

**STAGES OF CHANGE AND ETHNICITY AS PREDICTORS OF
WEIGHT LOSS AND ATTENDANCE IN A WEIGHT
MANAGEMENT PROGRAM FOR OBESE MEN**

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By

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I would like to dedicate this work to my brother.
I hope in death I can give you what in life I could not.

Thomas Wayne Oliver.
1965-1971

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CHAPTER 1

INTRODUCTION

Obesity

Obesity is one of the leading risk factors for early mortality in adults in the United States. Obesity and overweight are associated with four of the five leading causes of death: Heart disease, cancer, cardiovascular disease and diabetes mellitus (Department of Commerce, 1999). A 1993 study found that obesity-related medical conditions are the second leading cause of death (McGinnis & Froege, 1993). Obesity is estimated to be responsible for 325,000 deaths per year in the United States alone (Allison, Fontaine, Manson, Stevens & Van Itallie, 1999). With the ever rising rate of obesity, especially in the African American and Hispanic populations, the number of deaths will only increase. The significant public health problems associated with obesity have become a major concern for governmental organizations, the health industry and the scientific community.

Despite great efforts to reduce the problem of obesity, the problem is only getting bigger. When the typical person begins a weight loss program he or she either fails to lose weight, quits the program, or loses weight only to regain it within the year (National Institute of Health (NIH) 1998). The failure to lose or maintain weight decreases the sense of control and increases depression and poor self-esteem, all of which prevent

future weight loss. A better understanding of how people lose weight is needed to improve our effectiveness.

The Stages of Change model attempts to explain the weight loss process by examining a person's motivations and attitudes toward losing weight. Numerous studies have validated the Stages of Change model as an accurate gauge of the weight loss process in females but little is known about the weight loss process in males, especially African-American and Hispanic males. To better understand the weight loss process of males and the role of ethnicity in affecting weight loss, this study examines the interaction between Stages of Change model, based on The University of Rhode Island Change Assessment Scale, and ethnicity as predictors of weight loss and attendance in a weight loss program.

Prevalence of Obesity

Uniform categorization of people into weight categories is accomplished by using the body mass index (BMI). BMI is calculated by dividing a person's weight, in kilograms, by their height, in m^2 . This calculation yields a two-digit number that sorts the participant into one of three weight groups. A BMI of 19-24.9 is defined as a healthy weight. A BMI between 25-29.9 is defined as overweight, while a BMI greater than 30 is defined as obese (National Institute of Diabetes and Digestive and Kidney Disease (NIDDK), 2000).

By these BMI standards over half (54.9%) of the United States' adult population is considered overweight. More than one fifth (22.3%) of the adult population is considered obese. Furthermore, fewer than half (42%) of adults in the United States are

currently considered to have a healthy weight (NIDDK, 2000; American Dietetic Association (AOA), 1997).

These percentages are even more alarming when compared to the percentages of the population who were considered overweight in the past. The NIDDK's *Weight Control Information Network (2000)* reported on statistics taken from a study on the changes in weight trends from 1960-1994. From 1960-1994, the percentage of the population considered to be overweight (BMI of 25 to 29.9) rose only 1%, from 31.6 to 32.6%. During that same period, the obese (BMI of 30 or greater) population nearly doubled, from 13.4% to 22.3%.

Other research suggests that overall obesity rates increased about 6% from 1991 to 1998, increasing from 12% to 17.9%. This trend was evident regardless of demographic differences, gender, age, ethnicity, education level, and smoking status (Mokdad, Serdula, Dietz, Bowman, Marks, & Koplan, 1999). The greatest increases were found in adults aged 18-29 and in adults with higher educational levels. These increases varied significantly depending on geographic location. For instance, obesity rates (between 1991 and 1998) increased 11.3% in Delaware while they increased 101.8% in Georgia (Mokdad et al., 1999).

Increases in the average weight of Americans have significant effects on the nation's health and economic life. Being overweight increases the risk of developing diabetes, heart disease, stroke, hypertension, gallbladder disease, osteoarthritis, sleep apnea, and certain cancers (uterine, breast, colorectal, kidney, and gallbladder). Obesity is also associated with a greater risk for high blood cholesterol levels, complications during pregnancy and surgical procedures, menstrual irregularities, hirsutism, stress

incontinence, and psychological disorders, especially depression and anxiety disorders (NIDDK, 2000). Obesity also has indirect effects on health. For example, the risk of developing hypertension increases with higher BMI. Hypertension has been shown to increase the risk of heart attack, kidney failure, and congestive heart failure (AOA, 1999).

The Costs of Obesity

The health consequences of obesity also exact tremendous economic costs. These include higher hospital bills, more medical expenses, increased poverty, increased disability, and reduced job productivity. Using data collected in the National Health Interview Survey from 1994-1998, Wolf and Colditz estimated that the direct health care expenses (prevention, diagnosis, and treatment) totaled \$51.6 billion and the indirect expenses (estimated lost wages due to illness, disability and premature death) totaled \$47.6 billion (Wolf & Colditz 1998). These costs exceed those associated with HIV and AIDS and are double those spent on smoking-related morbidity and mortality (NIDDK, 2000). This figure does not take into account obesity related diseases (such as sleep apnea, gout, low back pain, and infertility) whose monetary costs are hard to calculate (AOA, 1999). Also not included is the \$33 billion that is spent on weight loss products and services such as commercial weight loss centers and diet drinks (NIDDK, 2000).

Obesity, Gender, Age and Education

Obesity affects different groups in different ways. Gender, age and socio-economic status all have been shown to correlate with obesity (Legato, 1997; Williamson, Kahn, Remington & Anda, 1990; Winkleby, Gardner, & Taylor, 1996). Women, middle-aged adults and adults with low levels of education have the highest rates of obesity (Legato, 1997; Winkleby et al., 1996).

Gender and obesity are connected across many fronts. Although research has consistently reported that females have a higher rate of obesity than males, the actual percent of difference varies significantly. A 1998 study on overweight and obesity rates from 1960-1994 reports that female's obesity rates are only 5.5% greater than males (Flegal, Carroll, Kuczmarski, & Johnson, 1998). A 1990 study examining adult weight gain within a ten year span found that females between the ages of 25 and 34 were twice as likely to have a major weight gain (five or more point gain in BMI) than males (Williamson et al., 1990). Another study on African-Americans found that African-American females were three times more likely than males to be severely obese (Arfken & Houston, 1996).

Fat distribution also differs by gender. Females are more likely to be overweight at a younger age (Forster & Jeffery 1986). Females have a high distribution of body fat on their torsos and extremities while males carry most of their weight within their bodies and around the abdominal area. Females also have high distributions of fat in their breasts, thighs and buttocks. Males have also been shown to lose weight by dieting while females need to diet and exercise to get the same effect (Legato, 1997). Weight loss and participation in weight loss treatment programs is another way in which males and females differ. Remaining physically active is an important variable in sustaining a healthy weight. The fact that males have been shown to devote more time to physical activity than females may play an essential role in gender differences in weight loss (Frankish, Milligan & Reid, 1998). Although females fail to engage in as much physical activity as males, females seem to be more successful in maintaining long-term weight loss (Forster & Jeffery, 1986).

In a study on gender differences in a behavioral weight loss program, females had a three times greater incidence of dieting and had higher prevalence of eating due to mood and decreased sense of self-efficacy (participants' belief in their ability to change a behavior). Males had a higher prevalence of eating while socializing and had poorer weight loss maintenance. Males were shown to have higher self-efficacy at pretreatment and higher self-esteem at pre and post treatment (Forster & Jeffery, 1986).

Numerous studies have found the hill-shaped curve that comes when comparing obesity and/or weight gain with age. Obesity and weight gain are usually lowest in younger and older participants. Weight gain is often first seen in participants in their mid-thirties and peaks in the mid-forties and early fifties (Arfken & Houston 1996; Rand C.S. & J.M. Kuldau 1990; Williamson et al. 1990). Williamson et. al. (1990) examined the incidence of increased BMI of 9,862 subjects age 25-74 over a ten-year period. Subjects age 25-34 at baseline gained the most weight over the ten years. Subjects age 34-44 showed the greatest peak in weight while subjects 55 and older had the largest decrease in BMI.

Education is also associated with obesity. In the Winkleby et al study (1996), the least educated Hispanic participants had the highest prevalence of overweight. The least educated Hispanic females had the highest prevalence of severe obesity. The association between education and obesity may be due to the fact that weight loss interventions are tailored to a participant with high or average education and do not meet the needs of a participant with lower education. This study also found that as education level decreased, participants' desired BMI increased, especially among Hispanic participants.

Treatment for Obesity

Despite the proliferation of weight loss products and programs and the increasing number of people trying to lose weight, successful long-term weight loss is rare. A NIH study found that, of the participants who lost weight, one-third to two-thirds regained that weight within one year. The rest of the participant's weight was regained within five years (NIH, 1992).

An expert panel formed by the National Heart, Lung, and Blood Institute (NHLBI) and NIDDK met to study the five main strategies for weight loss and weight loss maintenance: dietary therapy, physical activity, behavioral therapy, pharmacotherapy, and weight loss surgery. They reviewed hundreds of studies on these five strategies for weight loss and devised clinical guidelines for identifying, evaluating and treating overweight and obese adults (NIH, 1998). The panel concluded that the key component of dietary therapy is daily reduction in caloric intake. The recommended diet for an overweight or obese adult included an individualized plan that reduces the participants' caloric intake by 500-1000 per day or reduces the total caloric intake to 1,000-1,200 calories per day for women and 1,200-1,500 calories per day for men. Reducing fat intake was not shown to produce weight loss but the reduction of fat intake along with caloric intake did (NIH, 1998). The panel's review of forty-eight articles on dietary therapy found that an average of 8% of body weight could be lost over three to 12 months on this dietary program.

Physical activity is also necessary for successful weight loss (NIH, 1998). For overweight and obese participants, physical activity should be initiated slowly. The expert panel recommended a regime that begins with thirty minutes of appropriate

activity per day for three days a week. Time spent exercising is gradually increased to reach the goal of 45 to 60 minutes five days per week with a concurrent increase in intensity of the workout.

An alternative recommendation by the Centers for Disease Control and the American College of Sports Medicine promotes “regular moderate-intensity physical activity” for thirty minutes every day to achieve sustained health benefits. This includes walking at three to four miles per hour, racket sports such as table tennis, general home cleaning and repair, and golf (Pate et al., 1995). The NHLBI and NIDDK panel’s review of thirteen articles on physical activity (NIH, 1998) showed that physical activity alone produced the greatest weight loss, greatest increase in cardiorespiratory fitness, and greatest decrease in risk of cardiovascular disease. The panel’s review of fifteen studies on a combination of dietary therapy and physical activity demonstrated that the combination produced greater weight loss than either strategy alone. Reduced abdominal fat, increased cardiorespiratory fitness and an increase weight loss maintenance were also found (NIH, 1998).

The National Weight Control Registry (NWCR) studied 2,957 individuals who had lost 30 pounds or more and maintained the loss for at least one year to determine the habits and characteristics of successful weight loss maintainers. Of those registered with the NWCR, 55% participated in a formal weight loss program and 89% changed their eating habits and increased their exercise expenditure. Twenty-five percent of participants changed eating habits by limiting consumption of certain foods, counting calories, controlling the size of meals, and reducing fat intake. Only 5% changed their eating habits by dramatically limiting their food intake to 1 or 2 kinds of food. Of the

participants that exercised, 92% did so at home and 30%-40% did so with a friend or in a group. Walking was the main source of exercise with aerobic exercise and weight lifting coming in second and third. Men tended to use formal weight loss programs, and participated in aerobic exercise classes less, and instead ate more protein-based foods and expended more energy through exercise (Klem, 2000).

Other forms of obesity treatment include behavioral therapy, pharmacotherapy, and weight reduction surgery. Behavioral therapy for weight loss includes strategies to promote compliance and success in weight loss programs. Self-monitoring, stress management, cognitive restructuring and contingency management are all strategies used in behavioral therapy. The panel's review of 22 studies found that the use of behavioral strategies to reinforce weight loss and physical activity produced a 10% weight loss over a four month to one-year time frame. Continuous, intensive and multimodel strategies appeared to produce the best weight loss and maintenance outcome. A combination of dietary therapy, physical activity and behavioral therapy was found to provide the most successful weight loss and maintenance (NIH, 1998).

Pharmacotherapy, the use of pharmaceuticals to reduce weight, may be used as an adjunct to a weight loss program that includes dietary therapy and physical activity (National Institute of Health, 1998). Pharmacotherapy is only recommended for participants with a BMI of 27 or greater. Participants must be monitored by a medical professional to protect against possible side effects. The NHLBI and NIDDK panel's review of 44 studies of pharmacotherapy using dexfenfluramine, orlistat, phentermine/fenfluramine, or sibutramine found that their medications produced weight loss if used

for six months to one year. Medications have also been found to increase the positive effects of other weight loss therapies (NIH, 1998).

Weight reduction surgery (gastrointestinal surgery and gastric bypass) is only recommended for individuals with a BMI of 35 or higher who have severe complications due to obesity and who have failed at all other weight loss therapies. Weight reduction surgery has been shown to produce substantial weight loss, but requires lifelong medical surveillance (NIH, 1998).

Models Of Behavior Change

The Transtheoretical Model of Behavioral Change provides a theoretical framework that describes an individual's behavior change. This model demonstrates how behavior change progresses through stages, incorporating a variety of processes, variables and theories. The Transtheoretical Model uses an underlying construct, the Stages of Change, to predict how likely it is that a participant or population will change a particular behavior. The Stages of Change depict behavioral change through four to five (depending on the type of behavior) gradual, cyclical stages. As the participant progresses through the stages, readiness to and likelihood of change increase.

The original Stages of Change were first hypothesized in Horn's 1972 study (as cited in McConnaughy, Prochaska & Velicer, 1983). Horn's stages for modifying health related behaviors included: Contemplation, Decision-Making, Short-Term and Long-Term Change. DiClemente and Prochaska (1983) modified these stages for smoking cessation to include Contemplation, Decision-Making or Preparation, Active Modification or Action and Maintenance. Later DiClemente and Prochaska (1983) added the Precontemplation Stage to precede Contemplation (McConnaughy et al., 1983).

Since 1983, definitions for each stage have become more extensive and explicit. While some controversy arose over whether the Preparation Stage is actually a separate stage, for the most part the stages have remained consistent.

Stages of Change

Precontemplation:

This is the initial Stage of Change. In this stage, the participant has no intention of changing a problem behavior. This may be due to the participant's inability to acknowledge the problem's severity, the inability to admit that the problem behavior is problematic, total denial that a problem exists, or the belief that he or she has no control over the problem.

Contemplation:

In this stage the participant has become aware that some aspect of his or her behavior needs to be changed, but has not yet identified the resources to change the behavior. The Contemplation Stage involves a great deal of evaluation and weighing the positives and negatives involved in either changing the problem behavior or in keeping it. This process is called decisional balance (Rossi J., Rossi, Velicer & Prochaska, 1995). Participants often remain in this stage for long periods of time. The decision to change usually requires concomitant changes across many areas, making it very hard for some participants to initiate change (Prochaska, DiClemente & Norcross, 1992).

Preparation:

In the Preparation Stage, the individual has weighed the alternatives and decided that behavior change is necessary. After making this decision, participants become more committed to the change, believe more in their ability to change and make moderate

attempts to change behaviors. In the Preparation Stage the participant prepares an action plan, tries out the new life style and begins changing the surroundings to fit the new behavior. The contemplation stage concludes with a decision to change the behavior.

Action:

The Action Stage begins with the elimination of the problem behavior and/or active engagement in the healthy behavior. At this time numerous coping resources are employed. Coping resources include avoiding stimuli linked to problem behavior, eliciting social support, and finding new enjoyable behaviors to replace the old behavior (counter conditioning) (Prochaska, Norcross, Fowler, Follick & Abrams, 1992). This is also the stage in which most behavioral programs (such as psychotherapy or behavioral therapy) are used and the stage at which they are most successful. In the Action Stage significant gains are made and the problem behavior does not return.

Maintenance:

The final Stage of Change begins when the participant has completed six months of the healthy behavior without any relapse. A variety of cognitive resources are still being used to prevent relapse. In particular, reinforcement management and stimulus control techniques are useful in sustaining the new behavior (Prochaska, DiClemente, et al., 1992; Prochaska, Norcross, et al., 1992). The participant has now achieved, or is close to achieving, his or her goals.

New research has shown that the Stages of Change do not flow linearly but seem to progress in a cyclical pattern before coming to a close when behavior change and maintenance are achieved. This progression often takes three to four cycles through the stages before maintenance is achieved. A spiral model of Stages of Change (see figure 1)

is now being used to illustrate a more accurate picture of the model (Prochaska, DiClemente, et al., 1992).

Figure 1
A Spiral Model of the Stages of Change

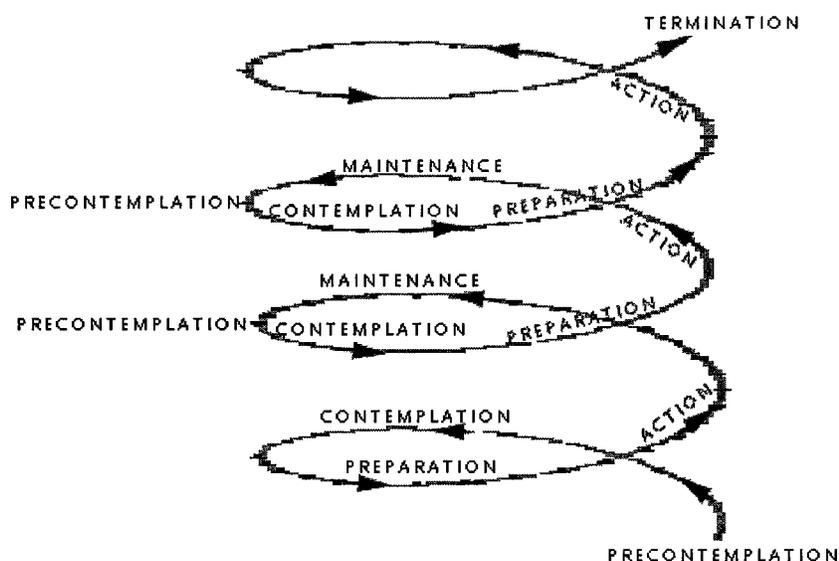


Figure 1. A representation of Stages of Change as a continuous spiral.

Note. Figure adapted from "In Search of How People Change: Applications of Addictive Behaviors," by J.O. Prochaska, C. C. DiClemente and J. C. Norcross, 1992, *American Psychologist*, 47, p. 1104. Copyright 1992 by the American Psychological Association, Inc.

Theoretical Basis of the Stages of Change

The Transtheoretical Model combines theories such as processes of change, decisional balance, self-efficacy and situational temptations. These theoretical underpinnings increase our knowledge of and accuracy in predicting behavioral change

(Rossi et al., 1995). Many of the theories that have been included in the transtheoretical model fit well within the Stages of Change.

While the stages of change describe when different change processes occur, the processes of change describe how they occur. The processes of change include consciousness-raising, self-reevaluation, self-liberation, counter conditioning, stimulus control, reinforcement management, helping relationships, dramatic relief, and environmental reevaluation (Prochaska, DiClemente, et al., 1992). The processes of change directly coincide with the Stages of Change (see Figure 2).

Figure 2
Stages of Change and Processes of Change

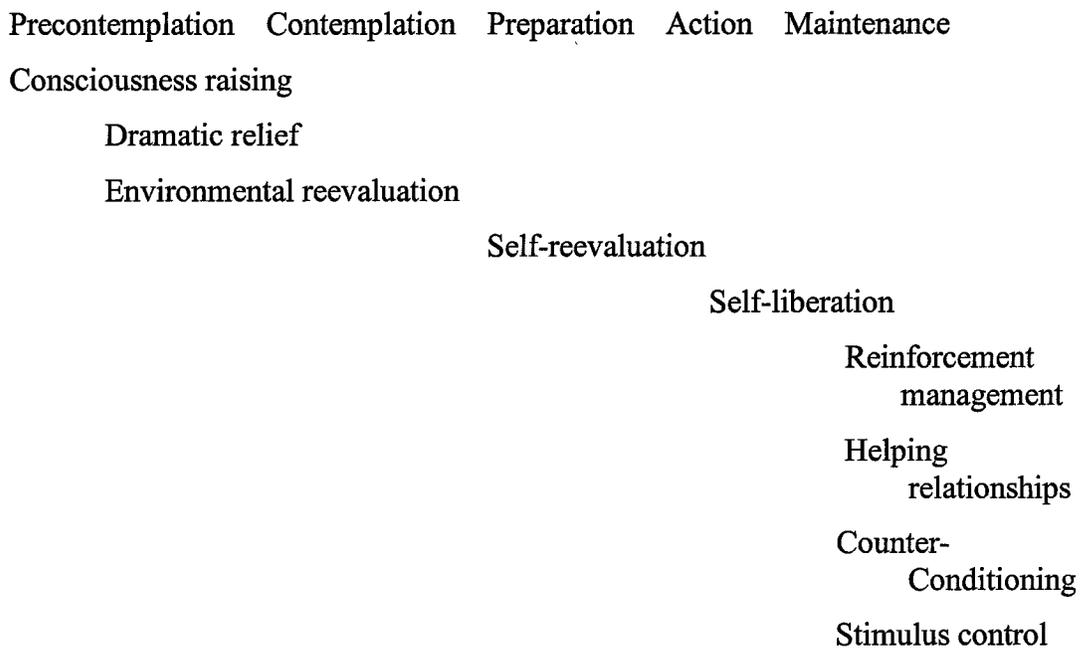


Figure 2. The concurrent flow of Stages and Processes of Change during the behavior change process.

Note. Figure reprinted from "In Search of How People Change: Applications to Addictive Behavior," by J.O. Prochaska, C.C. DiClemente, and J.C. Norcross, 1992, *American Psychologist*, 47, p. 1109. Copyright 1992 by the American Psychological Association, Inc.

Processes of change have also been shown to be good predictors of behavior change (Rossi et al., 1994; Prochaska, Norcross, et al., 1992). Prochaska, Norcross, and colleagues (1992) reported that the processes of change were the best predictors of

progress through the Stages of Change. Decisional balance, the participants' positive and negative beliefs about the behavior change, is another particularly useful part of the Contemplation Stage, as well as an important component in all stages. Prochaska (1994) studied how positive and negative beliefs about problem behaviors influence change. Positive beliefs about changing an unhealthy behavior were shown to increase the standard deviation by 1.0 when moving from Precontemplation to Action. Negative beliefs about changing an unhealthy behavior decreased by 0.5 standard deviations when moving from Precontemplation to Action (Prochaska, 1994). This shows the importance that decisional balance has throughout the Stage of Change process.

Decisional balance has been shown to be an excellent predictor of outcome of behavioral change. In a 1992 study on the predictability of participation in psychotherapy, the combination of these three measures, Stages of Change, processes of change and decisional balance, was able to predict participant adherence in therapy with 93% accuracy (Prochaska, DiClemente, et al., 1992).

Becker's Health Behavior Model (Becker, 1974 as cited in Rossi et al., 1995) incorporates both the denial of problem behavior that is observed in the Precontemplation Stage and the decision to balance behavior that is observed in the Contemplation Stage (Becker, 1974). Aspects of Rotter's external locus of control theory (Rotter, 1996 as cited in Zimmerman, 2000), the level in which participant believes that he or she does not have control over a situation, and Bandura's self-efficacy theory (Bandura, 1977, 1982, as cited in Rossi et al., 1995) are also applicable to the Precontemplation Stage. Concepts from the cognitive behavioral model and twelve-step programs such as situational

temptations, coping skills, and many of the processes of change are employed within the Preparation, Action and Maintenance Stages. (Zimmerman, 2000; Rossi et al., 1995).

Applications of the Stages of Change Model to Behavior Change

The Stages of Change model has been applied to behavioral change for nearly thirty years. It was first applied to addictive behaviors and psychotherapy where it was found to accurately describe changes in psychotherapy, tobacco cessation, alcohol use and abuse, and illicit drug use. The Stages of Change model was first applied to psychotherapy in 1973. In a University of Rhode Island study (McConaughy et al., 1983) on how the change process occurs in psychotherapy, the four Stages of Change model accounted for 58% of the total variance. A cluster analysis of the four stages produced nine highly distinctive client profiles that represented ninety percent of the study's population.

The Stages of Change model has also been applied to smoking cessation. Programs centered around the Stages of Change model have been successful in smoking cessation treatment with adolescents and adults. The Stages of Change correspond to the beliefs and behaviors of participants in the smoking cessation process (Velicer, Prochaska, DiClemente & Brandenburg, 1985). The model also relates well to decision balance measures and positively predicts outcome in smoking cessation participants (Velicer et al., 1985). Residing in either the Action or the Maintenance Stages of Change have also been found to be related to decreased cigarette smoking per day, increased attempts at smoking cessation, decreased addiction to nicotine, increased confidence in smoking cessation, increased use of resources, and increased cessation activity at one and six months of treatment (Diclemente et al., 1991).

The Tobacco Education Group (TEG) is a school program (Coleman-Wallace, Lee, Montgomery, Blix & Wang, 1999) focusing on adolescents in the Precontemplation Stage. It provides information on tobacco and its negative effects. TEG's primary goal is to get students to think about the negative consequences of smoking. This in turn should encourage them to move to the next Stage of Change. The Tobacco Awareness Program (TAG) (Coleman-Wallace et al., 1999) was a partner program for students in the later Stages of Change. TAG provided information, strategies and peer support to stop smoking.

Evaluation of both programs found positive results that mirrored the Stages of Change model. Twelve percent of student's participating in TEG and 15% of students in TAG reported complete smoking cessation by the end of the program. TEG was shown to increase the number of students in the Maintenance Stage, TAG was shown to decrease the number of students in the Precontemplation Stage and increase those in the Action and Maintenance Stages (Coleman-Wallace et al., 1999).

Stages of Change also have been shown to be the best predictor of drinking behavior at posttreatment in the treatment of alcohol abuse (DiClemente, Bellino & Neavins, 1999). One alcohol abuse treatment program, Project MATCH (a program that matches alcoholism treatment to client diversification), provided patients one of three different treatments depending on certain personal characteristics. Project MATCH found no change in outcome based on characteristic matching but did find that the patients' motivation or Stage of Change did accurately predict drinking at posttreatment.

The Stages of Change model has been applied to behavioral issues like condom use, dental hygiene, and weight loss. A Stages of Change algorithm for consistent

condom use was developed in 1996 to improve condom use among populations that are at high risk of contracting HIV (Schnell, Galavotti, Fishbein & Chan, 1996). By interviewing 2041 participants in high-risk populations (prostitutes, intravenous drug users, sexual partners of intravenous drug users, youth runaways, and sexually active adults in low socioeconomic levels), specific criteria were developed for each Stage of Change based on condom use during sexual intercourse and future intention of condom use (Schnell et al., 1996).

Based on this information, an algorithm was developed to plot the Stages of Change for regular condom use. The algorithm classified Precontemplators as participants who had no future intention of practicing regular condom use in the next six months and Contemplators were those who had future intention but did not report using condoms with any frequency within the last six months. Participants in the Ready-For-Action or Preparation Stage reported relatively frequent condom use at present and future intention of practicing regular condom use, participants in the Action Stage reported participating in regular condom use for less than six months, while participants in the Maintenance Stage reported regular condom use for over six months.

Significant differences in Stages of Change were found among participants based on city of residence, sexual partner and risk group. Sexual partners of intravenous drug users in New York were more likely to be in the Action and Maintenance Stage than those in Long Beach. Prostitutes in Seattle were also more likely to be in the Action or Maintenance Stage of condom use than prostitutes in Long Beach. Youth runaways in all cities were more likely to be in Action or Maintenance Stage than intravenous drug users. In all locations and within all risk groups, participants were more likely to be in the

Precontemplation Stage and less likely to be in the Maintenance Stage of condom use during sexual intercourse with the participant's regular partner than during sexual intercourse with other partners (Schnell et al., 1996).

When applied to oral hygiene behavior, the Stages of Change principles were shown to be a positive predictor of outcome as well as a good intervention tool. A 1996 study observed changes in dental knowledge and self-efficacy. Participants changes were based upon random assignments of interventions (educational, Stages of Change based psychological, and control) (Stewart, Wolfe, Maeder & Hartz, 1996).

In the psychological intervention information given to participants varied based on their Stage of Change. It included principles from the transtheoretical model such as increasing positive beliefs about changing behavior, self-monitoring, goal setting, stimulus control, contingency management, and reinforcement. Self-efficacy scores for flossing increased in all three groups but were significantly greater in the psychological intervention group. Although the psychological intervention did not include increasing dental knowledge that the education intervention did, both intervention groups experienced significant increases in dental knowledge. These findings may be due to increased interest experienced by the psychological intervention group and/or a low retention of the material by the education intervention group (Stewart et al., 1996).

Applications of Stages of Change to Exercise Programs

The Stages of Change model first was applied to exercise behavior in a 1992 worksite program. Among the mostly female population, Contemplation and Action Stage scores for exercise adoption were high, while Maintenance Stage scores were low. High scores in earlier stages were associated with increased age, increased stress and

lower education level but were not related to ethnicity, family income, occupation, or smoking status. Results from this study imply that the underlying Stages of Change model is also useful in evaluating exercise programs (Marcus, Rossi, Selby, Niaura & Abrams, 1992).

The effects of a six-week exercise program on Stages of Change in exercise behavior were examined in a 1992 study of community members (Marcus et al., 1992). Interventions included written material, based on participants' Stages of Change, which encouraged increased physical activity and weekly community activities designed to increase physical activity. Intervention was successful for participants in the Contemplation, Preparation and Action Stages at baseline. Of the participants in the Contemplation Stage, 31.4% progressed to the Preparation Stage and 30.2% progressed to the Action Stage. Sixty-one percent of participants in the Preparation Stage at baseline progressed to the Action Stage by posttreatment and 90% of participants in the Action Stage at baseline remained in the Action Stage or progressed to the Maintenance Stage at posttreatment. This study provides increased support for the use of Stages of Change as a predictor of outcome in community exercise adoption programs as well as its ability to enhance the positive effects of individualized exercise interventions (Marcus et al., 1992).

Stages of Change was again applied to exercise behavior in a 1997 study to determine if differences in the community in which the participant resided affected Stages of Change in exercise behavior. Polling of 2,639 female and 2,087 male adults from the province of Quebec, who resided in either rural, suburban or inner-city communities, found that Stages of Change for exercise behavior differed significantly depending on community of residence. Participants living in rural communities had

significantly higher Action Stages of Change scores than those who resided in suburban or inner-city communities. These results suggest that the kind of community a participant resides in has an effect on that participant's exercise behavior and/or readiness for exercise behavior. This study also has a fairly equal representation of gender, which suggests that Stages of Change model for exercise behavior can be successfully applied to males as well as females (Potvin et al., 1997).

Applications of Stages of Changes to Dietary Change

The Stages of Change model has been shown to be most applicable to behaviors that have strict definitions. When applied to more ambiguous behaviors the Stages of Change model has been less useful. Applying Stages of Change to dietary change and weight loss has been one such task. No absolute scale exists to measure variables such as desired weight loss or desired fat intake. For instance, some studies use decreased fat intake (to less than 30% of energy) to account for dietary change. Some studies measure fruit and fiber consumption. Others examine exercise behavior and still other studies use decreased levels of BMI to define dietary changes and weight loss. In spite of these obstacles, many studies have evaluated how Stages of Change apply to dietary change and weight loss.

Prochaska, Norcross, and colleagues (1992) studied client changes during a weight control program to identify the predictors of attendance and outcome. Pretreatment and Midtreatment Stages of Change were able to predict the attendance and weight loss outcomes of clients in the program. Pretreatment Stages of Change accounted for 2% of participants' attendance and 6% of participants' weight loss while midtreatment accounted for 26% of attendance and 18% of weight loss. Although this

study used a population made up almost entirely of women, the clients displayed predictable movement through stages. There was no change in the number of Precontemplators and Maintainers but decreased numbers of Contemplators and increased numbers of clients in Action Stage (Prochaska, Norcross, et al., 1992).

The Stages of Change model was also applied to ten health risk behaviors in older adults (Nigg et al., 1999). A Stages of Change survey was used to identify older adults' positions on changing maladaptive behaviors in weight management, consumption of high fat foods, consumption of high-fiber foods, seatbelt use, regular exercise, UV ray exposure, sunscreen use, high stress, smoking, and self-examination for cancer. Weight management, regular exercise and sunscreen use all had a large number of participants in the Precontemplation Stage and very few in the Action or Maintenance Stages. This indicates that most participants' were working to change these behaviors (Nigg et al., 1999).

Kristal, Glanz, Tilley and Li (2000) examined how a worksite nutrition intervention based on the Stages of Change model and social cognitive theories affected three mediating factors in dietary change: decreased fat intake and increased fiber, fruit, and vegetable intake. Predisposing factors for behavior change (knowledge, skills, and beliefs), enabling factors for behavior change (social support and social norms), and Stages of Change were examined to determine if the intervention affected dietary change. Through the Next Step Trail program, 1758 males at high risk for colon cancer participated in a worksite dietary intervention program. A dietary intervention including nutrition classes, informational material, and personalized feedback were provided to the participants throughout the two-year program.

The dietary intervention was shown to significantly affect all mediating factors. Predisposing factors and the participants' Stage of Change increased with intervention while the control group showed no effect. Although enabling factors such as social support and social norms remained unchanged in the intervention group, the enabling factors decreased (in the control group). Changes in all mediating factors at postintervention were associated with dietary change and these changes accounted for 34%- 55% of the intervention effects (Kristal et al., 2000). This study demonstrates the usefulness of the Stages of Change in predicting dietary outcome, the importance of mediating factors, and the value of including the Stages of Change in the intervention program.

Reduction in fat intake is another area in which the Stages of Change has been applied. In 1994 Greene, Rossi, Reed, Willey and Prochaska developed and validated a behavioral algorithm that defines a participant's Stage of Change based on a goal of reducing fat consumption to 30% or less of energy intake. Two samples were used to test the algorithm's validity. The first sample was composed of 614 adult participants in a mailed survey. The second sample was composed of 130 adult participants responding to university advertisements. In the two samples, the Stages of Change accurately classified participants who consumed less than 30% fat with 93% accuracy in the first sample and 87% accuracy in the second sample. The study correctly classified participants who consumed more than the 30% with 64% accuracy in the first group and 58% accuracy in the second sample (Greene et al., 1994).

A 1998 study examined the effects of dietary feedback, individualized messages, and educational material on fat intake reduction, based on participants' Stage of Change.

Predictable progression through the Stages was observed in the majority of the 296 participants with 9% of Precontemplators, 12% of Contemplators and 24% of Preparation participants moving into the Action Stage by the end of the 18 months. The individualized intervention reports significantly influenced the reduction of fat intake at six months (Greene et al., 1998). These results show the importance of the Stages of Change model as a predictor, as well as an enhancer, of reduction in fat intake.

A 1994 study by Cambell, DeVellis, Strecher, Ammerman, DeVellis and Sandler became another example of the usefulness of the Stages of Change model as a tool in the intervention process. This study examined the effectiveness of individualized computer messages in decreasing fat intake and increasing fruit and fiber intake among 558 adult participants recruited from their family practitioners. The majority were white, married, well-educated females. Participants took baseline surveys, including Stages of Change for decreased fat, increased fiber and increased fruit, as well as a food frequency questionnaire, and a psychosocial questionnaire. Participants were assigned to one of two groups: A mailed intervention report or a control group. The tailored reports included a computer message intervention based on individualized reports derived from all baseline questionnaires and structured according to Stages of Change and Health Beliefs model. The nontailored report consisted of a nutrition information packet based on the *1990 Dietary Guidelines for Americans*. The control group received no intervention. They were resurveyed after intervention.

Participants who received tailored reports reduced total fat intake by 23% and saturated fat intake by 26%. Participants receiving non-tailored reports reduced total fat intake by 9% and saturated fat intake by 11%. The no report control group reduced total

fat and saturated fat intake by 3%. Seventy-three percent of participants who received the tailored reports recalled receiving reports at four months post treatment compared to only 33% of participants with nontailored reports. Stages of Change was a significant predictor of baseline intake of total and saturated fat and fruits and vegetables, but type of intervention was the best predictor of post intervention intake (Campbell et al., 1994).

Motivational Interviewing (MI) is another behavior change intervention tool based on Stages of Change principles (Resnicow, Jackson, De, McCarty, & Baranowski, 2001; Berg-Smith et al., 1999). First described in 1983 by Miller and further developed by Miller and Rollnick, MI is a participant-centered therapeutic approach to increase the participants' motivation or readiness to change a particular health behavior. MI has been shown to be a useful intervention tool changing numerous health behaviors, including dietary habits (Berg-Smith et al., 1999).

In a study involving the Eat for Life Trail, Resnicow and colleagues evaluated the effectiveness of an MI intervention designed to promote fruit and vegetable consumption in African American churches (Resnicow et. al. 2001). Participants were recruited by telephone and a health fair which was conducted after church. At the health fair researchers and assistance distributed informational videos, cookbooks, and educational handouts centered around consuming more fruits and vegetables.

Participants were assigned to one of three intervention groups. The control group received only the materials that were distributed at the health fair. The second group received the materials at the health fair and were telephoned a few weeks after the fair as a reminder to use the material. The third group received the educational materials, the reminder phone call and 3 MI counseling calls. The MI calls consisted of the counselor

talking to the participant about the pros and cons of increasing fruit and vegetable consumption and using the educational materials. The participant did most of the talking while the counselor merely facilitated and encouraged the conversation.

Participants were assessed for changes in fruit and vegetable consumption and educational material use at a one-year follow-up. The MI group reported significantly more changes in fruit and vegetable consumption and were significantly more likely to use the cookbook than the control group and the group receiving only the phone call. Although these changes were significant, their level of significance was fairly low and did not effectively demonstrate that these changes were due to the MI intervention itself (Resnicow et. al., 2001).

Ethnicity

Of the limited amount of research focusing on minority ethnic groups and weight loss, most have found that minority groups differ significantly from their Anglo counterparts. Anglos differ from Hispanic and African Americans in their rates of obesity, what they consider of overweight and obese, and preferred weight loss method (Williamson, Serdula, Anda, Levy, & Byers, 1992; Winkleby et. al. 1996).

Winkleby and colleagues' (1996) study on ethnicity and BMI found significant differences in obesity levels between 688 Hispanic, predominantly Mexican Americans, and 688 Anglo participants. Hispanic males and females had significantly higher BMI levels regardless of age, socioeconomic status, language spoken or level of education. Hispanic females had a 19.6% greater likelihood of being overweight than Anglo females, while Hispanic males had 14.1% higher prevalence of being overweight than their Anglo counterparts. Hispanic females and males had a higher desired BMI than

Anglo females and males suggesting that the Hispanic participants actual and ideal weight were higher than the Anglos. These ethnic differences seem to be due mainly to cultural differences which may include food consumption and differences in perceived and desired body image (Winkleby et al., 1996; Allan, 1998).

A San Antonio heart study analyzed the differences in the dietary intake of macronutrients of Hispanic and Anglo Americans of low, moderate, and high socioeconomic status (SES) (Haffner, Knapp, Hazuda, Stern, & Young 1985). Hispanic females of low SES consumed more cholesterol than any other population. Hispanic males had higher diastolic and systolic blood pressure, higher fasting glucose, lower high-density lipoprotein cholesterol, lower consumption of linoleic acid, and higher cholesterol consumption than Anglo males. Hispanics had significantly higher carbohydrate and saturated fat intake than their Anglo counterparts. Hispanic males of moderate SES consumed lower levels of protein than did the Anglos of the same SES. (Haffner et al., 1985).

Arfken and Houston (1996) examined the problem of obesity among inner-city African Americans. Telephone interviews of 1445 participants revealed that this population had a high prevalence of obesity (44%). Of the obese, 40% had recently been advised to lose weight by their health care provider and 66% were currently attempting to lose weight. A combination of regular exercise and reduced calorie consumption was the most commonly used strategy; however reliance on diet alone increased with age. Age and level of obesity were also independent factors associated with the participants' attempts to lose weight. The younger the participant or the higher their level of obesity the more likely they were to attempt to lose weight.

Seventy percent of the obese participants perceived themselves as being overweight. Income, marital status, and level of obesity were independently associated with the obese participants' perception of being overweight. Participants who were widowed, had lower income level, or had a lower level of obesity were less likely to perceive themselves as overweight. These factors may be explained by fewer associations with the dominant culture, decreased social pressure, specific cultural differences or environment.

Rand and Kuldau (1990) surveyed 2,115 African American and Anglo adults to observe the differences in obesity and self-defined weight problems among these populations. Forty-six percent of the African American female and 28% of the African American male participants were overweight; while only 18% of Anglo females and 16% of Anglo male participants were overweight. Severe obesity rates were also higher among African-American females and males than their Anglo counterparts.

Rand and Kuldau also found that, of the participants that were 20 pounds or more overweight, 34% of Anglo males and 55% of African American males responded as having no weight problem. The African American participants, similar to the Hispanic participants studied previously, perceived a body weight that the medical community would call obese as acceptable and "no problem" (Rand & Kuldau, 1990).

A recent study comparing differences in body image among 120 African Americans, Hispanic and Anglo found distinct patterns of racial differences (Miller et al., 2000). On the Multidimensional Body-Self Relations Questionnaire, African Americans scored higher than Hispanic and Anglo on the Body Area Satisfaction, Appearance

Evaluation and Illness Orientation subscales and lower than the other groups in the Weight Preoccupation subscale.

Hispanic scored higher on Sexual Attractiveness and on the specific body part satisfaction scales. Hispanic and African Americans scored higher than Anglo on most items. This study, taken in conjunction with the previous studies, shows that perceptions of body weight and image vary greatly due to ethnicity. African American and Hispanic participants have a much different perspective on their body weight, their ideal weight and their body image than the Anglo participants.

Ethnic differences also become apparent when comparing weight loss methods and successful weight loss. In a comparison of weight loss methods of African American and Anglo females, Tyler, Allan, and Alcozer (1997) found several differences between these ethnic groups. African American females participated in more commercial diet programs than Anglo Americans. The African American participants stayed with their chosen weight loss method for shorter periods of time than did their Anglo American counterparts.

These findings were supported by previous studies that found that Anglo females engaged in weight loss methods for longer periods of time than African American females (Kumanyika, Wilson, & Guilford-Davenport, 1993) and, when in the same weight loss program, Anglo females lost more weight than African American females (Kumanyika, Obarzanck, Stevens, Herbert, & Welton, 1991).

In George and Johnson's (2001) evaluation of the weight loss behaviors of 1,852 college students they found that regardless of ethnicity, males had similar BMI's, but Hispanic participants (predominantly of Cuban descent) reported more dieting to lose

weight than any other ethnicity. In a telephone survey of 139,779 adult residents of the United States, Hispanic Americans were also found to be one third more likely to be using prescription diet pills than any other ethnicity (Khan, Serdula, Bowman, & Williamson, 2001).

Although successful weight loss and healthy lifestyle changes have been shown to be difficult for minority men, the LEAN Lifestyle program, a healthy lifestyle program for obese minority males, seems to have had success in helping patients lose and maintain weight loss (James, Folen, & Noce, 1998). The LEAN program is an extensive treatment program of two-weeks inpatient, one-week day treatment, and one-year of once-a-week follow-up sessions. On average these patients lost 13 pounds during inpatient treatment, continued to lose weight during day treatment, and ended the one-year follow-ups with a 19-pound weight loss. The LEAN program attributes this success to letting the patients make personal goals, emphasizing small reasonable weight loss goals (10 pounds rather than 10%), providing opportunities for professional staff to discuss therapeutic issues, involve the patients' families, implement low-intensity exercise programs, keep food diaries, weigh frequently, provide real-life field trips, and provide long-term follow-up sessions (James et al., 1998).

Hypothesis

The Stages of Change model has been used to examine various aspects of behavior change. The Stages of Change model has been successfully applied to dietary changes and reduced fat intake, increased physical activity and attendance in weight management programs for females. However, the Stages of Change model has not been used to predict outcome or attendance in male weight management programs. Ethnicity,

like the Stages of Change model, has been shown to predict successful behavior change but has yet to be applied to the prediction of outcome or attendance in male weight management programs.

The purpose of this study is to determine if adult males' pretreatment Stage of Change and ethnicity will predict: 1) the participant's attendance in a weight management program 2) reduction in the participant's weight or BMI.

Based on prior studies on male/female weight management differences, Stages of Change across many behaviors, and ethnicity it is predicted that 1.) Males whose scores on the URICA Stages of Change Inventory are in the Contemplation and Action Stage will attend a greater number of weight management sessions than males whose scores are in the Precontemplation and Maintenance Stage; 2.) Males whose scores are in the Contemplation and Action Stage will demonstrate greater decreases in BMI than participants whose scores are in the Precontemplation and Maintenance Stage; and 3.) Anglo males will demonstrate greater program attendance and a greater reduction in weight and BMI than African American or Hispanic males.

CHAPTER 2

METHODS

Participants

The subjects for this study were 53 men who completed the University of Rhode Island Change Assessment Scale, taken from a High Risk Weight Management Program at the San Antonio Veterans Hospital. This program accepts participants who receive medical care from the San Antonio Veterans Healthcare System. Participants were referred by their primary care providers, who were informed of the program by mail.

To be eligible for the program, participants had to have a BMI of 35 or greater, multiple co-morbidities, cardiac clearance which permitted moderate to mild physical activity, and previous failed attempts at weight management and treatment programs. Participants also had to be cognitively intact, psychiatrically stable, and able and willing to participate in a support group. To be eligible for the program, participants had to understand and agree to the requirements of the 16-week program.

Participants' anonymity was secured by assigning computer generated random numbers to each participant. The participant's random number was the only identifying factor when recording and reviewing the accuracy of data. Upon completion of accuracy

checks the random numbers for all participants were destroyed. Access to the database is password protected.

Intervention

The 16-week High Risk Weight Management Program utilizes an interdisciplinary team of physicians, psychologists, dietitians, nurse practitioners, physical therapists, kinesiotherapists, and recreational therapists to provide an intensive and comprehensive program. The program emphasizes gradual weight loss, modification of maladaptive beliefs, and lifestyle changes in healthy eating behaviors and physical activity. The program consists of pre- and post-nutritional, physical, psychological and medical assessments, seventeen education/support group classes, and over thirty-two group exercise sessions. A continuing care component consisting of group exercise classes and educational/social support was also offered to all graduates of the program.

Demographic Information

We used data from participants enrolled in the High Risk Weight Management Program between January 1997 and September 2000. Data included:

- participants' height, baseline weight, and ending weight
- number of classes attended
- participant's ethnicity
- participant's education level
- participant's pre-scores on a 4-scale URICA (Stages of Change) questionnaire

Measures

BMI- The Body Mass Index, is the uniform way to measure and categorize a participant's weight into a weight group. BMI is calculated by dividing the person's

weight (in kilograms) by their height (m^2). This calculation yields a two-digit number that categorizes people into three weight groups. A BMI of 19-24.9 is defined as a healthy weight, 25-29.9 is defined as overweight and 30 and greater is defined as obese (NIH, 1998).

URICA-The University of Rhode Island Change Assessment Scale

(McConaughy, DiClemente, Prochaska, and Velicer 1989) is a 32-item scale modified to measure four Stages of Change (Precontemplation, Contemplation, Action, and Maintenance). Each scale is measured by 8-items with scores ranging from 1 = strongly disagree to 5 = strongly agree on a 5 point Likert scale. Scores indicate a participant's level of agreement with each statement based on attitudes, cognitions and concerns associated with the four Stages of Change (Rossi et al., 1995).

Self-reports of attitudes, cognitions and concerns have been shown to be a more accurate description of Stages of Change in weight control than dietary behavioral measures. Through the examination of the research findings on stages of dietary change, Kristal and colleagues (1999) recommended that Stages of Change in weight control be used less as a measure of dietary behavior and more as a measurement of the cognitive, behavioral, and emotional engagement used by participants in the weight control process.

The URICA was originally used to measure Stages of Change in psychotherapy outpatients. It was validated on 150 patients in 1983 and then replicated and cross-validated on 350 patients (Prochaska, Norcross et al., 1992; McConaughy et al., 1983). Since then the URICA has been modified and validated for adult and adolescent tobacco cessation, alcohol abuse, reduction of fat intake and increased fruit and fiber consumption (Coleman-Wallace et al., 1999; DiClemente et al., 1999; Campbell et al., 1994).

The URICA has also been applied to weight loss control programs. It was used to predict the attendance and outcome in a sample of 184 participants of a worksite weight control program and in a 1992 weight control study by Norcross and colleagues (Prochaska, Norcross et al., 1992; Norcross et al., 1992).

Procedures

Participants' attendance and changes in weight were assessed weekly. The URICA, along with other program measures, was administered at baseline to determine participants' Stage of Change. Participants' attendance and weight were recorded weekly. Descriptive statistics were run on age, weight change, BMI change, number of classes attended, and each URICA subscale. The descriptive statistics included the mean, mode and median, standard deviations, kurtosis and skewness scores. Ethnicity, level of education and number of classes attended were analyzed using a frequency distribution. Mean procedures were then run on the two ethnic groups (Anglo group and Hispanic/African American group) and weight loss, BMI change and number of classes attended.

Wilcoxon Two-Sample Test and Krustal-Wallis Test were preformed on ethnicity and BMI loss and then ethnicity and BMI loss. The Wilcoxon Two-Sample Test was also used to examine the correlation between education level and weight change and education level and BMI change. The relationship between URICA subscale scores and weight loss, URICA subscale score and BMI loss, and URICA subscale scores, and class attendance were all examined using the Spearman Correlation Coefficient. The Wilcoxon was again used to assess any possible correlation between the Precontemplation URICA subscale and class attendance. A Pearson Partial Correlation

Coefficient was then performed on URICA subscale scores and weight loss and then on URICA subscales scores and BMI loss.

Weight change and number of classes attended and weight change and ethnicity were then examined using an Analysis of Variance (ANOVA). Lastly a Stepwise Regression was used to examine class attendance and weight loss, class attendance and BMI change, ethnicity and weight change, and ethnicity and BMI change.

CHAPTER 3

RESULTS

Descriptive Statistics

Demographic Information

One hundred and two patients of the San Antonio Veterans Hospital were referred to the High Risk Weight Management Program and attended an initial screening. Of those, 53 participants (51.9%) completed the clinical and psychological screenings and were included in this analysis.

The participants ranged in age from 27 to 76, with an average age ($M = 53.9$, $SD = 9.16$). The participants were ethnically diverse with 52% white, 30% African-American, and 15% Hispanic. Education level was higher than the national average with 16% of participants having attended graduate school, 8% having received a bachelor's degree, 43% having attended some college, 9% having graduated high school, and 12% having not completed the 12th grade. Due to the small number of African-American and Hispanic participants, ethnicity was combined into two categories: white (52%) and other (47%).

Participation and Weight Change

Out of the possible 16 classes the mean attendance was 7.38 classes (SD = 6.32). Fifteen participants never attended a class and 5 participants completed all 16 classes.

Participants' weight was monitored at the initial screening and at each weekly class thereafter. The participants' weight changes ranged from a + 6.8 pounds to a - 50 pounds. The mean weight change was a - 6.66 pounds (SD = 11.19), corresponding to an average BMI loss of 0.93 (SD = 1.48). During the 16-week program, 5 participants lost more than 25 pounds, 10 participants lost 10-25 pounds, 30 participants lost between 0 and 9 pounds and 8 participants gained weight.

Education

The participants that did not complete high school had a mean weight loss of 2.23 pounds (SD = 3.47) and a mean BMI loss of 0.33 (SD = 0.52). Those that had a high school diploma or more had a mean weight loss of 7.51 (SD = 11.78) and a BMI loss of 1.06 (SD = 1.56). These differences were also seen in program attendance. Participants who did not complete high school had a mean attendance of 3.5 classes (SD = 5.65) and the participants that did complete high school or more had a mean attendance of 7.88 classes (SD = 6.24).

Ethnicity

The 28 Anglo participants had a mean weight loss of 10.37 pounds (SD = 12.99) and a mean BMI loss of 1.44 (SD = 1.7). The African American and Hispanic group, consisting of 24 participants, had a mean weight loss of 2.51 pounds (SD = 6.9) and a BMI loss of 0.36 (SD = 0.93). Mean program attendance for the white participants was

8.93 classes (SD = 6.23); followed by a mean program attendance of 5.64 classes (SD = 6.08) for the other participants.

Stages of Change

The URICA was administered to the participants during the initial screening process. It was used to assess the participants' conformity to the emotional, cognitive and attitude-based statements that represented each Stage of Change prior to beginning the program. Scores for each Stage of Change subscale range from 8 (disagree with all statements) to 40 (total agreement with all statements). The Precontemplation Stage, the initial stage in which you have not admitted you have a weight problem, received the least support (M = 13.0, SD= 3.96). Participants seemed to agree most with the emotions, attitudes, and cognitions characteristic of the second Stage of Change, the Contemplation Stage (M = 35.7, SD = 2.96). The Action Stage, in which you choose a plan of action and start working to solve the problem, was also highly supported with a mean of 31.3 (S.D. 6.47). Lastly with a mean of 29.3 (S.D. 5.57), participants' support of the statements in the Maintenance Stage, the stage in which you feel you have made a behavior change and are working to maintain it, was less than that found for the previous two but remained fairly high.

Statistical Outcome

To examine the initial hypothesis, that pretreatment Stages of Change scores would predict participants' weight and BMI change, a Spearman Correlation Coefficient was used to assess correlations between each URICA subscale score and changes in weight and BMI. The examination found no significant correlations between any of the URICA subscales and changes in weight or BMI.

Table 1
 Assessment of relationship between URICA
 subscale scores and weight loss and BMI loss
 using a Spearman Correlation Coefficients Test

	URICA Pre Action	URICA PreCont	URICA Pre Mainten	URICA Pre Precont
WtChange	-0.22609 0.1036	-0.16972 0.2244	-0.04896 0.7277	-0.06739 0.6316
BMIChange	-0.22339 0.1079	-0.16672 0.2328	-0.04635 0.7417	-0.06842 0.6264

A Spearman Correlation Coefficient was used to examine relationships between URICA subscale scores and participants' attendance in the program. Again none of the URICA subscales were correlated with program attendance. The Precontemplation Stage subscale was found to have a significantly low kurtosis score, however (-1.03). Due to the apparent nonparametric nature of the Precontemplation subscale a Wilcoxon Two-Sample Test was preformed to assess any possible correlations between the Precontemplation Stage and program attendance. No significant correlation was found.

Table 2
Examination of relationship between
URICA subscale scores and class attendance
using a Spearman Correlation Coefficient Test

	URICA Pre Action	URICA PreCont	URICA Pre Mainten	URICA Pre Precont
NumClassesAttend	-0.15752 0.2600	0.01308 0.9259	0.11433 0.4150	-0.07359 0.6005

In testing the next hypothesis, that ethnicity would predict weight changes and changes in BMI, a Wilcoxon Two-Sample Test and a Kruskal-Wallis Test was used to find possible correlations between ethnicity and changes in weight and BMI. The Wilcoxon Test found significant differences between ethnicity and weight changes. The Kruskal-Wallis Test also found significant differences between ethnicity and weight changes. Wilcoxon and the Kruskal-Wallis tests were also used to determine if there were any correlations between ethnicity and changes in BMI. Both the Wilcoxon Two-Sample Test and the Kruskal-Wallis Test found significant correlation between changes in BMI and ethnicity ($t(53) = -2.461, p = .0126$ (two-tailed); $\chi^2(1, n = 53) = 6.2756, p = .0122$).

More analyses were run on URICA subscale score, Stages of Change, ($t(53) = -2.4961, p = .0126$ (two-tailed) $\chi^2(1, n = 53) = 6.2756, p = .0122$) to examine the effects of ethnicity on weight and BMI change. To determine whether ethnicity interacted with URICA scores and affected the weight and BMI change, we used Pearson Partial Correlation Coefficients to control the variance associated with ethnicity, leaving

only the correlations between URICA subscales and weight or BMI change. Even when controlling for the variance associated with ethnicity, URICA subscales were not significantly correlated with weight or BMI.

TABLE 3
 Pearson Partial Correlation Coefficient Test
 is used to assess relationships between URICA
 subscale scores and weight loss and BMI loss

	URICA Pre Action	URICA PreCont	URICA Pre Mainten	URICA Pre Precont
WtChange	-0.16394 0.2503	-0.00429 0.9761	-0.07084 0.6213	-0.15226 0.2861
BMIChange	-0.13649 0.3395	-0.00907 0.9496	-0.04473 0.7553	-0.14483 0.3106

After evaluating the hypotheses and outcome statistics there were still questions surrounding how ethnicity and number of classes attended and weight change or BMI change were related. The initial analysis found a strong, significant correlation between number of classes attended and ethnicity. In addition, an ANOVA found a significant relationship between number of classes attended and weight loss ($t(53) = 5.17, df = 1, p < .001$). This suggested that we should further examine the relationship among ethnicity, number of classes attended, and weight loss/ BMI change. To examine the possibility that

ethnicity and number of classes attended interacted to affect weight loss we conducted a stepwise regression analysis, using ethnicity and number of classes to predict weight loss. Number of classes attended entered the equation first, producing an F value of 32.48 (partial $R^2 = .3938$). Ethnicity entered the equation second with a F value of 3.31 (partial $R^2 = .0383$). The combination of variables produced a Model R^2 of .4321 ($p < .001$).

Discussion

The statistical analysis found that ethnicity and class attendance were the only variables that predicted weight loss and changes in BMI. Further, ethnicity and class attendance were correlated. Within this population, Anglo participants seemed to attend more classes and experience greater weight and BMI loss than African American and Hispanic participants. It seems probable that ethnicity affected attendance, which in turn affected weight loss. Thus, ethnicity may have acted as a moderating variable that affected participation in the program and, as a result, weight loss and changes in BMI. Ethnicity affects both program attendance and personal psychology. This would explain why, unlike in previous studies, Stage of Change did not predict weight loss, BMI change, or class attendance in the sample. Findings from the Motivational Interviewing (MI) research may shed some light on this phenomenon.

The ineffectiveness of MI as an intervention tool in Resnicow and colleagues' study (2001) may be caused by the use of African Americans as the population. This is unlike previous studies in the area that have used primarily Anglo participants as the study populations. A gap in the research on minority populations is seen in most of the behavior change research, especially weight loss and weight loss program success. The findings in this study and Resnicow, et al's (2001) illuminate the need for a better

understanding of the complex interaction between cultural attitudes toward obesity and weight loss. It is evident that the traditional weight loss program is not meeting the needs of the African American and Hispanic populations. It follows that for the African American and Hispanic populations to succeed in a weight loss program the program needs to be more sensitive to their culture and their attitudes, values and belief systems.

Some of the limitations of this study included the combination of the Hispanic and African American participants and their limited numbers. Due to the unique cultural and attributes of both ethnicities, further breakdown of the Hispanic/African American group is warranted and will be performed in future analyses. Larger population sizes in each group, especially Hispanic and African American groups, and ethnic groups proportional in number of participants, weight and BMI, SES, and education level are also needed in future studies.

It is well known and documented that obesity is a major risk factor for heart disease, cancer, cardiovascular disease, diabetes mellitus and death (Department of Commerce 1999; McGinnis & Froege, 1993; Allison, Fontaine, Manson et al., 1999). McGinnis and Froege's (1993) study estimated that obesity related medical conditions was the second leading cause of death. From health care expenses to disability and premature death expenses obesity and overweight costs over 99 billion dollars. Yet, obesity and overweight still plague more than half the members of our society (Wolf and Colditz 1998).

Research is the key to obtaining a better understanding of obesity and how to fight it. This study set out to do just that and, although the relationship between ethnicity and weight loss needs further study, the findings of this study show promising new

understanding of how ethnicity affects both how active a participant is in a weight loss program and his motivation for making a behavior change.

APPENDIX A

Change Assessment Scale
(URICA)

Each statement describes how a person might feel about controlling his or her weight. Please indicate the extent to which you tend to AGREE or DISAGREE with each statement. In each case, make your choice in terms of how you feel *right now*, not what you have felt in the past or would like to feel. There are FIVE possible responses to each of the questionnaire items. Please circle the number that best describes how much you agree or disagree with each statement.

1 = strongly disagree

2 = disagree

3 = undecided

4 = agree

5 = strongly agree

1. As far as I am concerned, I do not have any weight problems that need changing.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

2. I think I might be ready for some self-improvements in my weight.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

3. I am doing something about my weight that has been bothering me.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

4. It might be worthwhile for me to work on my weight.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

5. I am not the problem one. It doesn't make much sense for me to be here.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

6. It worries me that I might slip back on a weight problem I have already changed, so I am ready to work on my problem.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

7. I am finally doing some work on my weight problem.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

8. I have been thinking that I might want to change my weight.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

9. I have been successful in working on my weight but I am not sure I can keep up the effort on my own.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

10. At times my weight is a difficult problem, but I am working on it.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

11. Working on my weight is pretty much a waste of time for me because it does not have anything to do with me.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

12. I am working on my weight in order to better understand myself.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

13. I guess I have weight difficulties, but there is nothing that I really need to change.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

14. I am really working hard to change my weight.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

15. I have a weight problem and I really think I should work on it.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

16. I am not following through with the changes I have already made as well as I had hoped, and I am working to prevent a relapse of my weight problem.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

17. Even though I am not always successful in changing, I am at least working on my weight.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

18. I thought once I had resolved my weight problem, I would be free of it, but sometimes I still find myself struggling with it.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

19. I wish I had more ideas on how to solve my weight problem.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

20. I have started working on my weight but I would like some help.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

21. Maybe someone will be able to help me with my weight.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

22. I may need a boost right now to help me maintain the changes I have already made in my weight.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

23. I may be part of my weight problem, but I do not really think I am.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

24. I hope that someone will have some good advice for me about weight control.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

25. Anyone can talk about changing their weight; I am actually doing something about it.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

26. All this talk about psychology is boring. Why can't people just forget about their weight?

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

27. I am working to prevent myself from having a relapse of my weight problem.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

28. It is frustrating, but I feel I might be having a recurrence of the weight problem I thought I had resolved.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

29. I have worries about my weight, but so does the next person. Why spend time thinking about it?

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

30. I am actively working on my weight problem.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

31. I would rather cope with my weight than try to change it.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

32. After all I have done to try to change my weight, every now and then it comes back to haunt me.

1	2	3	4	5
strongly disagree	disagree	undecided	agree	strongly agree

APPENDIX B

Consent Form

High Risk Weight Management Program

The goals of this program are gradual, moderate weight loss and **long-term** lifestyle change. These goals are achieved through:

- ☞ **Healthy Nutrition Practices**
- ☞ **Physical Activity**
- ☞ **Effective Behavioral, Cognitive, and Emotional Strategies**
- ☞ **Medical Services**

The Weight Management Program is served by an interdisciplinary team consisting of professionals from Medicine, Nursing, Nutrition, Psychology, Physical Therapy, and Recreational Therapy. Specific components of the program include medical screening, dietary consultation, brief psychological assessment, education classes, skills training, counseling, and exercise groups. The program team can work with you to develop an individualized weight management program. The following is an outline of the program:

Medical, Psychological, Nutritional, Physical Assessment & Screening

Educational Class/Support Group*

Mondays 8:30-10:00

1 Introductory Session + 16 class sessions

Individualized Counseling as needed

Group Exercise Program

Exercise is a mandatory part of this program. We offer and would prefer participation in at least 2 of our group exercise sessions; if your work schedule interferes with this, we will work out an individual exercise program for you.

Post Group Assessment

Continuing Care Component

Group Exercise & Support Group

*If you participate in the program, please be aware that depending upon your service category/eligibility criteria, you may be charged a co-pay. If you are not sure of your status, please contact the Health Benefit Advisors at 617-5184

You are expected to attend all scheduled group meetings. If you "no show-no call", or miss more than 2 meetings, you will need to talk with a group facilitator before returning to the group. There will also be homework activities required outside of program times. In addition, a **minimum** of at least two group exercise activities a week is **required, (unless prohibited by your primary care physician)**. Participation in three or more group exercise activities is **strongly encouraged**. You will also be given a manual, The LEARN Program for Weight Control, that is yours to use and keep. We ask, however, that if you drop out of the program during the 1st month, that you return the manual to the team so that another patient can use it in the next group.

The Group Process - Through the group experience, we hope that you will learn about healthy nutrition practices, effective exercise activities, and cognitive, behavioral, and emotional strategies. We also hope you will learn more about yourself and how to find support inside and outside the group to reach and maintain your goals. By talking and sharing with others who are doing the same thing, you can hear other people's experiences, opinions, and ideas; find out what works for others; and get feedback on your own behavior. Remember, this is your group! You will only get out of it what you put into it. To facilitate this experience and the group process, we have come up with a list of expectations for the group:

1. **Confidentiality** - What happens in the group stays in the group. Don't gossip. This refers especially to personal sharing. (Please note that in order to provide the most effective service, information is shared between the treatment team members on a need to know basis).
2. **Be Respectful of Others** - Treat others as you would like to be treated. Remember, you're all in this together. No physical abuse, threats, or verbal abuse (including racist or sexist remarks) will be tolerated.
3. **Be Here Now** - Stick with the present. As much as possible, stay in the boundaries of the here and now by describing present experience.
4. **Be Aware of Feelings** - Try to express them. Because we are used to hiding our feelings, give special attention to how people feel and encourage feeling statements from others. Example: "I feel sad" or "I'm angry".
5. **Use "I" Statements** - Rather than using "we" or "you", speak for yourself. Example: "I feel comfortable".
6. **Speak Directly to Others** - Instead of making observations about someone, "Bill seems angry", speak directly to the person, "Bill, you seem angry to me".
7. **Speak Freely and Openly & Allow Others to do the Same** - You do not need to ask permission to speak. Ask questions and join in the group discussion whenever you feel comfortable doing so. However, be careful of interrupting others **and** monopolizing the conversation.
8. **Participation is Strongly Encouraged, but Voluntary** - If someone is uncomfortable with an activity or question, they have a right to say "I pass". The more you participate and share with the group, however, the more you will

gain from the experience.

9. **Avoid Judgments/Be Descriptive** - Instead of making assumptions about another person's motives or feelings, describe the person's behavior and your response. In this way, you do not lay a "trip" on someone else and you take responsibility for your own reaction. Instead of saying: "You don't care about what I say", it is more effective to say: "When you interrupt me, I feel hurt".

10. **Avoid "Should" Statements** - Avoid making statement that use the words "should" or "shouldn't". They tend to make judgments that produce defensive reactions.

I, _____, agree to comply with the recommendations of the treatment team, fully participate in the group, exercise, and other components of the Weight Management Program described above, and abide by the group process expectations.

Group Member Signature

Date

Team Facilitator

Date

APPENDIX C

Referral Letter

December 8, 2000

Dear Primary Care Provider:

We know that you probably have several patients in your practice who are obese with multiple comorbid conditions and who would benefit from a lifestyle change. The High Risk Weight Management Program will be offering its next class starting on January 29th. ***The class will meet on Monday mornings from 8:30 to 10:00 at the Audie Murphy Hospital.*** The 16-week program is an intense comprehensive program designed to promote healthy eating habits, increase physical activity, and modify maladaptive beliefs in patients who have previously been unsuccessful in losing weight and maintaining weight loss. The program emphasizes slow, gradual weight loss and long-term lifestyle change.

The program consists of weekly 90-minute group educational sessions, group exercise sessions offered 3 x weekly, personalized fitness training, and individualized nutritional evaluation and counseling as needed. Graduates of the program are encouraged to continue participate in the group exercise sessions and to participate in our monthly Continuing Care group that provides social support and educational offerings. The Weight Management Program is staffed by an interdisciplinary team, including professionals from the Nutrition Service, Psychology Service, Kinesiotherapy, and Physical Therapy.

To Participate, patients must be referred by their Primary Care Providers. Patients must meet the following criteria:

- BMI \geq 35, with multiple comorbidities
- Cardiac clearance permitting mild-to-moderate physical activity

- Patients should be psychiatrically stable, cognitively intact, and able to participate in a group didactic program (e.g., should have had inpatient hospitalization in previous 12 months; should not be psychotic, or have dementia, major depressive disorder, or poorly controlled PTSD)
- Patient understands and agrees to time commitment (weekly psychoeducational group plus supervised exercise sessions for 16 weeks).
- Failed previous alternative treatment modalities, including nutrition counseling with RD

Although this is a hard to treat group, many of our participants have been successful in losing weight and/or achieving lifestyle changes. To refer your patients to the program, please send an electronic consult to the Weight Management Program, or you may obtain a hard copy of our consult (see attached) from the registered dietitians in the IMC or FTOPC. If you have any questions, you may contact Sidney Warner (pager 594-6138) or Polly Noël (ext. 4105).

Sincerely,

Jacqueline A. Pugh, MD

Sidney Warner, MS, RD

Polly Hitchcock Noël, PhD

APPENDIX D

ALMMVH High Risk Obesity Program
Questionnaire

Today's Date _____

Your Name _____ SS# _____

Date of Birth _____ Age _____ Gender M F (circle one)

WEIGHT AND DIET HISTORY:

Current Weight: _____ Current Height: _____

Were you overweight as a child? Yes No (circle one)

How old were you when you began to have problems with your weight?(as a child or adult) _____

Lowest Weight as an Adult (since reaching the age of 21): _____ lbs. (at what age?) _____

Highest Weight as an Adult (since reaching the age of 21): _____ lbs. (at what age?) _____

Which of the following family members had trouble with their weight? (check all that apply)

_____ Father: _____ Brothers/Sisters (How Many? _____ of _____)

_____ Mother: _____ Children (How Many? _____ of _____)

Which of the following methods have you tried to lose weight?

METHOD	YEAR/AGE	HOW MUCH WEIGHT DID YOU LOSE?	HOW LONG DID YOU KEEP IT OFF?
Inpatient Program			
Physician Supervised Outpatient Program (e.g., liquid protein diet)			
Commercial Program (e.g., Weight Watchers, Jenny Craig, Nutrisystem etc.)			
Prescription Diet Pills			
Nonprescription Diet Pills (e.g., Dexatrim)			
Overeaters' Anonymous			
Diet Drinks (e.g., Slimfast, Metracal)			
Self-directed program of exercising and/or Eating less			
Other (specify)			

Please write down everything you ate yesterday. Include what you ate & drank & how much.

BREAKFAST: (Time: _____)

LUNCH: (Time: _____)

DINNER: (Time: _____)

SNACKS:

Was this a typical day for you? Y N

If not, what do you normally do that's different?

How many meals do you normally eat every day? _____

Which meals do you eat? _____ breakfast _____ lunch _____ dinner

How many times do you snack each day? _____

What are your problem foods? (foods that are particularly difficult to resist eating?)

Currently, do you engage in any regular physical activity or exercise program?

Y N

If you do exercise, how long have you been doing it? _____ months _____ years

If you do exercise, what do you do? (check all that apply)

_____ walking _____ biking _____ swimming _____ tennis or other sport

_____ other (please specify) _____

On average, how often do you exercise?

Every day 4-6 times a week 3 times a week
 2 times a week 1 time a week Less than once a week

When you exercise, how long do your sessions last/how far do you go?

minutes or miles

If you don't exercise, what prevents you from exercising?

pain other medical problem can't find the time

not in the habit don't like it don't know

other reason (please specify: _____)

Do you binge? (feel like you are out of control with your eating and eat large amounts of food in a short period of time?) Y N – If yes, describe a typical binge:

How often? (once a year/once a month/once a week/several times a week/daily).

Do you engage in secretive eating? (e.g., hide food intake from family by eating at night?)

Y N

If yes, when was the last time you did it?/How often do/did you do it?

Have you ever used laxatives or vomiting in order to lose weight or counter-act the effects of eating? Y N

If yes, when was the last time you did it?/How often do/did you do it?

Have you ever used diuretics to lose weight or counter-act the effects of eating?

Y N

If yes, when was the last time you did it?/How often do/did you do it?

Have you ever fasted (gone a 24 hours or more without eating) in order to lose weight or counter-act the effects of eating? Y N

If yes, when was the last time you did it?/How often do/did you do it?

Do you worry excessively or persistently about your weight or body shape?

Y N

Has your thinking about your shape or weight interfered with your ability to concentrate on your work/hobbies or enjoy social activities? Y N

Do you use eating to help you cope with:

_____ stress? _____ depression? _____ anxiety?

_____ boredom?

PSYCHOSOCIAL HISTORY

Marital Status: _____ Single _____ Married

Number of Children? _____

Number of Children/Grandchildren Living at Home? _____

How Many Years of Education?

_____ Attended High School _____ H.S. Diploma/GED

_____ Attended College _____ College Degree

_____ Graduate School

Are you currently employed? Y N

If no, are you: _____ retired _____ on medical disability _____ other

If you currently work, what do you do?/If you don't currently work, what did you do the last time you were employed?

Do you have any current life stressors in the following areas?

_____ Marital _____ Family _____ Other Relationships

_____ Work-related _____ Financial _____ Legal

_____ Other (Please specify: _____)

Please rate your current stress level on a 0-10 scale, with 0=Absolutely No Stress;
10=Extreme Stress (circle one)

0	1	2	3	4	5	6	7	8	9	10
Absolutely					Average					Extreme
No Stress										Stress

In the past month, on how many days did you drink any alcohol (e.g., beer, wine, or liquor?)

On the days when you did drink in the past month, how many drinks did you drink on average? (e.g., 1 drink equals 5 ounce Glass of wine; 12 ounce. Bottle/can of beer, or 1½ ounce shot of liquor)

On the day when you drank the most in the past month, how many drinks did you have?

Have you ever been seen by a mental health professional for any problem? NO YES

(If yes, please check off as many as appropriate)

Psychiatrist Psychologist Social Worker

Other (Please Specify _____)

Have you ever been prescribed medication for any psychiatric problem (depression, anxiety) by a psychiatrist or a physician? Y N

If so, when? _____

Have you ever been hospitalized for psychiatric problems (e.g., depression, alcohol abuse, etc.) Y N If so, when? _____

Are you currently under the care of a mental health professional?

Y N If so, where & by whom? _____

If you are not currently being seen by a mental health professional, do you feel like you need to see someone? Y N

MOTIVATION/GOALS:

What do you think has caused your weight problem?

Why do think you've been unable to lose weight and keep it off?

What role does your weight play in your life, and what effect will weight loss have for you?

Is there anything positive for you about being overweight?

What is your primary motivation for weight loss now?

How will other people (e.g., your family) feel about your losing weight?

How much weight would you like to lose?

How much weight do you feel you can realistically lose and keep off?

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