SUCCESS OF WOMEN IN A WORKSITE WEIGHT LOSS PROGRAM

ATTEMPTING TO LOSE WEIGHT AS PART OF A GROUP

COMPARED TO WOMEN ATTEMPTING TO LOSE

WEIGHT AS INDIVIDUALS

Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my advisory committee. This thesis does not include proprietary or classified information.

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Andrea Danielle Rigsby

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SUCCESS OF WOMEN IN A WORKSITE WEIGHT LOSS PROGRAM ATTEMPTING TO LOSE WEIGHT AS PART OF A GROUP COMPARED TO WOMEN ATTEMPTING TO LOSE WEIGHT AS INDIVIDUALS

Andrea Danielle Rigsby

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VITA

Andrea Danielle Rigsby was born September 22, 1981, in Cullman, Alabama. She is the daughter of Kenneth and Cecilia Smith and the wife of Paul William Rigsby, III. Andrea graduated with honors from Enterprise High School in Enterprise, AL., in 1999. She attended Enterprise State Junior College for one year before entering Auburn University in 2000 where she graduated Summa Cum Laude with a Bachelor of Science degree in Nutrition and Food Science in May 2004. In August 2004, she entered the dietetic internship at the University of Alabama at Birmingham. She completed her internship in May 2005. In June 2005, she began working as a registered and licensed clinical dietitian at Lanier Memorial Hospital in Valley, AL. In August 2006, she entered the graduate program in the Department of Nutrition and Food Science at Auburn University.

THESIS ABSTRACT

SUCCESS OF WOMEN IN A WORKSITE WEIGHT LOSS PROGRAM ATTEMPTING TO LOSE WEIGHT AS PART OF A GROUP COMPARED TO WOMEN ATTEMPTING TO LOSE WEIGHT AS INDIVIDUALS

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The success of women in a worksite weight loss program attempting to lose weight as part of a group was compared to the success of women attempting to lose weight as individuals. Female hospital and nursing home employees were enrolled in an 8-week worksite weight loss program as individuals (n=30) or as part of a group (n=42). At the end of the eight weeks, employees (irrespective of group versus individual participation) lost an average of 6.2 pounds and 1.5% body fat. Weight change ranged from a 29.6 lb loss to an 11 lb gain. The absolute weight reduction, weight reduction as percent of initial weight, absolute body fat reduction, reduction of body fat as percent of

initial body fat, absolute BMI reduction, and BMI reduction as percent of initial BMI were significantly greater ($p<0.05$) in those participating as part of a group compared to those participating individually. Absolute weight reduction was 7.6 $\pm$ 1.1 lbs (mean $\pm$ SD) per person for group participants and 4.2 $\pm$ 6.4 lbs for individual participants. Weight reduction as percent of initial weight was 4.0 $\pm$ 3.7% per person for group participants and 1.9 $\pm$ 3.4% for individual participants. Absolute body fat reduction was 1.7 $\pm$ 1.3% per person for group participants and 0.9 $\pm$ 1.3% for individual participants. Body fat reduction as percent of initial body fat was 5.4 $\pm$ 4.7% per person for group participants and 2.2 $\pm$ 3.6% for individual participants. Absolute BMI reduction was 1.3 $\pm$ 1.1 kg/m^2 per person for group participants and 0.7 $\pm$ 1.1 kg/m^2 for individual participants. BMI reduction as percent of initial BMI was 4.3 $\pm$ 3.7 % per person for group participants and 2.2 $\pm$ 3.4 % for individual participants. When comparing those participating as a group versus individually, exercising more frequently ($p=0.05$) was significantly associated with weight loss in those participating as a group and following a diet plan ($p=0.04$) was significantly associated with weight loss in those participating individually. In conclusion, in a worksite weight loss program, female employees attempting to lose weight as part of a group were more successful than female employees attempting to lose weight individually.

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Style manual or journal used Journal of Food Science

Computer software used Microsoft Word and Microsoft Excel

TABLE OF CONTENTS

LIST OF TABLES x

I. INTRODUCTION 1

II LITERATURE REVIEW 4

III. SUCCESS OF WOMEN IN A WORKSITE WEIGHT LOSS PROGRAM ATTEMPTING TO LOSE WEIGHT AS PART OF A GROUP COMPARED TO WOMEN ATTEMPTING TO LOSE WEIGHT AS INDIVIDUALS 37

IV SUMMARY OF FINDINGS 59

REFERENCES 60

APPENDICES 68

A. Auburn University Institutional Review Board Approval 69

B. Raw Data 71

C. Questionnaires 80

LIST OF TABLES

Table 1 Mean age, height, weight, body mass index (BMI), and body fat of participants at the start of the program 55

Table 2 Initial and final weight, body fat, and body mass index (BMI) of those attempting to lose weight as part of a group and as individuals 56

Table 3 Absolute weight, body fat, and body mass index (BMI) reduction, and reduction of weight, body fat, and body mass index as percent of initial values at the completion of the weight loss program 57

Table 4 Participants' use of eating plans, frequency of eating out, use of supplements, and frequency of exercise prior to and at the end of the weight loss program 58

CHAPTER I

INTRODUCTION

Obesity rates steadily and dramatically rose throughout the 1900s (Brownell and Wadden 1992). Since 1980, the number of obese adults and overweight children (ages 6-11 years) has doubled, and the number of overweight adolescents (ages 12-19 years) has tripled (Baskin and others 2005). According to the most recent National Health and Nutrition Examination Survey (NHANES), 66.3% of U.S. adults age 20 years and older are overweight or obese. Also, 17.1% of U.S. children and adolescents age 2-19 years are overweight (Ogden and others 2006).

There has been an increase in obesity among all age, gender, racial, and ethnic groups in recent years. Women have higher obesity rates than men across all groups (Baskin and others 2005). According to the National Health and Nutrition Examination Survey in 2003-2004, 33.2% of women and 31.1% of men were obese (Ogden and others 2006). Among young women ages 16-34 years, obesity rates doubled between 1980 and 2002 (Eiben and Lissner 2006).

Obesity is a major public health concern affecting health and well-being (Friedman and Brownell 1995). Adults who are obese are prone to die earlier and are at a higher risk of certain health problems than are adults who are of normal weight (Baskin and others 2005). Obesity is linked to an increased risk of hypertension, type 2 diabetes, dyslipidemia, gallbladder disease, osteoarthritis, coronary artery disease, stroke, asthma,

and sleep apnea (Caban and others 2005). Four of the 10 leading causes of death are associated with unhealthy eating practices (ADA 2006).

The health conditions associated with overweight and obesity also have a substantial economic impact on our country. In 2000, according to *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*, the medical and related costs of obesity in the U.S. totaled more than $117 billion (CDC 2005). Therefore, because of the potential reduction in health costs, decreasing the rates of obesity and overweight are significantly important in the realm of public health (ADA 2006).

Obesity and the many obesity-related illnesses directly impact the health and well-being of the United States (U.S.) workforce. The rates of obesity increased approximately 10% in U. S. workers between 1986 and 2002 (Caban and others 2005). Targeting the workplace with wellness programs is logical because Americans spend about one-third of their day at work, where organized communication and peer support exist (Reardon 1998).

Current research suggests that social support in weight loss programs is effective (Kalodner and DeLucia 1990). Group settings that offer reinforcement and social support enhance behavior modification in mildly to moderately obese individuals (Hermann-Nickell and Baker 1989). Many researchers believe that individuals who attempt to lose weight as part of a group are more successful than individuals who attempt to lose weight alone (Schwartz and Brownell 1995); and many studies have shown that group-based weight loss programs that provide participants with social support are effective

(Hausenblas and Carron 1998, Jeffery and others 1984, Kayman and others 1990, Marcoux and others 1990).

Several studies have shown that worksite weight loss programs are effective at inducing weight loss among participants (Brownell and others 1984, Hermann-Nickell and Baker 1989, Hoke and Franks 2002, Miller and Edelstein 1990, Peregrin 2005, Worick and Petersons 1993). Several studies have also shown that group-based weight loss programs, which offer participants more social support, are more effective than weight loss programs in which members participate individually (Heshka and others 2003, Jeffery and others 1983). To date, however, studies have not examined these two aspects, worksite weight loss programs and social support, together. The purpose of this study was to compare the effectiveness of a worksite weight loss program in which women attempted to lose weight as part of a group versus individually.

CHAPTER II

LITERATURE REVIEW

This literature review will address the following: the definitions of overweight and obesity, the prevalence of obesity, the health and economic effects of obesity, selected causes of obesity, the prevalence of obesity in the workplace, the need for wellness programs in the workplace, the benefits of wellness programs in the workplace, and the effectiveness and key components of worksite wellness programs. In addition, the definition of social support, the effects of social support, social support in weight loss, and sources and types of social support are discussed. Lastly, information on the effectiveness of group versus individual weight loss programs is presented.

Definitions of Overweight and Obesity

The terms overweight and obese characterize weight ranges that are greater than what is considered healthy. These terms also describe weight ranges, for specific heights, that have been linked to an increased risk of certain diseases and health conditions. The Center for Disease Control defines overweight and obese based on body mass index (BMI). BMI is calculated by dividing a person's weight, in kilograms, by their height, in meters, squared. A person with a BMI of 30 kg/m² or more is considered obese, and a person with a BMI of 25 to 29.9 kg/m² is considered overweight (CDC 2007b). BMI classifications also exist for normal weight as well as underweight individuals. A person

with a BMI of 18.5 to 24.9 kg/m² is considered normal weight, and a person with a BMI <18.5 kg/m² is considered underweight (CDC 2007b).

Prevalence of Obesity

Obesity rates have risen since the early 1900s. Daily energy expenditure has declined since this time as our country has evolved from an agriculture-based, to an industry-based, and now to an information-based society (Brownell and Wadden 1992). Before 1980, the number of obese adults and overweight children in the United States (U.S.) was relatively stable. Since then, the number of obese adults and overweight children (ages 6-11 years) has doubled, and the number of overweight adolescents (ages 12-19 years) has tripled (Baskin and others 2005). According to the 2003-2004 National Health and Nutrition Examination Survey (NHANES), 66.3% of U.S. adults age 20 years and older are overweight or obese. Also, 17.1% of U.S. children and adolescents age 2-19 years are overweight (Ogden and others 2006).

There has been an increase in obesity among all age, gender, racial, and ethnic groups in recent years (Baskin and others 2005). Obesity is more prevalent, however, in minority groups and in groups with low socioeconomic status. The prevalence of obesity also increases with age, especially in women (Brownell and Wadden 1992). Women have higher obesity rates than men across all groups (Baskin and others 2005). According to the National Health and Nutrition Examination Survey in 2003-2004, 33.2% of women and 31.1% of men were obese (Ogden and others 2006). Among young women ages 16-34 years, obesity rates doubled between 1980 and 2002 (Eiben and Lissner 2006).

Health and Economic Effects of Obesity

Obesity is a major public health concern affecting health and well-being (Friedman and Brownell 1995). Adults who are obese are prone to die earlier and are at a higher risk of certain health problems than are adults who are of normal weight (Baskin and others 2005).

Being overweight contributes substantially to disease and death. Obesity-related conditions account for more than half of all deaths every year (Foreyt and others 1980). Obesity is linked to an increased risk of hypertension, type 2 diabetes, dyslipidemia, gallbladder disease, osteoarthritis, coronary artery disease, stroke, asthma, and sleep apnea. Recently, studies have suggested that obesity is also linked to an increased risk of endometrial, breast, prostate, and colon cancers (Caban and others 2005). Four of the 10 leading causes of death, including coronary artery disease, stroke, certain cancers, and type 2 diabetes, are associated with unhealthy eating practices (ADA 2006). Gregg and others (2007) found that the prevalence of adult type 2 diabetes increased from 5.08% in 1976-1980 to 8.83% in 1999-2004. This finding is thought to be due to the considerable increase in obesity during this period of time (Gregg and others 2007).

Although the physical effects of obesity have been well studied, much less is known about the psychological associations of obesity (Friedman and Brownell 1995). Some studies suggest that there is no relationship between obesity and general psychological problems, and no differences in the psychological functioning of obese and non-obese people (O'Neil and Jarrell 1992; Striegel –Moore and Rodin 1986; Stunkard and Wadden 1992; Wadden and Stunkard 1985). However, others believe that the

psychological effects of obesity vary from person to person, with some obese individuals experiencing mild to severe psychological problems, and others experiencing no problems (Friedman and Brownell 1995).

The health conditions associated with overweight and obesity have a substantial economic impact on our country. Medical expenses related to overweight and obesity can include both direct and indirect costs. The direct medical costs of obesity include preventive, diagnostic, and treatment services. The indirect medical costs of obesity relate to morbidity and mortality and include income lost by decreased productivity, limited activity, absenteeism, sick days, and the cost of future income lost by premature death. In 1998, medical expenses associated with overweight and obesity accounted for 9.1% of total U.S. medical expenditures and may have reached $92.6 billion in 2002 (CDC 2007c). In 2000, according to *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*, the medical and related costs of obesity in the U.S. totaled more than $117 billion (CDC 2005). Therefore, because of the potential reduction in health costs, decreasing the rates of obesity and overweight are significantly important in the realm of public health (ADA 2006).

Causes of Obesity

Overweight and obesity result from eating more energy in the diet than is expended through physical activity. However, there are many factors that contribute to the development of obesity including genetic, environmental, behavioral, and cultural factors. Behavioral and environmental factors provide the greatest opportunities for prevention and treatment (CDC 2007a). Evidence suggests that genetic factors combine

with environmental and lifestyle factors to increase an individual's risk of becoming overweight or obese (Eiben and Lissner 2006). An individual's behavior, such as poor dietary choices and limited physical activity, add to this risk (CDC 2007a). Selected causes of obesity will be briefly reviewed including the roles of diet composition, physical activity, and environmental conditions.

Diet Composition

The changing environment in our country has expanded our food options and affected our eating habits. Readily available convenience foods, fast foods, and sodas, that are high in fat, energy, and/or sugar, may contribute to an increasing caloric intake. Portion sizes have also increased in the U.S., which can contribute to weight gain (CDC 2007a). People are also eating away from home more. In 1987, 36% of Americans reported eating away from home three or more times per week. Between 1999 and 2000, 41% of Americans reported eating away from home at least three or more times per week (Kant and Graubard 2004).

Physical Activity

Physical activity plays an important role in energy balance because it uses energy. Physical activity is also beneficial in reducing the risk of some diseases, such as colon cancer, diabetes, and hypertension, and in building and maintaining bones, muscles, and joints, and reducing the risk of falls among the elderly. However, most Americans do not get much physical activity. Advancements in technology have created many products that save time and energy such as cars, elevators, computers, dishwashers, and television remote controls. In 2000, according to the Behavioral Risk Factor Surveillance System,

more than 26% of adults engaged in no physical activity during their spare time (CDC 2007a).

Environmental Conditions

An individual's environment or community may also affect the health-related decisions they make. Health related decisions might be affected by community, home, and/or workplace influences (CDC 2007a). For example, environments that are safe and facilitate walking promote physical activity, which leads to lower obesity rates, lower obesity-related illnesses, and improved overall health (Doyle and others 2006). The current hypothesis is that building communities with more sidewalks and bicycle paths, better aesthetics, less crime, and less traffic would increase the physical activity of its residents. In a planned community near Denver, Colorado, an environment has been developed that has smaller housing lots with more parks, shops, restaurants, theaters, and workplaces within walking distance (Larkin 2003). More healthy meals, snacks, and beverages available in workplaces would also aid in positively influencing health-related decisions (ADA 2006). In these settings, it is important to create environments that facilitate physical activity and better dietary choices (CDC 2007a).

Prevalence of Obesity in the Workplace

Obesity and the many obesity-related illnesses directly impact the health and well-being of the U.S. workforce. The rates of obesity increased approximately 10% in U. S. workers between 1986 and 2002. During the past decade, obesity rates have increased in all occupational groups, regardless of race or gender. However, in a large national sample of U.S. workers, obesity rates were found to be higher in female workers

than in male workers in most of the 41 occupations investigated. Between 1986 and 1995, occupations with the highest female obesity rates were motor vehicle operators (22.6%), health services workers (21.0%), and cleaning and building services workers (20.0%). Work-related factors that may contribute to weight gain include job position, job stress, and extended work hours (Caban and others 2005).

Need for Wellness Programs in the Workplace

In her book, A Dietitian's Guide to Corporate Health Promotion, Denise Ferko-Adams writes that the corporate community cannot wait for more studies supporting benefits of employee wellness programs. She believes that it is urgent that today's society quit smoking, improve their eating habits, and exercise regularly. Ferko-Adams feels that employees who make these lifestyle changes would be more productive and healthy. As a result, employers would benefit from fewer health care costs. In a presentation titled, "Survival Skills for the Corporate Setting," Ferko-Adams suggests that businesses focus on implementing employee wellness programs, especially those that focus on obesity (Peregrin 2005).

The existence of a less physically active society with increasing health conditions and health care expenditures places a great financial burden on employers (Reardon 1998). The health conditions related to obesity contribute significantly to long-term disability, and the increase in childhood and adolescent obesity will pose a greater problem to employers in the future. Short-term disability claims from obesity-related conditions have increased 10-fold over the past decade. These claims cost employers approximately $8,720 per employee each year (Caban and others 2005). During a time of

rising health care costs and decreasing federal funding, it is important that programs, which promote health and prevent disease, prove to have economic advantages (ADA 2006). It makes sense, then, for employers to promote employee wellness in order to contain costs (Reardon 1998).

Ferko-Adams believes that, as a result of worksite wellness programs, cost is reduced due to decreased doctors' visits and improved moral and productivity. She also believes that wellness programs can reduce absenteeism (Peregrin 2005). It is important, then, that registered dietitians involve themselves in planning and recording outcomes of wellness programs (Peregrin 2005).

Insurance companies encourage employee wellness programs as well. The Health Insurance Institute Board and Blue Cross Blue Shield Associations have developed literature that summarizes the benefits of worksite wellness programs and reviews some of the most well known programs (Fielding and Breslow 1983). Some life and health insurance companies offer reduced insurance payments to participants of wellness programs (Foreyt and others 1980), and many insurance companies also sponsor wellness programs for their own employees (Fielding and Breslow 1983).

Benefits of Workplace Wellness Programs

Workplace wellness programs developed secondary to cultural progression, well-grounded research, and a nation-wide increase in attention to health and wellness (Reardon 1998). These programs started being developed in the 1970s when companies like Johnson and Johnson and Pfizer Pharmaceuticals began promoting employee wellness (Peregrin 2005). These types of worksite wellness programs have caused a shift

in the responsibility of health care from the government and health care industry to employers (Reardon 1998). The emphasis of health-promotion programs has also shifted from curative to preventive, and the worksite is a good place to offer both types of programs (Foreyt and others 1980).

Worksite intervention programs should emphasize physical activity and social support, and should provide education and incentives for employees (ADA 2006). Employee wellness programs might include lectures, classes, and reading materials designed to encourage healthy eating (Foreyt and others 1980). Many programs have shown that environmental manipulation can enhance motivation (Brownell and others 1986). An increase in the availability of more healthful foods and beverages in the workplace could help employees make better dietary choices (ADA 2006). Weight loss and smoking cessation programs that use financial incentives and reward systems have also been successful (Brownell and others 1986).

Targeting the workplace with wellness programs is logical because Americans spend about one-third of their day at work, where organized communication and peer support exist (Reardon 1998). Workplace wellness programs can generate both individual and institutional benefits. Employees participating in these programs become more positive about their own efforts, which can bring about a more positive attitude in their work life (Miller and Edelstein 1990). These programs help to prevent occupational illness, injury, and disability while promoting healthy lifestyles and reducing chronic disease in the workforce (Caban and others 2005). Worksite wellness programs could

potentially bring about team building, improved morale and productivity, and a reduction in insurance claims and sick days (Readron 1998).

Some research has shown that suggestions on improving diet are rarely implemented and that many weight loss programs are ineffective as well (Foreyt and others 1980). However, numerous worksite wellness programs have proven to be successful (Miller and Edelstein 1990). Many companies have implemented programs to help employees quit smoking and drinking and to help them increase exercise and improve their diet (Fielding and Breslow 1983). Several studies of worksite weight loss programs have reported significant weight loss, low attrition, and improved morale as a result (Worick and Petersons 1993).

The increased interest in health and wellness may be due to the financial benefits gained by employers (Reardon 1998). Creating and implementing worksite weight loss programs that assist employees in losing weight and maintaining weight loss could significantly reduce the health care expenditures of both employers and employees (Caban and others 2005). Many workplace health promotion programs have been developed that focus on wellness rather than the absence of disease as a way to manage costs (Reardon 1998); most of these programs are cost effective when compared to the price of obesity treatment (ADA 2006). For example, the cost of treating cardiovascular disease is much greater than the cost of preventing cardiovascular disease through wellness programs (Reardon 1998).

The potential of worksite health promotion programs to improve public health is great. One way to achieve these results is to implement health promotion competitions,

which can increase motivation and social support (Brownell and others 1984). Some of the many large companies that have implemented weight loss programs include Ford Motor Company, General Foods, Kimberly-Clark Corporation, Gold King, Boeing Company, Land O'Lakes Company, and Campbell's Soup Company (Foreyt and others 1980).

Effectiveness of Worksite Weight Loss Programs

The potential for weight loss programs in industry, government, and the armed forces is great. The positive health effects of these programs could impact many people. However, this potential has not yet been reached. Nutrition education programs related to healthy eating are particularly promising because they can so easily be put into effect in company cafeterias (Foreyt and others 1980). Worksite weight loss programs are becoming a growing trend in group-based obesity treatment (Hermann-Nickell and Baker 1989). Worksite wellness programs may be more effective than clinical programs because of the social interaction that exists between employees and the social reinforcement of behavior change that this interaction provides (Malott and others 1984). Such programs provide peer support and the added incentive of constant social support from coworkers (Hermann-Nickell and Baker 1989). The convenience of location in worksite wellness programs may also attract participants (Malott and others 1984).

A few studies have examined the effectiveness of weight loss programs in the workplace. Six studies will be reviewed. Brownell and others (1984) conducted weight loss competitions involving employees of three different work settings in Lycoming County, Pennsylvania. The competitions had 213 participants (78 males and 135 females)

with a mean age of 38.8 years. The objective of this study was to find out if health promotion competitions in the workplace enhance motivation and social support. Competition 1 took place in three banks, lasted 12 weeks, and involved 112 employees (29 males and 83 females) with a mean age of 35.7 years. Employees within each bank formed a team. Competition 2 took place in a manufacturing firm, lasted 13 weeks, and involved 53 employees (18 males and 35 females) with a mean age of 46 years who formed three teams. Competition 3 took place in a different manufacturing firm, lasted 15 weeks, and involved 48 employees (31 males and 17 females) with a mean age of 38.2 years who formed three teams.

The teams in this program were weighed weekly and received an informational packet from a section of a behavioral treatment manual each week. Topics covered in the sections from the manual included self-monitoring, stimulus control, slower eating, reinforcement, social support, attitude change, nutrition, and exercise. A bulletin board that posted weekly results provided feedback and acted as an incentive for participants throughout the competition. The winning team was the team that reached the highest percent of their weight loss goal. Teams paid to participate in the program, and the winning team from each competition received this money as their prize. Upon completion of the competition, employees and management completed a questionnaire addressing the changes they experienced in morale, energy level, employee-management relations, absenteeism, and work performance.

The results of this program were encouraging, and employers described this competition as a positive experience. This program experienced a dropout rate of less

than 1%, and each participant lost an average of 12.1 pounds during the competition. The average weight loss was 13.2 pounds in Competition 1, 11.9 pounds in Competition 2, and 9.9 pounds in Competition 3. All employees rated no change or improvement in all work-related factors, with 71% of employees reporting improvement in morale. Employees thought that weekly weigh-ins, team support, and the competition were the most beneficial aspects of the program. All managers reported an improvement in employees' health, health attitudes, morale, employee-management relations, work performance, and absenteeism. No negative effects were reported. Employers reported that team support, competition, and weekly weigh-ins were the most important parts of the competition. The program was successful in both business and industrial occupations, and at worksites with 150 to 1,200 employees. Most health promotion programs focus on education and not on motivation. This program produced better results than more educationally intensive programs. Perhaps this is a result of increased motivation and social support found in the workplace (Brownell and others 1984).

In a study by Hermann-Nickell and Baker (1989), 15 employees (11 females and four males) in the corporate headquarters of a major supermarket chain participated in an 8-week weight loss program. Participants met weekly after work hours for eight 1- hour classes led by a registered dietitian. Each participant received a manual and each class focused on a topic that corresponded to a chapter in the manual. Participants designed their own exercise programs, calorie levels, and weight loss goals. The registered dietitian monitored participants' diets through food logs that were reviewed weekly and returned to participants with suggestions for improvement.

During this program, participants lost an average of 6.4 pounds. The average absolute body fat of the participants decreased by 2.75% and the average inches lost from sites meaured on participants was 3.9. Circumference measurements were taken at the forearm, chest, waist, hips, thigh (in females only), calf (in females only), and upper arm (in males only). Men experienced an average decrease of 12.4 pounds, 1.4% total body fat, and 3.5 inches. Women experienced an average decrease of 4.1 pounds, 3.9% total body fat, and 4.3 inches. Surveys taken on completion of the program revealed that participants found behavior modification, nutrition education, and exercise to be beneficial components of the program. Regular aerobic exercise, recording food intake, and calorie counting were reported as behaviors most frequently used to aid in weight loss. By the end of the program, participants thought they could continue to lose weight based on the knowledge gained from the program (Hermann-Nickell and Baker 1989).

Hoke and Franks (2002) studied the effect of treatment setting on weight loss in a 12-week weight loss program that took place in Fort Worth, Texas. Twenty-seven women and six men ranging in age from 27 to 62 years (mean age of 44.27 years) participated at either a medical university, their primary care physician's office, or their worksite. A psychologist who led most of the weekly 1-hour sessions directed the program. A registered dietitian and a physiologist led other sessions. The registered dietitian developed a meal plan for each participant with a 500-kcal deficit relative to the subject's resting metabolic rate. The physiologist developed exercise programs for each participant.

At the completion of the program, weight and BMI had decreased by 9.05 pounds and 1.54 kg/m², respectively, in those participating at a medical university, 8.40 pounds and 2.21 kg/m², respectively, in those participating in a physician's office, and 14.97 pounds and 2.55 kg/m², respectively, in those participating at their worksite. The results of this study indicated that individuals participating at their worksite were more successful than individuals participating at a medical university and were statistically more successful than individuals participating at a physician's office ($p=0.03$). The study concluded that worksite programs promote better adherence to weight loss procedures (Hoke and Franks 2002).

Miller and Edelstein (1990) conducted an 8-week employee wellness program at a children's hospital in Miami, Florida. The wellness program included 142 employees who volunteered to join weight loss, smoking cessation, exercise, and/or cholesterol screening groups. The objective of this study was to show how a hospital employee wellness program can be established and to report the results of such a program (Miller and Edelstein 1990). Thirty-two employees (29 females and three males age 23 to 63 years) were enrolled in the 8-week weight loss component titled The Weight Watchers at Work Program. Thirty of the 32 participants lost weight and nine participants reached their goal weights. The average weight loss was 8 pounds for these employees, and weight change ranged from a loss of 26 pounds to a gain of two pounds. Twenty employees (19 females and one male age 24 to 59 years) participated in the exercise portion of the program. These employees experienced an average 4-pound weight loss, and weight change ranged from a loss of 15 pounds to a gain of two pounds. Participants'

average resting heart rate decreased from 81 beats per minute to 69.5 beats per minute. Twenty-four employees participated in the smoking cessation portion of the program titled Smokenders. Twenty-two of the twenty-four participants completed the course as non-smokers. On two separate occasions, 135 employees participated in cholesterol screening. These employees received dietary information for lowering cholesterol. If participants met their 8-week goals, the hospital paid their entry fee for the weight loss and smoking cessation programs. Employees in this wellness program reported an improvement in motivation, involvement, and attitude toward their workplace (Miller and Edelstein 1990).

Another study conducted by Worick and Petersons (1993) reviewed the results of five annual hospital worksite weight loss competitions in Kalamazoo, Michigan. In these competitions, participants formed their own teams of five members for a 5-week weight loss program. The competition included goal setting, incentives, weigh-ins, and the option of one-on-one nutrition counseling. A registered dietitian weighed participants each week, and the results, calculated as percentage of team goal weight, were posted weekly on the cafeteria bulletin board. The winning team was the team that lost the highest percentage of their goal weight. During the first two years of the program, the winning teams received t-shirts and trophies. During the third year, each participant paid an entry fee and the first and second place teams received the money. During the forth and fifth years, a weekly drawing was held for teams whose members had all attended the weekly weigh-in.

The 1,386 participants lost an average of 4.8 to 5.2 pounds during each of the five annual competitions. The competition enrolled 437 participants the first year, 298 participants the second year, 258 participants the third year, 221 participants the fourth year, and 172 participants the fifth year. Average weight loss was 4.9 pounds the first year, 5.1 pounds the second year, 5.2 pounds the third year, 5.0 pounds the fourth year, and 4.8 pounds the fifth year. Two-hundred four employees participated in two or more consecutive competitions. A trend toward smaller average weight losses were observed with repeat participation. Employees who participated in all five annual competitions lost more weight during the second, third, fourth, and fifth years than during the first year. These differences were significant in employees participating in only two consecutive years ($p>0.05$) and reached significance in those participating in three, four, or five consecutive years. This study suggested that annual worksite weight loss competitions could be effective (Worick and Petersons 1993).

Denise Ferko-Adams' team-based corporate wellness program, "Winning by Losing", has also produced positive outcomes. The participants of her programs, conducted in various workplaces, lose an average of 8 pounds during the 8-week program. Many participants have also reduced or eliminated the need for medications for diabetes, hypertension, and hyperlipidemia (Peregrin 2005).

In 1998, Ferko-Adam's program took place at a steel plant in Indiana. Of the 234 employees who participated, 83% completed the program, 94% attended at least six of the eight weekly sessions, and two quit smoking. The average weight loss was 8.4 pounds. At a hospital in Pennsylvania, the program included employees and members of

the community. Of the 195 participants, 77% completed the program and lost an average of 8.5 pounds. At a medical center in Pennsylvania, 22% of the hospital's 1,100 employees joined the program, and 73% of the participants reached their weight loss goal. The average weight loss was 7 pounds (Peregrin 2005).

Key Components of Worksite Weight Loss Programs

Workplaces should develop programs that offer year-round participation, rather than one-event each year, in order to minimize temporary weight loss. Keeping team members working together throughout the year may help to maintain social support and prevent participants from regaining the weight they lost. Maintenance of a healthy weight should be the long-term goal of all worksite weight loss programs. Contests can be part of such programs. However, encouragement and support of weight maintenance should exist between contests to prevent relapse (Worick and Petersons 1993).

Registered dietitians and dietetic technicians play an important role in the promotion of health and the prevention of disease. Prevention includes medical services and tests, counseling, and health education. These, among other factors, can help to prevent the onset of certain conditions. The focus of prevention is to reduce both the long-term and the short-term risk of disease (ADA 2006). Dietitians should help businesses to examine the unique qualities of their employees and their health care expenditures. From this information, they should be able to implement specific wellness programs (Peregrin 2005). Reardon states that "wellness is contagious" and that "workplace health promotion is progressive, responsible, and supportive of individuals, consumers, and communities." (Reardon 1998). Registered dietitians must continue to

educate businesses about the need for wellness programs and the value of their expertise (Peregrin 2005).

Definition of Social Support

Cobb (1976) defines social support as information that leads a person to believe that he or she is "cared for and loved", is "esteemed and valued", and "belongs to a network of communication and mutual obligation" (Cobb 1976). Social support is important in career, marital, and health counseling, as well as psychotherapy (Janis 1983). According to House (1981), social support can be in the form of physical assistance, emotional support, informational assistance, or appraisal (House 1981).

Effects of Social Support

Behavior and Motivation

Many researchers believe that social support is critical to initiate and sustain behavioral changes, including new health behaviors (Janis 1983). Social support may act to buffer stress and can assist individuals in making stressful decisions (Kayman and others 1990). Cobb believes that "social support facilitates coping with crisis and adaptation to change". The emotional support and sense of acceptance provided by social support may create an environment that is more conducive to lifestyle modification (Cobb 1976). Social support is an especially important component for those who lack motivation when faced with difficult situations or tasks such as changing careers, adhering to medical recommendations, or abstaining from cigarettes, alcohol, or drugs (Janis 1983). Family, friends, and coworkers can help individuals to remain motivated and provide positive reinforcement (NHLBI 1998).

Addiction

Evidence also shows that environmental and social factors have an impact on addictive disorders, such as disordered eating. The environment can negatively affect addictive behaviors through social pressures from others and exposure to unwanted behaviors or cues during social events. Interpersonal conflict, the opposite of social support, is associated with addiction relapse. Therefore, social support is seen as a component of relapse prevention. In addiction treatment, it seems that interpersonal conflict is a hindrance, but social support is helpful (Brownell and others 1986).

Health

Health-enhancing qualities of social contact and relationships have been seen as well. Many researchers have become interested in social support as a way to improve health. Some research suggests that individuals who are more socially withdrawn are more psychologically and physically unhealthy and more likely to die (House and others 1988). Social factors can determine susceptibility to diseases, such as heart disease, cancer, and psychiatric disorders (Brownell and others 1986). Studies indicate that socially isolated people, including unmarried people, have higher mortality rates and higher rates of tuberculosis, accidents, and psychiatric disorders. Early sociology research suggested that socially isolated people were more likely to commit suicide than socially integrated people (House and others 1988).

In a review of more than 30 human and animal studies, social relationships were found to have a protective effect on health (House and others 1988). Research has found that social support helps to protect against low birth weight, arthritis, tuberculosis,

alcoholism, psychiatric illnesses, and death (Cobb 1976). Whether social relationships are supportive or not may also have an effect on health. Supportive social relationships can have an effect on human thought, feeling and behavior in ways that enhance health (House and others 1988).

Psychological and sociobiological theories suggest that the presence of, or relationship with, another person may cause motivational, emotional, or neuroendocrinal effects which promote health. The effects that social relationships have on health may be due to the sense of meaning or coherence they provide, or by the health-enhancing behaviors they promote. Behaviors that may be positively influenced by social relationships include sleeping, dieting, exercising, abstaining from alcohol, cigarettes, and drugs, seeking medical care, and adhering to medical treatments. Declining risk factors and developing medical technology are helping to improve health and longevity. However, these improvements could be even greater if the quality and quantity of social relationships improve (House and others 1988).

Adherence to Therapy

Social factors can also influence individuals in making stressful decisions and adhering to therapeutic programs (Brownell and others 1986). In a health care setting, social support can help patients remain in treatment and comply with prescribed therapies (Cobb 1976). Studies suggest that when attempting to improve the health of large groups of people, it may prove more beneficial to focus on encouraging social support rather than discouraging negative behaviors (Janis 1983). This evidence suggests that social support is crucial to therapeutic processes (Cobb 1976).

Weight Loss

Social support is also related to weight loss success as it enhances motivation of individuals who are dieting and losing weight (Brownell and others 1986, Janis 1983). Strong social support systems can promote weight loss (NHLBI 1998). The worksite is one of the main environments in which social support could be used to promote behavioral change in weight loss programs (Worick and Petersons 1993). Ferko-Adams believes that "teams create an internal support network" in worksite weight loss programs (Peregrin 2005).

Sources or Types of Social Support

Social support may be found in families, in group settings, or in the workplace.

Family Support

In weight loss attempts, social support from both family and friends is imperative (Kalodner and DeLucia 1990). Families can increase treatment compliance, enhance motivation, provide social support, and positively influence an individual's diet and exercise patterns. Instrumental family support can include altering eating habits and becoming active along with the overweight person, transporting the overweight person to clinics, and helping the person to reduce the psychological stress of attempting weight loss (Barbarin and Tirado 1985). Family support can also discourage or prevent situations that may hinder weight loss (Kalodner and DeLucia 1990).

Psychological interventions, aimed at enlisting the support of family members, are critical to weight control in certain individuals (Weinsier and others 1984). Several behavior-oriented weight loss programs utilize family members to provide ongoing social

support and positive reinforcement for better adherence to weight loss regimens. Families can provide support by positive reinforcement and participation in the weight loss treatment. Familial encouragement and support increase the likelihood of weight loss success, which, in turn, increases the likelihood of continuing family support (Barbarin and Tirado 1985).

Research indicates that the state of relationships within a family is related to health maintenance and promotion as well. Emotionally close family relationships may contribute to long-term success in health maintenance and treatment programs (Barbarin and Tirado 1985). However, unsupportive families may undermine the progress of a family member attempting to lose weight (Kalodner and DeLucia 1990). Through their research, Barbarin and Tirado (1985) concluded that when a family is emotionally close, caring, and supportive, the "family relationship can make the difference between success and failure in maintaining weight loss" (Barbarin and Tirado 1985).

Research also suggests that spouse involvement may facilitate weight loss. In a study conducted by Brownell and others (1978), couples who received couple's training, focusing on providing support during weight loss, lost more weight than couples who did not receive couple's training. This study also suggested that spouses are influential in the maintenance of weight loss. In the couples that received couple's training, approximately 30% of total weight loss occurred in the maintenance period (Brownell and others 1978). In a meta-analysis of several couples' weight loss programs by Black and others (1990), couples' programs experienced greater weight loss than did behavioral treatments in

which individuals participated alone. However, these results were not statistically significant (Black and others 1990).

Group Support

Group settings that offer reinforcement and social support enhance behavior modification in those who are mildly to moderately obese (Hermann-Nickell and Baker 1989). Self-help groups like Weight Watchers, Take Off Pounds Sensibly, Overeaters Anonymous, and workplace weight loss programs all use peer support as a type of social intervention for weight loss (Kalodner and DeLucia 1990).

Gottlieb (1988) reported that the social support found in groups could bring about cognitive transformation relating to the experience of obesity and the process of losing weight. Group support can increase an individual's self-value through social comparisons and validation. By sharing their experiences with one another, group members acquire a greater sense of control. Many group members may adopt a new outlook on their weight problem and may even find purpose in the problem. Group members maintain their commitment by setting examples of mentally controlled behaviors, sharing frustrations, and pronouncing a sense of responsibility to each other (Gottlieb 1988). Paxton (1996) suggested that if groups of friends would explore healthy approaches to eating, powerful individual and cultural changes could occur (Paxton 1996).

One way to have individualized treatment, while maintaining the economic advantages and social support of group programs, is to allow individuals with similar characteristics to join the same group. Having homogenous group composition may allow content and discussion to center around common problems. Individuals who are similar

to one another may be more supportive than a group of individuals with different backgrounds. Some research has indicated that gender and problem severity may be closely associated with the outcome of obesity treatment. Other literature suggests that the degree of homogeneity of group members influences satisfaction with other group members (Jeffrey and others 1985).

Workplace Support

According to Stewart (1985), social relationships in work settings often represent the second most important relationships after family relationships (Stewart 1985). This is understandable because most employed adults spend at least 8 hours a day in a work environment. During this amount of time, co-workers typically have numerous opportunities to become acquainted with one another. Because coworkers share their work environment with each other, they also share common experiences, duties, stressors, and customs. The opportunity to share these commonalities with others in the workplace provides a natural base for the formation of relationships (Chadsey and Beyer 2001).

Social Support in Weight Loss

In 1995, Schwartz and Brownell (1995) hypothesized that individuals lacking social support would benefit from programs with high amounts of social support (Schwartz and Brownell 1995). Appraisal and emotional support seem to be the most beneficial in regard to weight management; however, the exact way in which social support aids in weight loss is unknown. The most common theory is that social support

helps to alleviate stress. However, the effects of social support may also be seen in the absence of stress (Parham 1993).

Current research suggests that social support in weight loss programs is effective (Kalodner and DeLucia 1990). Four studies examining the role of social support in weight loss are reviewed. In a study by Hausenblas and Carron (1998), a questionnaire completed by 102 University of Western Ontario students (44 male and 58 female), with a mean age of 19.3 years, living in a coed residence reported that the group had more positive influences on their eating and dieting behaviors than negative influences. Positive influences were reported by 71.4% of the females on quality of food consumed, by 12.9% on the quantity of food consumed, by 10% on routines or habits associated with food consumption, by 4.3% on weight and body shape issues, and by 1.4% on exercise. Positive influences were reported by 45.8% of the males on quality of food consumed, by 41.7% on the quantity of food consumed, by 4.2% on weight and body shape issues, and by 8.3% on exercise. No males reported a positive influence on eating routines or habits. The study concluded that female residents reported a significantly higher number of instances where the group influenced their eating and dieting behaviors than did male residents (Hausenblas and Carron 1998).

In a study, which took place in Fremont, California, 35 obese women (mean age of 41 years) who regained weight after weight loss, 24 formerly obese women (mean age of 47 years) who maintained weight loss, and 26 average weight control subjects who always remained approximately the same weight were compared. Subjects' age ranged from 21 to 73 years. Subjects were interviewed using a questionnaire. The questionnaire

included questions focusing on weight history, dieting and weight-loss history, reasons for gaining, maintaining, or sustaining weight, positive and negative involvement in weight control from other people, and perceived social support. This study found that significantly more women who maintained weight loss and control subjects sought support from family, friends, and professionals than did women who regained lost weight ($p<0.01$). Eighty percent of control subjects, 70% of those who maintained weight loss, and only 38% of those who regained lost weight sought social support. Significantly more individuals who regained lost weight reported having little support or help with their problems than individuals who maintained their weight loss ($p<0.01$) (Kayman and others 1990).

In a study by Jeffery and others (1984), 89 middle-aged obese men (mean age of 52.8 years) were randomly selected from a community sample in Minneapolis and St. Paul, Minnesota to participate in a 15-week behavioral weight loss program. The participants met weekly in groups of 12 to 17. At weekly meetings, participants developed weight loss contracts, received diet and exercise instructions, and received behavioral skills training. At a one-year follow-up, participants were questioned about social support and their use of behavioral techniques. The reported social support received from family and friends was positively and significantly related to the amount of weight loss in these men ($p<0.01$). The influence of family support was particularly influential in long-term weight loss success ($p<0.001$). The 20 men who reported high family cooperation in weight loss lost 35.1 pounds in treatment, 28.2 pounds at the 1-year follow-up, and 20.6 pounds at the 2-year follow-up. The 22 men who reported low family

cooperation in weight loss lost 26.2 pounds in treatment, 11.9 pounds at the 1-year follow-up, and 5.8 pounds at the 2-year follow-up (Jeffery and others 1984).

In a study designed to prevent relapse following weight loss, Marcoux and others (1990) recruited 26 subjects (24 female and two male with a mean age of 44.8 years) who had completed a behavior modification weight loss program. The relapse prevention program consisted of six weekly classes each focusing on a topic related to relapse. Before beginning the relapse prevention program, subjects completed questionnaires focusing on diet history, health beliefs and behaviors, and social support. Subjects also completed the same social support questionnaire at a three-month follow-up. The results of this study showed that all general measures of support were associated with weight loss, and that appraisal support was the most strongly associated with weight loss and reached significance ($p=0.05$). In measures of support related specifically to weight loss, emotional support and appraisal support were both positively associated with weight loss. Subjects reported that their greatest sources of appraisal support were from neighbors and friends. The results of this study suggest that social support is an important factor in weight maintenance (Marcoux and others 1990).

Effectiveness of Group Weight Loss Programs vs. Individual Weight Loss Programs

Many researchers believe that individuals who attempt to lose weight as part of a group are more successful than individuals who attempt to lose weight alone (Schwartz and Brownell 1995). It is common for behavioral treatment of obesity to be done in groups (Jeffrey and others 1985). The experience and social support found in group settings and programs, like Weight Watchers, is much different from the experience of

losing weight alone (Schwartz and Brownell 1995). In group programs, the content is standardized, duration is fixed, and progress is geared toward the average client (Jeffrey and others 1985).

Several studies have researched the effects of group support in weight loss programs. Four of these studies are reviewed here. In a 2-year study that took place in six different clinical centers in the U.S., 212 individuals (185 females and 27 males) participated in an individual self-help weight loss program, and 211 individuals (173 females and 38 males) participated in a group-based commercial weight loss program. The mean age of the participants was 44 years in the self-help group and 45 years in the commercial group. Individuals in the self-help program had two 20-minute consultations with a registered dietitian and received printed materials on diet and exercise. Individuals in the group-based program attended weekly Weight Watchers meetings, which included food, activity, and behavior modification plans. Meetings lasted one hour and included educational materials, weigh-ins, and social support.

At all follow-up visits, the weights of subjects in the group-based program were significantly lower than at baseline, and the amount of weight loss and BMI reduction was greater in the participants in the group-based program than those in the individual self-help program. At the one-year follow-up, weight had decreased by 9.5 pounds in the commercial group and 2.9 pounds in the self-help group ($p<0.001$), and BMI had decreased by 1.6 kg/m^2 in the commercial group and 0.5 kg/m^2 in the self-help group ($p<0.001$). At the two-year follow-up, weight had decreased by 6.4 pounds in the commercial group and 0.4 pounds in the self-help group ($p<0.001$), and BMI had

decreased by 1.1 kg/m² in the commercial group and 0.2 kg/m² in the self-help group ($p<0.001$). Waist circumference was significantly less in subjects in the group-based program compared with subjects in the individual self-help program at 1 and 2 years after the study. At the one-year follow-up, waist circumference had decreased by 4.1 centimeters (cm) in the commercial group and 1.6 cm in the self-help group ($p=0.003$). At the two-year follow-up, waist circumference had decreased by 2.4 cm in the commercial group and 0.6 cm in the self-help group ($p=0.02$). The results of this study suggest that structured, group-based commercial weight loss programs, that provide social support, are more effective than individual counseling or self-help weight loss programs (Heshka and others 2003).

In a study by Kingsley and Wilson (1977), 78 women, whose age ranged from 20 to 60 years (mean age of 41.5 years), in an obesity treatment program were randomly assigned to either a social pressure treatment condition, a group-based behavioral therapy treatment condition, or an individual behavioral therapy treatment condition. Treatment consisted of eight weekly treatment sessions led by therapists. Sessions for the social pressure treatment condition focused on motivation and group dynamics. The group behavioral therapy treatment sessions focused on changing current behaviors. Subjects in the individual behavior therapy condition received the same treatment as the group behavioral therapy subjects, but received one-on-one counseling with a therapist rather than group therapy. Results of this study showed that subjects in the group-based and the individual behavior therapy treatment conditions experienced significantly more weight loss than the subjects in the social pressure treatment conditions ($p<0.005$). Initially, no

differences were seen between the group-based behavioral therapy treatment condition and the individual behavioral therapy treatment condition. However, at a 12-month follow-up, the group-based behavioral therapy treatment condition and the social pressure treatment condition showed significantly more weight maintenance success than the individual behavioral therapy treatment condition ($p<0.05$). Subjects in the individual behavior therapy condition experienced significant relapse. At the 12-month follow-up, the social pressure group had maintained a 6.87 pound weight loss and the behavioral therapy group had maintained a 13.64 pound weight loss. However, the individual behavioral therapy group had gained 0.26 pounds. The study concluded that group behavior therapy might be the most favorable approach to weight loss, but social pressure treatment is also a credible approach (Kingsley and Wilson 1977).

However, other researchers have found no difference between attempting weight loss as part of a group or as an individual. In a study of 82 men (mean age of 45.75 years) attempting to reduce body weight and sodium intake, the outcomes of group treatment and individual counseling were compared. Forty-one men (mean age of 45.7 years) were assigned to group treatment, and 41 men (mean age of 45.8 years) were assigned to individual treatment. During the first year of the study, subjects completed eight weeks of weight reduction education classes, followed by a 4-week stabilization period, and eight weeks of sodium reduction education classes. During the second year of the study, the sodium education classes were taught first and the weight reduction education classes were taught second. Sodium intake decreased by 90.6 mEq in group participants and 80.9 mEq in individual participants. Weight decreased by 13.2 pounds in group participants

and 12.5 pounds in individual participants. Both treatments were successful at inducing significant reductions in body weight and sodium intake; however, no significant differences in outcomes between treatment modes were found (Jeffery and others 1983).

A study by Adams and others (1986) compared the results of 125 subjects attempting to lose weight as part of a group to 28 subjects attempting to lose as individuals. Mean age of the subjects was 43.4 years, and subjects' age ranged from 18 to 70 years. The participants consisted of 129 women and 24 men. Subjects receiving group treatment lost 11.11 pounds and subjects receiving individual treatment lost 14.28 lbs. In this study, men who participated in group sessions lost approximately 35.02 pounds, and women who participated in group sessions gained approximately 1.62 pounds. Conversely, women who participated individually lost approximately 21.16 pounds, and men who participated individually gained approximately 4.46 pounds. No significant difference in group versus individual treatment was shown in this study. However, significant differences between sex and type of program were seen ($p<0.001$) (Adams and others 1986).

Conclusions and Justification

Social support has proven to be a major component of many successful weight loss programs. Most studies examining worksite weight loss programs show that these programs are effective at inducing weight loss among participants (Brownell and others 1984, Hermann-Nickell and Baker 1989, Hoke and Franks 2002, Miller and Edelstein 1990, Peregrin 2005, Worick and Petersons 1993). The support of coworkers may enhance the success of participants in worksite weight loss programs. Studies have shown

social support to be positively related to weight loss, especially in women (Kayman and others 1990, Hausenblas and Carron 1998, Wollersheim 1970). Several studies have shown that group-based weight loss programs, which offer participants more social support, are more effective than weight loss programs in which members participate individually (Heshka and others 2003, Jeffery and others 1983). To date, studies have not examined these two aspects, worksite weight loss programs and social support, together.

The worksite weight loss program examined in the present study involved participants attempting to lose weight as part of a group and participants attempting to loss weight individually. The purpose of the retrospective analysis of this program was to determine whether those participating in groups, and, therefore, receiving more social support, were more successful in their weight loss attempts than those participating as individuals.

Research Hypotheses

1. Absolute weight reduction will be significantly greater in those attempting to lose weight as part of a group versus those attempting to lose weight individually.

2. Percent of initial weight change will be significantly greater in those attempting to lose weight as part of a group versus those attempting to lose weight individually.

3. Absolute body fat reduction will be significantly greater in those attempting to lose weight as part of a group versus those attempting to lose weight individually.

4. Percent of initial body fat change will be significantly greater in those attempting to lose weight as part of a group versus those attempting to lose weight individually.

5. Absolute BMI reduction will be significantly greater in those attempting to lose weight as part of a group versus those attempting to lose weight individually.

6. Percent of initial BMI change will be significantly greater in those attempting to lose weight as part of a group versus those attempting to lose weight individually.

CHAPTER III

SUCCESS OF WOMEN IN A WORKSITE WEIGHT LOSS PROGRAM ATTEMPTING TO LOSE WEIGHT AS PART OF A GROUP COMPARED TO WOMEN ATTEMPTING TO LOSE WEIGHT AS INDIVIDUALS

ABSTRACT

The success of women in a worksite weight loss program attempting to lose weight as part of a group was compared to the success of women attempting to lose weight as individuals. Female hospital and nursing home employees were enrolled in an 8-week worksite weight loss program as individuals (n=30) or as part of a group (n=42). At the end of the eight weeks, employees (irrespective of group versus individual participation) lost an average of 6.2 pounds and 1.5% body fat. Weight change ranged from a 29.6 lb loss to an 11 lb gain. The absolute weight reduction, weight reduction as percent of initial weight, absolute body fat reduction, reduction of body fat as percent of initial body fat, absolute BMI reduction, and BMI reduction as percent of initial BMI were significantly greater ($p<0.05$) in those participating as part of a group compared to those participating individually. Absolute weight reduction was 7.6 ± 1.1 lbs per person for group participants and 4.2 ± 6.4 lbs for individual participants. Weight reduction as percent of initial weight was $4.0 \pm 3.7\%$ per person for group participants and $1.9 \pm 3.4\%$

for individual participants. Absolute body fat reduction was 1.7 ± 1.3% per person for group participants and 0.9 ± 1.3% for individual participants. Body fat reduction as percent of initial body fat was 5.4 ± 4.7% per person for group participants and 2.2 ± 3.6% for individual participants. Absolute BMI reduction was 1.3 ± 1.1 kg/m² per person for group participants and 0.7 ± 1.1 kg/m² for individual participants. BMI reduction as percent of initial BMI was 4.3 ± 3.7 % per person for group participants and 2.2 ± 3.4 % for individual participants. When comparing those participating as a group versus individually, exercising more frequently (p=0.05) was significantly associated with weight loss in those participating as a group and following a diet plan (p=0.04) was significantly associated with weight loss in those participating individually. In conclusion, in a worksite-based weight loss program, female employees attempting to lose weight as part of a group were more successful than female employees attempting to lose weight individually.

INTRODUCTION

Since the early 1900s, obesity rates have increased (Brownell and Wadden 1992). According to the most recent National Health and Nutrition Examination Survey, 66.3% of U.S. adults age 20 years and older are overweight or obese, and 17.1% of U.S. children and adolescents age 2-19 years are overweight (Ogden and others 2006). The increase in obesity has been seen in all age, gender, racial, and ethnic groups (Baskin and others 2005). However, in recent years, the increase in obesity among women has become even more apparent (Brownell and Wadden 1992). Women have higher obesity rates than men across all groups (Baskin and others 2005). According to the National Health and

Nutrition Examination Survey in 2003-2004, 33.2% of women and 31.1% of men were obese (Ogden and others 2006).

Obesity is a major public health issue affecting health and well-being (Friedman and Brownell 1995). Adults who are obese are prone to die earlier and are at a higher risk of many health problems than are adults who are of normal weight (Baskin and others 2005). Obesity is linked to an increased risk of hypertension, type 2 diabetes, dyslipidemia, gallbladder disease, osteoarthritis, coronary artery disease, stroke, asthma, and sleep apnea. Recently, studies have suggested that obesity is also linked to an increased risk of endometrial, breast, prostate, and colon cancers (Caban and others 2005).

Obesity and the many obesity-related illnesses directly impact the health and well-being of the U.S. workforce (Caban and others 2005). Therefore, the potential of worksite health promotion programs to improve public health is great. One way to achieve these results is to implement health promotion competitions, which can increase motivation and social support (Brownell and others 1984). The prevalence of obesity is highly influenced by social factors (Colletti and Brownell 1982), and strong social support systems can promote weight loss (NHLBI 1998). Social support is related to weight loss success as it enhances motivation of individuals who are dieting and attempting to lose weight (Brownell and others 1986; Janis 1983). Because of the available support from coworkers, the worksite is one of the main environments in which social support could be used to promote behavioral change in weight loss programs (Worick and Petersons 1993). Several studies have shown that worksite weight loss

programs are effective at inducing weight loss among participants (Brownell and others 1984, Hermann-Nickell and Baker 1989, Hoke and Franks 2002, Miller and Edelstein 1990, Peregrin 2005, Worick and Petersons 1993). Several studies have also shown that group-based weight loss programs, which offer participants more social support, are more effective than weight loss programs in which members participate individually (Heshka and others 2003, Jeffery and others 1983). To date, however, studies have not examined these two aspects, worksite weight loss programs and social support, together. This study was a retrospective examination of the results of a workplace weight loss program in which women attempted to lose weight as part of a group or as individuals.

SUBJECTS, STUDY DESIGN, AND METHODS

In January 2007, an 8-week weight loss program, titled "Alabama's Weight Loss War" was offered for the 454 employees of a hospital and nursing home in a rural town in Chambers County, Alabama. Data from the U.S. Census Bureau on Chambers County show that the median age is 37.7 and the median household income is $29,667. Sixty-four percent of the population has obtained high school and college degrees, 60.9% of the population is Caucasian, and 38.1% of the population is African American (U.S. Census Bureau 2000). The goal of the program was to improve the health of hospital and nursing home employees while fostering peer support and healthy competition. Andrea Rigsby, RD, LD developed the program.

Subject Recruitment

Recruitment for the program began in November of 2006. Flyers were placed around the hospital and nursing home advertising the program. The flyers contained

information about the nature of the competition, the prizes to be awarded, and where and when to sign-up for the program. In December 2006, a sign-up sheet was placed outside of the dietitian's office. Employees could sign-up to participate either as part of a group or as an individual. Groups could consist of three to five employees each. Those participating as part of a group were allowed to decide which employees were part of their group and to make up a creative name for their group. Employees were able to self-select whether they participated as part of a group or as an individual. Therefore, this study used convenience sampling.

Upon signing up, participants received an information sheet. The information sheet contained information about the weigh-ins and how the winners would be determined. After all participants had signed-up, a weigh-in schedule was developed and distributed to each participant.

Study Design and Methods

All participants reported for the initial assessment in January 2007. At this time, participants' age and race were obtained and anthropometric measurements were taken. Weight was measured weekly to the nearest 0.1 pound using a digital scale (Seca® Physician & Fitness Scale, Model # 703, Hanover, MD). The scale had a precision of <0.05%. At each weigh-in, participants wore their usual work attire or uniform and were asked to remove their shoes and jackets, and any items in their pockets. Participants were weighed at similar times of the day at each weigh-in. Moreover, participants tended to wear similar attire or uniforms at each weigh-in; thus, it is unlikely that significant differences in clothing weight existed across weigh-ins.

Height was measured using a measuring rod (Seca®, Model #220, Hanover, MD) attached to the digital scale. To measure height, each participant stood barefoot with their heels, buttocks, upper back, and head touching the back of the measuring rod. The measuring slide was then lowered to the top of each participant's head, and the height to the nearest quarter inch at the read-off mark on the measuring rod was recorded.

Body mass index (BMI) was calculated from each participant's height and weight measurements based on the formula: BMI = weight in kilograms divided by height in meters squared.

Body fat was measured using bioelectrical impedance (Omron Fat Loss Monitor, Model HBF-306, Bannockburn, IL). The instrument generated a current, which was passed through participants' bodies via two grip electrodes, which were held in each of the participants' hands. The resistance to impedance between the electrodes was measured. The BIA device enables calculation of body fat percentage up to 50 percent. Because hydration status affects BIA accuracy, participants were instructed to consume fluids at regular intervals throughout the day and to remain hydrated throughout the program.

In addition, participants completed a questionnaire asking about the use of a diet plan, dietary supplements and/or weight loss medications, frequency (number of days per week) of eating away from home, and frequency (number of days per week) of exercise. All participants also received a manual containing a 1,200 calorie eating plan, low-fat cooking techniques, tips on dining away from home, grocery shopping advice, and information on physical activity, fiber and water intake, the dangers of fad diets, and

weight maintenance. The eating plan included in the manual was based on the food guide pyramid and was similar to the Weight Watchers diet plan. The manual also included a weekly menu planner and daily food journals. The eating plan and weekly menu planners were provided so that participants could decide what they were going to eat throughout each week and make their grocery lists accordingly. The food journals were provided so that participants could record the number of servings from each food group they consumed each day.

For the 8-week program period, participants were required to report each Tuesday to be weighed. Participants were weighed on the same scale each time. At the final assessment, participants were not only weighed, but body fat was also re-assessed. Participants also completed the same questionnaire as the one completed at the initial assessment.

Other Program Information

In conjunction with the weight loss program, several fat- and calorie-controlled items were added to the hospital's cafeteria menu. Weekly menus were posted in the cafeteria and the healthier items were marked so that participants knew what to order. These menu items continue to be offered year round.

Weekly results as percentage weight change for both the groups and the individuals were posted on a bulletin board located near the hospital's cafeteria every Wednesday, following Tuesday's weigh-in, so that participants could compare their individual and/or group results with the results of other individuals and/or groups. The three groups and the three individuals with the highest percent weight change and the

total number of pounds lost by all participants combined were also posted on the bulletin board each week.

Prizes were awarded to the three groups with the highest percent weight change and the individual with the highest percent weight change. Those participating as part of a group were eligible to win both a group prize and the individual prize. However, those participating as individuals were only eligible to win the individual prize.

The first place group received one dollar for each pound lost by all group members combined. The second place group received fifty cents for each pound lost by all group members combined, and the third place group received twenty-five cents for each pound lost by all group members combined. The individual participant with the highest percent weight change received one year of free health insurance.

Approval

Retrospective anonymous data analyses, based on data collected as part of the program Alabama's Weight Loss War by the hospital and nursing home were approved by the Institutional Review Board for the Use of Human Subjects in Research at Auburn University.

Statistical Analyses

Statistical analyses were performed using the software InStat Version 3.0 (GraphPad Software, San Diego, CA). Unpaired student's t-tests were used to compare differences in initial weight, height, age, body fat, and BMI of participants attempting to lose weight as part of a group versus participants attempting to lose weight as individuals. Body weight reduction as percent of initial weight, body fat reduction as percent of initial

body fat, and BMI reduction as percent of initial BMI were calculated by dividing the amount of weight, body fat, or BMI reduction by the initial value and multiplying by 100. Unpaired student's t-tests were used to compare differences in final weight, absolute weight reduction, weight reduction as percent of initial weight, final body fat, absolute body fat reduction, body fat reduction as percent of initial body fat, final BMI, absolute BMI reduction, and BMI reduction as percent of initial BMI at the completion of the program for participants attempting to lose weight as part of a group and participants attempting to lose weight as individuals. Paired student's t-tests were used to compare the initial weight, body fat, and BMI to the final weight, body fat, and BMI for all participants. Multiple regression analysis was used to determine which (if any) factors including following a diet plan, supplement or weight loss medication use, frequency of eating out, and/or frequency of exercise influenced weight loss in those participating as part of a group and as individuals. Statistical significance was set at a p value of <0.05.

RESULTS

Subjects

A total of 72 female (52 Caucasian and 20 African American) employees signed up to participate in the 8-week program. Forty-two employees participated as part of a group (28 Caucasian and 12 African American), and 30 employees participated as individuals (24 Caucasian and 8 African American). The 42 employees who participated as part of a group formed a total of 10 groups. There were two groups with three members each, four groups with four members each, and four groups with five members

each. The participants in this study represent a convenience sample. Selected characteristics of the participants are shown in Table 1.

Anthropometric Findings

Overall, employees (irrespective of group versus individual participation) lost an average of 6.2 lbs and 1.5% body fat. Weight change ranged from a 29.6 lb loss to an 11 lb gain. Percent body fat loss ranged from a 4.9% loss to a 2.8% gain. Of those participating as a group, 90.5% (38/42) lost weight. Weight change in this group ranged from a gain of 2.6 lbs to a loss of 29.6 lbs. Of those participating individually, 80% (24/30) lost weight and weight change ranged from a gain of 11 lbs to a loss of 19 lbs. No significant differences were found in the mean initial age, height, weight, and BMI of individuals participating as individuals versus those participating as part of a group; however, initial percent body fat was significantly ($p=0.007$) higher in those participating as individuals versus those participating as part of a group (Table 1). The mean initial weight and percent body fat of those participating as part of a group was 197.1 ± 57.0 lbs and $36.0 \pm 7.0\%$, respectively. The mean initial BMI of those participating as part of a group was 32.3 ± 9.8 kg/m². By the end of the 8 weeks, the mean final weight and body fat of these participants decreased significantly to 189.5 ± 56.8 lbs and $33.5 \pm 6.8\%$ respectively. The mean BMI also decreased significantly to 30.9 ± 9.8 kg/m² at the end of the program (Table 2).

The mean initial weight of those participating individually was 205.2 ± 50.4 lbs. Mean weight decreased significantly to 201.2 ± 50.0 lbs at the end of the program. The mean initial percent body fat of those participating individually was $40.0 \pm 6.5\%$ and

decreased significantly to a mean final percent body fat of 38.7 ± 6.5%. The mean initial BMI of those participating individually was 34.6 ± 8.4 kg/m² and decreased significantly to a mean final BMI of 33.8 ± 8.3 kg/m² (Table 2).

At the completion of the program, the absolute weight reduction, weight reduction as percent of initial weight, absolute body fat reduction, reduction of body fat as percent of initial body fat, absolute BMI reduction, and BMI reduction as percent of initial BMI were significantly greater in those participating as part of a group compared to those participating individually (Table 3). Absolute weight reduction was 7.6 ± 1.1 lbs per person for group participants and 4.2 ± 6.4 lbs for individual participants. Weight reduction as a percent of initial weight was 4.0 ± 3.7% per person for group participants and 1.9 ± 3.4% for individual participants. Absolute % body fat reduction was 1.7 ± 1.3% per person for group participants and 0.9 ± 1.3% for individual participants. Body fat reduction as percent of initial body fat was 5.4 ± 4.7% per person for group participants and 2.2 ± 3.6% for individual participants. Absolute BMI reduction was 1.3 ± 1.1 kg/m² per person for group participants and 0.7 ± 1.1 kg/m² for individual participants. BMI reduction as percent of initial BMI was 4.3 ± 3.7 % per person for group participants and 2.2 ± 3.4 % for individual participants (Table 3).

Questionnaire Findings

More individuals participating as a group increased use of a meal plan, dined out fewer days per week, and exercised more days per week than those participating individually (Table 4). While dietary supplements or weight loss medications were reportedly used by slightly more women participating as a group (Table 4), a review of

the supplements showed that the supplements contained vitamins, minerals, and/or fiber and thus were not considered as weight loss supplements.

When comparing those participating as a group versus individually, exercising more frequently ($p=0.05$) was significantly associated with weight loss in those participating as a group and following a diet plan ($p=0.04$) was significantly associated with weight loss in those participating individually.

DISCUSSION

Wellness and weight loss programs have become increasingly popular in the workplace. One major benefit of worksite wellness and weight loss programs is the social support that participants receive from their coworkers. The social support provided by a group of people attempting to lose weight together seems to positively affect weight loss, especially in women (Hausenblas and Carron 1998; Kayman and others 1990; Wollersheim 1970). Some studies have examined only the effectiveness of worksite weight loss programs (Brownell and others 1984; Hermann-Nickell and Baker 1989; Hoke and Franks 2002; Miller and Edelstein 1990; Peregrin 2005; Worick and Petersons 1993), and others have examined only the effects of group support in attempting to lose weight (Heshka and others 2003; Jeffery and others 1983). This study examined both of these aspects together and found that women in a worksite setting who attempted to lose weight as part of a group lost a significantly larger amount of weight and percentage of body fat than women who attempted to lose weight as individuals.

Anthropometric Findings

In this 8-week study, participants attempting to lose weight as part of a group lost an average of 7.6 lbs, whereas participants attempting to lose weight individually lost an average of 4.2 lbs. These findings are similar to those of other studies examining the effectiveness of worksite weight loss programs. Brownell and others (1984) found that 112 bank employees and 101 manufacturing firm employees (78 males and 135 females with a mean age of 38.8 years) participating in a weight loss competition lost an average of 9.9 to 13.2 lbs over 15 weeks. Hermann-Nickell and Baker (1989) reported that 4 male and 11 female supermarket chain employees lost an average of 12.4 and 4.1 lbs respectively in an 8-week weight loss program. Worick and Petersons (1993) reported that 1,386 employees participating in five consecutive annual hospital worksite weight loss programs, each lasting 5 weeks, lost an average of 4.8 to 5.2 lbs.

The differences in this study's findings between employees who participated individually versus those who participated as part of a group are consistent with the literature that has examined the effectiveness of social support in weight loss programs. In a 2-year study, Heshka and others (2003) found that 211 subjects (173 females and 38 males) in a group-based weight loss program experienced significantly greater reduction in weight ($p<0.001$), BMI ($p<0.001$), and waist circumference ($p=0.003$) than 212 subjects (185 females and 27 males) in individual based programs.

The present study also found that those participating as part of a group lost a significantly higher percentage of initial weight than those participating as individuals. The group participants lost 4% of their initial weight, and the individual participants lost

only 1.9% of their initial weight. Similarly, a study researching a group-based worksite weight loss program found that participants lost 7.8% of their initial weight in 12 weeks (Hoke and Franks 2002). A 2-year study by Heshka and others (2003) comparing group-based and individual participants' weight loss found that 211 subjects (173 females and 38 males) participating in groups lost 3.18% of their initial weight and 212 subjects (185 females and 27 males) participating individually lost only 0.11% of their initial weight.

In the present study, participants in groups had a significantly greater absolute change in BMI than individual participants. Group participants' BMI decreased by 1.4 kg/m^2 and individual participants' BMI decreased by only 0.8 kg/m^2. A study by Hoke and Franks (2002) that examined the effect of setting on weight loss attempts in 33 participants (27 females and 6 males) ranging in age from 27 to 62 years (mean age of 44.27 years) found that the 10 participants (mean age of 47.8 years) assigned to a 12-week group-based worksite weight loss program had a decrease in BMI of 2.55 kg/m^2.

In the present study, participants in groups had a significantly greater BMI decrease as percentage of initial BMI, than individual participants. The final BMI of group participants was 4.3% less than their initial BMI, and the final BMI of individual participants was only 2.2% less than their initial BMI. In a 2-year study, Heshka and others (2003) found that 211 subjects (173 females and 38 males) participating in groups had a greater decrease in BMI as percent of initial BMI than 212 subjects (185 females and 27 males) participating individually; the final BMI of group participants was 3.55% less than their initial BMI, and the final BMI of individual participants was 0.30% less than their initial BMI.

Factors Associated with Weight Change

In the present study, those participating in a worksite weight loss program as part of a group lost significantly more weight than those participating as individuals. The success of those participating in groups is assumed to be attributed to the social support found in group settings. Several studies have demonstrated the positive association between group support and weight loss (Gottlieb 1988; Hermann-Nickell and Baker 1989; Kalodner and DeLucia 1990; Paxton 1996). Other factors, such as following a diet plan and increasing energy expenditure through exercise, can also help promote weight loss. Similar to the finding of this study, both Haynes and others (1999) and Stefanick and others (1998) found that following a prescribed eating plan leads to significant weight loss. Other studies also support the findings that increased frequency of exercise can be associated with weight loss (Ross and others 2000, Tsai and others 2003).

The social support provided by members of a group likely played a key role in positively influencing decisions related to dieting, exercising, eating away from home, and using weight loss medications or supplements. Group members may encourage other members of the group to follow a diet or eating plan, exercise more, and eat away from home less. They may also influence decisions about taking weight loss medications or supplements. Yet in this study, while the group participants were more successful than the individual participants, the study did not have random sampling, therefore, the results lack external validity and cannot be generalized.

CONCLUSION

In conclusion, women attempting to lose weight as part of a group in a workplace setting were more successful than women attempting to lose weight individually in a workplace setting.

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Table 1: Mean age, height, weight, body mass index (BMI), and body fat of participants at the start of the program

	Group[a] (n=42)	Individual[a] (n=30)	p-value
Age (yr)	35.31 ± 10.83	39.53 ± 9.51	0.091
Height (in/cm)	65.69 ± 3.32/ 166.85 ± 8.43	64.67 ± 2.20/ 164.19 ± 5.59	0.146
Weight (lb/kg)	197.1 ± 57.0/ 89.6 ± 25.9	205.2 ± 50.4/ 93.3 ± 22.9	0.535
Body Mass Index (kg/m^2)	32.3 ± 9.8	34.6 ± 8.4	0.300
Body Fat (%)	36.0 ± 7.0	40.0 ± 6.5	0.017

[a] Data are presented as mean ± SD

Table 2: Initial and final weight, body fat, and body mass index (BMI) of those attempting to lose weight as part of a group and as individuals

	Initial[a]	Final[a]	p-value
Group (n=42)			
Body weight (lb)	197.1 ± 57.0	189.5 ± 56.8	<0.0001
Body fat (%)	36.0 ± 7.0	33.5 ± 6.8	<0.0001
BMI (kg/m²)	32.3 ± 9.8	30.9 ± 9.8	<0.0001
Individual (n=30)			
Body weight (lb)	205.2 ± 50.4	201.2 ± 50.0	0.002
Body fat (%)	40.0 ± 6.5	38.7 ± 6.5	0.001
BMI (kg/m²)	34.6 ± 8.4	33.8 ± 8.3	0.0007

[a] Data are presented as mean ± SD

Table 3: Absolute weight, body fat, and body mass index (BMI) reduction, and reduction of weight, body fat, and body mass index as percent of initial values at the completion of the weight loss program

	Group[a] (n=42)	Individual[a] (n=30)	p-value
Absolute weight reduction (lb)	7.6 ± 1.1	4.2 ± 6.4	0.036
Weight reduction as percent of initial weight (%)	4.0 ± 3.7	1.9 ± 3.4	0.015
Absolute % body fat reduction (%)	1.7 ± 1.3	0.9 ± 1.3	0.008
Body fat reduction as percent of initial body fat (%)	5.4 ± 4.7	2.2 ± 3.6	0.003
Absolute BMI reduction (kg/m^2)	1.3 ± 1.1	0.7 ± 1.1	0.025
BMI reduction as percent of initial BMI (%)	4.3 ± 3.7	2.2 ± 3.4	0.016

[a] Data are presented as mean ± SD

Table 4: Participants' use of eating plans, frequency of eating out, use of supplements, and frequency of exercise prior to and at the end of the weight loss program[a]

		Individuals participating as a group (n=42)		Individuals participating alone (n=30)	
		Initial	Final	Initial	Final
Followed an eating plan	No	37 (88)	20 (48)	25 (83)	17 (57)
	Yes	5 (12)	22 (52)	5 (17)	13 (43)
Days per week dining away from home	0	2 (5)	3 (7)	0 (0)	3 (10)
	1-3	26 (62)	33 (79)	21 (70)	19 (63)
	3-5	9 (21)	3 (7)	9 (30)	5 (17)
	5-7	5 (12)	3 (7)	0 (0)	3 (10)
Dietary supplements or weight loss medication use	No	40 (95)	38 (90)	28 (93)	26 (87)
	Yes	2 (5)	4 (10)	2 (7)	4 (13)
Days per week exercising	0	23 (55)	10 (24)	11 (37)	9 (30)
	1-3	12 (29)	19 (45)	15 (50)	16 (53)
	3-5	6 (14)	10 (24)	4 (13)	4 (13)
	5-7	1 (2)	3 (7)	0 (0)	1 (3)

[a] Data are presented as number of participants (%)

CHAPTER IV

SUMMARY OF FINDINGS

Women attempting to lose weight as part of a group experienced a significantly greater absolute weight reduction than women attempting to lose weight as individuals. This finding supports hypothesis one.

Women attempting to lose weight as part of a group experienced a significantly greater weight reduction as percent of initial weight than women attempting to lose weight as individuals. This finding supports hypothesis two.

Women attempting to lose weight as part of a group experienced a significantly greater absolute body fat reduction than women attempting to lose weight as individuals. This finding supports hypothesis three.

Women attempting to lose weight as part of a group experienced a significantly greater body fat reduction as percent of initial body fat than women attempting to lose weight as individuals. This finding supports hypothesis four.

Women attempting to lose weight as part of a group experienced a significantly greater absolute BMI reduction than women attempting to lose weight as individuals. This finding supports hypothesis five.

Women attempting to lose weight as part of a group experienced a significantly greater BMI reduction as percent of initial BMI than women attempting to lose weight as individuals. This finding supports hypothesis six.

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APPENDICES

APPENDIX A

AUBURN UNIVERSITY INSTITUTIONAL REVIEW BOARD APPROVAL

AUBURN
UNIVERSITY

Office of Human Subjects Research
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June 7, 2007

MEMORANDUM TO: Dr. Sareen Gropper
Nutrition and Food Science

PROTOCOL TITLE: "Success of Women in a Work-site Weight Loss Program Attempting to Lose Weight as Part of a Group Compared to Women Attempting to Lose Weight as Individuals"

IRB AUTHORIZATION NO: 07-124 EP 0706

APPROVAL DATE: June 6, 2007
EXPIRATION DATE: June 5, 2008

The above referenced protocol was approved by IRB Expedited procedure under 45 CFR 46.110 (#5). You should report to the IRB any proposed changes in the protocol or procedures and any unanticipated problems involving risk to subjects or others. Please reference the above authorization number in any future correspondence regarding this project.

If you will be unable to file a Final Report on your project before June 5, 2008, you must submit a request for an extension of approval to the IRB no later than May 22, 2008. If your IRB authorization expires and/or you have not received written notice that a request for an extension has been approved prior to June 5, 2008, you must suspend the project immediately and contact the Office of Human Subjects Research for assistance.

A Final Report will be required to close your IRB project file.

If you have any questions concerning this Board action, please contact the Office of Human Subjects Research at 844-5966.

Sincerely,

Peter W. Grandjean, Chair
Institutional Review Board for the Use of Human Subjects in Research

cc: Dr. Doug White

APPENDIX B

RAW DATA

							1/9						
Code	G/I	Ht in In	Ht in Cm	Age	BMI	Grp BMI	Wt in lbs	Wt in Kg	Fat%	IQ1 Diet	IQ2 Eat Out	IQ3 Pill/ Sup	IQ4 Exe
01	G1	63"	160	26	34.96	32.73	197.0	89.5	40	No	3-5	No	0
02	G1	69"	175	52	31.83		214.2	97.4	35	No	1-3	No	0
03	G1	64"	163	55	37.82		221.4	100.6	45	No	3-5	No	3-5
04	G1	65"	165	23	26.32		157.6	71.6	29	No	3-5	No	0
05	G2	65"	165	38	25.63	27.35	153.4	69.7	34	No	1-3	No	0
06	G2	68"	173	43	25.62		168.6	76.6	36	No	1-3	No	1-3
07	G2	63”	160	49	26.84		151.2	68.7	38	No	3-5	No	0
08	G2	62"	157	20	25.81		139.6	63.5	29	No	1-3	No	1-3
09	G2	67"	170	37	35.85		228.0	103.6	42	No	3-5	No	0
10	G3	72"	183	32	29.79	33.03	219.6	99.8	31	No	1-3	No	3-5
11	G3	68"	173	24	37.00		243.2	110.5	40	No	1-3	No	0
12	G3	69"	175	43	34.22		230.4	104.7	44	No	3-5	No	0
13	G3	67"	170	27	31.11		197.8	89.9	30	No	3-5	No	1-3
14	G4	66"	168	39	22.38	24.06	138.8	63.1	30	No	5-7	No	0
15	G4	63"	160	18	23.28		131.2	59.6	26	No	1-3	No	0
16	G4	63"	160	52	26.13		147.2	66.9	42	No	1-3	No	3-5
17	G4	70"	178	19	21.89		152.6	69.4	20	No	1-3	No	1-3
18	G4	65"	165	29	26.62		159.2	72.4	30	No	1-3	No	0
19	G5	64"	163	29	33.31	28.59	195.0	88.6	40	Yes	5-7	No	1-3
20	G5	61"	155	25	34.38		181.4	82.5	36	No	1-3	No	0
21	G5	69"	175	29	28.79		193.8	88.1	29	Yes	1-3	Yes	5-7
22	G5	67"	170	35	23.29		148.0	67.3	30	No	1-3	No	0
23	G5	64"	163	40	23.20		135.8	61.7	27	No	1-3	No	3-5
24	G6	58"	147	38	71.68	43.26	343.0	85.1	>50	No	1-3	Yes	1-3
25	G6	67"	170	42	36.43		231.6	105.3	43	No	1-3	No	0
26	G6	68"	173	39	28.46		187.2	85.1	35	No	1-3	No	0
27	G6	63"	160	23	36.68		206.6	93.9	38	No	1-3	No	1-3
28	G6	72"	183	40	43.04		317.2	144.2	41	No	5 -7	No	1-3
29	G7	61"	155	43	58.25	39.28	307.6	139.8	>50	No	1-3	No	0
30	G7	68"	173	44	28.26		186.0	84.5	36	No	1-3	No	0
31	G7	68"	173	45	31.34		206.2	93.7	41	No	5-7	No	0
32	G8	68"	173	40	28.76	31.82	189.2	86.0	30	No	1-3	No	0
33	G8	65"	165	51	29.12		174.2	79.2	30	No	5-7	No	1-3
34	G8	67"	170	50	47.23		300.4	136.5	44	Yes	1-3	No	3-5
35	G8	66"	168	37	22.16		137.4	62.5	28.0	No	3-5	No	1-3
36	G9	62"	157	22	37.36	36.73	202.2	91.9	43	No	1-3	No	0
37	G9	73"	185	26	46.96		353.4	160.6	48	No	0	No	0
38	G9	67"	170	55	33.84		215.2	97.8	42	No	0	No	1-3
39	G9	64"	163	23	28.76		167.6	76.2	36	No	1-3	No	0
40	G10	60"	152	34	26.10	26.86	132.6	60.3	35	Yes	3-5	No	0
41	G10	62"	157	24	25.98		140.6	63.9	28	No	1-3	No	1-3
42	G10	66"	168	23	28.51		176.8	80.4	35	Yes	1-3	No	3-5

							1/9						
Code	G/I	Ht in In	Ht in Cm	Age	BMI	Grp BMI	Wt in lbs	Wt in Kg	Fat%	IQ1 Diet	IQ2 Eat Out	IQ3 Pill/ Sup	IQ4 Exe
43	I	65"	165	51	36.03		215.6	98.0	44	No	1-3	No	3-5
44	I	65"	165	53	38.68		231.4	105.2	45	Yes	3-5	No	1-3
45	I	67"	170	25	30.17		191.8	87.2	34	No	1-3	No	1-3
46	I	64"	163	29	37.48		219.4	99.7	39	No	1-3	No	1-3
47	I	63"	160	31	43.32		244.0	110.9	47	No	1-3	No	1-3
48	I	63"	160	29	33.79		190.4	86.5	40	No	3-5	No	0
49	I	63"	160	37	30.16		169.9	77.2	40	Yes	1-3	Yes	1-3
50	I	65"	165	41	25.48		152.4	69.3	29	No	3-5	No	1-3
51	I	63"	160	53	29.02		163.4	74.3	39	Yes	1-3	No	1-3
52	I	67"	170	51	39.45		250.8	114.0	47	No	1-3	No	1-3
53	I	65"	165	39	64.52		386.2	175.5	>50	No	1-3	No	1-3
54	I	67"	170	24	24.60		156.4	71.1	31	No	1-3	No	0
55	I	68"	173	33	38.19		251.2	114.2	43	No	3-5	No	0
56	I	65"	165	45	41.54		248.6	113.0	47	No	1-3	No	1-3
57	I	66"	168	27	29.65		184.0	83.6	34.0	No	1-3	Yes	1-3
58	I	64"	163	38	27.18		159.0	72.3	36	No	1-3	No	0
59	I	64"	163	34	38.57		225.8	102.6	44	No	1-3	No	0
60	I	64"	164	42	26.84		158.8	72.2	42.0	Yes	1-3	No	1-3
61	I	68"	173	25	27.59		181.6	82.5	27.0	No	1-3	No	1-3
62	I	61"	155	46	38.25		202.0	91.8	49	No	1-3	No	0
63	I	65"	165	54	44.08		263.8	119.9	47	No	3-5	No	0
64	I	63"	160	39	23.24		131.0	59.5	26	No	3-5	No	0
65	I	64"	163	29	43.42		254.0	115.5	40	No	1-3	No	1-3
66	I	68"	173	36	34.95		229.8	104.5	41	No	3-5	No	0
67	I	65"	165	41	34.78		208.2	94.6	42.0	No	3-5	No	0
68	I	63"	160	51	37.93		213.6	97.1	45	No	1-3	No	3-5
69	I	64"	163	41	25.53		149.4	67.9	32	No	1-3	No	1-3
70	I	58"	147	45	36.44		173.2	78.7	43	No	1-3	No	3-5
71	I	65"	165	43	31.14		186.4	84.7	43	No	3-5	No	0
72	I	68"	173	54	25.08		165	75	37	Yes	1-3	No	3-5

	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13			
Code	Wt	Wt	Wt	Wt	Wt	Wt	Wt	Wt	Final Wt in kg	Final BMI	Abs BMI Chg
01	191.0	189.8	190.4	189.8	192.2	190.0	187.8	184.6	83.9	32.70	-2.26
02	205.8	202.4	201.2	199.8	198.2	196.2	192.2	189.2	86.0	27.94	-3.89
03	215.8	214.6	213.0	212.6	212.2	212.0	213.2	209.4	95.2	35.94	-1.88
04	156.2	153.0	153.6	151.8	153.2	150.8	150.6	148.4	67.5	24.69	-1.63
05	145.0	144.0	144.8	142.6	141.6	142.0	139.4	136.8	62.2	22.76	-2.87
06	162.6	162.8	161.0	160.2	161.6	159.8	163.4	159.6	72.5	24.26	-1.36
07	149.8	149.2	147.8	147.2	147.0	148.2	146.6	147.6	67.1	26.14	-0.70
08	137.0	135.6	137.2	136.2	136.0	135.2	135.6	138.6	63.0	25.35	-0.46
09	220.4	218.4	214.8	214.6	213.4	210.8	208.6	208.4	94.7	32.64	-3.21
10	218.0	215.4	215.4	212.8	211.0	209.8	214.0	207.4	94.3	28.13	-1.66
11	238.6	237.0	235.6	234.6	233.8	234.8	233.2	234.8	106.7	35.70	-1.30
12	225.0	220.2	217.4	217.0	216.0	216.8	214.0	212.6	96.6	31.39	-2.83
13	189.0	187.0	180.4	179.8	176.0	174.8	173.4	168.2	76.5	26.34	-4.77
14	137.4	136.2	134.0	132.0	130.6	129.4	128.0	127.6	58.0	20.59	-1.79
15	130.2	124.6	123.0	123.4	126.0	124.0	125.0	125.6	57.1	22.25	-1.03
16	146.0	141.8	140.6	139.0	137.8	136.2	136.2	135.0	61.4	23.91	-2.22
17	150.2	150.8	149.4	145.6	143.6	141.6	140.4	140.0	63.6	20.09	-1.80
18	158.6	157.4	157.4	157.6	158.8	156.6	157.6	155.6	70.7	25.89	-0.73
19	192.8	192.0	192.2	190.0	186.6	187.6	186.4	186.2	84.6	31.96	-1.35
20	179.6	176.2	175.8	174.8	169.4	167.8	167.0	163.6	74.4	30.91	-3.47
21	191.6	191.8	191.6	190.6	189.6	188.6	190.8	189.6	86.2	28.00	-0.79
22	146.6	147.2	147.2	147.0	146.4	145.2	143.2	144.0	65.5	22.55	-0.74
23	133.0	133.0	131.4	130.0	131.6	129.8	127.6	128.6	58.5	22.07	-1.13
24	340.4	339.0	340.6	339.4	337.8	336.4	338.0	337.0	153.2	70.43	-1.25
25	228.6	228.4	228.2	228.2	228.0	229.0	229.0	232.2	105.5	36.36	-0.07
26	183.4	181.4	183.4	182.2	182.6	181.8	183.0	185.6	84.4	28.22	-0.24
27	206.6	206.0	207.0	204.6	204.0	204.0	203.6	205.8	93.5	36.45	-0.23
28	313.4	313.4	313.8	315.4	314.0	313.0	314.4	313.2	142.4	42.47	-0.57
29	303.6	303.6	305.4	302.4	302.2	302.8	301.8	304.4	138.4	57.50	-0.75
30	184.6	182.6	181.8	180.8	179.2	180.0	180.0	179.2	81.5	27.24	-1.02
31	203.6	202.8	202.2	204.6	204.0	200.8	198.6	197.8	89.9	30.07	-1.27
32	187.0	187.0	189.0	186.0	185.2	186.0	186.6	185.2	84.2	28.16	-0.60
33	173.4	174.0	173.4	173.8	173.6	173.8	174.4	174.4	79.3	29.02	-0.10
34	294.8	294.8	293.0	292.2	290.6	291.8	292.2	293.2	133.3	45.92	-1.31
35	136.4	138.6	135.0	135.8	133.8	136.4	135.8	135.4	61.5	21.85	-1.01
36	201.8	201.0	202.2	203.0	202.8	202.5	202.8	202.4	92.0	37.02	-0.34
37	348.6	348.2	348.4	347.4	349.2	347.2	346.6	344.2	156.5	45.41	-1.55
38	214.6	211.8	214.6	216.2	214.0	211.8	212.6	213.0	96.8	33.36	-0.48
39	166.0	166.2	166.4	166.0	165.6	166.6	166.6	167.0	75.9	28.66	-0.10
40	131.4	132.2	131.8	131.4	131.6	133.2	134.4	135.2	61.5	26.40	0.30
41	141.0	138.6	139.2	138.2	137.0	137.4	137.8	138.0	62.7	25.24	-0.74
42	174.2	174.4	174.8	175.4	174.2	175.2	174.8	174.8	79.5	28.21	-0.30

	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13			
Code	Wt	Wt	Wt	Wt	Wt	Wt	Wt	Wt	Final Wt in Kg	Final BMI	Abs BMI Chg
43	210.4	212.6	210.2	205.0	206.8	208.0	206.0	205.6	93.5	34.21	-1.82
44	231.0	228.0	228.2	227.4	228.6	229.0	229.4	229.0	104.1	38.10	-0.58
45	188.4	186.2	187.2	185.4	188.0	186.4	187.0	188.8	85.8	29.57	-0.60
46	219.4	219.4	222.0	222.6	222.2	223.6	222.8	223.6	101.6	38.38	0.90
47	242.0	238.0	236.0	236.8	237.2	237.6	240.0	242.2	110.1	42.90	-0.42
48	183.4	181.6	183.4	182.2	182.6	181.8	183.0	185.6	84.4	32.87	-0.92
49	166.6	166.4	164.0	164.8	165.8	162.0	159.8	165.6	75.3	29.33	-0.83
50	150.0	148.2	146.2	146.2	144.2	143.2	142.0	140.2	63.7	23.33	-2.15
51	161.6	160.6	162.8	163.6	161.4	162.8	162.6	163.6	74.4	28.98	-0.04
52	250.0	248.0	246.0	246.0	246.0	246.0	246.0	248.4	112.9	38.90	-0.55
53	388.0	383.8	383.0	379.2	378.0	376.4	373.2	370.0	168.2	61.56	-2.96
54	157.2	157.8	158.2	159.8	162.6	164.8	166.2	167.4	76.1	26.22	1.62
55	251.2	251.0	250.8	248.4	248.2	247.7	247.0	246.6	112.1	37.49	-0.70
56	246.6	245.0	244.0	244.0	244.2	245.4	246.0	246.6	112.1	41.03	-0.51
57	181.0	180.8	184.4	186.0	186.4	185.8	185.4	185.8	84.5	29.99	0.34
58	154.2	153.8	152.4	152.0	150.2	149.8	147.2	146.6	66.6	25.16	-2.02
59	225.0	221.0	220.2	218.2	215.8	215.0	212.8	212.0	96.4	36.39	-2.18
60	155.0	152.0	151.6	148.4	146.2	144.0	142.6	139.8	63.5	23.99	-2.85
61	178.0	177.2	177.8	177.2	177.0	177.4	177.8	178.6	81.2	27.15	-0.44
62	200.2	194.0	195.2	195.0	196.4	197.2	197.6	198.0	90.0	37.41	-0.84
63	264.4	264.2	265.4	268.2	266.0	267.0	270.0	266.6	121.2	44.36	0.28
64	131.0	129.8	128.0	128.4	130.0	128.6	130.8	128.6	58.5	22.78	-0.46
65	253.6	254.4	249.2	251.4	252.6	251.4	251.0	250.8	114.0	43.04	-0.38
66	224.5	222.4	221.4	222.4	222.8	224.4	225.2	226.4	102.9	34.42	-0.53
67	206.2	204.8	205.2	205.0	204.2	208.0	205.4	207.6	94.4	34.54	-0.24
68	210.6	211.6	209.8	207.0	205.2	202.0	202.6	203.6	92.5	36.06	-1.87
69	149.4	147.6	147.8	148.6	146.8	144.0	142.6	143.4	65.2	24.61	-0.92
70	172.0	175.4	172.8	171.4	173.0	174.0	174.8	176.0	80.0	36.78	0.34
71	189.6	189.2	188.8	189.8	189.0	188.4	189.0	189.8	86.3	31.58	0.44
72	163	162	161	159	161	159	159	159	72.3	24.17	-0.91

	3/13										
Code	%init BMI	Fat %	FQ1 Diet	FQ2 Eat Out	FQ3 Pill/ Sup	FQ4 Exe	Abs Wt Loss	Abs Group Wt Loss	% Init Wt Change	Grp % Init Wt Change	Abs Fat Change
01	-6.46	36	Yes	1-3	No	0	-12.4	-14.7	-6.29%	-7.42	-4.1
02	-12.22	32	Yes	1-3	No	5-7	-25.0		-11.67%		-2.9
03	-4.97	44	Yes	5-7	No	3-5	-12.0		-5.42%		-1.6
04	-6.19	28	No	1-3	No	1-3	-9.2		-5.84%		-1.4
05	-11.20	32	No	1-3	No	3-5	-16.6	-10.0	-10.82%	-5.92	-2.0
06	-5.31	34	Yes	1-3	No	1-3	-9.0		-5.34%		-1.4
07	-2.61	36	Yes	1-3	No	1-3	-3.6		-2.38%		-1.9
08	-1.78	28	Yes	1-3	No	3-5	-1.0		-0.72%		-1.1
09	-8.95	40	Yes	1-3	No	1-3	-19.6		-8.60%		-2.8
10	-5.57	28	Yes	1-3	No	3-5	-12.2	-17.0	-5.56%	-7.63	-3.1
11	-3.51	38	No	1-3	No	1-3	-8.4		-3.45%		-1.6
12	-8.27	41	Yes	3-5	Yes	0	-17.8		-7.73%		-2.8
13	-15.33	25	No	1-3	Yes	1-3	-29.6		-14.96%		-4.9
14	-8.00	28	No	1-3	No	5-7	-11.2	-9.0	-8.07%	-6.20	-2.2
15	-4.30	23	Yes	1-3	No	1-3	-5.6		-4.27%		-3.3
16	-8.50	40	No	3-5	No	3-5	-12.2		-8.29%		-2.2
17	-8.22	16	Yes	1-3	No	3-5	-12.6		-8.26%		-3.2
18	-2.74	30	Yes	0	No	1-3	-3.6		-2.26%		-0.9
19	-4.05	37	Yes	1-3	No	1-3	-8.8	-8.4	-4.51%	-4.92	-2.2
20	-10.09	33	Yes	1-3	Yes	3-5	-17.8		-9.81%		-3.5
21	-2.74	27	No	1-3	No	3-5	-4.2		-2.17%		-1.6
22	-3.18	29	Yes	1-3	No	1-3	-4.0		-2.70%		-0.7
23	-4.87	23	Yes	1-3	No	1-3	-7.2		-5.30%		-3.2
24	-1.74	>50	No	1-3	Yes	0	-6.0	-2.4	-1.75%	-0.92	N/A
25	-0.19	41	No	1-3	No	0	0.6		+0.26%		-1.6
26	-0.84	33	No	1-3	No	0	-1.6		-0.85%		-1.2
27	-0.63	38	Yes	1-3	No	0	-0.8		-0.39%		+0.3
28	-1.32	41	No	5-7	No	1-3	-4.0		-1.26%		-0.7
29	-1.29	>50	No	1-3	No	0	-3.2	-6.1	-1.04%	-2.63	N/A
30	-3.61	35	Yes	1-3	No	1-3	-6.8		-3.66%		-0.6
31	-4.05	39	Yes	1-3	No	0	-8.4		-4.07%		-2.2
32	-2.09	29	No	1-3	No	1-3	-4.0	-3.3	-2.11%	-1.62	-0.9
33	-0.34	29	No	5-7	No	0	0.2		+0.11%		-0.3
34	-2.77	43	No	1-3	No	5-7	-7.2		-2.40%		-1.3
35	-4.58	27.0	No	1-3	No	1-3	-2.0		-1.46%		-1.0
36	-0.91	42	No	3-5	No	1-3	0.2	-3.0	+0.10%	-1.26	-0.6
37	-3.30	46	No	0	No	1-3	-9.2		-2.60%		-1.5
38	-1.42	42	Yes	0	No	1-3	-2.2		-1.02%		-0.6
39	-0.35	36	No	1-3	No	0	-0.6		-0.36%		+0.1
40	1.15	34	Yes	1-3	No	3-5	2.6	-0.7	+1.96%	-0.44	-0.6
41	-2.85	22	Yes	1-3	No	3-5	-2.6		-1.85%		-5.8
42	-1.05	34	No	1-3	No	1-3	-2.0		-1.13%		-1.0

3/13											
Code	%init BMI	Fat %	FQ1 Diet	FQ2 Eat Out	FQ3 Pill/ Sup	FQ4 Exe	Abs Wt Loss	Abs Group Wt Loss	% Init Wt Change	Group % Init Wt Change	Abs Fat Change
43	-5.05	43	Yes	No	No	1-3	-10.0		-4.64%		-0.8
44	-1.50	43	No	3-5	No	1-3	-2.4		-1.04%		-1.7
45	-3.31	32	Yes	1-3	No	1-3	-3.0		-1.56%		-1.7
46	2.40	38	No	1-3	No	0	4.2		+1.91%		-1.1
47	-0.97	46	No	1-3	Yes	1-3	-1.8		-0.74%		-0.4
48	-2.72	38.0	Yes	0	No	1-3	-4.8		-0.85%		-1.9
49	-2.75	39	No	3-5	Yes	1-3	-4.3		-2.36%		-1.8
50	-8.44	25	Yes	1-3	No	1-3	-12.2		-3.40%		-3.4
51	-0.14	39	Yes	3-5	No	1-3	-2.4		+0.12%		-0.6
52	-2.53	47	No	5-7	No	1-3	-2.4		-0.96%		+0.1
53	-4.59	>50	Yes	1-3	No	3-5	-16.2		-4.19%		N/A
54	6.59	34	No	1-3	No	1-3	11.0		+7.03%		+2.8
55	-1.83	43	No	1-3	No	0	-4.6		-2.71%		+0.4
56	-1.23	45	Yes	1-3	No	1-3	-2.0		-0.80%		-1.6
57	1.15	33	No	1-3	Yes	1-3	1.8		+0.98%		-0.7
58	-7.43	34.0	Yes	1-3	No	5-7	-12.4		-7.80%		-1.8
59	-5.71	42	Yes	0	No	0	-13.8		-6.11%		-1.9
60	-10.62	38	Yes	1-3	yes	0	-19.0		-11.96%		-3.6
61	-1.59	27	Yes	1-3	No	0	-3.0		-1.65%		-0.2
62	-2.20	49	No	3-5	No	0	-4.0		-1.98%		-0.3
63	0.64	48	No	3-5	No	1-3	2.8		+1.06%		+0.9
64	-1.98	25	No	1-3	No	0	-3.2		-1.83%		-0.8
65	-0.88	39	No	1-3	No	1-3	-3.2		-1.26%		-0.5
66	-1.52	40	No	1-3	No	0	-3.4		-1.48%		-0.9
67	-0.69	41	No	5-7	No	1-3	-0.6		-0.29%		-1.3
68	-4.93	43	No	1-3	No	3-5	-10.0		-4.68%		-2.5
69	-3.60	31	Yes	1-3	No	1-3	-6.0		-4.02%		-1.1
70	0.93	42	Yes	1-3	No	3-5	2.8		+1.62%		-0.5
71	1.41	43	No	5-7	No	0	3.4		+1.83%		+0.6
72	-3.63	37	Yes	1-3	No	3-5	-6.0		-3.75%		-0.0

3/13		
Code	% Init Fat Change	Grp % Init Fat Change
01	-10.15	-6.68
02	-8.26	
03	-3.53	
04	-4.79	
05	-5.92	-5.07
06	-3.92	
07	-5.07	
08	-3.81	
09	-6.62	
10	-10.00	-9.18
11	-4.03	
12	-6.42	
13	-16.28	
14	-7.26	-8.87
15	-12.60	
16	-5.21	
17	-16.33	
18	-2.96	
19	-5.57	-7.03
20	-9.62	
21	-5.57	
22	-2.36	
23	-12.03	
24	0.00	-1.63
25	-3.75	
26	-3.47	
27	0.79	
28	-1.70	
29	0.00	-2.37
30	-1.69	
31	-5.41	
32	-2.99	-2.64
33	-1.01	
34	-2.97	
35	-3.57	
36	-1.41	-1.43
37	-3.15	
38	-1.42	
39	0.28	
40	-1.74	
41	-20.57	
42	-2.84	

3/13		
Code	% Init Fat Change	Group % Init Fat Change
43	-1.84	
44	-3.82	
45	-5.07	
46	-1.03	
47	-0.86	
48	-4.76	
49	-4.46	
50	-11.89	
51	-1.53	
52	0.21	
53	0.00	
54	9.00	
55	0.94	
56	-3.43	
57	-2.06	
58	-5.03	
59	-4.35	
60	-8.57	
61	-0.74	
62	-0.61	
63	1.90	
64	-3.13	
65	-1.26	
66	-2.22	
67	-3.10	
68	-5.52	
69	-3.42	
70	-1.17	
71	1.41	
72	0.00	

APPENDIX C

QUESTIONNAIRES

Alabama's Weight Loss War Initial Questionnaire

Your Name:_____

1) Have you followed a certain diet or eating plan in the past month?
   a. No
   b. Yes:_____

2) On average, how many days do you eat food from a restaurant (dine-in, take-out, or fast food) per week?
   a. 5-7 days
   b. 3-5 days
   c. 1-3 days
   d. None

3) Have you taken any diet pills and/or dietary supplements during the past month?
   a. No
   b. Yes:_____

4) On average, how many times do you exercise each week?
   a. 5-7 days
   b. 3-5 days
   c. 1-3 days
   d. None

Alabama's Weight Loss War Final Questionnaire

Your Name:_____

1) Have you followed a certain diet or eating plan during the past 8 weeks?
   a. "Counting Your Servings" from the Week 1 Handout
   b. No diet or eating plan
   c. Other:_____

2) On average, how many days have you eaten food from a restaurant (dine-in, take-out, or fast food) per week during this competition?
   a. 5-7 days
   b. 3-5 days
   c. 1-3 days
   d. None

3) Have you taken any diet pills and/or dietary supplements during the competition?
   a. No
   b. Yes:_____

4) On average, how many times did you exercise each week during the competition?
   a. 5-7 days
   b. 3-5 days
   c. 1-3 days
   d. None