail in a future paper, and specifically coded for the categories described below.

Several themes appeared among the positive comments. The most frequent positive comments consisted of emotional support during the weight loss process, compliments on physical appearance, social comparisons, and disclosures that the person had inspired the messenger or acted as a positive role model. Less frequent positive messages were expressions of health benefits participants were achieving, validation that they were actually achieving what the messenger originally thought was doubtful, and back-handed compliments.

The most frequently recalled negative comments were health warnings, program attacks indicating it was unhealthy or not effective for the long-term, suggestions that what they were doing was not working or lacking effectiveness, and personal attacks on what the person was not doing. Less frequently recalled negative comments consisted of social comparisons and comments of disbelief.

Responses to positive and negative messages included, token appreciation (i.e., thank you), compliment acceptance, requests to get them involved in the process, downgrading, deflection, compliment returns, educating the messenger, and efforts to bite back when a negative comment was expressed.

Participant Condition Variation

It was proposed that the group program participants should report more perceived support compared to the individual program and control group participants (H9); the group program participants should have higher reported levels of self-efficacy compared to the individual program and control group participants (H10); the group program participants should have stronger diet adherence compared to the individual program and control group participants (H11). Analysis of variance (ANOVA) assessed these hypotheses, with group condition as the independent variable.

Results indicated a significant effect for group condition on perceived support (F (2, 293) = 21.76, p<.0001). Scheffe's multiple comparison test indicated that the mean level of social support in the group condition (M = 3.34, sd = .98) was significantly greater than both the other conditions (M = 2.86, sd = .86, individual; M = 2.44, sd = 1.03, control), which also significantly differed (see Table 6). Thus, the data were consistent with hypothesis nine.

Comparison Conditions	Group, private, or control	Mean Difference	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
group	private	.48654(*)	.13822	.002	.1465	.8266
	control	.90737(*)	.13756	.000	.5689	1.2458
private	group	-.48654(*)	.13822	.002	-.8266	-.1465
	control	.42083(*)	.13575	.009	.0868	.7548

* The mean difference is significant at the .05 level.

Table 6. Scheffe's multiple comparisons for group condition and social support.

Hypothesis number ten posited that the group program participants should have higher reported levels of self-efficacy compared to the individual program and control group participants. Results indicated a significant effect for group condition on efficacy[4] (F (2, 293) = 10.73, p<.0001). Scheffe's multiple comparison test indicated that the mean level of efficacy in the individual condition (M = 2.60, sd = 1.24) was significantly lower than both the other conditions (M = 3.05, sd = 1.35, group; M = 3.36, sd = .86, control), which also significantly differed (see Table 7). Thus, the data were partially consistent with hypothesis ten.

Compared Conditions	Group, private, or control	Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
group	private	.45317(*)	.16642	.026	.0437	.8626
	control	-.30758	.16600	.181	-.7160	.1008
private	group	-.45317(*)	.16642	.026	-.8626	-.0437
	control	-.76075(*)	.16515	.000	-1.1671	-.3544

* The mean difference is significant at the .05 level.

Table 7. Scheffe's multiple comparisons for group condition and efficacy.

The final hypothesis proposed that the group program participants should have stronger diet adherence compared to the individual program and control group participants. Results indicated a significant effect for group condition on adherence to diet (F (2, 293) = 6.02, p<.01). Scheffe's multiple comparison test indicated that the mean level of diet adherence in the group condition (M = 3.16, sd = 1.20) was significantly higher than the control condition (M = 2.63 sd = .84). The individual condition did not significantly differ from the group nor the control condition (M = 2.86, sd = 1.15) (see Table 8). Thus, the data were not consistent with hypothesis eleven.

[4] The efficacy scale is a combination of outcome expectancies and self-efficacy items.

Compared Conditions	Group, private, or control	Mean Difference	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
group	private	.29816	.15331	.153	0.079	.6753
	control	.52807(*)	.15255	.003	.1527	.9034
private	group	-.29816	.15331	.153	-.6753	.0790
	control	.22991	.15177	.319	-.1435	.6033

* The mean difference is significant at the .05 level.

Table 8. Scheffe's multiple comparisons for group condition and adherence to diet.

Chapter 5

DISCUSSION

What do people need to do to lose weight? When asked, most people are able to respond that they need to eat better and exercise more. Yet, when it comes to actually performing these behaviors people fall short. Recent literature reviews have identified a need for studies that delineate causal pathways and the underlying behavioral mechanisms (i.e., Nothwehr, 2004; 2005; Tsai & Wadden, 2005). This time series study investigated whether five variables combined to predict adherence to diet and exercise.

Two hundred and ninety-nine people trying to lose weight completed a series of questionnaires. Participants fell into three different groups: an individual medically-supervised program; a medically-supervised program with weekly group meetings; and a control group, consisting of people trying to lose weight a variety of different ways. Participant responses were analyzed to evaluate the hypotheses based upon Clark et al.'s framework for chronic disease self-management (2001) and the research questions assessing actual messages communicated to the participants regarding their weight-loss attempts. Two models were proposed- one for diet adherence and one for exercise. However, analyses revealed that the models could not be tested as proposed and adjustments were made. This research reveals several interesting findings that merit comment.

The reliability analysis indicated that three adjustments should be made to the diet and physical activity variables originally proposed. First, outcome expectations, defined as the possible results of one's action ("The diet program I am on is effective.") was

proposed as conceptually different from self-efficacy, defined as an individual's beliefs in his/her capabilities to perform a course of action to attain a desired outcome ("I can maintain the diet program."). Research supports the notion that these are separate, distinct construct (for reviews see Bandura, 1997; Witte, 1992). However, these data revealed these constructs to be highly correlated with each other, and correlated with other measures in similar ways. Participants did not view "My diet program is effective" and "I can do this diet" as two distinct ideas. One explanation for this discovery is a possible testing effect, given that outcome expectations and self-efficacy followed each other on the survey. If future investigations replicate this occurrence, it may have important theoretical implications, especially for health models that include the concepts of efficacy and self-efficacy (i.e., Bandura, 1997, Witte, 1992). In order to analyze these data, self-efficacy and outcome expectations were combined to create one broad concept, labeled efficacy.

Second, vicarious experience, which involves the observation and comparison of another's performance on a task, was originally proposed as one construct. This construct ranged from observing positive rewards resulting from weight loss on one end, to observing negative treatment associated with lack of weight loss on the opposite end. Studies often manipulate the vicarious experience such that participants either experience positive vicarious experience or negative vicarious experience or high or low positive vicarious experience (Bandura, 1997). However, in this field investigation, analyses revealed that participants experienced high levels of positive and negative vicarious experience, rather than either experiencing negative or positive vicarious experience.

This duality makes sense given the mixed messages individuals often receive regarding weight. Idealization of the lean figure combined with epidemic rates of obesity and widespread concern about body weight and dieting have created a social environment that is extremely obsessed about weight (Davidson & Birch, 2004; Paeratakul, York, Williamson, Ryan, & Bray, 2002). The beliefs that thin is good and fat is bad are broadly disseminated in newspapers, magazines, videos, television, and the music industry (Cusumono & Thompson, 1997; 2001; Myers & Biocca, 1992). Americans are also inundated with encouraging messages about how to lose weight, national weight loss challenges, stories of people who have lost weight and look/feel great, and even reality television shows illustrating weekly progress with prizes for people who successfully lose weight (such as Celebrity Fit Club and The Biggest Loser). Thus, vicarious experience was separated into two distinct variables, positive vicarious experience and negative vicarious experience. After the variable was divided, it was predicted that positive vicarious experience would increase self-efficacy, and negative vicarious experience would decrease self-efficacy.

The items measuring the original social influence variable also were divided into two distinct variables: positive social influence and negative social influence. Positive social influence or social support has received the bulk of the attention in the literature (Goldsmith, 2004). In recent years, researchers have supplemented work on the benefits of social support by focusing on the adaptational significance of the negative aspects of social relationships. Vinokur and van Ryn (1993) introduced the concept social undermining as "behaviors directed toward the target person that display (a) negative affect (anger or dislike), (b) negative evaluations of the person in terms of his or her

attributes, actions, and efforts (criticism), and (c) behaviors that make difficult or hinder the attainment of instrumental goals'' (p. 350). Several studies have found results supporting undermining (Finch Okun, Pool, & Ruehlman, 1999; Manne, Taylor, Doherty, & Kemeny, 1997), while other studies have failed to find evidence for this negativity effect (e.g., Druley & Townsend, 1998; Lepore, 1992; Okun & Keith, 1998). These data indicated that social support and social undermining are separate concepts that should not be combined into one social influence scale. It was predicted that positive social influence (social support) would increase efficacy, and negative social influence (social undermining) would decrease efficacy.

Diet model

The first hypothesis predicted that diet past behavior, diet vicarious experience, and diet interpersonal influence would have positive direct effects on diet outcome expectations. It was posited in the second hypothesis that diet past behavior, diet vicarious experience, and diet interpersonal influence have positive direct effects on self-efficacy. Hypothesis one and two were rejected for the conceptual reasons discussed above. After considering the variable changes, the following prediction was analyzed: diet past behavior, diet positive vicarious experience, and diet positive social influence (i.e., social support) have positive direct effects on efficacy, while negative vicarious experience and social undermining have negative direct effects on efficacy. As predicted, the data were partially consistent with this prediction. Amount of past behavior and positive vicarious experience positively affected level of efficacy, while negative vicarious experience and social undermining lowered levels of efficacy. People who reported more successful past behavior and more rewarding vicarious experiences

reported higher levels of efficacy, while negative vicarious experiences and negative social influence lowered efficacy levels. However, social support was more strongly correlated with diet adherence than was efficacy.

The third and fourth hypotheses also were rejected due to the reasons listed above. The following prediction was assessed: the effects of diet past behavior, diet positive vicarious experience, diet negative vicarious experience, diet positive social influence, and diet social undermining are mediated through efficacy, which has a direct effect on diet adherence. This prediction, based on the framework for chronic disease self-management, suggests that external variables will affect internal evaluation variables (e.g., efficacy). However, while the effects of past behavior, positive vicarious experience, negative vicarious experience and social undermining on adherence were mediated through efficacy, social support effects were not mediated through efficacy. Thus, the original model did not fit the data. When the model was re-run after removing social support, the model was more successful. As expected, the effects of past behavior, positive vicarious experience, negative vicarious experience, and social undermining were mediated by the level of efficacy, which positively and directly affected adherence. However, the global goodness-of-fit test indicated that while the model fit the data, there was much room for improvement, and possibly better fitting alternative models.

Physical activity model

It was posited in the fifth hypothesis that PA past behavior, vicarious experience, and interpersonal influence would have positive direct effects on outcome expectations. It was posited in the sixth hypothesis that PA past behavior, vicarious experience, and interpersonal influence would have positive direct effects on self-efficacy. Hypothesis

five and six were rejected for the conceptual reasons discussed above. After considering the variable changes, the following prediction was analyzed: PA past behavior, positive vicarious experience, and positive social influence have positive direct effects on efficacy, while negative vicarious experience and negative social influence have negative direct effects on efficacy. As expected, participants experienced stronger feelings of efficacy to the extent that their past behaviors were successful, that their vicarious experiences were rewarding and not punishing, that social support was present, and that social undermining was rare.

The seventh and eight hypotheses were rejected due to reasons discussed above. The following prediction was assessed: the effects of PA past behavior, positive vicarious experience, negative vicarious experience, positive social influence, and negative social influence are mediated through efficacy, which has a direct effect on level of physical activity. Path analysis indicated that the model fit the data. However, because the strength of the paths for negative vicarious experience and social support on efficacy were weak, the PA model was analyzed again without these variables. The results indicated that this model provided a better fit to the data.

Efficacy

Consistent with expectations, efficacy had a direct positive effect on diet adherence and exercise level. When people are confident that the program will work and that they can successfully execute the program, they are more likely to carry it out. While efficacy is important at the start of a new challenge, it is when one is applying skills that high-efficacy intensifies and sustains the effort needed to realize a difficult performance, which is hard to attain if one is doubt-ridden (Bandura, 1986)

In forming their efficacy judgments, people have to deal not only with different configurations of efficacy-relevant information conveyed by a given modality, but they also have to weigh and integrate efficacy information from these diverse sources. The weights assigned to different types of efficacy information may vary across different domains of activity (Bandura, 1986). This investigation assessed whether and how people trying to lose weight integrated past behavior, vicarious experience, and social influence.

Past behavior

Past behavior is considered the most influential source of efficacy information because it is based on authentic mastery experience (Bandura, 1986). Not surprisingly, past behavior had a direct positive affect on level of efficacy, such that high levels of successful past behavior led to high levels of efficacy for diet and exercise. Successes raise efficacy appraisals; failures lower them. However, if people experience only easy successes they may come to expect quick results and may become easily discouraged by failure. A resilient sense of efficacy requires experience in overcoming obstacles through perseverant effort. Some setbacks and difficulties serve a practical purpose in teaching that success usually requires sustained effort. After people become convinced they have what it takes to succeed, they persevere in the face of adversity and quickly rebound from setbacks. By sticking it out through tough times, they emerge stronger from adversity.

Participants' assessments of "what is successful past behavior" are interesting. An item from the original past behavior scale, "I have regained the weight I lost on previous diets." was dropped from the scale because it was not highly correlated with the other items. In discussions following data collection it was apparent that the participants defined success as having ever lost weight on any diet, which is different from keeping

off weight on any diet attempt. Because they viewed past behavior success as ever having lost weight, they were fairly positive that they could do it again, even though most reported that they had often gained back the weight (and even added pounds) during previous diet attempts. Participants seem to take credit for something that they did not fully accomplish, because they lost the weight but they did not keep it off. This could pose a challenge for weight loss educators because the goal is to have motivated participants, confident that they can do something about their weight. However, health educators also want people to realize that the mark of success is losing the weight and keeping it off. To regain the weight negates the positive results of the original diet. This logical disconnect is consistent with the self-serving bias literature which states that people take credit for their successes and deflect blame for their failures. Future investigations should consider assessing weight loss programs, and specifically the concept of past behavior, with an attribution framework so that this self-serving disconnect can be further articulated.

Vicarious Experience

Positive and negative vicarious experiences were assessed for diet and exercise. Positive vicarious experience proved to be an interesting variable. Consistent with predictions, positive vicarious experience positively and directly affected efficacy for exercise; contrary to expectations, positive vicarious experience regarding diet had a negative direct effect on efficacy. Negative vicarious experience had a negative direct relationship with efficacy for diet and exercise. These results suggest that vicariously witnessing similar others being punished for not losing weight and being rewarded for losing weight lower confidence to lose weight through diet.

Interestingly, positive vicarious experiences did not increase personal diet efficacy. The more people witnessed similar others being rewarded by their weight loss, the lower their reports of diet efficacy. People do not necessarily see others successfully losing weight and think, "I can do it!" Instead, successful others may hinder the cause. Perhaps when people are trying to decide which program to start, positive vicarious experience has a positive efficacy outcome. However, the people in the current investigation were already part of an existing program. Another explanation is that when people begin dieting they move into more of a social comparison mode. They may see another person successfully dieting and feel that they are not losing weight as fast, or that it is not as easy as they anticipated. These comparisons may then lower their perceptions of their abilities to achieve their goals. Also, because a plethora of diets exist today on the market and because Americans value fast results for minimal work, seeing a similar other on a different diet that seems to yield more rewards and less costs may lower their perceptions of efficacy in their current diet program. This is plausible, particularly since the current investigation revealed that positive vicarious experience was positively related to efficacy for exercise. People's perceptions of exercise may be more realistic. They know what they need to do to lose weight, whereas with diet, under one program a person can eat anything they want and under another program the diet may be heavily restrictive. Unlike exercise, diet has different inputs for the same output.

Negative attitudes toward obesity are prevalent. Relative to lean individuals, overweight individuals are described as lazy, sloppy, lacking in self-discipline, overindulgent, and having poor personal hygiene (Puhl & Brownell, 2001). Fat stereotypes are present among children as young as age three, and they increase with age

(Cramer & Steinwert, 1998). Thus, it is not surprising that participants reported high levels of exposure to negative vicarious experience, nor is it unusual to find that seeing others made fun of or punished for not losing weight would lower personal perceptions of efficacy. Researchers on weight criticism believe that obese individuals become accustomed to hearing negative words about their weight and not losing it; observing negative images is not an "I'll show you" motivator or confidence builder to lose weight (Faith, Leone, Ayers, Heo, & Pietrobelli, 2002). Future research could control for the amount of time spent being overweight to assess whether the potential negative vicarious experience has a positive motivating effect on the newly overweight as opposed to those who have lived a lifetime with verbal criticism.

While the vicarious experience results need to be replicated, they may have significant implications for weight loss programs, since most plans have photos and stories of successes promoting their diets. People may lose confidence and quit when they compare their weight loss progress to the "ideal participant" who may seem to be losing weight more rapidly or effortlessly.

Interpersonal Influence

Social influence was divided into two concepts: social support and social undermining. Social support was more strongly correlated with diet adherence than efficacy, so it was dropped from the model. However, that does not weaken its value as having a direct effect on diet outcome. People who received emotional support and encouragement from others reported adhering to their diets more.

Social support also did not fit within the exercise model. This does not necessarily negate the impact of social support, and may speak more to the timing of the data

collection, which occurred partway through a program. Specifically, social support may be important in initially promoting behavioral change (i.e., supporting the choice to begin a program) and less important (as evidenced by the model) in terms of sustaining a program once it has begun. Interventions that promote increased encouragement from family and friends to be physically active may have a positive impact and help initiate behavior change. In other research, higher levels of physical activity related social support were more likely to accumulate 150 min or more of moderate intensity physical activity per week (Ronda et al., 2001). Social support to be physically active may be an important aspect of interventions geared toward achievement of CDC recommendations. When designing physical activity programs for the worksite, community center, or place of worship it is important to tap in to the already-existing social networks. These networks can catalyze behavior change.

Encouraging social support is important, but also risky. The inclusion of people also means that they may sabotage weight loss efforts. The current research found a direct negative relationship between social undermining and efficacy for both the diet and exercise models. People reported that when others criticized their efforts and showed that the weight loss project was not important their confidence in their ability to be successful wavered. Interpersonal researchers report that negative messages are far more lasting than positive messages (Gottman, 1994). It can take an average of five positive messages to negate one negative message (Gottman, 1994). Manne et al. (1997) found that withdrawal/avoidant and overtly critical spouse behaviors had stronger correlations with psychological distress than did the measure of spouse supportive behaviors. Other studies, however, did not find evidence for this negativity effect (e.g., Druley &

Townsend, 1998; Lepore, 1992; Okun & Keith, 1998). A recent meta-analytic review concluded that the main effects of social support and undermining on psychological distress are comparable in magnitude; however, effect sizes appear to vary as a function of how support and undermining are assessed (Finch, Okun, Pool, & Ruehlman, 1999).

One of the original studies comparing the effects of social support and undermining was conducted by Rook (1984), who asked a sample of 115 elderly widowed women about the supportive and problematic others in their social networks. Rook (1984) found that the range of problems caused by others in the social network predicted lower psychological well-being, but the range of supportive functions performed by others was not associated with well-being. Rook (1984) also found that the sheer number of problematic others in the social network predicted lower well-being, but the number of supportive others did not predict well-being. However, Rook's results also indicated that frequency of socializing predicted higher well-being, but frequency of interaction with problematic others did not predict well-being. Overall, the pattern of results supported the hypothesis that "negative social interactions have more potent effects on well-being than positive interactions" (Rook, 1984, p. 1106).

Future researchers should continue this line of research to assess enacted social undermining and social support. Perhaps undermining is more memorable than support. Moreover, one may imagine that perceptions of available support would reflect summary judgments of enacted support, but studies comparing measures of enacted support and perceived support have produced weak correlations between the two (for a review see Dunkel-Schetter & Bennett, 1990; Goldsmith, McDermott, & Alexander, 2000). Several promising lines of research show that what the sender says, how s/he says it, how the

receiver interprets the message, and the feedback provided by receivers are all important facets of social support (Burleson & Goldsmith, 1998; Burleson & MacGeorge, 2002). Future research should attempt to ascertain if these relationships also hold for social undermining.

Memorable Messages

Participants recorded negative and positive messages they heard during their weight loss attempts. Many of the problems researchers have come across in studying enacted support and undermining stem from trying to understand the communication phenomena without concentrating on the actual communication process (Cohen et al., 2000).

"A close examination of research on enacted support reveals assumptions that are fundamentally at odds with what we know about the process of interpersonal communication. For example, most survey instruments and coding systems for measuring enacted support focus on frequency of occurrence of various kinds of support. The effect of these measurement approaches is to group together all instances of some type of support, without respect to potential differences in quality of support (Goldsmith, 2004, p. 24)."

Expert advice is weighted no differently than well-intentioned but incorrect information, resources enthusiastically offered are considered equal to those given begrudgingly, and sincere expressions of concern are equal to those that condescend or overprotect. In effect, the current measurement systems presume that three episodes of half-hearted support should have a more positive effect than one insightful expression of support (Goldsmith, 2004). Further, current measurement approaches often fail to

account for messages or acts that illustrate lack of support from social networks and their outcomes on well-being.

The current investigation, revealing seven positive comment categories and six negative comment categories, confirms the need to look more directly at the actual messages heard and their outcomes. Is a back-handed compliment as likely to elicit positive outcomes as a "you look great" and "you are my role model" messages? Research on compliments suggests that people find comments on their personality and performance more meaningful than comments on their appearance (Herbert, 1990; Holmes, 1988). However, the context of weight loss may produce different results, since weight is so closely tied to appearance and attractiveness. It would be interesting to investigate magnitude effects of specific comments heard during weight loss attempts. Regarding responses to positive comments, it is not surprising that many participants did something other than accept the positive comment. Herbert (1990) found that two thirds of the time, when Americans respond to compliments they do something other than accept them. This data set will be explored further by coding the open-ended positive comment responses for Herbert's (1990) response categories.

The negative messages revealed six general categories that tended to have three overarching themes. One set expressed concern over the safety of the diet/exercise regime. Another group conveyed that the participants are failures; either they were not doing enough or they were going to fail eventually. The final set communicated messages of social comparison (i.e., you are not losing as much weight as X). Understanding the effect these different types of messages have on participants and assessing their ability to

cope after hearing these messages should be foremost on the research agenda for anyone studying social-psychological variables affecting long-term weight loss.

Participant Condition Variation

Several hypotheses pertained to the three different sample groups. It was proposed in hypothesis nine that group program participants should report more perceived support compared to the individual program and control group participants. Group participants did report significantly higher social support than the individual program participants, who reported significantly higher social support than the control group.

The tenth hypothesis predicted that the group program participants should have higher reported levels of self-efficacy compared to the individual program and control group participants. The data were partially consistent with this prediction. Surprisingly the control condition reported significantly higher levels of efficacy than the group condition, which reported higher levels of efficacy than the individual program condition. People in the individual program believed less strongly that the program was effective and that they could accomplish their goals regarding weight-loss.

The final hypothesis proposed that the group program participants should have stronger diet adherence compared to the individual program and control group participants. The data were partially consistent with this prediction. Group participants adhered to their diet program better than the control group, but not significantly better than the individual group. Interestingly, the control condition experienced the highest levels of efficacy, yet the group condition, followed by the individual participants reported the highest levels of social support and adherence to diet.

These results strengthen a budding area of research on commercial programs that include weekly group meetings. Heshka and colleagues randomly assigned participants to Weight Watchers or a self-help program that included two visits to a dietitian. They found that Weight Watchers participants lost more weight and had better maintained their weight loss at two years than the self-help participants. People who attended the most group sessions over the two-year study period maintained the largest weight losses at the end of this period. Other research has highlighted the positive impact of regular group attendance on weight-loss (Djuric, DiLaura, Jenkins, Darga, Jen, Mood, Bradley, & Hryniuk, 2002; Odom & Ferrara, 2005; Rippe, Price, & Hess, 1998).

It makes sense that the current control condition (largely self-helpers) reported less support and diet adherence, yet higher efficacy than the medically supervised conditions. Structured programs offer ready social support, accountability, and a very specific diet. In the medical programs, people are paid to follow-up with their progress through phone calls and emails. Meetings offer time to work through tough issues, vent, and ask questions. Self-help programs require people to give themselves diet structure, hold themselves accountable, and find their own social support outlets. The benefit of self-help programs is that a person gets to choose the program that s/he believes is feasible (efficacious), usually one with a variety of food options. In contrast, the group and individual participants have very strict diets consisting of shakes and salads. The clinic weight loss program eliminates choice from the diet, making it seem more difficult to accomplish, and yet easier to adhere to.

Limitations

Several limitations of this study qualify the current findings and hopefully will guide future research. Limitations of this study include an ethnically homogeneous sample, exclusive reliance on self-report methodology, a limited time series design, and survey length. The sample consisted largely of Caucasians who had taken some college courses. Thus, this information may not be generalizable to a large population, but it will aid weight loss clinics nationwide. The goal was to assess the current population of medical weight loss centers. They are individuals who can afford the expenses of the program.

Data collection relying on self-reports generate some concern. For instance, due to its complexity, there is no single device, instrument or tool that can capture the essence of all types of physical activity. Dishman et al. (2004) provides a comprehensive review of problems encountered when measuring physical activity. The primary dependent variables in this investigation will continue to be measured. They must be accurately and reliably measured before claims of effectiveness are recognized. Future investigators should consider multiple methods of assessing physical activity and adherence to meal plan.

Finally, survey length is also a concern. Most participants did not respond to the open-ended items. While participants truly may not have been able to recall specific messages, it is also likely that they simply did not want to take any more time to answer the questions. This is plausible given that only 3 participants reported that they had not received any social support or undermining during the time of the study. A follow-up

study assessing specific messages, responses, and coping skills would be valuable to this research domain.

Conclusion

This investigation enhanced knowledge of health model constructs. The chronic framework as presented in Figure 1 suggests that predisposing and external factors affect the observations, judgments, and reactions of the individual, leading him or her to undertake disease management strategies (including meal replacement programs and exercise) so as to achieve a desired end point or goal. One reaction is to determine whether the action taken will produce the expected outcome (outcome expectation). Another reaction is whether one feels the confidence to continue the action (self-efficacy). Over time, continuous observation, judgment, and reaction lead to modification of management strategies and sometimes modification of the goal itself. The chronic disease self-management framework is one of several theoretical models (i.e., Social Cognitive Theory, Self-Efficacy Model, Extended Parallel Process Model, and Theory of Planned Behavior) that denote a distinction between self-efficacy and outcome expectations. However, the current data did not. Other researchers question Bandura's decision to distinguish self-efficacy from outcome expectations (Eastman & Marzillier, 1984; Kirsch, 1985). Additional research needs to take a closer look at the two constructs to assess whether self-efficacy and outcome expectations are different. If this result is replicated, then these investigations will have important theoretical implications for several health models.

The chronic disease self-management framework is valuable because it approaches weight management as a continual process. The framework acknowledges the

ebb and flow of weight management; progress is constantly assessed, confidence levels change, people adjust what they do, the level of adherence to the plan may then affect level of efficacy, and future endpoints may alter. The current research enhanced our understanding of constructs leading into efficacy, namely the difference between negative and positive vicarious experience (role modeling), and the need to assess both social support (as the framework states) and social undermining. Research efforts should continue to approach weight as a chronic health issue, and as such continue to investigate weight through time series models delineating causal pathways.

This is the first study to test weight loss social undermining in addition to social support. From a behavioral economic perspective, social undermining may decrease the "reinforcing value" of diet and physical activity such that people who are teased are less likely to be active (or select a healthy food item) when given a choice of things to do (or eat) (Bickel & Vuchinich, 2000). Since families, friends, and coworkers may not naturally provide helpful comments during the weight loss process, people trying to lose weight (and their loved ones) must be taught how to cope with all types of comments in order to strengthen adherence.

The discovery that social undermining is an influential variable for diet and exercise will hopefully inspire further investigations. An experimental study could test whether the reinforcing value of physical activity changes as a function of the presence/absence of concomitant verbal commentary. Another study could evaluate whether the effect of social undermining on health can be buffered by certain problem-focused coping skills. Assessing social undermining and related coping skills may be

clinically useful for identifying and overcoming barriers to diet and exercise and may be a potential target for intervention.

Weight-loss is a complex health issue. Little published information is available to guide practitioners or consumers in the selection of a weight loss program. This study suggests that programs offering diet structure and weekly group meetings for social support and training on how to cope with negative messages help individuals adhere to their weight loss goals.

APPENDIX A

Description of Interventions at Beaumont Weight loss Clinic

Individual Program

- Patient planning session with psychologist (45 minutes)
- History and physical exam, ECG, lab work (1.5 hours)
- Instructions (45 minutes by appointment)
- Meet with a Registered Dietitian and Exercise Physiologist\
- Action phase
- Medical monitoring and lab work
- ECG at every 50 pounds of weight loss
- Dietitian visit once per month
- Follow-up appointment with psychologist
- Exercise consultation
- Nutrition phase (start determined by medical staff)
- Meet with dietitian prior to starting nutrition phase
- Physician visits as determined by provider
- Attend nutrition classes for 8 weeks to complement learning
- Maintenance phase
- Free maintenance group available for weekly relapse prevention education and support
- Medical monitoring and lab work
- Use of an on-site exercise facility supervised by an exercise physiologist
- The option to use high-quality, clinically proven meal replacements as a tool for weight loss.

Group program

- Patient planning session with psychologist (45 minutes)
- History and physical exam, ECG, lab work (1.5 hours)
- Group instruction with Exercise Physiologist and Nurse (2 hours)
- Action phase (First 12 weeks)
- Medical monitoring and lab work
- Weekly group meetings with psychologist
- ECG at every 50 pounds of weight loss
- Dietitian visits
- Nutrition phase (8 weeks)
- 8 weeks of nutrition classes
- Medical monitoring and lab work
- ECG at every 50 pounds of weight loss
- Dietitian visit as recommended by provider or if change in diet

- Continuation phase (beyond 12 weeks)
- Medical monitoring and lab work
- Weekly group meetings with psychologist
- ECG at every 50 pounds of weight loss
- Dietitian visits
- Maintenance phase
- Free maintenance group available for weekly relapse prevention education and support
- Medical monitoring and lab work
- 2 free visits per month with a dietitian, psychologist, or exercise physiologist
- Use of an on-site exercise facility supervised by an exercise physiologist
- The option to use high-quality, clinically proven meal as a tool for weight loss replacements as a tool for weight loss.

APPENDIX B

Questionnaire for the Social Relationships Study

Because we need to keep track of these questionnaires, we are asking you to create a unique identification code that only you will remember. All identifying information will be destroyed after the data are collected. This information will not be connected with your name. Your answers will remain confidential. In the following space, please indicate (a) the first and second letters of your mother's first name, (b) the month in which you were born (e.g., 08 for August), and (c) the day of the month you were born (e.g., 04).

Your Code:_____

I. Demographic Information

1. Gender **(please check one)**

[1]___Male [2]___Female

2. Age I am _____Years Old.

3. Race/Ethnic Group **(please check one)**

[1]___American Indian/ Native American

[2]___Asian/Pacific Islander

[3]___Black/African American

[4]___Hispanic

[5]___White/Caucasian

[6]___Mideast/Arabian

[7]___Other

4. What is your level of education? **(please check one)**

[1]___No formal education

[2]___Kindergarten to grade 6

[3]___Grade 6 to grade 12

[4]___High School diploma

[5]___Some college

[6]___Bachelor's degree

[7]___Master's degree

[8]___Ph.D., MD, or JD

5. What is your household's total annual income? **(please check one)**

[0]_____ Less than $10,000

[1]_____ $10,000 to $19,999

[2]_____ $20,000 to $29,999

[3]_____ $30,000 to $39,999

[4]_____ $40,000 to $49,999

[5]_____ $50,000 to $59,999

[6]_____ $60,000 to $69,999

[7]_____ $70,000 to $79,999

[8]_____ Greater than $80,000

6. Meal Replacement Program details:

Starting weight: _____ Current weight: _____

Number of weeks on your Beaumont Weight Clinic program: _____

7. Circle all that apply to you:

Full meal replacement Partial meal replacement

Group program Private program

8. If you are in the group program, how many group meetings have you attended?

_____

PAST BEHAVIOR

Tell us whether you agree with the following statements right now:	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
9. On past weight lost tries I have been successful.	1	2	3	4	5
10. I have successfully lost weight on previous weight loss attempts.	1	2	3	4	5
11. I have regained the weight I lost on previous attempts.	1	2	3	4	5
12. I have failed to lose weight on previous weight loss efforts.	1	2	3	4	5
13. On past weight lost tries I have not done well.	1	2	3	4	5
14. I have tried to begin an exercise program before starting at Beaumont.	1	2	3	4	5
15. On past exercise program attempts, I gave up.	1	2	3	4	5
16. On exercise programs in the past, I have not done well.	1	2	3	4	5
17. In past exercise programs I have been successful.	1	2	3	4	5

18. I have given up on past exercise programs that I have attempted.	1	2	3	4	5

19. How many different diets have you tried? _____

20. How many times have you succeeded on previous diet attempts? _____

21. How many times have you regained the weight you lost? _____

22. How many different times have you tried to take up exercise? _____

23. On these exercise programs, how many of these tries were successful? _____

24. How many times did you give up on exercise? _____

SOCIAL SUPPORT

Think of all the important people you talk to. Take a few minutes to think about your communication with them over the past month. Then, use the scale below to rate how often you experienced each of the following types of interaction with **one or more** of these important people during the past month. We are **not concerned with how you were treated by any one person in particular**. We'd like you to judge how often each of the following occurred with one or more of the important adults on your list. For each item below, please indicate your response by circling the appropriate number next to the item.

IN THIS SET OF QUESTIONS, THE PROJECT REFERS TO YOUR MEAL REPLACEMENT PROGRAM.

1 = Not at all
2 = Once or twice during the month
3 = About once a week
4 = Several times a week
5 = About every day

REGARDING THE MEAL REPLACEMENT PROGRAM...

25. Showed he (or she) was pleased with my progress on the project (Meal Replacement Program)	1	2	3	4	5
26. Prevented or discouraged other people from helping me	1	2	3	4	5
27. Showed that he (or she) thought I was doing a good job	1	2	3	4	5

28. He or she used resources (e.g., money or materials) that I needed for my project	1	2	3	4	5
29. Helped me to think about different ways to achieve my goal on the project	1	2	3	4	5
30. Gave misleading advice or information	1	2	3	4	5
31. Showed that he (or she) thought I would fail	1	2	3	4	5
32. Shared my enthusiasm about the project	1	2	3	4	5
33. Tried to help me with the project and made mistakes	1	2	3	4	5
34. Showed that he (or she) hoped I would succeed with the project	1	2	3	4	5
1 = Not at all, 2 = Once or twice during the month, 3 = About once a week, 4 = Several times a week, 5 = About every day					
35. Helped me to evaluate the work I'd already done on the project (Meal Replacement Program).	1	2	3	4	5
36. Made me feel worse when I felt discouraged about the project	1	2	3	4	5
37. Understood my feelings about the project	1	2	3	4	5
38. Showed that he (or she) thought the project wasn't important	1	2	3	4	5
39. Comforted me when I was feeling bad about the project	1	2	3	4	5
40. Made so many demands on me that I had less time or energy to work on my project	1	2	3	4	5
41. Criticized my efforts	1	2	3	4	5
42. Made fewer demands on me so I could work on my project	1	2	3	4	5
43. Wasted time when he (or she) was working with me on my project	1	2	3	4	5
44. Showed faith in my ability to succeed	1	2	3	4	5
45. Tempted me to cheat on my project	1	2	3	4	5

EFFICACY AND OUTCOME EXPECTAITONS

Tell us whether you agree with the following statements right now:	**Strongly Disagree**	**D**	**Neutral**	**A**	**Strongly Agree**
75. The Meal Replacement Program helps people lose weight.	1	2	3	4	5
76. The Meal Replacement Program works in lowering risk factors related to unhealthy weight.	1	2	3	4	5
77. The Meal Replacement Program works in getting rid of unwanted pounds.	1	2	3	4	5
78. The Meal Replacement Program is effective for a healthy life.	1	2	3	4	5
79. I am able to use the Meal Replacement Program.	1	2	3	4	5
80. It is easy for me to use the Meal Replacement Program.	1	2	3	4	5
81. I can stick to the Meal Replacement Program.	1	2	3	4	5
82. I am confident (sure) that I can carryout my Meal Replacement Program.	1	2	3	4	5

Think of all the important people you talk to. Take a few minutes to think about your communication with them over the past month. Then, use the scale below to rate how often you experienced each of the following types of interaction with **one or more** of these important people during the past month. We are **not concerned with how you were treated by any one person in particular**. We'd like you to judge how often each of the following occurred with one or more of the important adults on your list. For each item below, please indicate your response by circling the appropriate number next to the item.

THESE QUESTIONS ARE IN REFERENCE TO ANYTHING REGARDING EXERCISE.

1 = Not at all
2 = Once or twice during the month
3 = About once a week
4 = Several times a week
5 = About every day

REGARDING EXERCISE...

46. Showed he (or she) was pleased with my EXERCISE progress.	1	2	3	4	5
47. Prevented or discouraged other people from helping me exercise	1	2	3	4	5
48. Showed that he (or she) thought I was doing a good job exercising	1	2	3	4	5
49. He or she used resources (e.g., money or materials) that I needed to exercise	1	2	3	4	5
50. Helped me to think about different ways to achieve my exercise goal	1	2	3	4	5
51. Gave misleading advice or information about EXERCISE	1	2	3	4	5
52. Showed that he thought I would fail	1	2	3	4	5
53. Shared my enthusiasm	1	2	3	4	5
54. Tried to help me with EXERCISE and made mistakes	1	2	3	4	5
55. Showed that he hoped I would succeed	1	2	3	4	5
56. Helped me to evaluate the EXERCISE work I'd already done	1	2	3	4	5
57. Made me feel worse when I felt discouraged about EXERCISE	1	2	3	4	5
58. Understood my feelings about EXERCISE	1	2	3	4	5
59. Showed that he (or she) thought EXERCISE wasn't important	1	2	3	4	5
60.Comforted me when I was feeling bad	1	2	3	4	5
61. Made so many demands on me that I had less time or energy to EXERCISE	1	2	3	4	5
62.Criticized my EXERCISE efforts	1	2	3	4	5
63. Made fewer demands on me so I could EXERCISE	1	2	3	4	5

64. Wasted time when he (or she) was EXERCISING with me	1	2	3	4	5
65. Showed faith in my ability to succeed	1	2	3	4	5
66. Tempted me to cheat on EXERCISE	1	2	3	4	5

VICARIOUS

Tell us whether you agree with the following statements right now:	**Strongly Disagree**	**D**	**Neutral**	**A**	**Strongly Agree**
67. I have seen people like me rewarded for losing weight	1	2	3	4	5
68. I have seen people like me cheered on for their weight loss.	1	2	3	4	5
69. I have seen people like me treated badly because they are not losing weight.	1	2	3	4	5
70. I have seen people like me made fun of because they are not losing weight.	1	2	3	4	5
71. I have seen people like me treated badly because they don't	1	2	3	4	5
72. I have seen people like me cheered on for exercising.	1	2	3	4	5
73. I have seen people like me made fun of because they are not losing weight.	1	2	3	4	5
74. I have seen people like me rewarded for exercising	1	2	3	4	5

Tell us whether you agree with the following statements right now:	**Strongly Disagree**	**D**	**Neutral**	**A**	**Strongly Agree**
83. Exercising helps people lose weight.	1	2	3	4	5
84. Exercising works in lowering risk factors related to unhealthy weight.	1	2	3	4	5
85. Exercising works in getting rid of unwanted pounds	1	2	3	4	5
86. Exercising is effective for a healthy life.	1	2	3	4	5
87. I am able to exercise for at least 30 minutes three times a week.	1	2	3	4	5

88. It is easy for me to exercise for at least 30 minutes three times a week.	1	2	3	4	5
89. I can stick to exercising for at least 30 minutes three times a week.	1	2	3	4	5
90. I am confident (sure) that I can exercise for at least 30 minutes three times a week.	1	2	3	4	5
91. This past week, I have stuck with my meal replacement program.	1	2	3	4	5
92. I have not done well staying on my meal replacement program this past week.	1	2	3	4	5
93. This past week, I have eaten exactly what I was told to eat for my weight loss program.	1	2	3	4	5
94. I have stayed on track with my weight loss program meals this past week.	1	2	3	4	5
95. I have not kept up with my meal replacement program this week.	1	2	3	4	5

96. During the past month did you participate in any physical activity or exercises such as running, aerobics, golf, gardening, or walking for exercise?

Yes _____ No _____

97. If yes, what type of physical activity did you spend most of your time doing during the past month? Activity: _____

98. How many times per week did you usually do this activity? _____ per week

99. And when you took part in this activity, how many minutes or hours did you usually keep at it?

Hours and minutes _____ (hours) : _____ (minutes) OR _____ Don't know/not sure

100. If the activity is running, jogging, swimming, or walking:

How far did you usually go: _____ Miles OR _____ Don't know/not sure

101. Was there another physical activity you participated in during the past month?

_____ Yes _____ No

102. If yes, what type of physical activity did you spend most of your time doing during the past month?

Activity: _____

103. How many times per week did you usually do this activity? _____ per week

104. And when you took part in this activity, how many minutes or hours did you usually keep at it?

Hours and minutes _____ (hours) : _____ (minutes) OR _____ Don't know/not sure

105. If the activity is running, jogging, swimming, or walking:

How far did you usually go: _____ Miles OR _____ Don't know/not sure

MEMORABLE MESSAGES ABOUT YOUR MEAL REPLACEMENT PROGRAM

We are interested in the comments that you receive from other people regarding your attempt to lose weight THROUGH THE MEAL REPLACEMENT PROGRAM. Please think of a memorable time when you discussed weight. This may have been informal, such as while at a restaurant, or more formal "talk" perhaps prompted by a health issue. We are interest in WHAT WAS SAID TO YOU and WHAT YOU SAID BACK. This may have been instructive (what should or should not be done) or may have been informative (information and facts). We realize that you may or may not be able to recall one conversation, but only pieces of several conversations you have had. Any information you can recall would be useful. In the space provided below, please recall the actual words spoken.

106. In the PAST MONTH, have you received any **POSITIVE** comments from others regarding your meal replacement program? If yes, please write exactly what was said:

107. Who said this to you? (DO NOT PUT A PERSON'S NAME. PUT THE TYPE OF RELATIONSHIP- FRIEND, COWORKER, BOSS, CHILD, MOTHER-IN-LAW, ETC.)

108. What did you say in response? (Again, please write exactly what was said):

109. In the PAST MONTH, have you received any **NEGATIVE** comments from others regarding your meal replacement program? If yes, please write exactly what was said:

110. Who said this to you? (DO NOT PUT A PERSON'S NAME. PUT THE TYPE OF RELATIONSHIP- FRIEND, COWORKER, BOSS, CHILD, MOTHER-IN-LAW, ETC.)

111. What did you say in response? (Again, please write exactly what was said):

MEMORABLE MESSAGES ABOUT EXERCISE

112. In the PAST MONTH, have you received any **POSITIVE** comments from others regarding EXERCISE? If yes, please write exactly what was said:

113. Who said this to you? (DO NOT PUT A PERSON'S NAME. PUT THE TYPE OF RELATIONSHIP- FRIEND, COWORKER, BOSS, CHILD, MOTHER-IN-LAW, ETC.)

114. What did you say in response? (Again, please write exactly what was said):

115. In the PAST MONTH, have you received any **NEGATIVE** comments from others regarding EXERCISE? If yes, please write exactly what was said:

116. Who said this to you? (DO NOT PUT A PERSON'S NAME. PUT THE TYPE OF RELATIONSHIP- FRIEND, COWORKER, BOSS, CHILD, MOTHER-IN-LAW, ETC.)

117. What did you say in response? (Again, please write exactly what was said):

Tell us whether you agree with the following statements right now:	**Strongly Disagree**	**D**	**Neutral**	**A**	**Strongly Agree**
118. When I see other people fail to lose weight it makes me doubt my abilities.	1	2	3	4	5
119. I compare my weight loss efforts to other people's weight	1	2	3	4	5
120. I notice other people's weight loss.	1	2	3	4	5
121. When I see other people losing more weight than me, it	1	2	3	4	5
122. When I see other people losing less weight than me, it encourages me.	1	2	3	4	5
123. When I see other people losing more weight than me, it discourages me.	1	2	3	4	5
124. When I see other people losing less weight than me, it discourages me.	1	2	3	4	5

Thank you for completing this questionnaire!

APPENDIX C

Scale Items for Diet

Diet Past Behavior Items 1 (Strongly Disagree) → 5 (Strongly Agree)
On past weight lost diets I have been successful.
I have successfully lost weight on previous weight loss diets.
I have regained the weight I lost on previous diets.*
I have failed to lose weight on previous weight loss diets.
On past weight lost diets I have not done well.

Alpha= .845

*item dropped from final scale

Diet Vicarious Experience Negative Items 1 (Strongly Disagree) → 5 (Strongly Agree)
I have seen people like me treated badly because they are not losing weight.
I have seen people like me made fun of because they are not losing weight.

Alpha= .966

Diet Vicarious Experience Positive Items 1 (Strongly Disagree) → 5 (Strongly Agree)
I have seen people like me rewarded for losing weight
I have seen people like me cheered on for their weight loss.

Alpha= .673

Diet Social Support Items 1 = Not at all 2 = Once or twice during the month 3 = About once a week 4 = Several times a week 5 = About every day
Showed he (or she) was pleased with my progress on the project (Meal Replacement Program)
Showed that he (or she) thought I was doing a good job
Helped me to think about different ways to achieve my goal on the project*
Shared my enthusiasm about the project
Showed that he (or she) hoped I would succeed with the project
Helped me to evaluate the work I'd already done on the project (Meal Replacement Program).*
Understood my feelings about the project
Showed faith in my ability to succeed*
Comforted me when I was feeling bad about the project
Made fewer demands on me so I could work on my project*

*item dropped from final scale
Alpha= .886

Diet Social Undermining Items 1 = Not at all 2 = Once or twice during the month 3 = About once a week 4 = Several times a week 5 = About every day
Made me feel worse when I felt discouraged about the project*
Showed that he (or she) thought the project wasn't important
Made so many demands on me that I had less time or energy to work on my project*
Criticized my efforts
Wasted time when he (or she) was working with me on my project*
Tempted me to cheat on my project*
Prevented or discouraged other people from helping me

He or she used resources (e.g., money or materials) that I needed for my project*
Gave misleading advice or information*
Showed that he (or she) thought I would fail
Tried to help me with the project and made mistakes*

*item dropped from final scale
Alpha= .923

Diet Efficacy Items 1 (Strongly Disagree) → 5 (Strongly Agree)
The Meal Replacement Program helps people lose weight.
The Meal Replacement Program works in lowering risk factors related to unhealthy weight.
The Meal Replacement Program works in getting rid of unwanted pounds.
The Meal Replacement Program is effective for a healthy life.
I am able to use the Meal Replacement Program.
It is easy for me to use the Meal Replacement Program.
I can stick to the Meal Replacement Program.
I am confident (sure) that I can carryout my Meal Replacement Program.

*item dropped from final scale
Alpha= .923

Diet Adherence (DV) 1 (Strongly Disagree) → 5 (Strongly Agree)
This past week, I have stuck with my meal replacement program.
I have not done well staying on my meal replacement program this past week.
This past week, I have eaten exactly what I was told to eat for my weight loss program.
I have stayed on track with my weight loss program meals this past week.
I have not kept up with my meal replacement program this week.

Alpha= .929

APPENDIX D

Scale Items for Physical Activity

Exercise Past Behavior Items 1 (Strongly Disagree) → 5 (Strongly Agree)
I have tried to begin an exercise program before.*
On past exercise program attempts, I gave up exercising
On exercise programs in the past, I have not done well.
In past exercise programs I have been successful.
I have given up on past exercise programs that I have attempted.

*item dropped from final scale
Alpha= .795

Exercise Vicarious Experience Positive 1 (Strongly Disagree) → 5 (Strongly Agree)
I have seen people like me rewarded for exercising.
I have seen people like me cheered on for exercising.

Alpha= .735

Exercise Vicarious Negative Exercise 1 (Strongly Disagree) → 5 (Strongly Agree)
I have seen people like me treated badly because they don't exercise
I have seen people like me made fun of because they are not losing weight

Alpha= .893

Exercise Social Support Items 1 = Not at all 2 = Once or twice during the month 3 = About once a week 4 = Several times a week 5 = About every day

Showed he (or she) was pleased with my progress on the project
Showed that he (or she) thought I was doing a good job
Helped me to think about different ways to achieve my goal on the project*
Shared my enthusiasm about the project
Showed that he (or she) hoped I would succeed with the project
Helped me to evaluate the work I'd already done on the project*
Understood my feelings about the project
Showed faith in my ability to succeed*
Comforted me when I was feeling bad about the project*
Made fewer demands on me so I could work on my project*

*item dropped from final scale
Alpha= .906

Exercise Social Undermining Items 1 = Not at all 2 = Once or twice during the month 3 = About once a week 4 = Several times a week 5 = About every day
Made me feel worse when I felt discouraged about the project
Showed that he (or she) thought the project wasn't important
Made so many demands on me that I had less time or energy to work on my project
Criticized my efforts
Wasted time when he (or she) was working with me on my project
Tempted me to cheat on my project
Prevented or discouraged other people from helping me *
He or she used resources (e.g., money or materials) that I needed for my project*
Gave misleading advice or information*
Showed that he (or she) thought I would fail
Tried to help me with the project and made mistakes*

*item dropped from final scale
Alpha= .923

Exercise Efficacy Items 1 (Strongly Disagree) → 5 (Strongly Agree)
Exercising helps people lose weight.
Exercising works in lowering risk factors related to unhealthy weight.
Exercising works in getting rid of unwanted pounds
Exercising is effective for a healthy life.
I am able to exercise for at least 30 minutes three times a week.
It is easy for me to exercise for at least 30 minutes three times a week.
I can stick to exercising for at least 30 minutes three times a week.
I am confident (sure) that I can exercise for at least 30 minutes three times a week.

Alpha= .932

APPENDIX E

Memorable Messages

Positive comments

1. Emotional support
   Keep up the good work
   As you participate the shakes get easier.
2. Compliments- physical
   You look great
3. Role model
   I am proud of you. You have encouraged me to do something about my weight.
4. Health benefits
   I will tell my other patients about how well you have done on this program. This program has already improved your health, asthma, and blood pressure.
   Exercise helps to relieve stress.
5. Social comparison
   I could not do what you are doing. You are so committed.
6. Back-handed compliment
   I saw a picture from last year and you were really much bigger.
7. Validation
   You were right. The program really does work.

Negative Comments

1. Physical/health warnings
   The shake is not good for you, you can lose weight too quickly, and you won't be or look healthy.
   You are going to screw up your metabolism.
2. Lack of effectiveness
   You are going to need to do more exercise than that to lose your weight.
   See you are not dropping weight like they promised you could.
3. Program attack
   It is better to lose weight though real food and exercise. Just use your willpower
   That program will not work long term.
   Those diets aren't safe. It is not teaching you good eating habits.
4. Negative social comparison
   You are not losing the weight like I did
5. Disbelief/incredulity
   Is that all you get to eat?
   How could you stick to that shake? I would get tired of eating the same thing every day.
6. Personal attack
   Get to work. You need to exercise more
   You do not have the willpower. You will just regain the weight

Replies

1. Appreciation token

Thanks

2. Compliment acceptance

   I have been working hard at it.

   I try hard. It is not always easy, but it is really worth it when the scale moves down

   I feel good when I exercise and I enjoy doing things for myself.

3. Express desire for joint activities

   Let's work out together. We can motivate each other.

   Well if you do not like how I am doing this, then join me. Show me how.

4. Downgrading

   It is no big thing.

   You do what you have to do to lose weight. You get so that you don't notice it so much.

5. Deflect

   I am going to try it anyway. I need to jumpstart my weight loss. I feel secure in this program because it is totally medically monitored.

6. Compliment returns

   I could not have done this without you.

   You look great too.

7. Educate

   The program really works. Check out the website.

   The diet is medically supervised. They also offer nutrition classes to help me make my food choices.

8. Bite back

   The same way that you get tired of me eating that shake, I get tired of you eating all that unhealthy food.

   Get off it. All of those people that regain the weight immediately are those that quit after the initial weight loss. They did not take the time to learn to eat correctly and follow the continuing education program.

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