

DIETING HABITS OF MEN

by

Virginia L. Vining

A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Master of Science in Human Nutrition

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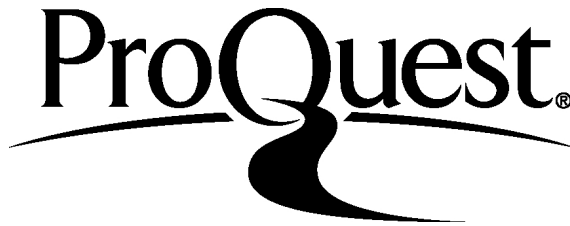
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ABSTRACT

Introduction

There is little research involving the US male population with regard to weight-control and behavior that may affect their weight status. Gender-specific weight-control programs for men aren't the standard.

Aims

The primary aim of this study was to survey dieting and health habits of an adult male employee population. The secondary aim was to determine if the population would be interested in a male-specific weight-control program.

Methods

A 50-question web-based Qualtrics® survey was posted October 2nd – 30th, 2014. A convenience sample was taken. Excluded were men who had not attempted to diet in the past and those under age 18.

Results

Participants numbered 254 males. Sources of nutrition knowledge pertaining to diets ranged from a high of web sites (n=163, 71.2%) to a low of registered dietitians (n=24, 10.5%). Of those who reported restricting at least one-macronutrient (47%, n=119) restrictions were carbohydrates 77% (n=92), fats 40% (n=47) and protein 19% (n=22).

Data were collapsed into age groups for some analyses such as dieting methods. The over 30 age group was more likely to have: decreased amount of food intake ($\chi^2 = 12.03$, $n=185$ $p = .001$), reduced overall calories ($\chi^2 = 3.95$, $n=163$, $p = .047$), skipped meals ($\chi^2 = 7.70$, $n=55$, $p = .006$) or tried programs such as Weight-Watchers™, Jenny Craig™, etc. ($\chi^2 = 6.40$, $n=30$ $p = .011$). There was nothing of significance for those under 30.

Among all respondents, interest in a gender-specific weight-loss program was compared with the following variables: satisfaction with current weight ($\chi^2 = 6.89$, $n=252$, $p = .032$), education (three groups) ($\chi^2=9.76$, $n=251$, $p = .008$), income ($\chi^2=14.56$, $n=245$, $p = .006$) and BMI ($\chi^2=11.17$, $n=252$, $p = .004$). Applying the Mann-Whitney U test to compare weight satisfaction (1-5) values between those interested/not interested in a weight-loss program for men, the two age groups gave (5863.5, $p = .019$), weight satisfaction (5625, $p = .005$), three levels of education (5525.5, $p = .002$), BMI (5678.5, $p = .005$) and income (5599, $p = .034$).

Conclusion

Further research addressing dissatisfaction with BMI may lead to development of gender-specific programs that could result in safe and effective weight-control programs for men possibly decreasing prevalence of male obesity.

Chapter 1

INTRODUCTION

Obesity is a health disparity that cuts across all demographics. Two-thirds of adults and almost one-third of children in the United States (US) are overweight or obese, with every age group, gender, urban or rural and majority-minority populations being represented.¹ This epidemic is associated with major causes of chronic disease, disability and death. Obesity is a complex and multifaceted problem in the US and resources have been developed to bring awareness to the problem at the community and individual level.

A 2012 Institute of Medicine (IOM) report puts a great deal of emphasis on “message environments” for obesity prevention which are broken down into four components including school, food and beverage, physical activity, health care and work environments.² Programs have been developed for communities, schools and work environments as well as for women and children and the IOM report focuses strongly on these components. Yet there is a missing link in these intervention plans. Very little research has been done on the dieting habits of men in the US and the effect these habits have on their weight status.

Males make up 49% of the total population. According to the US Census Bureau, the male population has increased at a slightly higher rate than females (9.9% as opposed to 9.5% respectively between 1999 and 2010).³ Furthermore, much research has been done to address behavioral and group dynamics associated with the influence of diet habits among specific groups with little focus on male dieting habits.

Dietary choices of men may influence health and lifestyle outcomes that affect them as individuals and collectively as a member of their household, potentiating far reaching long-term health affects.

Weight status and the dietary habits associated with weight status have been strongly implicated in research leading to development of chronic conditions such as diabetes, stroke, hypercholesterolemia, heart disease, certain cancers and arthritis. The following literature review will address the eating and dieting habits of men and the effect such habits have on their health.

Chapter 2

LITERATURE REVIEW

2.1 Background

According to the National Health and Nutrition Examination Survey (NHANES) the prevalence of obesity has increased between 1976-1980 and 1988-1994 and again between 1988-1994 and 1999-2010.⁴ An analysis was done of height and weight measurements on 5,555 adult men and women aged 20 years and older obtained in 2007-2008 as part of an NHANES survey, a nationally representative sample of the US population.² Overweight is defined as a Body Mass Index (BMI) between 25.0 and 29.9. Obesity is defined as a BMI of 30 or higher. Estimates of the overweight and obese population of this study revealed that over the 10-year period between 1999 and 2008, obesity showed no significant trend among women, however, there was a significant linear trend for men. A sample size of 2,750 men revealed a prevalence of obesity in 32.2% of men greater than 20 years of age in years 2007-2008; this was up from 27.5% in 1999-2000. Non-Hispanic white men had a 31.9% obesity rate and non-Hispanic black men had an obesity rate of 37.3%. Thirty-one percent of adult men aged 40-59 years were found to be obese between 2011-2012, which indicates increasing trends in obesity across age ranges and further emphasizes this linear trend.

Another NHANES study examined the trends in energy intake among US adults from the 1999 through 2010.⁸ Energy balance has been recognized as a key influence for weight status. Trends in energy intake using data taken from nine

NHANES surveys included a total of 63,761 adults age 20-74 years. The results demonstrated an adjusted mean energy intake that increased from 1955 kcal/day in years 1971-1975 to 2269 kcals/day in 2003-2010, then, declined to 2195 kcals/day during years 2009-2010. Analysis of data from NHANES suggest that the prevalence of obesity may be leveling off among women, particularly white women, but continues to increase among men. In contrast, energy intake among men increased similarly in relative terms as energy intake among women despite a continuing increase in the prevalence of obesity in men. Evidence of this is demonstrated by the population of 4,903 men in 1971-1975 eating a mean total of 2453.4 kcals per day as opposed to the sample population of 2,456 men in 2009-2010 eating a mean total of 2564 kcals per day. Obesity in men might be attributed to the additional 108 kcals/day taken by men combined with increased sedentary lifestyles.

2.2 Dieting Habits of the Male Population and Related Health Disparities

As the baby-boomer population ages certain lifestyle predictors such as smoking, physical activity, sedentary lifestyles and alcohol consumption in middle-aged men can lead to higher disability rates compressed into fewer years. Healthy aging has no clear phenotype definition and more research is needed to establish the impact on dietary and sedentary behaviors on healthy aging men. A study of older men included samples of men born prior to the Second World War.⁶ It is thought that in light of the obesity epidemic, future generations may not age the same. The global phenomenon of obesity is associated with environment, social and personal factors, such as urbanization and global change to food availability, eating habits and increasingly sedentary lifestyles. Current and future impacts of obesity on health care expenditures and human life expectancy may be enormously impacted.⁶

The Pennington Center Longitudinal Study involved 14,343 adults ages 18-89 years and measured height, weight, waist to height ratio (WHtR), waist to hip ratio (WHR) and BMI.⁷ These measures were compared to the vital statistics of the population after 120,637 person years. The vital status of the participants was determined by linkage with the National Death Index through 2009. Associations of anthropometry and all-cause mortality were stronger in white adults than African American (AA) adults; however, total male participation was lower (36.6%) than female (63.4%) in this study. While the purpose of this study was to compare anthropometric measures with mortality between races, it is important to note that the sample size of men in the study was significantly smaller than that of women thereby leading to the need for further research on the association between anthropometric measures and race with attention to the male population. The strength of the association between BMI and mortality in AA men is unclear, as some studies have reported a significant association in these men while others have reported an absent or reduced association.⁷

Weight control is strongly related to other health habits. In men these habits may have a stronger correlation as demonstrated by several studies. A prospective cohort study of 19,478 US male health professionals with follow up from 1988-1992 was tracked and the effect of a change in four common habits (exercise, smoking, television viewing and eating) on body weight was measured.¹⁰ This group of middle-aged men, who were free of cancer, coronary heart disease and stroke, was tracked to determine the association between a 4-year change in body weight and common habits, after adjusting for baseline age, hypertension and hypercholesterolemia. The results revealed that vigorous activity was associated with

weight reduction, while television and video viewing and eating between meals were associated with weight gain. Quitting smoking and a history of voluntary weight loss prior to the study period were consistently related to weight increase. Recently being on a diet was more strongly related to weight loss among older men. Over the 4-year period, middle-aged men who increased their exercise, decreased television viewing and stopped eating between meals, lost an average weight of 1.4 kg. Overall, this population realized a 1.4 kg. increase in weight. Another study suggested the prevalence of obesity among middle-aged men was lowest among those who maintained a higher level of vigorous physical activity.⁶ These data suggested an improvement in overall health habits with emphasis on increased physical activity and decreased television use along with change in eating habits resulted in weight maintenance or a modest weight loss over 4 years in this male population.

The FINRISK study using a population of 3995 Finnish men and women aged 25 to 64 years aimed to find associations of education and income with BMI and to study the mediating pathways through health behaviors.¹² A self-administered questionnaire assessed education, household income, leisure-time physical activity, sitting behavior, dietary habits, smoking, and alcohol consumption. The results indicated that most health behaviors mediated the association between socioeconomic status and BMI. Health behaviors clustered strongly with each other. Among men, diet had the strongest association with BMI, while the effect was of lower magnitude for television time, physical activity and between meal eating. Furthermore, education and income had direct associations with BMI among women only. There were several gender differences noted in this study. In men, diet and sitting, but not leisure-time physical activity were systematic mediators between socioeconomic status and BMI.

In women, the mediators were income, diet, sitting, leisure-time and physical activity, and alcohol consumption. This may indicate that socioeconomic status, mostly high income, fosters healthier behaviors and there is a larger variance in these behaviors in women as opposed to men. The data in this study found that women used fruits and vegetables more frequently suggesting an overall healthier diet in women than in men. In contrast, men more than women reported a higher self-rated diet quality overall. Therefore, there may be gender-specific perceptions in health behaviors. The data in this study concluded that higher socioeconomic position predicted lower BMI and its effect was mediated by diet and sitting in men.

A study using NHANES data from 2001-2002 aimed to analyze specific practices by US adults who tried to lose weight or tried to not gain weight during the past 12-month period.¹⁴ A total of 2,209 men aged 20 years and older were used in this study. Covariates of age, race/ethnicity, education, smoking status and BMI were included. Overall, 51% percent of US adults tried to control their weight in the past 12 months of the study, including those who tried to lose weight (34% of men and 48% of women) and those who tried to maintain weight (11% vs. 10% respectively). Many more women with a normal BMI reported trying to lose weight in the previous year than men (29.8% vs. 9.9% respectively). The prevalence of trying only not to gain weight over the previous 12 months was similar between genders (9.8% and 11% respectively). Trying to lose weight varied by socio-demographics but was most strongly associated with increased BMI. Among men, there was no association with age and trying to lose weight. Gender-specific odds of men trying to maintain weight (not gain) were higher in those aged greater than 30 years. Sixty-four percent of both genders ate less food as a means to lose weight. However, men reported higher levels

of physical activity (180 minutes vs. 100 minutes per week respectively). Among the group trying to maintain weight, men and women did not differ significantly in rates of calorie restriction (71.2% for men, 64.1% for women); however, men once again reported higher levels of physical activity (210 minutes per week as opposed to 113 minutes/week) and were more likely than women to meet recommendations combining calorie restriction with physical activity.

Another study was done to examine the association between BMI and more objective measures of prostate tumor aggressiveness, tumor grade and size. A retrospective analysis of 2,302 patients treated with radical prostatectomy at the Duke Prostate Center from 1988-2007 was performed.¹⁵ After adjusting for multiple clinical pre-operative characteristics, higher BMI was associated with a greater percent of the prostate involved with cancer, increased tumor volume and high-grade disease. Men with BMI >35 had nearly 40% larger mean tumor volumes than normal-weight men. There may be substantial evidence that obesity in men may cause greater risk of more aggressive prostate cancers if diagnosed with the disease.

Obesity may be associated with prostate cancer leading to greater amount of tumor involvement, a higher-grade tumor at diagnosis and death. The Cancer Prevention Study II Nutrition Cohort examined the BMI and weight change in relation to incident of prostate cancer by disease grade and stage in 69,991 men.¹⁶ Participants provided height and weight in 1982 and again at enrollment in 1992. During follow-up, documentation on 5,252 prostate cancers was done. BMI was found to be inversely associated with risk of non-metastatic low-grade prostate cancer, but BMI was positively associated with risk of non-metastatic high-grade prostate cancer. Compared with weight maintenance, men who lost >11 pounds between 1982 and

1992 were at decreased risk of more aggressive prostate cancer and may have decreased further occurrence and diagnoses of less-aggressive tumors.

2.3 Dieting Habits of Young Adult Males

Obesity is not only a concern for adult males. The prevalence of obesity in the US is higher among adolescents than children aged 2-5 years.⁸ Between years 2009-2010, data also show that the prevalence of obesity is higher among boys aged 2-19 than girls.¹ Weight gains were found to be of greater incidence and magnitude in college-aged males than females.⁷ Several studies have shown this to be true. One such study focused on fast-food eating habits of university men and women¹⁷. A two-page questionnaire assessed subjects' frequency of eating meals and snacks at fast-food restaurants, the predominant types of fast-food restaurants patronized, frequency of meals and snacks eaten at such restaurants and influencing factors on choices. Eighty-four percent of men as opposed to 58% of women reported eating fast food for lunch at least once day a week. Also, a significantly higher percentage of men than women (70% as opposed to 63%) reported choosing a burger and French fries at this meal. Forty-one percent of men as opposed to 21% of women choose a carbonated beverage whereas the reverse was reported for diet soda (14% vs. 31%). Women reported eating at fast-food restaurants with family/friends more often than men as one of two main reasons for eating at fast-food restaurants. Forty-four percent of men reported eating everything served as opposed to women who ate just until satisfied. Thirty-seven percent of men and 51% of women reported they considered selecting healthier options at fast-food restaurants.

A study done to examine differences in dieting trends, eating habits and nutrition beliefs in a group of college students reported men had significantly higher

height, weight and BMI values.⁵ A significantly higher percentage of women reported trying a low-fat or low-carbohydrate diet than men, a significantly lower percentage of men than women ever tried a diet, and women reported obtaining nutrition knowledge from family, newspapers, and magazines while men reported gaining nutrition knowledge primarily from classes, friends, instinct, television and other means. Women agreed there was too much sugar in their diets and that it is important to monitor carbohydrate and fat consumption in order to lose weight. Ninety-four percent of all subjects agreed that it is important to eat a variety of foods to maintain health.¹¹

Research on gender differences as a contributing factor for weight gain during the freshman year in college found that of the 379 college students (60% male) who participated in this weight assessment and life-course perspective study (obtained in a focus group setting) concluded that weight gains were significantly higher and of greater incidence in males than in females during freshman first semester.¹¹ Eating a healthy diet during this time was considered to be more challenging than during senior year of high school for both males and females. Male students were less concerned about weight and used fewer strategies to control weight gain than females. Behaviors established during this time could initiate life-long weight struggles and associated health problems and the college male populations may be at increased risk for these health disparities.

2.4 Temporal Eating and Weight

Research supports eating breakfast is one of the most common habits that facilitate a healthy BMI. Among adults, skipping meals is associated with excess body weight, hypertension, insulin resistance and elevated fasting lipid concentrations.¹³ The Health Professionals Follow-Up Study (HPFS) prospectively

researched breakfast eating habits and risk of coronary heart disease (CHD) in 26,902 American men age 45-82.¹³ These men were free of cardiovascular disease and cancer at the time of study. The HPFS is an ongoing study of male health professionals who were enrolled in 1986; about 97% were of white European decent. Questionnaires about medical history, lifestyle and health –related behaviors were mailed to participants with baseline questions for eating habits of this population beginning in 1992. The HPFS used a 131-item food frequency questionnaire every 4 years to assess dietary habits. Because some men reported skipping breakfast and then reported eating before breakfast and in between breakfast and lunch, breakfast was defined as eating before breakfast, after breakfast and before lunch. In this study late-night eating was defined as eating after going to bed. Results of this study found that men who skipped breakfast had a 27% higher risk of CHD compared with men who did not. Compared with men who did not eat late at night, those who ate late at night had a 55% higher CHD risk. These associations were attenuated by body mass index, hypertension, hypercholesterolemia, and diabetes mellitus. Eating breakfast was associated with significantly lower CHD risk in this cohort of male health professionals. Skipping breakfast, and late-night eating were associated with higher BMI's, and late- night eating was associated with increased calorie intake.

2.5 Emotional Eating

A number of research studies have been done on how psychological influences correlate with weight status. There is evidence that emotional eating (EmE) may differ between genders. Using a three-factor eating questionnaire, 8,589 men and 27,061 women participated in the Nutri-Net-Sante cohort.¹⁸ The three factors addressed in this study were: cognitive restraint, uncontrolled eating and EmE. Self-

reported height and weight were used as well as EmE scores from the 21-item questionnaire. The relationship between EmE and weight status was estimated and interactions between EmE, gender and dieting history were assessed. Emotional eaters were likely to overeat in response to emotions rather than respond to internal satiety cues. This type of behavior is more frequent in obese subjects. Results of this study indicate that EmE was greater in women than in men and in former or current dieters than in subjects without a history of dieting. The modification of gender and dieting on the EmE score and on the association of the EmE score and weight status as well as history of dieting should be further explored when addressing dieting and the male population.

2.6 Male Obesity in Other Cultures

As obesity remains a public health challenge on a global level, populations are being studied to determine what can be done to modify diets and eating behavior within communities. A study of London-based Irish men cites the number of men rated as obese in England is estimated to have increased from around 4.3 million in 2003 to over 6.6 million by 2010.¹⁹ Similarly, a focus group study of Mexican immigrant men's perceptions of dietary choices relating to lifestyle was done to explore this population's perspective on weight, diet and physical activity as it relates to the individual and families.²⁰ Immigration is happening on a global scale and Latinos comprise the largest, fastest growing minority group in the United States. Among the Mexican-American population 40.4% of adults aged 20 years or older are classified as obese.¹⁸ The prevalence of obesity in Hispanic men in years 2011-2012 is 40.1% (which includes all Hispanic men not just Mexicans).³ These data correlate with increasing risk for chronic diseases such as diabetes. Using a Socio-Ecological

Model as a guide, research questions were developed to gain insight on immigrant men's perspective on weight and lifestyle as they relate to the individual and family. Mean age of the population was 41 years. One-hundred percent were born in Mexico and had lived in Alabama for a mean of 8 years. Perceived benefits of a healthy lifestyle included improved mobility and decreased morbidities. Perceived obstacles to achieving a healthier weight included demanding work schedules and an environment not conducive to walking. These men also described immigration as having a negative impact on family unity and established meal times. The difficulty in recruitment of men for this study may be an indication of difficulty in involving men in family-based programs and public health research more generally. The focus on future health programs should be family centered and designed to address what Mexican men perceive as important within their culture.

A gender-sensitized and healthy-living program entitled Football Fans in Training (FFIT) was done through the Scottish Premier League football (soccer) clubs.²¹ The study involved 747 men aged 35-65 years living in the United Kingdom with a BMI of >30 who, after being randomized into intervention and control groups, completed a 12-month program. Primary outcome was the mean difference in weight loss between groups at 12 months; secondary outcomes were mean difference in weight loss between groups at 12 weeks; and mean difference at 12 weeks and 12 months in waist circumference, blood pressure self-reported physical activity, diet, psychological health and quality of life. At 12 months, more men in the intervention group achieved at least 5% weight loss. Secondary outcomes (weight at 12 weeks, systolic and diastolic blood pressure at 12 weeks and 12 months) were significantly in favor of the intervention group. Differences in self reported improvements in physical

activity, decreased consumption of fatty foods and alcohol units and increased consumption of fruits and vegetables, were reported.²¹

A review of randomized controlled trials of lifestyle weight-loss interventions set out to investigate total and ethnic male population inclusion.²² Results revealed samples were on average 27% male as opposed to 73% female. Trials recruiting a diseased sample included a larger proportion of males than those not targeting a disease. About 5% were exclusively male samples. No studies in the past 10 years specifically targeted minority males. Despite the prevalence of obesity being similar between men and women, males, including ethnic males, are unrepresented in lifestyle intervention trials.

2.7 The Challenge

Obesity presents a population-wide far-reaching health crisis that contributes to decreased quality of life and contributes an economic burden on the health care system. Both private sectors and the government research firmly support funding for communities to work toward prevention of obesity in children, adolescents and women but are less representative of men. An IBISWorld (International Benchmarking of Information Society) report on the weight-loss industry identifies men as a “large, untapped market” and predicts increased efforts focused on weight loss programs for men.²³

This literature review has shown that the male population, a large portion of the community population, has been under-represented in both research and prevention programs that stem from such research. The male population in communities may be a missing link in the fight against the obesity epidemic. Clearly, there are gender differences in dietary habits and more studies should be done on

eating and dieting habits of the male population in the United States. Furthermore, family-centered programs should engage men and promote goals related to wellness for the communities they live in.

The prevention and treatment of overweight and obesity on a population-wide basis is challenging. Population-based strategies for men may need to be tailored for specific behaviors that are measured and evidence based. These efforts may reveal environmental interventions that could lead to decreased prevalence of obesity in males and, in turn, may lead to healthier lifestyles, which could positively influence the households these men live in.

Before the dieting “market” begins to tap into the male population, it may be prudent to do further research on male eating and dieting habits in an effort to drive this market toward development of safe, effective weight-control programs for men. A rigorous program for men in a community setting is a safe effective way for men to achieve sustained weight loss using a multidisciplinary community- based gender-sensitized approach. This study proposes to examine dieting and health-related habits of a community university-based male population.

Chapter 3

PURPOSE

3.1 Statement of Problem

Obesity has become a population-wide health disparity and a substantial amount of research has been done on the female and child/adolescent population with the goal of providing supportive intervention programs. However, very little research has been done using male populations and weight-control and weight-loss programs that are gender-specific for men are lacking. Currently, men make up about 49% percent of the United States population. It would be prudent if these programs aimed to include and assist the male population. Dieting and weight-control programs may be better supported if the entire family and community these programs are aimed to assist were included as a more effective means of intervention. Gender-specific programs for males may be another means of fighting the obesity epidemic in our society.

3.2 Purpose

The purpose of this study was to survey the eating, dieting and health habits of adult male employees at the University of Delaware using a Web based survey.

3.3 Specific Aims

The primary aim of this study was to survey the eating and dieting and health habits that may affect weight status of adult male employees at the University of Delaware

The secondary aim was to explore if gender-specific weight-control programs may be an effective means of addressing obesity in this male population.

Chapter 4

METHODS

4.1 Study Design

The design of this study was a cross-sectional Web-based survey. The researcher-developed survey consisted of 50 questions, which were validated and pilot tested. The survey was posted on Qualtrics® in the fall of 2014 for 6 weeks to recruit volunteers to participate.

4.2 Number of Subjects

The University of Delaware male employee population was accessed electronically for this Web-based survey. A minimum goal of 100 male participants was set for the study.

4.3 Inclusion Criteria

The survey population included males ages 18 years and over.

4.4 Exclusion Criteria

Females and those under the age of 18 years were excluded.

4.5 Subject Recruitment

Subjects were recruited via email blasts. The survey included an introductory paragraph and invitation to participate. The self-administered survey included a section for opt-in informed consent to be reviewed by the potential subject before

beginning the survey. The survey included contact information of researcher, advisor and graduate office and also stated that it had been reviewed and approved by the Institutional Review Board. Data were collected through the Web page exclusively and results were anonymous. There were no right or wrong answers to the survey. A \$100 gift card to Cabela's was offered to those who opted in for an anonymous drawing performed.

4.6 Statistical Analysis

The data collected were summarized using descriptive statistics such as frequencies, means and percentages. Chi-square and t-test statistical assessments from the Statistical Package for the Social Sciences (version 19.0.01 SPSS Inc. an IBM company, 2010, Chicago, IL) were applied to test associations between survey responses. Data were first summarized using descriptive statistics. Some of the answers were compiled into age patterns to show similar results among participants. This research study was approved/exempt by the UD Institutional Review Board (IRB).

Chapter 5

RESULTS

5.1 Demographics

A convenience sample of 254 full-time male University of Delaware employees participated in this survey. The overall demographic data can be found in Table 1. The majority of respondents were ages 21 to 30 years (n=81, 31.9%), followed by those 51 to 64 years (n=68, 26.8%). Most respondents held a bachelor's degree or higher (n=79, 31.2%). Only 10 respondents (4.0%) had trade/technical training with an equal number having a high school diploma or GED. One participant reported a BMI of 18.5 and was excluded from this sample, as he would not be considered a candidate for a weight-loss diet regimen. The sample was predominantly white Caucasian (n=216, 85.7%) and of non-Hispanic ethnicity. Twenty-five percent (n= 63) had a household income greater than \$91,000, followed by those with income of \$51,000-70,000 (n=56, 22.7%) and those earning \$15,000-30,000 (n=49, 19.8%). Only 2.8% (n=7) were in the lowest reported income category of less than \$15,000/year.

For the purposes of this study, BMI was calculated using NIH standards. Most participants were either overweight (n= 114%) or obese (n=54%)) (see Table 2). Based on self-reported height and weight, the mean BMI was 27.36 (SD 4.8) with a minimum BMI of 19.37 and a maximum of 48.82.

5.2 Dieting Habits

In the past year, men had changed their eating habits on average one to two times to control their weight (Table 3). The most weight lost during these attempts was reported to be > 21 pounds (n=79, 31.6%), (Table 4), longest length of time weight loss was maintained was > 6 months (n=151, 60.6%), (Table 5). The majority of participants were unsatisfied or very unsatisfied with current weight (n=77, 70%, n=29, 11.4% respectively). Only 19.3% were satisfied with their current weight. When grouped into NIH standards for BMI, Figure 3 shows interest in gender-specific weight-loss programs by BMI weight classification. Desire to go on a weight-loss program for men was strongly indicated by BMI classification, those of normal BMI (n=50, 59.5% within group), overweight (n=71, 62.3% within group) and obese (n=46, 85% within group) were interested in a weight-loss program for men.

Data were collapsed into two age groups those under 30 years and those over age 30, and methods of dieting were compared (Table 6). The four methods showing most significance ($p < .05$) for those over 30 years were decrease the amount of food (n=185, $\chi^2=12.03$, $p = .001$), skip a meal (n=55, $\chi^2=7.70$, $p = .006$); commercial programs such as Jenny Craig™ (n=30, $\chi^2= 6.40$, $p = .01$); and reduce overall calories (n=163, $\chi^2 = 3.95$, $p = .047$). Other methods chosen such as, fasting and cutting out sweets and junk showed no statistically significance between those under age 30 and those over age 30.

In the over age 40 group, dieting methods such as eating away from home less and programs such as Weight -Watchers™ and Jenny Craig™ were statistically significant ($p = .007$ and $p = .049$ respectively).

In the past year, men reported changing their eating habits in an effort to lose weight one to two times (n=154, 60%), zero times (n= 57, 22%) and three to four

times (n=26, 10%). In these attempts to lose weight, carbohydrate foods were more frequently restricted (n=92, 57%), followed by fat foods (n=47, 29%) and protein foods (n=22, or 13.7%).

There are a number of weight-loss aids marketed to the public. Weight-loss aids most often chosen by this population were low-calorie foods (n=106, 56%) and least often were liquid diet supplements such as Slim Fast TM (n=25, 13) (Table 7). Thirty-three percent (n=104) of men took a basic multivitamin as opposed to those who did not take any multivitamin or mineral supplements (n=125, 40%), (Table 8).

When BMI ranges were compared with desire for a weight-loss program for men, the overweight BMI category of men had the greatest interest (Figure 1). The amount of weight gain that would cause the participant to consider going on a diet ranged from 5 pounds (n=100, 39%) to more than 25 pounds (n=9, 3.6%). Four percent (n=10) would never consider going on a weight-loss diet due to weight gain (Figure 2).

When asked how satisfied with their current weight, 110 men (43%) reported unsatisfied, followed by satisfied (n=49, 19%), and neutral (n= 46, 18%). Of those, 167 (66%) participants would consider a weight-loss program specific for men (Figure 3). When fitting the Mann-Whitney U test to those who would consider going on a weight-loss diet specifically for men those with higher incomes (Mann-Whitney 5599, $p = .034$), education level (Mann-Whitney 5525, $p = .002$) and age (Mann-Whitney 5863, $p = .019$) were statistically significant. Weight satisfaction and desire for a weight-loss program for men was also statistically significant (Mann-Whitney 5625, $p = .005$). The mean ranks for weight satisfaction compared to men interested in a weight-loss diet and men not interested are 117.68 and 143.82. The two groups'

medians are 2 and 3 respectively (Figure 4). The distributions of weight satisfaction in the two groups differed significantly.

5.3 Behavioral Habits Relating to Weight

Eating take-out or restaurant food due to lack of time and ability to cook have been noted as behavioral habits that may lead to weight gain due to hidden calories and less healthful choices at mealtimes.¹⁹ The number of restaurant meals or take-out meals eaten per week was broken down into frequency with the majority of respondents eating out one-two times per week (n=102, 40%), and equal frequencies for those who eat out 3-4 times per week and more than four times per week (n=58, 22.7%). Of those who eat home-prepared meals, dinner (n=147 or 58%) was the meal most often chosen. Six (2.4%) of the participants indicated they currently smoke. Only 4 respondents indicated they have ever smoked to control their weight (1.6%).

Web sites were indicated as the source most often utilized for gaining knowledge for weight loss (n=164, 30%). Other means of gaining nutrition knowledge include advice from friends (n=121, 22%) and newspaper/magazine media (n=80, 14.7%). Medical professionals such as physician's assistants, doctors and nurses were accessed by 68 (12.5%) of the respondents, followed by registered licensed dietitians (n=24, 4.4%).

Chapter 6

DISCUSSION

When considering the amount of weight gain that may motivate a participant to go on a weight-loss diet, those who responded “no” to a gain between 20-25 pounds and desire to lose weight may suggest that those who gain 20 or more than 25 pounds can be compared to the group that would never go on any diet and therefore be at risk for overweight/obesity. Those who indicated a 5-10 pound gain also had greater desire to diet than those who would consider dieting if they gained more than 25 pounds. A research study done by Karkkainen²⁴ indicated that gender-specific factors are associated with successful weight maintenance, and highlights factors such as baseline weight and education level to be specific factors for men. The data in this study show an inverse relationship between weight gain and consideration of a weight-loss diet. It seems that those who gain lower amounts of weight and have lower baseline weights are more motivated to control their weight by dieting than those who gain more weight. It may be that after this amount of weight gained motivation and effort to lose becomes too difficult and the effort to lose weight may seem insurmountable. Body mass index is used to assess the weight status of US males in the NHANES 2011-2012 survey.²⁵ This survey indicates that 71% percent of white men are overweight or obese in the US. Comparatively, the University of Delaware population data reveal that 66% percent are either overweight or obese. The demographics of this population may account for the 5% percent difference between

the NHANES population and this group but it is still too high. Research has shown that people from higher socioeconomic groups seem more likely to monitor their weight and diet more frequently to lose weight.¹⁹

According to Marketdata research, estimates of the US weight -loss market revenue grew 1.7% in 2012, with revenues being \$61.6 billion in 2012 and \$60.6 billion in 2011.²⁶ In 2012, dieters shifted toward more frequent use of free or low-cost –do-it-yourself diet plans including over-the-counter diet pills, meal replacements and diet books.²⁶ In this survey, weight-loss aids such as low-calorie foods, and appetite suppressants were chosen most frequently and the overall 147% of cases chose multiple weight-loss aids including herbal supplements and liquid diet products being purchased for aid in weight loss. This gives supportive evidence to the Marketdata estimates that diet aides are popular and men in this study population purchase such aid. There are many dietary regimens for weight-loss marketed to the US population but most target women. Untapped markets include men, teens, African American and Hispanic markets.²⁶

Research from the NIH Office of Dietary Supplements (ODS) has shown that more than one-third of the US population takes multivitamin mineral supplements.²⁷ Forty-five percent of men in this study use a basic multivitamin and vitamin D supplement. Forty percent do not use any vitamin or mineral supplements. Because this is an educated population, knowledge concerning adequate diet and ODS recommendations may have influence on frequency and amounts of supplements used.

Historically, diets that restrict carbohydrates, such as Atkins™, have been popular with the male population because they are high in animal protein and fat. This study reflects that as 57% of males at UD have restricted carbohydrates in the past in

an effort to lose weight. Despite the popularity of low-carbohydrate diets efficacy has not been proven.²⁸

When considering the dieting methods attempted by men grouped into those over 30 years and those under 30 years there was a significant statistical difference between these age groups. Behaviors such as skipping a meal and decreasing amount of food can be categorized as reducing overall calories in the over 30-age group. Programs such as Weight Watchers™ were also employed to facilitate weight-loss in this group. Choices such as decreasing alcohol, eating away from home less, cutting out snacks and increasing fruits and vegetables were not statistically significant between these age groups. However, when considering the over 40 age group eating away from home less and programs such as Weight Watchers™ and Jenny Craig™ were employed as dieting methods. This may be due to the population's higher income ranges and possible age-related lifestyle changes. In research done with a group of Irish men between the ages of 23 and 27 years, stereotypical food included burgers and steak. During this focus group research one young man said "this is manly food...anything that's big meaty and unhealthy." ¹⁹ Programs such as Jenny Craig™ and Weight Watchers™ may not appeal to men, especially young men. In this study, dieting methods including skipping meals, decreasing amount of food, reducing overall calories and programs such as Weight Watchers™ are more strongly employed by the over 30 year population. Participation in programs such as Weight Watchers™ are methods used by the over 40 year population, likely due to increased expendable income as well as a higher level motivation to control weight due to age-related health risks.⁶

We found a significant difference in interest in a gender-specific weight-loss program when grouped into those who would consider going on a weight-loss program specifically for men and those who were less satisfied with weight. Those with overweight and obese BMI ranges showed a statistically significant difference and higher interest in a gender-specific weight-loss program. Increased BMI may lead to less satisfaction with weight and an increased desire for weight-loss programs.

Lifestyle intervention can be an effective treatment intervention for obesity.²² The effectiveness of these interventions may differ by gender due to sex and cultural differences in physiological response to activity levels, influence of stress hormones on weight, associations between depression and obesity and norms relating to body image. Satisfaction with weight and interest in gender-specific weight-loss programs for this population may act as a snapshot of the US male population when considering methods to most effectively manage the obesity epidemic in the male population.

6.1 Study Limitations

Web-based surveys are convenient and low cost. Because this study was administered via campus e-mail it was assumed that the population had access to the web to take the survey. The population was limited in diversity. Future studies should address a more geographically and ethnically diverse population. The survey itself could have been more inclusive in the number of choices about types of diet - specifically for those who may be vegetarian or who have tried the Paleo and gluten - free diet as methods to lose weight which may be popular to this male population and are current diet methods used to control weight. Studies based on a convenience sample often do not produce representative results therefore one cannot treat results as representative of the target audience.²⁹ Because results may be hard to replicate, and

differences in results can be hard to replicate in ways that confound, it is difficult to draw concrete conclusions. The results of this study are not generalizable to the male population at large due to the nature of convenience sampling.

6.2 Conclusion

The US male population is an underrepresented population in the area of programs designed for prevention of obesity. This study has indicated a desire in men over 30 years for a gender-specific program for weight-loss and it is clear that those in higher education and socioeconomic status and may be motivated to participate in such programs. Weight-loss programs and dieting remain popular as methods of controlling weight and the dieting and weight-loss industry continue to offer dieting methods without regard for gender-specific needs. Men in this study have attempted to diet in the past and indicated they are dissatisfied with their weight and have interest in a male-specific program so this may be an indication that there are ineffective and unsuccessful weight-control programs available to men leading to overweight and obesity in this population. Offering a male-specific diet program may add incentive and motivation to affect and empower men to lead healthier lives that could affect BMI ranges. Further research and development of nascent interventions that include safe, effective weight-control programs for men, developed by qualified professionals should be offered in the future.

REFERENCES

1. Ogden CL. Prevalence of obesity among adults: United States, 2011-2012. www.cdc.gov/nchs/data/databriefs/db131.pdf Web site. . Updated 2013. Accessed January, 20, 2014.
2. U.S. Department of Health and Human Services. Final review, Healthy People 2010: Nutrition and Overweight. Updated 2010. www.cdc.gov/hchs/data/series/sr10/sr10_252.pdf. Accessed January 20, 2014.
3. Howden LM, Age and Sex Composition 2010. Issued May 2011, www.census.gov/prod/cen2010/briefs/c2010br.pdf. page 2, accessed February 8, 2014
4. Flegal KM, Carroll MD, Kit BK, Ogden CL. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999-2010. *JAMA- Journal of the American Medical Association*. 2012;307(5):491-497.
5. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA- Journal of the American Medical Association*. 2012;307(5):483-490.
6. Sjogren P, Cederholm T, Heimbürger M, et al. Simple advice on lifestyle habits and long-term changes in biomarkers of inflammation and vascular adhesion in healthy middle-aged men. *Eur J Clin Nutr*. 2010;64(12):1450-1456.
7. Katzmarzyk PT, Mire E, Bray GA, Greenway FL, Heymsfield SB, Bouchard C. Anthropometric markers of obesity and mortality in white and african american adults: The Pennington Center longitudinal study. *Obesity*. 2013;21(5):1070-1075.
8. Ford ES, Dietz WH. Trends in energy intake among adults in the United States: Findings from NHANES. *Am J Clin Nutr*. 2013;97(4):848-853.
9. Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and trends in obesity among US adults, 1999-2008. *JAMA*. 2010; 303(3):235-241.

10. Coakley E, Rimm E, Colditz G, Kawachi I, Willett W. Predictors of weight change in men: Results from the health professionals follow-up study. *Int J Obes*. 1998;22(2):89-96.
11. Cluskey M, Grobe D. College weight gain and behavior transitions: Male and female differences. *J Am Diet Assoc*. 2009;109(2):325-329.
12. Borodulin K, Zimmer C, Sippola R, Makkinen TE, Laatikainen T, Prattala, R. Health behaviors as mediating pathways between socioeconomic position and body mass index. *Int J Behav Med*. 2012; 19(1):14-22.
13. Cahill LE, Chiuve SE, Mekary RA, et al. Prospective study of breakfast eating and incident coronary heart disease in a cohort of male US health professionals. *Circulation*. 2013;128(4):337-343.
14. Weiss EC, Galuska DA, Khan LK, Serdula MK. Weight-control practices among U.S. adults, 2001–2002. *Am J Prev Med*. 2006; 31(1):18-24.
15. Freedland SJ, Banez LL, Sun LL, Fitzsimons NJ, Moul JW. Obese men have higher-grade and larger tumors: An analysis of the Duke Prostate Center database. *Prostate Cancer Prostatic Dis*. 2009; 12(3): 259-263.
16. Rodriguez C, Freedland SJ, Deka A, et al. Body mass index, weight change, and risk of prostate cancer in the cancer prevention study II nutrition cohort. *Cancer Epidemiol Biomarkers Prev*. 2007; 16(1): 63-69.
17. Driskell JA, Meckna BR, Scales NE. Differences exist in the eating habits of university men and women at fast-food restaurants. *Nutr Res*. 2006;26(10):524-530.
18. Peneau S, Menard E, Mejean C, Bellisle F, Hercberg S. Sex and dieting modify the association between emotional eating and weight status. *Am J Clin Nutr*. 2013;97(6):1307-1313.
19. Kelly A, Ciclitira K. Eating and drinking habits of young London-based Irish men: A qualitative study. *Journal of Gender Studies*. 2011;20(3):223-235.
20. Martinez J, Powell J, Agne A, Scarinci I, Cherrington A. A focus group study of Mexican immigrant men's perceptions of weight and lifestyle. *Public Health Nurs*. 2012; 29(6):490-498.

21. Hunt K, Wyke S, Gray CM, et al. A gender-sensitised weight loss and healthy living programme for overweight and obese men delivered by Scottish premier league football clubs (FFIT): A pragmatic randomised controlled trial. *Lancet*. 2014. doi: 10.1016/S0140-6736(13)62420-4; 10.1016/S0140-6736(13)62420-4.
22. Pagoto SL, Schneider KL, Oleski JL, Luciani JM, Bodenlos JS, Whited MC. Male inclusion in randomized controlled trials of lifestyle weight loss interventions. *Obesity*. 2012;20(6):1234-1239. doi: 10.1038/oby.2011.140.
23. Hill C. 10 things the weight loss industry won't tell you. Wall Street Journal. 2014; www.marketwatch.com/story/10-things-the-weight-loss-industry-won-t-tell-you-2014-01-10. Accessed January 18, 2014.
24. Karkkainen U. Successful weight maintenance factors highly gender-specific. *Endocrine Today*- 2015- www.healio.com/endocrinology/obesity/news/online-2014-11-18. Accessed January 28, 2015.
25. Fryar CD, Carroll MD, Ogden CL. Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, 1960-1962 Through 2011-2012. www.cdc.gov/nchs/data/databriefs/db131.pdf. Web site. Updated September 2014. Accessed February 8, 2015.
26. <http://www.prweb.com>. Weight Loss Market in U.S. Up 1.7% to \$61 Billion. 2013-04-16. Accessed February 9, 2015.
27. <http://ods.od.nih.gov/factsheets/MVMS-Consumer>. Multivitamin/mineral supplements Reviewed January 07, 2013. Accessed February 10, 2015.
28. Foster GD, Wyatt HR, Hill JO. A randomized trial of low-carbohydrate diet for obesity. *N Eng J of Med*. 2003; 348(21): 2082-2090.
29. <http://dissertation.laerd.com/convenience-sampling.php> . Accessed March 12, 2015.

Appendix A

TABLES AND FIGURES USED IN ANALYSIS

Table 1. Demographic characteristics of all 254 participants

	<u>n</u>	<u>(%)</u>
All Subjects *	254	100
Age		
18-20	5	2.0
21-30	81	31.9
31-40	58	22.8
41-50	32	12.6
51-64	68	26.8
65 years and over	10	3.9
Education Levels		
High School/GED	10	4.0
Trade/technical/vocational	10	4.0
Associate's degree	10	4.0
Bachelor's degree	79	31.2
Master's degree	70	27.7
Doctoral or professional	74	29.2
Race		
White Caucasian	216	85.7
Black or African American	7	2.8
Asian	18	7.1
American Indian or Alaska Native	2	0.8
Other	9	3.6
Ethnicity		
Hispanic/Latino	17	6.8
Non-Hispanic	233	93.2

Household Income (US\$)		
Below \$15,000	7	2.8
\$15,000-30,000	49	19.8
\$31,000-50,000	41	16.6
\$51,000-70,000	56	22.7
71,000-90,000	31	12.6
91,000 or more	63	25.5
*All categories do not add up to 254 due to missing data		

Table 2. BMI based on NIH definitions

	<u>Frequency</u>	<u>Percent</u>
18.5<=BMI<25 (Normal)	86	33.9
25<=BMI<30 (Overweight)	114	44.9
30<=BMI (Obese)	54	21.3
Total	254	100

Table 3. Past year eating habits have changed to control weight

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
0 times	57	22.4	22.4	22.4
1-2 times	154	60.6	60.6	83.1
3-4 times	26	10.2	10.2	93.3
More than 4 times	17	6.7	6.7	100
Total	254	100	100	

Table 4. Most weight lost while trying to lose weight

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
5 pounds or less	45	17.7	18.0	18.0
6-10 pounds	58	22.8	23.2	41.2
11-15 pounds	35	13.8	14.0	55.2
16-20 pounds	33	13.0	13.2	68.4
More than 21 pounds	79	31.1	31.6	100
Total	250	98.4	100	
Missing	4	1.6		
Total	254	100		

Table 5. Length of time weight loss was maintained

	<u>Frequency</u>	<u>Percent</u>	<u>Valid Percent</u>	<u>Cumulative Percent</u>
Less than 1 month	11	4.3	4.4	4.4
1-3 months	43	16.9	17.3	21.7
3-6 months	44	17.3	17.7	39.4
Greater than 6 months	151	59.4	60.6	100
Total	249	98.0	100	
Missing	5	2.0		
Total	254	100		

Table 6. Comparison of dieting methods followed (18-30 years old vs. 31+ years old)

Q9: What methods of dieting have you followed?	<u>df</u>	<u>n</u>	<u>X²</u>	<u>p</u>
Decrease amount of food	1	185	12.03	0.001*
Skip a meal	1	55	7.70	0.006*
Other programs such as Weight Watchers, etc.	1	30	6.40	0.011*
Reduce overall calories	1	163	3.95	0.047*
Decrease fatty foods	1	149	2.15	0.142
Fasting	1	32	2.35	0.125
Cut out sweets/junk food	1	190	0.51	0.477
Cut out snacking	1	130	0.29	0.593
Eat away from home less	1	105	0.02	0.904
Decrease or omit alcohol	1	97	0.002	0.966
Increase fruits and vegetables	1	181	0.04	0.834
*p < .05				

Table 7. Weight-loss aids commonly used		
Responses*	<u>n</u>	<u>Percent of Cases</u>
Low-calorie foods	106	82.2%
Appetite suppressants	27	20.9%
Liquid diet supplements such as Slim-Fast	25	19.4%
Prescription drugs	5	3.9%
Herbal supplements	26	20.2%
Total	189	146.5%

***Participants could select more than one answer**

Table 8. Frequencies of vitamin and mineral supplements

Responses *	<u>n</u>	<u>Percent of Cases</u>
Basic multivitamin	104	41.1%
Vitamin D	37	14.6%
Antioxidants such as vitamin C, E or A	31	12.3%
Zinc, iron, or selenium	15	5.9%
I do not take vitamin or mineral supplements	125	49.4%
Total	312	123.3%

***Participants could select more than one answer**

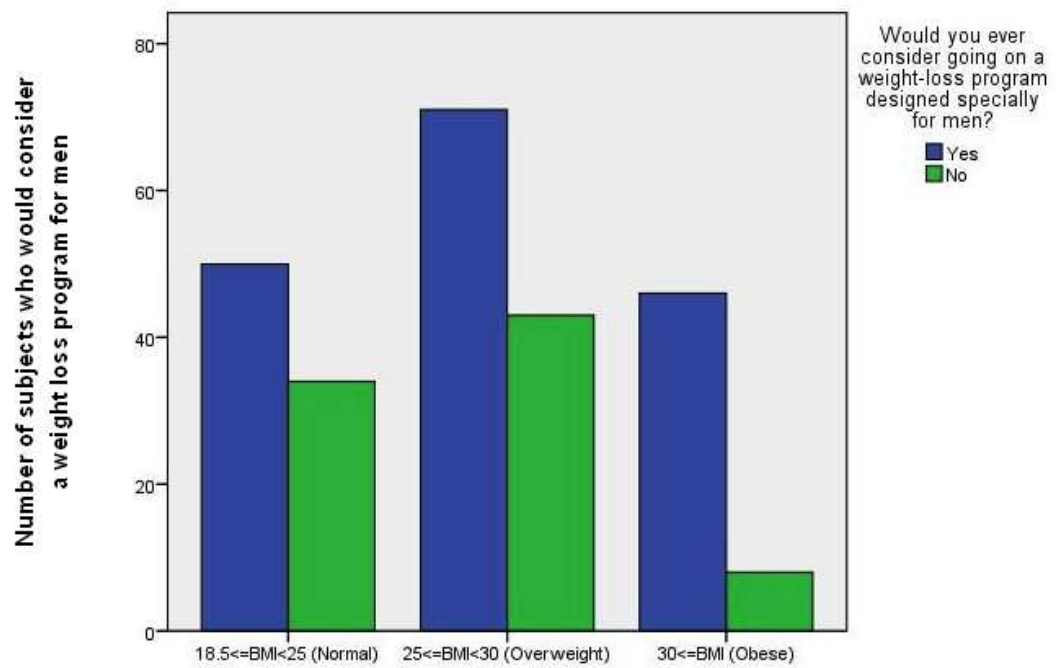


Figure 1. BMI and those who would consider going on a weight-loss diet specifically for men.

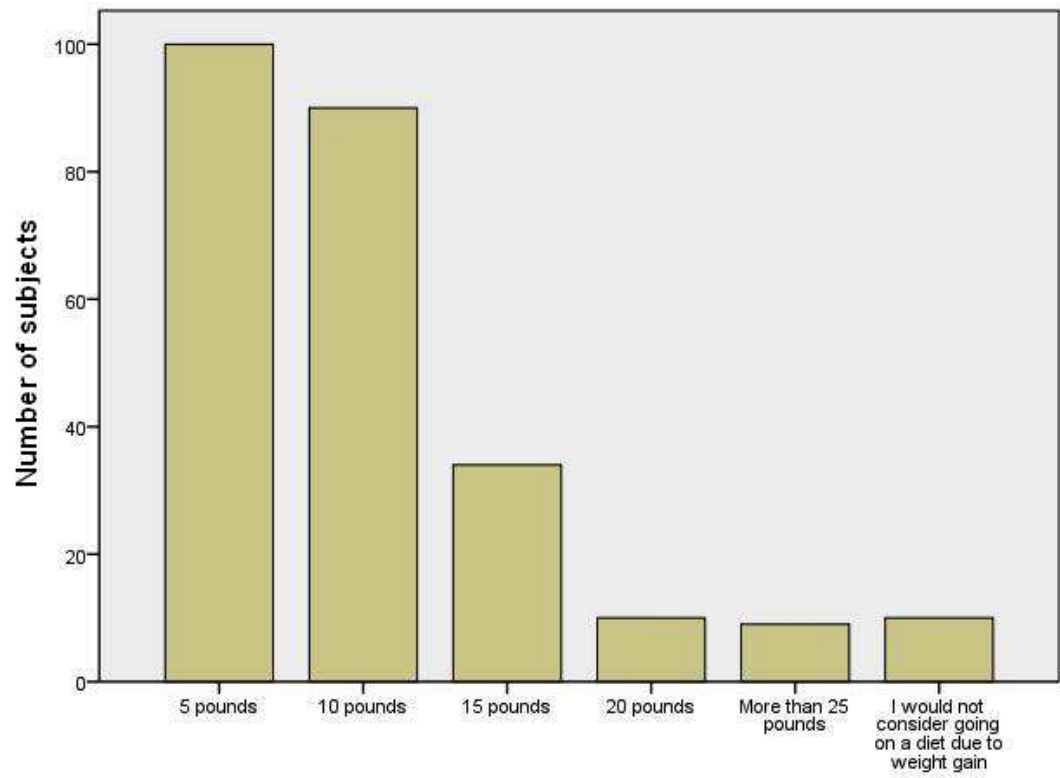


Figure 2. Amount of weight gain before considering going on a weight-loss diet.

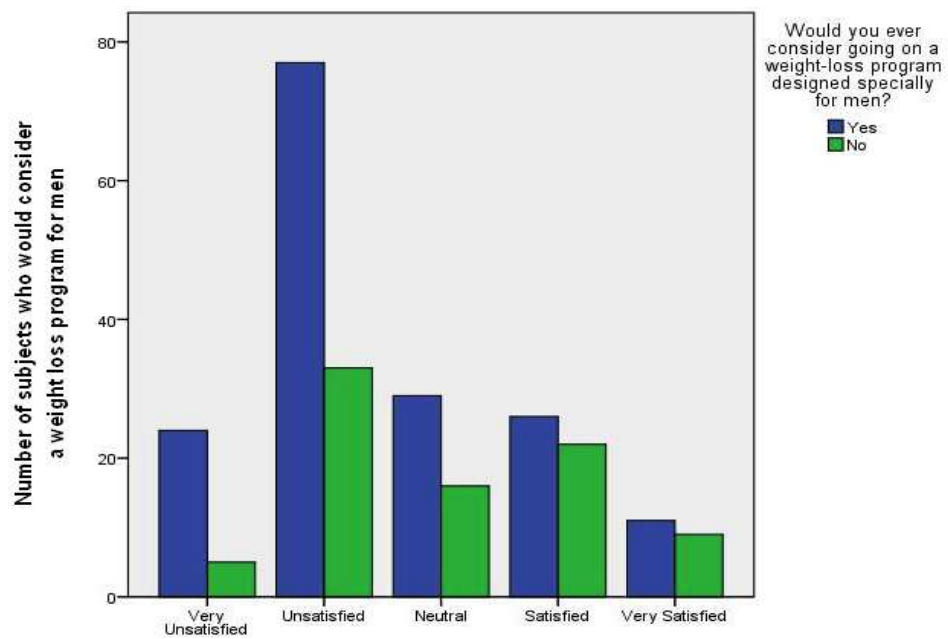


Figure 3. Weight satisfaction and desire for a weight-loss program specifically for men

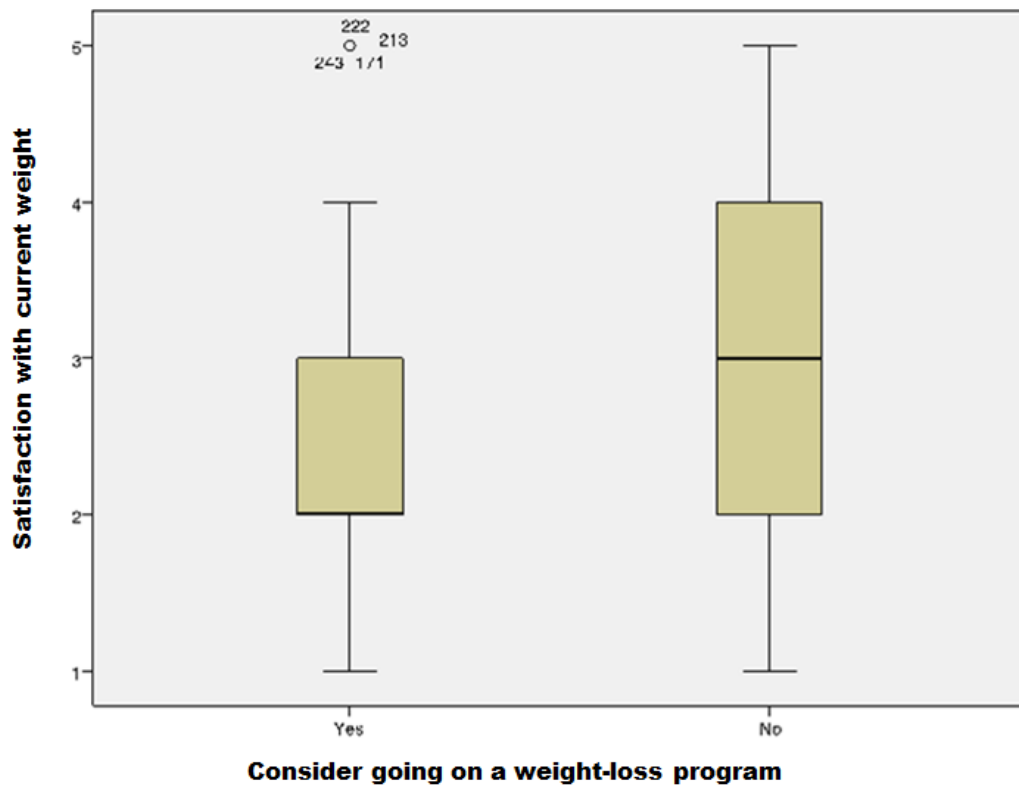


Figure 4. Mann-Whitney test for weight satisfaction and consider ever going on a weight-loss program for men.

Appendix B

ADDITIONAL TABLES AND FIGURES

Table 9. Days/week eat home-prepared breakfast

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	28	11.0	11.2	11.2
	1-2	41	16.1	16.3	27.5
	3-4	25	9.8	10.0	37.5
	5-6	54	21.3	21.5	59.0
	7	103	40.6	41.0	100.0
	Total	251	98.8	100.0	
Missing	System	3	1.2		
Total		254	100.0		

Table 10. Days/week eat home-prepared lunch

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	26	10.2	10.5	10.5
	1-2	63	24.8	25.5	36.0
	3-4	49	19.3	19.8	55.9
	5-6	71	28.0	28.7	84.6
	7	38	15.0	15.4	100.0
	Total	247	97.2	100.0	
Missing	System	7	2.8		
Total		254	100.0		

Table 11. Days/week eat home-prepared dinner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	.8	.8	.8
	1-2	9	3.5	3.6	4.4
	3-4	58	22.8	23.0	27.4
	5-6	147	57.9	58.3	85.7
	7	36	14.2	14.3	100.0
	Total	252	99.2	100.0	
Missing	System	2	.8		
Total		254	100.0		

Table 12. Meals per week eaten in a restaurant or take-out food

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rarely/never	36	14.1	14.2	14.2
	1- 2 meals a week	102	40.0	40.2	54.3
	3-4 meals a week	58	22.7	22.8	77.2
	More than 4 meals a week	58	22.7	22.8	100.0
	Total	254	99.6	100.0	
Missing	System	1	.4		
Total *		255	100.0		

* Includes subject with 18.5 BMI

Table 13. Times per day snacks are eaten between meals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 times	42	16.5	16.5	16.5
	1-2 times	172	67.5	67.5	83.9
	3-4 times	28	11.0	11.0	94.9
	More than 4 times	13	5.1	5.1	100.0
	Total *	255	100.0	100.0	

*Includes subject with 18.5 BMI

Table 14. Amount of times per day eat after the evening meal

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid I never eat after the evening meal	88	34.5	34.5	34.5
Once per day	145	56.9	56.9	91.4
Two times per day	16	6.3	6.3	97.6
More than two times per day	6	2.4	2.4	100.0
Total*	255	100.0	100.0	

*Includes subject with 18.5 BMI

Table 15. Number of times get up to eat after going to bed

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	22	8.6	8.7	8.7
No	231	90.6	91.3	100.0
Total	253	99.2	100.0	
Missing System	2	.8		
Total *	255	100.0		

*Includes subject with 18.5 BMI

Table 16. Average time per day spent sitting

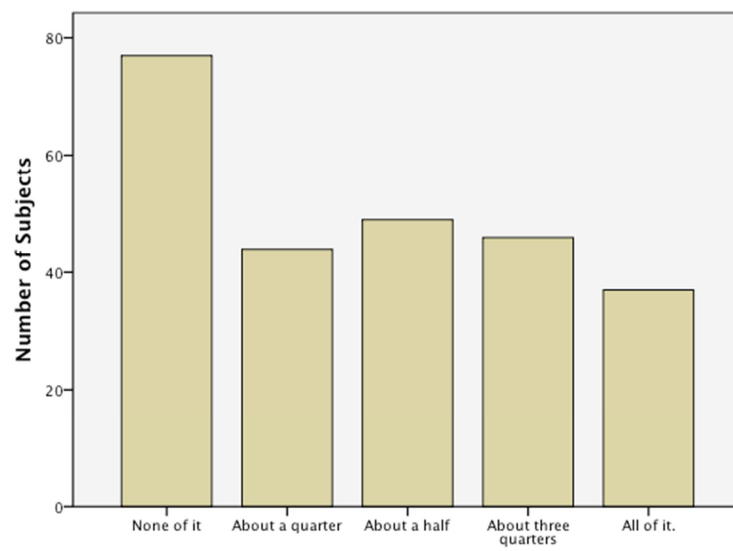
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 2 hours per day	11	4.3	4.3	4.3
	2-4 hours per day	34	13.3	13.4	17.7
	4-6 hours per day	76	29.8	29.9	47.6
	6-8 hours per day	79	31.0	31.1	78.7
	More than 8 hours per day	54	21.2	21.3	100.0
	Total	254	99.6	100.0	
Missing	System	1	.4		
Total *		255	100.0		

*Includes subject with 18.5 BMI

Table 17. Either of parents overweight

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mother	47	18.4	18.4	18.4
	Father	50	19.6	19.6	38.0
	Both parents	56	22.0	22.0	60.0
	Neither parent	102	40.0	40.0	100.0
	Total*	255	100.0	100.0	

*Includes subject with 18.5 BMI



Fraction of physical activity that is vigorous

Figure 5. Fraction of activity that is vigorous physical activity

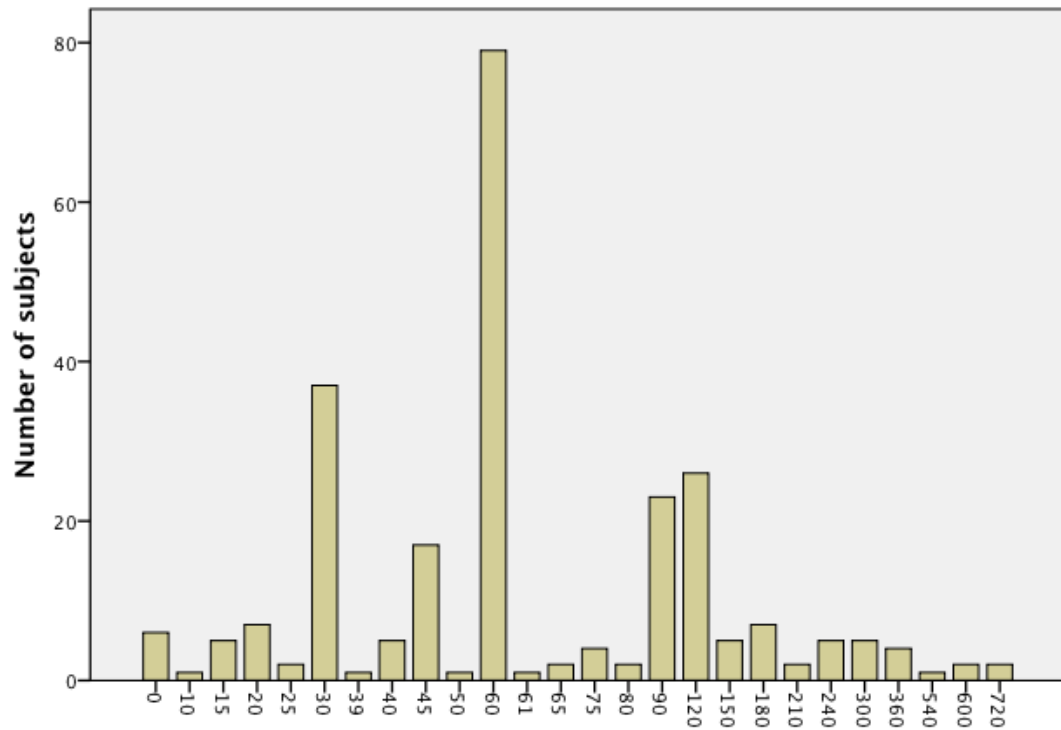


Figure 6. Average minutes per day engage in physical activity

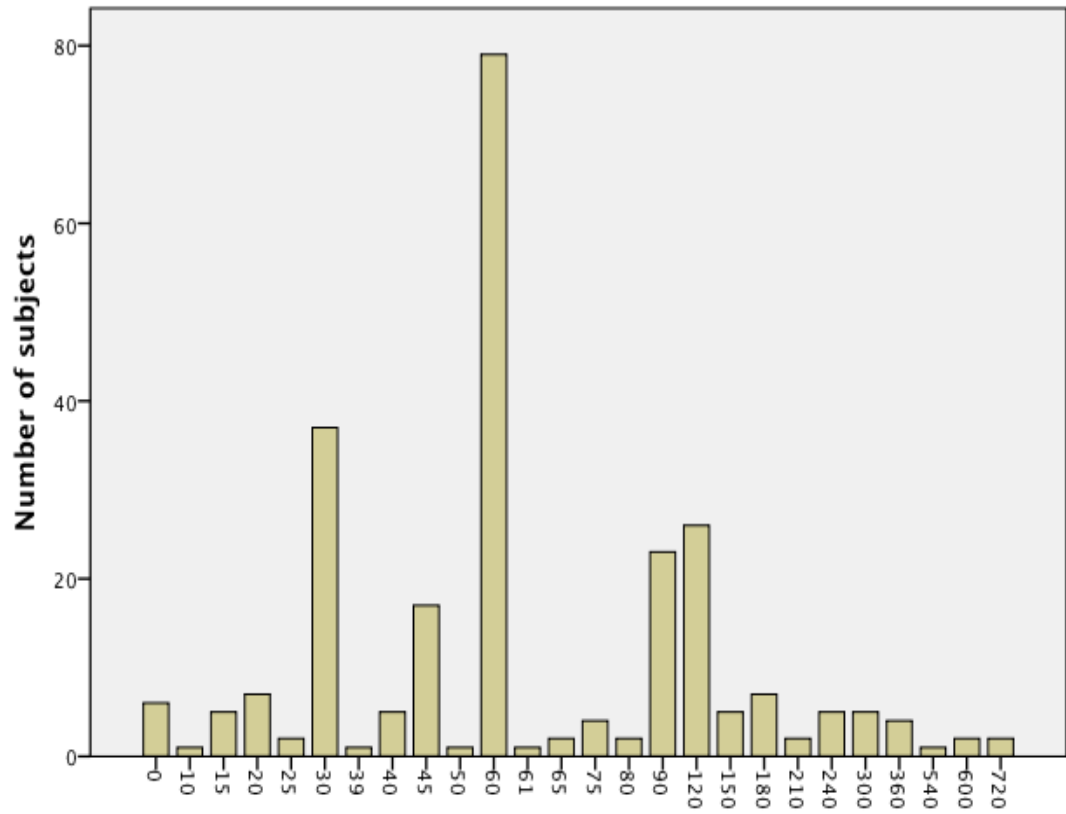


Figure 7. Average amount of minutes per day engage in vigorous physical activity

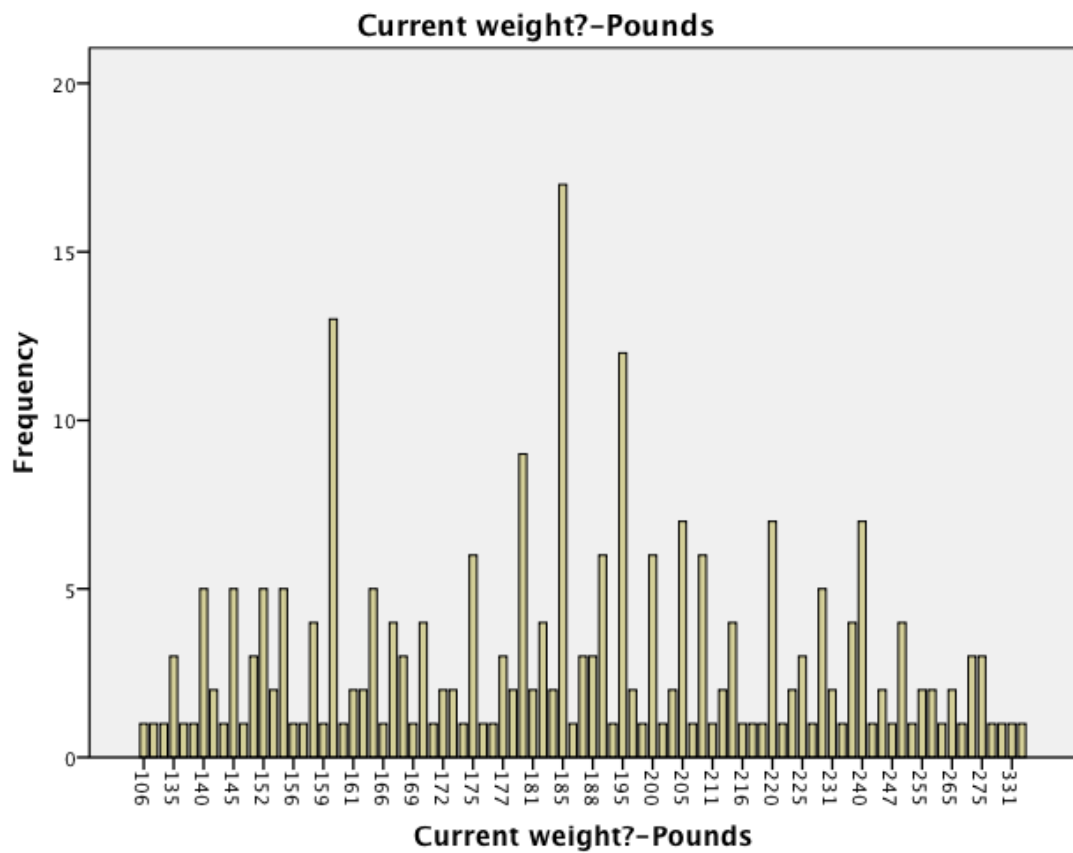


Figure 8. Current weight-Pounds

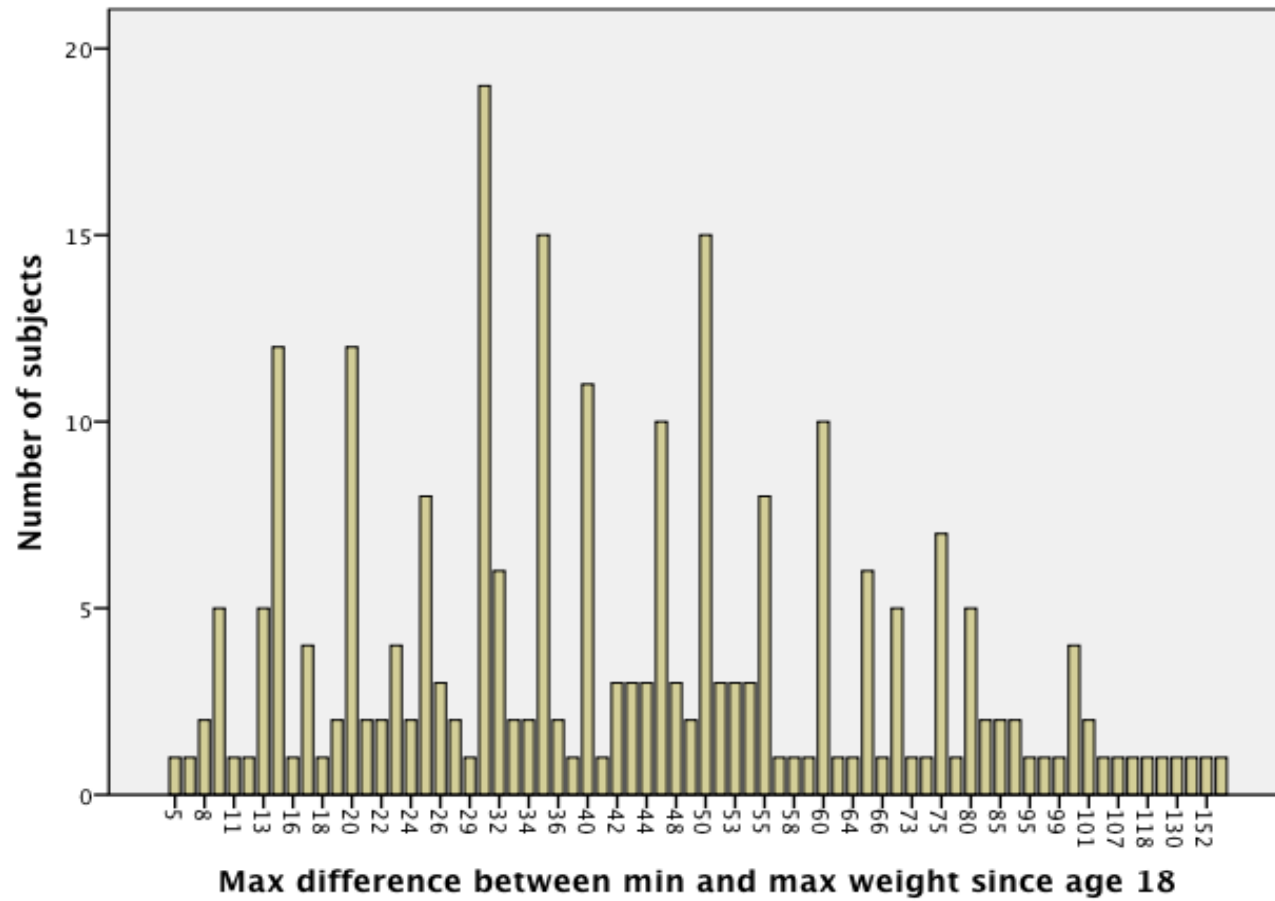


Figure 9. Maximum difference between min and max weights since age 18

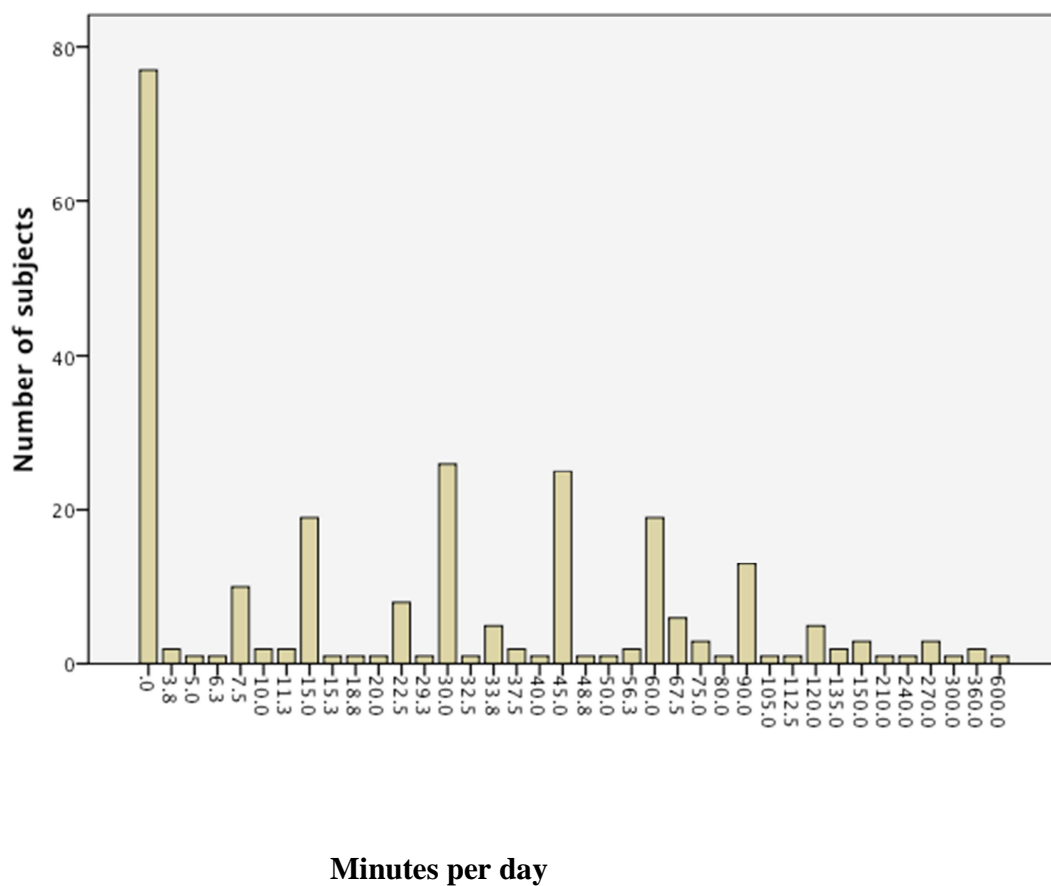
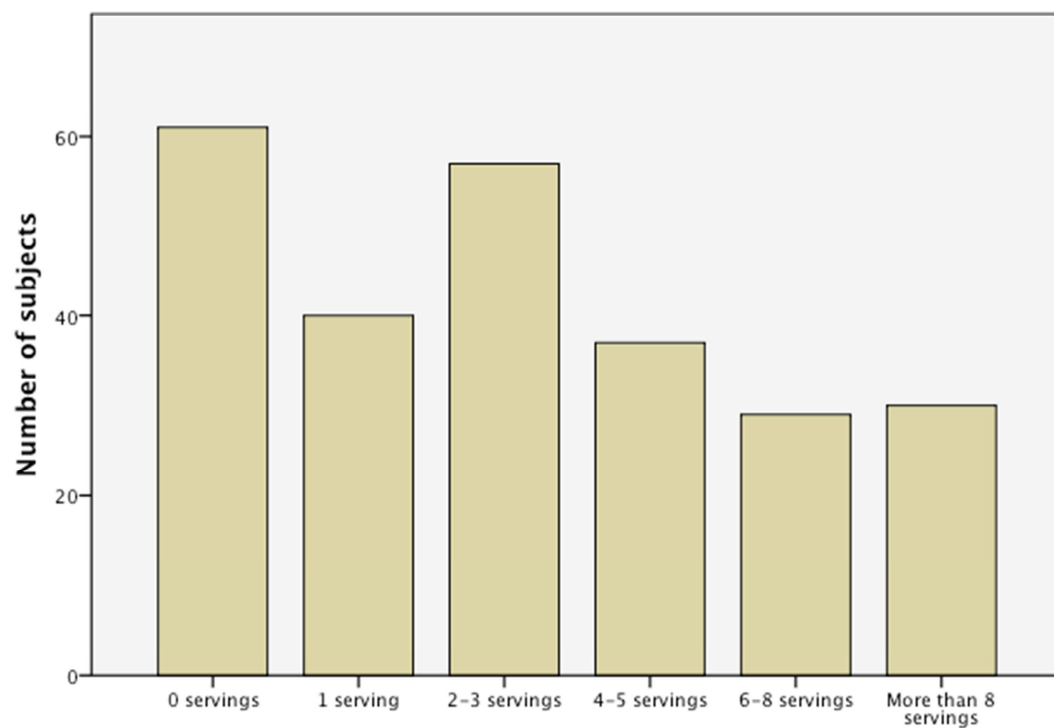
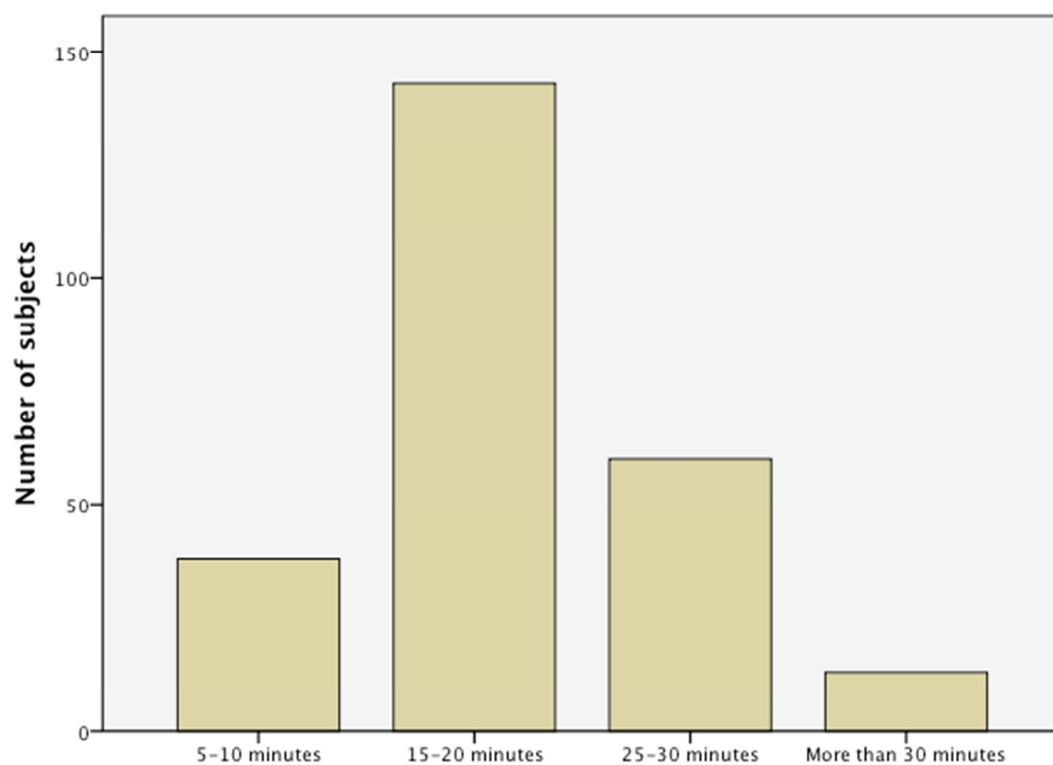


Figure 10. Average amount of minutes per day engage in vigorous physical activity



Servings of Alcohol

Figure 11. Number of servings of alcohol per week



Average length of time to eat dinner

Figure 12. Average length of time taken to eat dinner

Appendix C

IRB APPROVAL

If you only have one appendix, change the styles of the previous two paragraphs to *Appendix - one* and *APPENDIX TITLE - one*, respectively.



RESEARCH OFFICE

210 Hultihen Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: July 10, 2014

TO: Virginia Vining, BS
FROM: University of Delaware IRB

STUDY TITLE: [624687-1] Eating Habits of Men

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: July 10, 2014

REVIEW CATEGORY: Exemption category # (2)

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.

Appendix D

SURVEY

Consent

This research studies eating habits that may be specific to men. Virginia Vining RDN, CSO, LDN, a graduate student at the University of Delaware, and Dr. Nancy Cotugna, DPH, RDN, LDN, an advisor and professor at the University of Delaware are conducting this survey

The survey takes approximately 15 minutes to complete. On completion, you will qualify to enter a drawing for a \$100 gift card to Cabela's.

To enter the drawing, you will be asked for your name and email address. This identifiable information will not be revealed to the investigator and her advisor and will not be stored with your survey responses.

Your participation in this study is completely voluntary. Without loss or penalty of any kind you may choose not to take part in this study, not to answer a question on the questionnaire, or withdraw from the study at any time by closing your browser before pressing the final **SUBMIT RESPONSES** button.

You must be male and at least 18 years old to take the survey

Do you choose to participate in this study?

- ☐ I do.
- ☐ I do not.

First, a few preliminary questions...

What is your gender?

- ☐ Male
- ☐ Female

Are you age 18 or above?

- ☐ Yes
- ☐ No

From age 18 to the present, have you ever followed a diet or changed your eating habits to *control your weight*?

☐ Yes

☐ No

Ineligible message

Your response indicates that you are not interested in taking the survey at this time.

*If you decide to take it at a later time,
you may return to the survey link sent to you in your survey-invitation email message.*

Thank you for your interest in taking the survey.

*However, your response indicates that do not meet the survey's
eligibility requirements (males of age 18 or over).*

*If you mistyped your responses, you may restart the survey.
Just use the survey link sent to you in your survey-invitation email message.*

Thank you for your interest in taking the survey but you are not an appropriate candidate for this study.

The survey is targeted strictly for men who have already engaged in dieting for weight-control purposes.

*If you mistyped your responses, you may restart the survey.
Just use the survey link sent to you in your survey-invitation email message.*

Main

This section explores some of your eating habits and weight-loss strategies. There are no right or wrong answers. Your answers will remain anonymous to the researchers.

What methods of dieting have you followed? Choose all that apply.

☐ Decrease amount of food

☐ Skip a meal

☐ Decrease fatty foods

☐ Fasting

- | | |
|---|---|
| <input type="checkbox"/> Reduce overall calories | <input type="checkbox"/> Decrease or omit alcohol |
| <input type="checkbox"/> Increase fruits and vegetables | <input type="checkbox"/> Eat away from home less |
| <input type="checkbox"/> Cut out sweets/junk food | <input type="checkbox"/> Other programs such as Weight Watchers, Nutrisystem ^R or Jenny Craig ^R |
| <input type="checkbox"/> Cut out snacking | |

Have you ever followed any dietary eating pattern that restricts any specific foods or food groups?

- ☐ Yes
- ☐ No

What food group did you restrict or exclude? *Choose all that apply.*

- ☐ Carbohydrates (pasta, bread, potatoes, cereal)
- ☐ Fats (butter, margarine, oil)
- ☐ Proteins (beef, chicken, eggs, dairy products)

What types of vitamin and/or mineral supplements do you use? *Choose all that apply.*

- ☐ Basic multivitamin
- ☐ Vitamin D
- ☐ Antioxidants such as vitamin C, E or A
- ☐ Zinc, iron, or selenium
- ☐ I do not take vitamin or mineral supplements

Have you ever used any of the following to lose weight? *Choose all that apply.*

- ☐ Low-calorie foods
- ☐ Appetite suppressants
- ☐ Liquid diet supplements such as Slim-Fast^R
- ☐ Prescription drugs
- ☐ Herbal supplements

How often *in the past year* have you changed your eating habits in an effort to control your weight?

- ☐ 0 times
- ☐ 1-2 times

- ☐ 3-4 times
- ☐ More than 4 times

What is the most weight you have lost when trying to lose weight?

- ☐ 5 pounds or less
- ☐ 6-10 pounds
- ☐ 11-15 pounds
- ☐ 16-20 pounds
- ☐ More than 21 pounds

How long did you maintain this weight loss?

- ☐ Less than 1 month
- ☐ 1-3 months
- ☐ 3-6 months
- ☐ Greater than 6 months

This section focuses on what, where and when you eat.

How many days per week do you eat a home-prepared meal for ...

	0	1-2	3-4	5-6	7
breakfast	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
lunch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
dinner	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How many meals per week do you eat in a restaurant or as take-out food? (Include breakfast, lunch and dinners.)

- ☐ Rarely/never
- ☐ 1- 2 meals a week
- ☐ 3-4 meals a week
- ☐ More than 4 meals a week

How many *times per day* do you eat snacks between meals?

- ☐ 0 times
- ☐ 1-2 times
- ☐ 3-4 times
- ☐ More than 4 times

How many *times per day* do you eat after the evening meal?

- ☐ I never eat after the evening meal
- ☐ Once per day
- ☐ Two times per day
- ☐ More than two times per day

Do you ever get up to eat after going to bed?

- ☐ Yes
- ☐ No

Where have you obtained nutrition knowledge pertaining to weight loss diets? *Choose all that apply.*

- ☐ Newspaper/magazine
- ☐ Websites
- ☐ Advice from friends or relatives
- ☐ Popular media-based books
- ☐ Health-club trainer
- ☐ Media-based health programs
- ☐ Registered licensed dietitian
- ☐ Other medical professionals (e.g., physician's assistant, nurse, doctor)

This section gathers some basic history about you.

What is your current height?

Feet Inches

What is your current weight?

Pounds

Since turning 18 years old, what is the most you have ever weighed?

Pounds

Since turning 18 years old, what is the least you have ever weighed?

Pounds

This section focuses on your motivations to eat differently to change your weight.

How satisfied are you with your current weight?

Very Unsatisfied



Unsatisfied



Neutral



Satisfied



Very Satisfied



What amount of weight gain would cause you to consider going on a diet to lose weight?

- ☐ 5 pounds
- ☐ 10 pounds
- ☐ 15 pounds
- ☐ 20 pounds
- ☐ More than 25 pounds
- ☐ I would not consider going on a diet due to weight gain

Would you ever consider going on a weight-loss program designed *specially for men*?

- ☐ Yes
- ☐ No

What is your Body Mass Index (BMI) range?

- ☐ I don't know my Body Mass Index
- ☐ Less than 24
- ☐ 24-29
- ☐ 30-39
- ☐ Over 40

This section focuses on your level and types of physical activity. Since this may vary greatly from week to week, please try to give an average value when responding to these questions.

On average, how much *time per day* do you engage in physical activity? (Include exercise at a gym, recreational exercise, bicycling to work, walking on campus, house/yard work, etc.)

	Hours	Minutes
Average total time per day:	<input type="text"/>	<input type="text"/>

What fraction of your physical activity is *vigorous* (weight training, running, jogging, biking greater than 10 MPH, swimming laps, etc.)?

- ☐ None of it
- ☐ About a quarter
- ☐ About a half
- ☐ About three quarters
- ☐ All of it.

How much time per day do you spend sitting?

- ☐ Less than 2 hours per day
- ☐ 2-4 hours per day
- ☐ 4-6 hours per day
- ☐ 6-8 hours per day
- ☐ More than 8 hours per day

This section investigates other health-related factors that are related to eating habits.

Do you currently smoke?

- ☐ Yes
- ☐ No

Have you ever smoked as a way to control your weight?

- ☐ Yes
- ☐ No

How many servings of alcohol do you drink in a week? A serving is one 12-ounce beer, 5 ounces of wine, or 1.5 ounces of liquor.

- ☐ 0 servings
- ☐ 1 serving
- ☐ 2-3 servings
- ☐ 4-5 servings
- ☐ 6-8 servings
- ☐ More than 8 servings

On average, how long do you take to eat dinner?

- ☐ 5-10 minutes
- ☐ 15-20 minutes
- ☐ 25-30 minutes
- ☐ More than 30 minutes

Were either of your parents overweight?

- ☐ Mother
- ☐ Father
- ☐ Both parents
- ☐ Neither parent

Finally, some demographic questions.

Do you currently smoke?

- ☐ Yes
- ☐ No

Have you ever smoked as a way to control your weight?

- ☐ Yes
- ☐ No

How many servings of alcohol do you drink *in a week*? *A serving is one 12-ounce beer, 5 ounces of wine, or 1.5 ounces of liquor.*

- ☐ 0 servings
- ☐ 1 serving
- ☐ 2-3 servings
- ☐ 4-5 servings
- ☐ 6-8 servings
- ☐ More than 8 servings

On average, how long do you take to eat dinner?

- ☐ 5-10 minutes
- ☐ 15-20 minutes
- ☐ 25-30 minutes
- ☐ More than 30 minutes

Were either of your parents overweight?

- ☐ Mother
- ☐ Father
- ☐ Both parents
- ☐ Neither parent

Finally, some demographic questions.

What is your age?

- ☐ 18-20 years old
- ☐ 21-30 years old
- ☐ 31-40 years old
- ☐ 41-50 years old
- ☐ 51-64 years old
- ☐ 65 years old and over

What is the highest level of education you have completed?

- ☐ 8th grade or less
- ☐ Less than high school
- ☐ High school / GED
- ☐ Trade/technical/vocational training
- ☐ Associate's degree
- ☐ Bachelor's degree
- ☐ Master's degree
- ☐ Doctoral or professional degree (JD, MD)

What is your race?

- ☐ White or Caucasian
- ☐ Black or African American
- ☐ Asian
- ☐ American Indian or Alaska Native
- ☐ Native Hawaiian and Other Pacific Islander
- ☐ Other

Do you consider yourself to be of Hispanic or Latino origin?

- ☐ Yes, I am of Hispanic or Latino origin.
- ☐ No, I am not of Hispanic or Latino origin.

What is your employment status?

- ☐ Full time
- ☐ Part time
- ☐ Retired

What is your annual income range?

- ☐ Below \$15,000 per year
- ☐ \$15,000 - \$30,000
- ☐ \$31,000 - 50,000
- ☐ 51,000-70,000
- ☐ 71,000-90,000
- ☐ \$91,000 or more

What is your current marital status?

- ☐ Single
- ☐ Married
- ☐ Separated
- ☐ Divorced
- ☐ Widowed

Wrapup

Please press the *SUBMIT RESPONSES* button below to complete the survey.