Certified personal trainers and physicians: An evaluation of consumer preference, influence, and decision making on intent to use a weight-loss medication

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CERTIFIED PERSONAL TRAINERS AND PHYSICIANS: AN EVALUATION OF CONSUMER PREFERENCE, INFLUENCE, AND DECISION MAKING ON INTENT TO USE A WEIGHT-LOSS MEDICATION

A Dissertation

Presented in partial fulfillment requirements for the degree of Doctorate of Philosophy in the School of Applied Sciences, Department of Health, Exercise Science, and Recreation Management The University of Mississippi

Submitted by

LINDA RHEA LEMGRUBER-LOBB

April 25, 2014
ABSTRACT

In health-related behavioral decision-making, the Theory of Planned Behavior (TPB) posits that attitudes toward a behavior are the function of three metrics: beliefs and strengths of beliefs toward the behavior, subjective norms around the behavior and locus of control for the individual (Ajzen, 1988). The purpose of this research was to identify the extent to which consumers would accept the recommendation of taking weight-loss medications, based on the source of the recommendation. Research shows that the source of knowledge for information plays a significant role in health-related decision-making of consumers (Pornpitakpan, 2004). In comparison to traditional weight-loss methods such as diet and exercise, research studies report bias’ against the use of prescription (Rx) and over-the counter (OTC) weight-loss medications among both physicians (MD) and certified personal trainers (CPT) (Ashworth, 2002; Holcomb, 2012). Given the current obesity epidemic in the United States (CDC, 2013), the research model examined two different sources of knowledge for weight-loss medications (MD versus CPT). The objective of the study was to examine the influence each source (MD and CPT) had on consumer-based decision-making, and the extent to which each source altered consumers’ intention to try a weight-loss medication. The internet-based research company, Research Now®, administered the on-line survey instrument to qualifying participants (N=168), and collected data for the treatment interventions. Subjects who qualified for the treatment completed a validated questionnaire that collected data on attitudes about physicians, certified personal trainers, types of weight-loss medications (Rx and OTC) (Petty and Cacioppo, 1983, 1986; Sewak, 2002, Sewak, et al., 2005). All eight story-based treatment scenarios were randomly assigned, and given to all participants. Statistical analysis consisted of a 2x2x2 design
(ANOVA). Analyses of source of information and type of weight-loss medication were crossed with source of information communication type (positive versus negative) in each scenario. Null hypotheses were rejected ($H_1 - H_8$). As expected, the physician was the over-all stronger source. However, positive CPT communication and higher credibility score, led to an increase in intention. This is a significant finding. If consumers perceive CPTs to be as knowledgeable as MDs (outside of CPT expertise in exercise planning, prescription, and training); consumers would view CPTs as a credible, reliable, and alternative source for weight-loss related areas of interest and concern.
DEDICATION

This work is dedicated to:

William Boyd Lobb, R.Ph., Ph.D.
Alumnus of:

The University of Texas at Austin
Pharmacy
Hook ‘Em

The University of Mississippi
Pharmacy Administration
Delta Psi
Rho Chi

First and foremost, this work is dedicated to the love of Linda Rhea Lengruber-Lobb’s life, her husband, Bill Lobb. No other person possesses the key, which unlocks access to the very core of Linda’s heart and soul. To know Bill Lobb, is to know that he is a man of his word. His word is backed with a level of honesty and integrity that is unparalleled. Bill’s attitudes, beliefs, intentions, words, and actions produce outcomes in which his good beats most peoples best.

I love you Bill Lobb.
“What do We Drink To?”
“Me Do Too”
“Leave No Doubt”
In memory of Major Dr. Dickie Lee Fox, a subsequent dedication is warranted.

**Dr. Dickie Lee Fox**  
(1944 – 2008)  
“Be the Captain of Your Own Ship”  
“Semper Fidelis”  
“Be Kind”

Dr. Fox was both a United States Marine Core and Navy Veteran. After flying an F-4 Phantom in Viet Nam for the Core, he retired from military service and earned a Ph.D. from East Texas State University. His beloved family, wife Susan, children Julie and Richard, and beautiful grandchildren were always the primary recipients of his unconditional love, devotion, and attention. Those outside of Dr. Fox’s immediate family, who were fortunate enough to have had him as an academic and life mentor, could never have imagined the magnitude of just how important this one man would become in their lives. Finishing this work has been a labor of love and a true testament to everything good that Dr. Fox ever said Linda Lemgruber-Lobb could be, and is.

For the family of Dr. Dickie Lee Fox, his students, friends, and military brothers, this work is for you too.
ACKNOWLEDGMENTS

For whoever does not jump straight to chapters four and five, and actually reads this extensively long and exhausting document, your name may be in this section. Just kidding. I would need another whole document to acknowledge each family member, friend, and colleague who has been instrumental in guiding me through this life. I have been blessed with a small army of warriors, and probably blessed more than I deserve. If my daughter, Miss. Meredith Ann Irene Lobb, is only half as blessed as I have been, I think she was all right. If she is not, it is probably because she has not truly been the captain of her own ship. Sometimes it is appropriate to have people, if you will, walk the plank.

Special Acknowledgement

Medical Marketing, LLC (MME) provided the funding for this research project. MME was founded in 2002 by Eugene “Mick” Kolassa, and with six core partners, has become a global leader in the development of value-based strategies and market research for health care goods and services. The partners of MME (See Below) believe that pharmaceuticals are the most cost effective health care intervention available. This belief drives their intellectual curiosity and passion for solving complex problems. Based on their practical experience, academic rigor, business acumen, and a zeal for research, they appreciated and understood the importance of the topic of the research presented herein. They subscribe to the idea that my research will help to build and capture the importance of certified personal trainers as potential valued resources for information about prescription anti-obesity weight-loss medication, and the appropriate promotion of such
medications. I would like to thank the partners and senior management for their support.

- Dave Evans – Partner
- E.M. Kolassa, MBA, PhD - Chairman & Managing Partner
- William Lobb, RPh, PhD - Vice President & Partner
- Jack M. Mycka - Global President, CEO & Partner
- Amit S. Patel, PhD, Director
- Kevin Patterson, MA - Vice President & Partner
- Douglas Paul, PharmD, PhD - Vice President & Partner
- Brian Reisetter, RPh, MBA, PhD - Vice President & Partner
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>iv</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENT</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xiii</td>
</tr>
<tr>
<td>SEARCH TERMS</td>
<td>xiv</td>
</tr>
<tr>
<td>CHAPTER 1 – INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>CHAPTER 2 – LITERATURE REVIEW</td>
<td>6</td>
</tr>
<tr>
<td>CHAPTER 3 – RESEARCH DESIGN</td>
<td>108</td>
</tr>
<tr>
<td>CHAPTER 4 – RESULTS</td>
<td>122</td>
</tr>
<tr>
<td>CHAPTER 5 – DISCUSSION</td>
<td>131</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>143</td>
</tr>
<tr>
<td>APPENDIX – SURVEY INSTRUMENT</td>
<td>159</td>
</tr>
<tr>
<td>VITA</td>
<td>187</td>
</tr>
</tbody>
</table>
LIST OF ABBREVIATIONS

Agency for Healthcare Research (AHRQ)
American Council on Exercise (ACE)
American Association for Retired Persons (AARP)
American Council on Sports Medicine (ACSM)
American Medical Association (AMA)
Analysis of Variance (ANOVA)
Basal Metabolic Rate (BMR)
Behavioral Risk Factor Surveillance Survey (BRFSS)
Body Adiposity Index (BAI)
Bioelectrical Impedance Analysis (BIA)
Body Mass Index (BMI)
Bureau of Labor and Statistics - United States (BLS)
Cardiopulmonary Resuscitation (CPR)
Cardiovascular (CV)
Centers for Disease Control and Prevention (CDC)
Certified Personal Trainer (CPT)
Department of Health and Human Services-United States (DHHS)

Drug Price Competition and Patent Term Restoration Act of 1984 (DPC PTRA)

Dual X-Ray Absorptiometry (DEXA)

European Health Interview Survey (EHIS)

European Union (EU)

Fitness Trainer (FT)

For Example (I.E.)

General Family Physician (GFP)

Hazard Risk Ratio HR

International Dance-Exercise Association (IDEA)

Institute for Credentialing Excellence (ICE)

Investigational New Drug Application (IND)

Kentucky Medicaid Adult Patient and Provider Survey (KMAPP)

Medical Doctor (MD)

Motivational Interview Treatment Integrity Scale (MITI)

National Academy of Sports Medicine (NASM)

National Ambulatory Medical Care Survey (NAMCS)

National Board of Fitness Examiners (NBFE)

National Center for Health Statistics (NCHS)

National Commission for Certifying Agencies-Accredited Certification Programs (NCCA-ACP)
National Commission for Health Education Credentialing (NCHEC)

National Council on Strength and Fitness (NCSF)

National Exercise & Sports Trainers Association (NESTA)

National Exercise Trainers Association (NETA)

National Health and Nutrition Examination Survey (NHANES)

National Health Interview Survey (NHIS)

National Institutes of Health (United States) (NIH)

National Strength and Conditioning Association NSCA

National Strength Professionals Association (NSPA)

Odds Risk Ratio (OR)

Over-the Counter (OTC)

Patient Protection and Affordable Care Act (PPACA)

Personal Trainer (PT)

Pharmaceutical Researcher and Manufacturers of America (PhRMA)

Practice-based Opportunities for Weight Reduction (POWER)

Prescription Drug (Rx)

Primary Care Physician PCP

Professional Fitness Instructor Training (PFIT)

Research and Development (R & D)
Social Cognitive Theory (SCT)

Social Evaluation Theory (SET)

Social Learning Theory (SLT)

The Cochrane Effective Practice and Organisation of Care Group (CEPOCG)

The Cooper Institute (CI)

The United States Preventive Services Task Force (USPSTF)

Theory of Reasoned Action (TRA)

Theory of Planned Behavior (TRB)

Waist-to-Hip Ratio (WHR)

Whole-Body Air Displacement Plethysmography  □ADP(Bod-Pod) □
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Instruments Used to Determine Adiposity Source:</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>Adult BMI Classification Ages 18 and above</td>
<td>10</td>
</tr>
<tr>
<td>3.</td>
<td>Adult Body Mass Index Formulas Ages 18 and above.</td>
<td>11</td>
</tr>
<tr>
<td>4.</td>
<td>List of U.S. Surveys Used by Healthy People 2020</td>
<td>15</td>
</tr>
<tr>
<td>5.</td>
<td>BMI at 50 years of Age and multivariate relative risk ratio (RR) for men and women</td>
<td>21</td>
</tr>
<tr>
<td>6.</td>
<td>Application Approval Process of a New Drug in the U.S</td>
<td>24</td>
</tr>
<tr>
<td>7.</td>
<td>FDA Approved Prescription Drugs Indicated for Weight-loss</td>
<td>28</td>
</tr>
<tr>
<td>8.</td>
<td>Adapted from the 2013 Bureau of Labor Statistics: Family and General Practitioners</td>
<td>45</td>
</tr>
<tr>
<td>9.</td>
<td>Survey of U.S. physicians’ communication with patients on behavioral aspects of healthy lifestyle habits</td>
<td>59</td>
</tr>
<tr>
<td>10.</td>
<td>PCP Identifying Most Qualified Health Professional to Help Obese Patients</td>
<td>64</td>
</tr>
<tr>
<td>11.</td>
<td>Summary of Wages, Employment, and Education Requirement of Fitness Trainers</td>
<td>75</td>
</tr>
<tr>
<td>12.</td>
<td>NCCA Approved Fitness Organizations</td>
<td>77</td>
</tr>
<tr>
<td>13.</td>
<td>Educational Requirements and Costs of Various Certifications</td>
<td>78</td>
</tr>
<tr>
<td>14.</td>
<td>Examples Of Hypothetical Positive and Negative Attitudes That May Influence The Decision To Take a Weight-loss Aid</td>
<td>95</td>
</tr>
<tr>
<td>15.</td>
<td>Geographic Location</td>
<td>120</td>
</tr>
<tr>
<td>17.</td>
<td>Tests of Between-Subjects Effects – Three-Way ANOVA - Intention</td>
<td>123</td>
</tr>
<tr>
<td>18.</td>
<td>– Hypotheses Test Summary</td>
<td>127</td>
</tr>
<tr>
<td>19.</td>
<td>Sub-analyses for SC, CPT and Intention</td>
<td>133</td>
</tr>
</tbody>
</table>
**LIST OF FIGURES**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 1.</td>
<td>Example of Adult BMI Chart used in many health settings i.e. Physicians’ Offices Universities, Fitness Centers</td>
<td>12</td>
</tr>
<tr>
<td>Figure 2.</td>
<td>Theory of Reasoned Action</td>
<td>91</td>
</tr>
<tr>
<td>Figure 3:</td>
<td>An Illustration of the Theory of Reasoned Action and Planned Behavior</td>
<td>92</td>
</tr>
<tr>
<td>Figure 4 –</td>
<td>Power Analysis for Three-Way ANOVA (G*Power)</td>
<td>109</td>
</tr>
<tr>
<td>Figure 5:</td>
<td>Questions to assess attitudes about the use of a weight-loss medication</td>
<td>112</td>
</tr>
<tr>
<td>Figure 6:</td>
<td>Questions to assess intent to try a weight-loss medication</td>
<td>113</td>
</tr>
<tr>
<td>Figure 7.</td>
<td>Example of Scenario of Information Provided to respondents</td>
<td>115</td>
</tr>
<tr>
<td>Figure 8:</td>
<td>Statistical Analysis Plan for Testing Hypotheses in Proposed Design</td>
<td>116</td>
</tr>
</tbody>
</table>
SEARCH TERMS

Main search keywords:
certified personal trainer, personal trainer, exercise professional, physician, medical doctor, weight-loss, anti-obesity medication, prescription anti-obesity medication, over-the-counter medication, over-the-counter weight-loss supplement, drug knowledge, theory of planned behavior, source credibility, source of influence, beliefs, persuasion, decision making
CHAPTER 1

INTRODUCTION

Obesity has reached epidemic proportions in the United States (U.S.) (CDC, 2013; Eknoyan, 2006; Flegal, et al., 2010). As recently as the mid-1980’s, there have been reports on the condition of obesity being under-diagnosed and under-treated by physicians in the United States (U.S.) health care system (AMA, 1986). In the U.S. clinical health care setting, obesity is no longer recognized by professionals as a lifestyle condition. The American Medical Association (AMA) now clearly defines obesity as a disease (AMA, 2013). There is evidence that suggests obesity continues to be under-reported and under-treated by physicians and medical professionals within the broadly defined U.S. health care system (Grizzard, 2002. Despite the newly adopted goals of the AMA to effectively report and treat this disease that has become an epidemic in the United States, difficulties still exist in the identification and treatment of obese patients (AMA, 2013; Grizzard, 2002.).

The prevalence of obesity among U.S. adults has significantly risen since the first Behavioral Risk Factor Surveillance Survey (BRFSS) survey in 1995. In 1995, BRFSS survey reported that 15.9 percent of U.S. adults had a Body Mass Index (BMI) greater than 30, whereas in 2011, the percent dramatically increased to 27.8 % (BRFSS, 2013). With the estimation that more than one third of all U.S. adults, and approximately 17 percent of all children and adolescents, are overweight or obese, effective solutions to identify, manage, and intervene have
become top public health priorities both stateside and abroad (DHHS, 2001; Ogden, 2012; WHO (d), 2013; Weisburg, 2002).

The 2011 Report from the Center for Disease Control and Prevention (CDC) estimates that approximately 64 percent of U.S. adults are overweight or obese, indicating that approximately 145 million adults are believed to be impacted by this epidemic (CDC, 2013). Worldwide, there are (numerous) scientific research studies that generate the same conclusions: those adults with a BMI of 24.9 or greater have a higher risk ratio associated with the adverse conditions and effects of both physical and mental weight-related medical conditions; also, many of these conditions are preventable (Flegal, et al., 2002; Flegal, et al., 2013; Wormser, et al., 2011). Therefore, at-risk individuals with a BMI classification of 24.9 or greater can make positive behavioral changes that can control for, reduce, and possibly eliminate adverse secondary medical conditions associated with weight-related pre-mature death (Flegal, et al., 2007; Wang et al., 2007; WHO(c), 2013).

In response to the current obesity epidemic in the United States, government health programs continue to implement research, policies, and programs to improve the health status of Americans. As the numbers of Americans who are overweight and obese continue to rise, the negative impacts of health-related factors that have a direct or indirect relationship to unhealthy weight also rise in a linear fashion (Danaei, et al., 2009; Reis, et al., 2009; Shields, et al., 2012). When exploring how to improve over-all health status in the general population and the relationship between weight status and the social determinates of health, countless unfavorable associations are present in all social health determinants (CDC-HP, 2010, Harris, Holden, & Chen, 2010, WHO, 2008). The social determinants of public health have five main categories: societal, ecological, behavioral, genetic, and medical care; and, within the sub-categories of these
components, a myriad of complex negative associations emerge (Marmot, 2008; Wilkinson & Marmot, 2006). These determinants have become the foundation for local, state, federal, and global health organizations to reconstruct current health-related practices, policies, and programs in order to provide more specialized, validated, and successful approaches to reduce the prevalence of overweight and obesity (CDC-HP (b), 2007, WHO, 2008).

Health Belief Theories and Frameworks

In the field of social psychology, various theories address the social determinants of health, and provide models, which outline methods to improve health-related behaviors. Specifically, health-belief change theories offer models to address weight-related areas of study. Health-belief change theories propose that individuals have a unique set of underlying beliefs, and those beliefs are based upon, created, altered, influenced and changed, depending on their relationships to social determinants (Ajzen, 1987; Bandura, 1986; Bronfenbrenner, 1977; Weiner, 1980). Over the past 50 years, health-belief change theories have provided a wealth of knowledge and information into the fields of public health. These theories have made positive contributions in the many domains of health-based research, including weight-related areas of research in nutrition, physical activity, and exercise. Initially, these theories were able to provide public health researchers the opportunity to improve and implement effective strategies in weight-related studies, however, as the prevalence of overweight and obesity continued to rise, so did the complexity of addressing effective theory-based solutions. In response, theorists and researchers sought a better understanding of health-belief change theories, and in taking a closer look, determined that sub-categories within the social determinants of health can change over time and across the life span, affecting the health status of both an individual and society (Marmot, 2005; Glanz and Bishop, 2010).
This research seeks to explore the medical care component within the social determinants of a public-health model, using the specific model found in the Theory of Planned Behavior. The specific aim of this research is to identify the decision-making processes of consumers, and their willingness to use a weight-loss drug therapy, prescription (Rx) or over-the-counter (OTC). The identification of previous health-based beliefs reported in the literature concerning diet, exercise, and weight-loss medications will serve as the foundation for the hypotheses. Specifically, the primary goal of this study is to examine the influence of source, either physician or personal trainer, and the type of drug therapy, either prescription or OTC, on consumers’ attitude/beliefs toward weight-loss medications and intention to use a weight-loss medication.

Research Questions

In the lay press, there is a significant amount of literature that defines the roles and responsibilities of both physicians and personal trainers in weight-loss strategies, however, it is unclear to what extent either source can influence or change a consumer’s beliefs and decision-making in the use of a weight-loss medication. Thus, in the context of consumers and weight-loss medication beliefs, this research proposes to:

1. Determine if positive or negative source-based statements either influence or change consumer beliefs and intentions to use a weight-loss medication.
2. Determine differences in the effect of recommendations, either positive or negative, based on source between physicians and certified personal trainers.
3. Determine consumers’ attitudes about or intent to use a weight-loss medication differs by type of product.
The results generated by this research may help to identify situations and personnel in the broadly defined U.S. health care system that may increase consumer participation in weight-loss programs that include weight-loss medications.
Obesity: Definition, Classification, Health-related Risks, and Treatment Options

Obesity has reached epidemic proportions in the United States and is an excess of both visceral and subcutaneous fat in humans, is known to have adverse effects in children, adolescents and adults, leads to an over-all decline in physical and mental health, and is associated with (increased) risk of death among adults (CDC, 2013; Caballero, 2007; CDC, 2012; Danaei, et al., 2009, Flegal, et al., 2013; Haslam, 2005; NCHS, 2013; USPSTF, 2012; WHO, 1995, WHO, 2013). The prevalence of obesity among U.S. adults is significant in all fifty states, supporting the need for interventions designed to treat and manage this disease (BRFSS, 2012; BRFSS, 2013; Ogden, 2012). As of June, 2013, the AMA officially classified obesity as a disease, whereas prior to this date, the AMA recognized it only as a condition in which multiple factors contributed to the severity of the condition (AMA, 2013; Frellick, 2013). The World Health Organization (WHO), The National Institutes of Health (NIH), and The (CDC)-also recognize obesity as disease (CDC, 2013; NIH, 2013; WHO, 2013). The new AMA obesity classification is a result of the combined efforts of medical and health leaders worldwide, to reduce the current prevalence of obesity, to establish preventative interventions for children, and improve upon the current treatment interventions for adults (AMA, 2013; Kraschnewski, 2013). The following summaries have been adapted from prominent health organizations, in order to
provide a better understanding of the terminology used to describe overweight and obesity among adults:

1. Centers for Disease Control and Prevention: Overweight and obesity are both labels that outline specific ranges of weight using Body Mass Index, weight ranges are known to be greater than what is generally considered healthy for a given height; and increase the likelihood of certain diseases and other health problems.

2. National Institutes of Health: Overweight persons may have an excess amount of body weight from muscles, bone, fat, and water; obesity refers to only an excess amount of body fat.

3. World Health Organization: Abnormal or excessive fat accumulation that presents a risk to health; overweight persons weigh in excess of normal limits for one's age, height, and build; obesity is a condition that is characterized by excessive accumulation and storage of fat in the body; adult obese persons with a body mass index of 30 or greater.

The CDC, as well as many local, state, federal, and global health organizations have adopted (BMI) as the primary measurement tool used to determine the prevalence of overweight and obese within their respective sample populations (CDC, 2013; WHO, 2013). Comparative statistical analysis of scientific data on unique global population characteristics, such as weight, height, and body type, have been extensively analyzed to determine BMI classification that is generalizable across all global sample populations (WHO, 2013). Physiological conditions such as high blood pressure, diabetes, cardiovascular disease, stroke, arthritis, and gall bladder disease increase in relation to an increase in weight, as does the propensity for psychological disorders (AMA, 1986; AMA, 2013; CDC, 2013; McGee, 2005). Calls for the increased treatment of
obesity have existed globally for years and have only increased as the prevalence of the condition has increased (Ashworth, 2002; CDC, 2013; Galuska, et al., 1999; Ogden, 2012; Wooley & Garner, 1994). In a recent study of the Behavioral Risk Factor Surveillance System (BRFSS), only 42 percent of individuals who were obese, from a sample of nearly 13,000, reported that their doctor had advised them to lose weight (Campbell, 2001). Moreover, almost 80 percent of respondents to a nationwide survey, two-thirds of which were overweight or obese, reported that their weight was not a health concern (Flegal, et al., 2002). An understanding of the history, prevalence, co-morbidities, and the myriad of factors associated with overweight and obesity in the United States has been documented by the U.S. government since the inception of Healthy People in 1979 (USDHHS, 2013). The current U.S. data on the prevalence of obesity is important within the context of this study, in that the likelihood of overweight and obese consumers included in this study is high. Gaining insights of (consumers’) beliefs, preferences, and willingness to use a weight-loss medication based on preferred health professional source, provides additional knowledge that can aid in the creation of identifying new sources and avenues to improve weight-loss interventions.

Another important concept when defining overweight and obesity are the methods of measurement and instruments used to assess actual body weight, and if the method provided adequately explains, the metabolic pathology associated with different levels of adiposity. Due to the complexity and costs associated with other available anthropometric measures, the scientific community relies on BMI to approximate adiposity (ACSM, 2013; BRFSS, 2013; CDC (b), 2013; Eknoyan, 2007; Garrow & Webster, 1985; Gray DS, 1991). Table 1 is an overview of various methods and instruments used to determine adiposity (ACSM (b), 2014; Duren, et al., 2008; Fuller, et al., 1992; Hu, 2008).
Table 1. Instruments Used to Determine Adiposity Source:

<table>
<thead>
<tr>
<th>Methods and Instruments Used to Determine Adiposity</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioelectrical Impedance Analysis (BIA)</td>
<td>Percentage of Body Fat</td>
</tr>
<tr>
<td>BMI Combined with US Navy Circumference</td>
<td>Body Composition, Percentage of Body Fat</td>
</tr>
<tr>
<td>Body Adiposity Index (BAI)</td>
<td>Percentage of Body Fat</td>
</tr>
<tr>
<td>Body Average Density Measurement: Brozak and Siri Formulas</td>
<td>Percentage of Body Fat</td>
</tr>
<tr>
<td>Body Mass Index Measurement (BMI)</td>
<td>Body Composition</td>
</tr>
<tr>
<td>Caliper Skinfold Tests Combined with Anthropometric Formulas</td>
<td>Percentage of Subcutaneous Adipose Tissue</td>
</tr>
<tr>
<td>DXA combined with Flowing Afterglow Mass Spectrometry and/or ADP</td>
<td>Percentage of Bone Density, Body Water, Muscle Mass, Body Fat</td>
</tr>
<tr>
<td>Dual Energy X-Ray Absorptiometry (DXA)</td>
<td>Percentage of Bone Density, Muscle Mass, Adipose Tissue, Body Fat</td>
</tr>
<tr>
<td>Hydrostatic Weighing (Underwater Weighing)</td>
<td>Percentage of Bone Density, Percentage of Body Fat</td>
</tr>
<tr>
<td>In-Vivo Neutron Activation</td>
<td>Percentage of Body Fat</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>Percentage of Subcutaneous Body Fat</td>
</tr>
<tr>
<td>Waist-to-Hip Ratio Measurement</td>
<td>Percentage of Body Fat</td>
</tr>
<tr>
<td>Whole-Body Air Displacement Plethysmography (ADP/”BodPod”)</td>
<td>Body Volume, Body Weight, Percentage of Body Fat</td>
</tr>
</tbody>
</table>

Adapted from ACSM 2010

BMI is a simple equation used to classify an individual’s weight-to-height ratio. The final calculated value is the ratio of weight-to height, and is associated with a pre-determined weight classification index. This value is a prediction of an individuals’ adiposity. Table 2 and
Table 3 provides how BMI is calculated and categorized; Figure 1 illustrates the WHO Adult BMI Chart (ACSM, 2013; WHO, 2006; WHO, 2013). In 1832, Adolphe Quetelet first published his work on the weight to height relationship, providing the foundation of BMI (Quetelet, 1968). Over two-hundred years of scientific evidence validates BMI as a reliable instrument to predict adiposity in terms of weight classification (Eknoyan, 2007; Florey, 1970; Gray, 1991; Flegal, et al., 2013; Harris, Holden, & Chen, 2010; Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972; NIH, 1998; Quetelet, 1968; WHO (d), 2013). The WHO, CDC and many other governing health organizations both stateside and abroad have incorporated the use of BMI as the preferable instrument in qualitative survey research, due to the nature of self-reported data that often accompanies survey research. For example, BMI is regarded as a measurement of equal reliability and validity, as compared to using other self-reported measurements such as waist circumference and waist-to-hip ratio (WTHR) (Shields, Tremblay, Connor-Gorber, & Janssen, 2012 Vazquez, Duval, Jacobs, & Silventoinen, 2007).
Table 2. Adult BMI Classification Ages 18 and above

<table>
<thead>
<tr>
<th>CLASSIFICATION</th>
<th>BMI RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight (Very Severely)</td>
<td>Less than 16.0</td>
</tr>
<tr>
<td>Underweight: (Severely)</td>
<td>16.0 to 16.99</td>
</tr>
<tr>
<td>Underweight</td>
<td>17.0 to 18.49</td>
</tr>
<tr>
<td>Normal: (Healthy Weight)</td>
<td>18.5 to 24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0 to 29.9</td>
</tr>
<tr>
<td>Obese Class I: (Moderately Obese)</td>
<td>30.0 to 34.9</td>
</tr>
<tr>
<td>Obese Class II: (Severely Obese)</td>
<td>35.0 to 39.9</td>
</tr>
<tr>
<td>Obese Class III: (Very Severely Obese)</td>
<td>Greater than 40</td>
</tr>
</tbody>
</table>

Adapted from The World Health Organization 2013
Table 3. Adult Body Mass Index Formulas Ages 18 and above.

<table>
<thead>
<tr>
<th>UNITS</th>
<th>FORMULA AND CALCULATION</th>
</tr>
</thead>
</table>
| Kilograms And Meters | Formula: \( \text{Weight (kg)} / [ \text{Height (m)}]^2 \)  
Weight in kilograms divided by height in meters squared.  
To convert height in cm, divide height in centimeters by 100 to obtain height in meters.  
Example: \( \text{Weight} = 60\text{kg} \quad \text{Height} = 165\text{cm} \ (1.65\text{m}) \)  
BMI Calculation: \( 60 \div (1.65)^2 = 22.00 \) |
| Pounds And Inches | Formula: \( \text{Weight (lbs.)} / [ \text{Height (in)}]^2 \times 703 \)  
Divide weight in pounds (lbs.) by height in inches (in) squared, then multiply by 703.  
Example: \( \text{Weight} = 130\text{lbs} \quad \text{Height} = 5'5" \ (65\text{in.}) \)  
BMI Calculation: \( [130 \div (65)^2] \times 703 = 21.60 \) |

Adapted from CDC 2013
The "gold standard" commonly cited in research literature to determine adiposity, is the Dual Energy X-Ray Absorptiometry Scan (DXA) (Flegal, et al., 2008). A DXA scan provides gender-based estimates of bone density, muscle mass and adipose tissue, that are unique to each individual’s body height and weight. However, factors such as availability, accessibility, complexity, and cost of DXA scans contribute to why other instruments are more widely used by health experts. There is evidence that some anthropometric methods do provide more precise...
over-all values of an individual’s unique body composition to determine adiposity, however, BMI is an accepted method for determining general adiposity. Scientific studies have validated the use of BMI as an accepted method by comparing BMI to other anthropometric methods for its overall reliability (Flegal, et al., 2008).

*The National Institutes of Health: Obesity, Health Surveys, Results, and Conclusions*

With the new classification of obesity as a disease by the AMA, there are many important factors to consider in health regulations and policies of the United States. Research literature clearly imparts that obesity is an excess of both visceral and subcutaneous fat that leads to an over-all decline in physical and mental health, and increased morbidity (Caballero, 2007; CDC (b), 2013; Haslam, 2005; NIH, 1998). The probability of an individual developing a negative health condition increases as his or her BMI value increases. It is important to note, as compared to BMI, results from cutting-edge medical devices provide specific amounts of visceral and subcutaneous fatty tissue. Thus, these results also indicate increases in health-related odds risk ratios associated with overweight and obesity, and provide additional validation of the adverse health-related risks, diseases, and conditions associated with elevated BMI. Examples of BMI associated physiological health conditions are high blood pressure, diabetes, cardiovascular disease, strokes, arthritis, and gall bladder disease increase in relation to an increase in weight, as well as the proclivity for psychological disorders (AMA, 1986; 2009, 2013; CDC (b), 2013; Danaei, et al., 2009).

Relative to a person’s height-weight ratio, waist-hip circumference ratio, and lean muscle mass, disproportionate proportions of visceral and subcutaneous adipose tissue lead to the development of detrimental physical and mental illnesses/diseases, that can have both short and
long-term effects on the human body (Flegal, et al., 2013). Overweight and obese BMI classification, for both adults and adolescents, have significant associations to an increased risk of having multiple illnesses and diseases. Two decades of research have identified health conditions that have high associations with overweight and obesity, which increase the risk of mortality (Allison, et al., 1999; Danaei, et al., 2009; Flegal, et al., 2013; Mokdad, Stroup, & Gerberding, 2004). Cardiovascular disease, diabetes mellitus, respiratory conditions, kidney disease, chronic pain, depression, and anxiety are all examples of weight-related cause-specific risk factors that adversely affect health.

In response to the growing obesity epidemic in the U.S., the NIH seeks to advance obesity-related scientific research, in order to better identify correlations between diseases, disease states, and health conditions related to overweight and obesity. HealthPeople2020 is the multifaceted government health promotion and disease prevention program that serves as the foundation for all government based health-related programs, initiatives and population-related goals. Currently, Healthy People 2020 has one (1) mission; four (4) primary goals; four (4) primary health foundation measures; forty one (41) focus areas; six hundred (600) specific objectives dispersed within the focus areas; and over thirteen hundred measures to establish quantifiable data within each objective (1,300). The social determinants of public health are the framework for the Healthy People 2020 initiatives, and the various government-based surveys seek to evaluate the health-related goals, foundations, objectives, and public health status (Wilkinson & Marmot, 2003). Table 4 provides a partial summary of health and medical based surveys that are used by the NIH collect information on the citizens of the United States and its territories, many of these surveys provide data to report on the prevalence of overweight and
obesity in the U.S., as well as adverse health risk indicators associated with unhealthy weight status.

Table 4. List of U.S. Surveys Used by Healthy People 2020.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Data Source</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Ambulatory Medical Care Survey (NAMCS)</td>
<td>Medical Record Reviews or Patient Visits</td>
<td>≥180,000 Adults</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥20,000 Physicians</td>
</tr>
<tr>
<td>National Ambulatory Medical Care Survey-Physician Workflow Survey</td>
<td>Survey of Physicians</td>
<td>≥5,600 Physicians</td>
</tr>
<tr>
<td>(NAMCS-WF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Health and Nutrition Examination Survey (NHANES)</td>
<td>Personal Interviews</td>
<td>≥5,000 Adults</td>
</tr>
<tr>
<td></td>
<td>Physical Exams</td>
<td>≥5,000 Children</td>
</tr>
<tr>
<td></td>
<td>Lab work</td>
<td>Oversample of ≥5,000:</td>
</tr>
<tr>
<td></td>
<td>Nutrition Assessment</td>
<td>Seniors ≥60</td>
</tr>
</tbody>
</table>

Selected information from each survey provides a partial summary of the information collected to report on the prevalence of overweight and obese people. Source: CDC, 2013
Health Risks Associated with Overweight/Obesity

NIH surveys identify, adopt and adapt to the most important and current health issues of U.S. citizens. These surveys help to evaluate and confirm that the mission, goals, objectives, and health measures of HealthyPeople stay aligned with the most important and current health issues. Surveys such as NHANES, BRFSS, and vital statistic data (1971 to 2011), a series of reports have been published on the health of the U.S citizens, and represent large national samples that confirm the current obesity epidemic. Data sets from 1971 to 2011, were combined to evaluate BMI and other health covariates, and to determine estimates of cause-specific excess deaths associated with underweight (BMI ≤18.5), overweight (BMI ≥24.9), and obesity (BMI ≥30) (BRFSS, 2012). Underlying cause-specific mortality associated with overweight and obesity was estimated for 2.3 million adults in the United States and U.S. territories (CDC(c), 2001; Danaei, et al., 2009; Finucane, 2011; Flegal et al., 2002; Flegal, et al., 2010; Flegal, et al., 2004; NCHS, 2013). Analysis from these studies report a significant negative relationship between BMI to an increased risk ratio of having an obesity-related cancer and/or cardiovascular disease (CVD) (Flegal, et al., 2010; Flegal, et al., 2007; Flegal, et al., 2013; Wormser, et al., 2011). When excluding cancers not related to weight status and non-CVD mortality risks, overweight (BMI ≥ 24.9 – 29.9) was associated with an excess (preventable) of total deaths (N = 69, 299); and obesity (BMI ≥ 30.0) was associated with significantly increased obesity-related CVD mortality (N = 112,159 deaths). When overweight and obesity were combined, associations with increased mortality from diabetes and kidney disease were also reported (N = 61,248 total deaths). Obesity was also associated with increased mortality from certain types of obesity-related kidney and liver cancers. A reported (N = 13,839) total deaths were associated with these obesity-related cancers. Unfortunately, many of deaths attributed to CVD and
obesity-related cancers, could have been prevented with the maintaining a healthy body weight. Historically, NIH surveys have collected data through mail, in-person and telephone-based surveys, and have been reliable sources for health-related information of the U.S. population. Advances in technologies, (i.e. computers, internet, cell phones), have improved health-based surveys to collect data on larger and more diverse population samples using a variety of different survey methods (Ekma, et al., 2006; Ekman & Litton, 2007). The NIH has addressed the goal for implementing a variety of survey collection methods, with an aim for continuing to advance obesity-related research that will lead to a healthier nation (NIH, 2013).

The Prospective Studies Collaboration, a long-term prospective follow-up collaborative analyses, reviewed a large adult sample population (N = 894,576) that included fifty-seven large studies from both Europe and the U.S. (61 percent), provided further support of BMI and cause-specific mortality (Whitlock, et al., 2009 ). The association of BMI to mortality was assessed based on gender, smoking status, and type of study. Deaths of known cause (n = 522) not associated BMI were excluded, which allowed for eliminating reverse causality. Eliminating age and actual cause of death, results yielded high associations with vascular events (n = 30,416); diabetic, renal or hepatic conditions (n = 22,592); neoplastic (n = 2,070); and respiratory conditions (n = 3,770). Mortality was lowest among both male and females with a BMI of approximately 2.5 – 25.0 kg/m². BMI above 25.0 indicated several specific causes associated with mortality, but there were no inverse associations to mortality detected. As BMI increased, for every 5 kg/m² increments, there was a 30 percent increase of the odds of health risk associated with mortality and obesity. With these BMI increments, odds percentages increased for vascular mortality (40); diabetic, renal, and hepatic mortality (60-120); neoplastic mortality (10); and respiratory mortality (20). Results indicate that as BMI increases above 25.0 kg/m²,
odds of mortality from a vascular condition increased, thus the study hypothesized that BMI may be highly correlated as the possible root cause of vascular mortality in overweight and obese individuals. An alarming result purported that BMI between 30–35 kg/m², median survival is reduced by 2–4 years; and between 40–45 kg/m², it is reduced by 8–10 years. Remarkably, these results are comparable with the effects of smoking (CDC, 2010).

Estimates of the relative mortality risks associated with weight classifications may help to improve physician-based decision making in the clinical setting. Systematic reviews reporting relative risks (RR’s) and hazard risk ratios (HRs) of all-cause mortality for overweight and obesity, relative to normal weight in the general population, consistently report adverse physical and mental effects, conditions, and diseases associated with weight classification as BMI increases (Allison, et al., 1999; Flegal, et al., 2007; Flegal, et al., 2004; Mokdad, Stroup, & Gerberding, 2004; Reis, et al., 2009; Wormser, et al., 2011).

One of the most comprehensive meta-analysis to date, evaluated the association between BMI and all-cause mortality in 2010 (Flegal, et al., 2013). Of the ninety-seven studies included for the analysis, the combined sample size included an adult sample population of over 2.88 million, with more than 270,000 reported deaths. Coupled with the strict methodological criteria, the most rigorous statistical sensitivity analysis was executed to address issues of possible over and under adjustment. The analysis adjusted for random effects, factors in the causal pathway, as well as independent variables not adjusted, (i.e. age, sex, and smoking), and all-cause mortality hazard ratios for overweight (BMI of 25.0-29.9), obesity (BMI of ≥30.0), grade one obesity (BMI of 30.0-34.9), and grades two and three obesity (BMI of ≥35.0) were calculated and compared, relative to the data grouped as normal weight (BMI of 18.5-24.9). Results from Flegal, et al., 2013, reported alarming high hazard risk ratios for all BMI
classifications. A hazard risk ratio (HR) can be used to express effects in studies that compare treatments across studies, that use statistics to describe time-to-event (Duerden, 2009) The HR’s reported in Flegal, et al., 2013, should not be confused with relative risk (RR), which are used to predict the statistical probability of an event occurring. Although selection bias and time-based endpoints can affect study results, it is important to note that in the Flegal, et al., 2013 study, the large sample size and defined endpoints attributed to the strength of the study results.

Flegal, et al., 2013, indicate a serious increase of hazard risk ratios associated with overweight and obese adults. Among overweight adults, the hazard risk ratio was 0.94 (95 percent CI, 0.91-0.96) and among obese adults, the hazard risk ratio was 1.18 (95 percent CI, 1.12-1.25). When all obesity grades were combined the hazard risk ratio was, 0.95 (95 percent CI, 0.88-1.01). Hazard risk ratios for obesity grades 2 and 3 combined was 1.29 (95 percent CI, 1.18-1.41). The relationship between BMI and HR was further strengthened when statistical analyses were repeated in studies when all categories of both self-reported BMI and measured BMI (i.e. clinical measures) were compared. Thus, the repeated analysis with measured BMI classification provided additional support across many of the HR associations to overweight and obesity. Repeated analysis reported overweight to be associated with reduced mortality, grade 1 obesity not significantly associated with increased mortality, and the higher grades of obesity significantly associated with increased mortality. All grades of obesity and grades 2 and 3 obesity were associated with significantly higher all-cause mortality. With respect to how weight can affect the quality and length of life, this meta-analysis found that overweight was associated with significantly lower all-cause mortality. The results from this study reinforce the endless amount of research studies that report even small, sustained decreases in weight can have an over-all positive long-term impact on quality and length of life.
To address the reliability of results and the validity of using standard BMI classifications across multiple studies, the NIH-based alliance of the American Association for Retired Persons (AARP) sought to determine if BMI and the hazard risk ratio risk (HR) associated with all-cause mortality could be statistically validated in older adults (age 50 to 71 years) (Adams, et al., 2006). The relationship between BMI between 24.9 to 29.9 (overweight) and the attributable causes of death has been questioned within this age group, as it is often difficult to separate and identify causes of mortality as a person ages. The significance of investigating BMI and its relationship to all-cause mortality HRs within this age group could provide a plethora of relevant information that could improve clinical, policy, intervention, and treatment proposals aimed to identify and adequately combat the current obesity epidemic.

The AARP Diet and Health Study survey questionnaire collected data on food frequency habits, demographics, and various health status variables of 567,169 U.S. adults (n = 340,148 men and (n = 227,021 women) between the years of 1995 and 1996 (Schatzkin, et al., 2001). Ten years later, Adams et al. (2006) used the AARP data to determine if BMI, at both baseline and follow-up, altered the relative risk ratio of death. Statistical analyses were implemented to control for potential biases related to pre-existing chronic disease and smoking status, and relative risk ratios (RR) were adjusted for age, race or ethnic group, level of education, smoking status, physical activity, and alcohol intake.

Across gender, age, race, and ethnicity, the RR of death among both men and women increased linearly at baseline and follow-up as BMI increased, in all racial or ethnic groups, and at all ages. At baseline, among healthy people who had never smoked, the risk of death was associated with overweight and obesity in both men and women (Table 6).

Table 5. BMI at 50 years of Age and multivariate relative risk ratio (RR) for men and women.
<table>
<thead>
<tr>
<th></th>
<th>BMI ≥25.0-26.4</th>
<th>BMI ≥26.5-27.9</th>
<th>BMI ≥28.0-29.9</th>
<th>BMI ≥30.0-34.9</th>
<th>BMI ≥35.0-39.9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Men</strong></td>
<td>1.00</td>
<td>1.09</td>
<td>1.18</td>
<td>1.46</td>
<td>1.86</td>
</tr>
<tr>
<td><strong>Healthy Men Non-Smokers</strong></td>
<td>1.05</td>
<td>1.31</td>
<td>1.49</td>
<td>1.96</td>
<td>2.46</td>
</tr>
<tr>
<td><strong>All Women</strong></td>
<td>1.08</td>
<td>1.15</td>
<td>1.28</td>
<td>1.51</td>
<td>1.90</td>
</tr>
<tr>
<td><strong>Healthy Women Non-Smokers</strong></td>
<td>1.21</td>
<td>1.19</td>
<td>1.37</td>
<td>1.99</td>
<td>2.57</td>
</tr>
</tbody>
</table>

Adams et al. 2006.

The statistical associations of the relative risk of death at midlife (50 years of age) among those who had never smoked, increased by 20 to 40 percent among those categorized as overweight according to BMI. Excess weight in all cohort participants, categorized beyond normal BMI limits at baseline, accounted for approximately 7.7 percent of all premature deaths among men and 11.7 percent of all premature deaths among women. When controlling for preconditions and smoking status for all cohort participants, it accounted for 18.1 percent of all premature deaths among men who had never smoked and 18.7 percent of all premature deaths among women who had never smoked. The results of this study do not suggest a causal relationship between BMI and death; however, it does establish an association between BMI at mid-life, and the relative risk of death due to weight status. Specifically, it indicates the significance and potential impact a higher BMI may have after the age of fifty.
Discussion

Economists project that a significant decrease in research and development funds was appropriated to the discovery of new prescription medications that can extend and improve the quality of life (Adams & Brantner, 2011; CBO, 1998; Kisselman, 2011). If this is the projected outcome for new drug discovery, it is essential that for the future generations of tomorrow, they have the skills and knowledge needed to stay healthy, as opposed to depending on medications to treat otherwise preventable conditions and diseases, such as obesity. From a health promotion perspective, providing those needed skills and knowledge is possible through resources already available. As NIH public health programs continue to mature and adapt to the needs of an ever growing and diverse America, predominating the difficulties that are unique to its state and community-based programs, there is no shortage of ideas, methods, and interventions to combat the current obesity epidemic. Traditionally, NIH funded programs turn to the clinical setting, to investigate how general family physicians fit into reducing obesity in America.

Pharmaceutical Prescription Medications and Weight-loss Supplements: A Summary of the Identification, Approval, Indication, Effectiveness and Health-related Risks for Weight-loss

The FDA Drug Approval Process

Within the scope of this study, it is imperative to have a basic understanding of the complex and costly process of bringing a prescription medication to the U.S. consumer. Having a basic understanding of the cost of a prescription medication, provides many links to the social determinants in health belief change models, and how social norms can influence decision-making beliefs before purchasing a medication. Contrary to popular belief, pharmaceutical companies do not solely determine drug prices. Determinants for establishing prices for
medications are a function of 11 independent cost and pricing categories, with multifarious influencing factors within each category (Mattingly, 2012). Similar to most consumer products, the basic economic principle of “supply and demand” influences drug availability and price. A comprehensive analysis for medicinal pricing in the Unites States is available, at no cost, by the Academy of Managed Care Pharmacy, and is far beyond the scope of this study (Rubenstein & Tag, 2013). However, understanding the basic processes of securing just one patented FDA approved medication to the consumer, imparts critical insight into the health-related value of the prescription medications that afford U.S. citizens improved health status.

In the United States, the government is responsible for ensuring that prescription medications are safe for consumption by the general population. The Food and Drug Administration (FDA) is the U.S. government-based organization that regulates prescription (Rx) medications for human consumption. Revered as a global leader in public health, the FDA’s mission is to develop new tools, standards, and approaches that enhance the ability to assess the safety, efficacy, quality, and performance of all products the organization regulates (FDA, 2013). As seen in Table 7, prescription medications for human consumption, regardless of indication for use, arguably have the most rigorous FDA approval process worldwide (PhRMA, 2013). The process of FDA drug approval is rigorous, methodical, prolonged, and exorbitantly expensive. The total projected cost of just one FDA approved pharmaceutical medication averages 12-15 years between the pre-clinical trial phase of compound discovery to market launch and ranges from $800 million to 2.0 billion dollars (Adams, et al., 2006; Adams & Brantner, 2011; DiMasi, 2003; Paul, 2010).
Table 6: Application Approval Process of a New Drug in the U.S

<table>
<thead>
<tr>
<th></th>
<th>Pre-clinical Testing</th>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
<th>FDA</th>
<th>Phase IV</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years</strong></td>
<td>~3.5</td>
<td>~1</td>
<td>~2</td>
<td>~3</td>
<td>~2.5</td>
<td>~1</td>
</tr>
<tr>
<td><strong>Sample</strong></td>
<td>Animal</td>
<td>~20-80 Healthy Volunteers</td>
<td>~100-300 Patient Volunteers</td>
<td>~1000-3000 Patient Volunteers</td>
<td>Review Process and Approval</td>
<td></td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>Assess Safety And Biological Activity</td>
<td>Establish Safety and Dosage</td>
<td>Evaluate Efficacy and Identify Side Effects</td>
<td>Verify Efficacy and Audit Adverse Reactions During Long-Term Use</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Success Rate</strong></td>
<td>~5,000 Compounds Evaluated</td>
<td>~5 Drugs Enter Trials</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional post marketing testing required by FDA

Adapted from PhRMA Spring 2013 Version 3.0.

*IND: investigational new drug application. Provides outlined proposal for human testing in clinical trials.

*NDA: new drug application.

*FDA drug approval process chart reflects approximations in all categories, it is important to note that drugs such as orphan drugs typically take longer to develop, research, gain FDA approval and become available for human consumption.

The U.S. market is a free market, designed to allow its citizens to make profit, based on products sold to the consumer. Modestly stated, the laws regulating a free market protect
individuals and businesses from excess of government tax, which protects business owners from profit loss. As compared to general retail good prices, there are many more costs associated with the development of medicinal prescription drugs. Compared to typical retail products (i.e. cosmetics, electronics, and food) purchased in the general public sales free-market, a new prescription medication is subject to more governing laws and drug approval costs in research and development (R&D), than the average retail good (DiMasi, 2003). The future of prescription drug manufacturing, availability, and cost in America, are solely dependent on the qualified medical professional writing the prescription i.e. physician, nurse practitioner, whereas, the regulation of general retails items are not. In other words, despite the amount of medications available to the consumer, if the physician is not willing to write a prescription for a certain drug, there is often minimal to no profit made on that drug, dependent on drug class and category (CBO, 1998; DiMasi, Feldman, Seckler, & Wilson, 2010; Morgan, Grootendorst, Lexchi, Cunningham, & Greyso, 2011).

In the US, consumers need a physicians’ prescription to obtain a prescription medication from a pharmacy. They do not need such a prescription to purchase an OTC medication. Therefore, when it comes to using/consuming a prescription medication, physicians’ decisions also play a key role in medications that consumers can have access. For weight-loss medications, if obtaining a prescription and/or visiting a physician is considered to be a barrier, the consumer may lean toward purchasing an OTC medication or may ask other healthcare professionals, e.g., a personal trainer, for advice on such medications.
History of Prescription Weight-loss Medications

An alternative strategy to diet, exercise and surgery interventions for weight-loss, is the use of pharmaceutical medicines. Pharmacological and behavioral interventions for obesity have had limited success in physician-based clinical settings and have generated little satisfaction among physicians (Ashworth, 2002; Stafford and Radley, 2003; Wooley & Garner, 1994; Yanoversuski, 2002). The current recommendation for the treatment of obesity is increased physical activity and reduced caloric intake. However, when the behavioral approach is not sufficient, a pharmacologic treatment is recommended by physicians (Stafford and Radley, 2003). Currently, pharmaceutical medications for obesity are considered “lifestyle drugs” that have experienced both positive and negative consumer and physician popularity (Moldrup, 2004). The term “lifestyle” medication has had several definitions over the years, but currently reflects a method of weight-loss therapy that is primarily patient selected. Because of this view, the FDA and health insurance formularies currently list treatments for obesity that are grouped with other patient-selected therapies, i.e. medications for baldness. Unfortunately, anti-obesity weight-loss prescription medications are commonly not covered by insurance companies (WIN, 2009). This suggests a potential gap in the importance of treatments for obesity (Anderson, 2008; Moldrup, 2004). This has led to diminished importance and emphasis placed on prescription medications for reduction of weight, despite the current weight of our nation (PhRMA, 2013). Reimbursement of health care services associated with weight management has gradually improved in the past decade, however, is often limited to those who have a BMI higher than 35, with additional co-morbidity risk factors (Bardia, Holtan, Slezak, & Thompson, 2007). Effective therapy for overweight and obese patients is no longer as simple as receiving a medical recommendation from a doctor, advice on a healthy diet and increased physical activity.
Integrated interventions that encompass all aspects of health, across multiple environments where individuals spend time, have produced the most successful long-term weight-loss and optimal health status. Primary care setting interventions have reported limited sustainability. Again, doctors continue to cite that programs that are not integrated within the financial system of an organization often fail and have a very limited impact without additional support within the workplace and/or the community. To determine the most efficient and effective physician-based weight-loss intervention programs, it is imperative that a complete demographic, socioeconomic, cultural, evaluation of the population be performed. Table 8 provides examples of currently available FDA approved prescription weight-loss medications.

There are current streams of scientific literature that have identified various prescription medications for their potential to enhance both short-term and long-term weight-loss. The pharmaceutical industry has developed new, promising FDA approved prescription anti-obesity medications and these new drugs are effective, based on an improved understanding of the multiple mechanisms and complex physiological systems targeting appetite (Aronne, Powell, & Apovian, 2011). However, it is important to understand that FDA approved medications specifically indicated for weight-loss, are not comparable to other medications indicated for off-label use to augment weight-loss. Off-label use of prescription medications is the use of any OTC or Rx medications to treat a condition other than what the drug is indicated to treat. Examples of off-label drug use of prescription medications are depression and Type-II diabetes drugs, which are used to treat obesity and enhance weight-loss, not necessarily to treat depression and diabetes (THA, 2013; WIN, 2013).
Table 7. FDA Approved Prescription Drugs Indicated for Weight-loss.

<table>
<thead>
<tr>
<th>Clinical Drug Name</th>
<th>Brand Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethylpropion</td>
<td>Tenuate®</td>
</tr>
<tr>
<td></td>
<td>Tenuate Dospan®</td>
</tr>
<tr>
<td>Benzphetamine</td>
<td>Didrex®</td>
</tr>
<tr>
<td>Lorcaserin</td>
<td>Belviq®</td>
</tr>
<tr>
<td>Methamphetamine Hydrochloride</td>
<td>Desoxyn®</td>
</tr>
<tr>
<td>Orlistat</td>
<td>Xenical®</td>
</tr>
<tr>
<td>Phendimetrazine Tartrate</td>
<td>Adipost®</td>
</tr>
<tr>
<td></td>
<td>Bontril SR and PDM®</td>
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<td></td>
<td>Melfiat®</td>
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<tr>
<td>Phentermine-Topiramate</td>
<td>Qysmia®</td>
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<tr>
<td>Phentermine Hydrochloride</td>
<td>Adipex-P®</td>
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<td>Fastin®</td>
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<td>Oby-Cap®</td>
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<td>Suprenza®</td>
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<td>T-Diet®</td>
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<td></td>
<td>Zantryl®</td>
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<tr>
<td>Sibutramine</td>
<td>Meridia®</td>
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</table>

Source: NIH 2013; WIN 2013

There is a vast amount of scientific literature detailing the mechanisms and effects of past and present therapeutic medications, specifically indicated for weight-loss in the treatment of obesity (Li, Cheung, & Ming-Fang, 2011). The two primary functions of weight-loss medications in the human body, are through the suppression of appetite and the reduction of the absorption of fatty foods (Cooke and Bloom, 2006; Sargent and Moore, 2009). In past years, there have been numerous FDA approved brand name and generic prescription drugs for the treatment of obesity; however, several have been withdrawn from the market because of their adverse effects (Glazer, 2001; Jick, et al., 1998; NTF-OT; 1996). In 1995-1997, the FDA voluntarily withdrew fenfluramine and dexfenfluramine from the U.S. market, due to increased
reports of heart valve damage and heart attack of patients who took these medications over a prolonged period. In 1999, the Sibutramine Cardiovascular Outcomes Trial explored the prevalence of patients who experienced major adverse cardiovascular events while taking sibutramine. This appetite suppressant was highly associated with increased heart rate and blood pressure, and the findings of this trial ultimately led to its withdrawal in both Europe and the United States (Fanghanel, et al., 2000). Rimonabant was also found to have similar adverse effects, and although rimonabant was not associated with major cardiovascular risk factors, it was associated adverse psychiatric side effects, leading to its withdrawal by the FDA in the U.S. market.

Other prescription drugs doctors prescribe “off label” to promote weight-loss include bupropion, a drug used to treat depression, and metformin, a drug used to treat type II diabetes (Kang, 2012). In fact, amphetamine, rimonabant, and sibutramine licenses were withdrawn, due to the increased risk of psychiatric disorders and non-fatal myocardial infarction or stroke. As a result, pharmaceutical companies lost great amounts of net-profit, due to the litigation for damages and deaths that occurred from persons taking these medications. With the recent emphasis on government based initiatives to reduce overweight and obesity in the general U.S. population, there has been a new urgency to discover improved treatments that are both better tolerated and more efficacious (Halford et al., 2010; Kennett and Clifton, 2010; Rodgers et al., 2010; Vickers et al., 2011). In this context, major recent advances in our understanding of the basic neurobiology of appetite and energy homeostasis have identified numerous targets for potential anti-obesity drug development (Halford et al., 2010; Heal et al., 2009; Wilding, 2007).

The drugs presented in this review were referenced in a myriad of sources, with available retail pharmacy information to determine an accurate list of drugs currently approved by the
Food and Drug Administration (FDA) as appetite suppressants (Aronne, Powell, & Apovian, 2011; Chawla & Kochar, 2006; WebMD, 2013; WIN, 2009). Arguably, the largest selection by mechanism, and most prescribed prescription anti-obesity medications are the appetite suppressants. Appetite suppressants trigger certain brain chemicals that help decrease an individual’s desire to eat. Arguably, the largest class of anti-obesity drug is the phentermine’s class. Phentermine’s are available as both brand and generic drugs. Examples of brand names include Adipex-P®, Anoxine-AM®, Fastin®, and Ionamin®. As previously mentioned, two very controversial appetite suppressant drugs, fenfluramine and dexfenfluramine, were pulled off the market in 1997. These two drugs had sizeable prescription sales in the nineties, and represent some of the dangers associated with obesity treatment.

Perhaps in response to two of the popular appetite suppressant drugs being pulled from the, a new anti-obesity class of drug became available to the public in 1999 (Bray, 2000). Approved by the FDA, and marketed to the public as Xenical®, the lipase inhibiting drug orlistat began to gain physician drug mentions to patients as the safer alternative to stimulant and appetite-based prescription weight loss medications. At the time of product launch, the mechanism of action for orlistat was novel to both physicians and patients. Working by blocking fat absorption and digestion of food in the intestines, the drug blocks the body from delivering an overall percentage of the food substances ingested. For this drug to be utilized in the body, it is dependent upon the consumption of foods with higher concentration of fat content. The mechanism of action for orlistat is it that it blocks enzymes in the stomach and small intestine from hydrolyzing dietary fat in the form of triglycerides into absorbable free fatty acids. The result is fewer absorbed fats. The resulting caloric deficit may have a positive effect on weight control, in that orlistat inhibits dietary fat absorption by approximately 30 percent. Thus, when
compared to other types of weight-loss medications, orlistat aids in the reduction of caloric uptake within the body itself, which can result in weight loss (Bray, 1999).

Generally, physician and pharmaceutical-based medication guidelines recommend that prescription weight-loss medications are indicated for use by patients who have a BMI of greater than or equal to 30, or a BMI of 27 with additional adverse risk factors such as high blood pressure, high cholesterol, and diabetes (Bray and Ryan, 2012, FDA, 2013; Yanoversuski, 2002). Because the mechanism of action for appetite suppressants is via stimulation of the hypothalamus, they subsequently increase metabolic response by way of neural brain receptors. This pathway results in an increased “feeling” of energy, as well as repressed appetite. Because appetite suppressants have been correlated to critical cardiovascular risk factors (CV), caution is advised for the use of suppressants for those within higher BMI categories, (i.e. Obesity Grades II and III), (AHFS, 2006; Jick, et al., 1998; Khan, et al., 1998). Conclusively, accepted guidelines recommend that for most patients, initial weight-loss attempts should be attempted through healthy lifestyle and behavioral changes for a period of six months, prior to the use of prescription weight-loss medications, (CDC, 2013).

Flegal, et al., reported in 1996 that the effectiveness of anti-obesity prescription medications, in combination with diet and exercise behavior therapies, could produce as much as 5-15 % decrease in body weight as well as noticeable improvements in comorbidities associated with obesity (Flegal, 1996). One of the most thorough studies investigating physician mentions of prescribed weight-loss medications to date sought to identify incidence of physicians who mentioned and/or prescribes a weight-loss medication (Stafford and Radley, et al., 2003). Using data from Intercontinental Marketing Services (IMS) Health and National Disease and Therapeutic Index (NDTI), from 1991-2001, Stafford and Radley, et al., developed a serial cross
sectional study to analyze only office-based physician visits of clinically obese patients (N = 13,452) patients (Stafford and Radley, 2003). Outcome measures were the number of drug mentions, including non-brand name drugs. The mean numbers of anti-obesity medications prescribed were examined along with other factors, to develop an estimate reflective of national physician practice methods. The approximate examination of over 55 million patient visits over an eleven year time period, yielded interesting results, especially when considering the fact that during this period both fenfluramine (the “fen” of “fen-phen”) and dexafluramine (Redux) were pulled off of the U.S. market by the Food and Drug Administration.

The most dramatic finding from Stafford and Radley et al. was that substantially more prescriptions were written for Fen-Phen and Redux between 1995 and 1997. Specifically, in 1996 there were 10.6 million drug mentions for anti-obesity prescriptions and 9.4 million mentions in 1997. Also reported in these findings was the number of patients who physicians reported as being obese. In 1991, the number of physician reported obese patients was 2.6 million; peaking at 7.8 million in 1996, and then decreasing to 4.2 million in the late 1990’s. An overwhelming majority of obese patients, 79 percent of those patients reported to be obese as of 2002, were female between the ages of 20 and 59 years of age. These characteristics did not change within the timeframe examined (1991-2001). Overall physician mentions and patient use of phentermine has remained constant over time. In 2002, the data for phentermine’s show 300,000 quarterly mentions by physicians, and appears to be the most common medication of choice for anti-obesity therapy. The results from this analysis suggest that between the years of 1991-2001, physicians were mentioning and prescribing weight-loss medications for their obese patients. However, analysis was only exploratory and included only physician drug mentions.
This study was not able to report on the safety, efficacy, or weight-loss outcomes associated with the medications.

Equally important, is evaluating the efficacy issues that are related to the use of anti-obesity medications. *HealthyPeople* predicted that by the year 2000, over 40 percent of Americans would be obese, and based this predication on data from the U.S. National Health and Nutrition Examination Survey (NHANES III). As of 2010, several reliable resources for weight classification data report that Americans are close to the *HealthyPeople* predication (Flegal, et al., 2010). However, in terms of health risk factors associated with the use of drug treatments, it is not recommended that all of those who are overweight or obese turn to drug therapy for a cure. In knowing the guidelines set forth for prescribing anti-obesity medications, it is equally important to be aware of the risk factors that have been scientifically reported to be associated with the afore mentioned medications. Risk factors thought to be associated with the use of these medications are cardiac abnormalities, such as increased blood pressure, valve disorders, and even stroke (Flegal, 2010; 2013). It has already been established that obesity is an indicator of other health risk factors such as diabetes and high cholesterol, scientists seek to know whether the use of these anti-obesity medications will contribute to the development of these risk and sequentially lead to a CV event (i.e. stroke) factors (Derby, Myers, & Jick, 1999).

To uncover the association of anti-obesity medication with adverse risk factors, Derby et al, 1999, performed a cohort study in the United Kingdom involving over eight thousand subjects \((n = 8243)\), less than 69 years of age. The majority of the subjects were female, and were exposed to dexfenfluramine \((n = 60910)\), fenfluramine \((n = 2355)\), phentermine \((n = 887)\), and unexposed obese subjects \((n = 17225)\). Specifically, the study sought to determine if anti-obesity medications factored in the incidence and prevalence of cardiovascular abnormalities such as
cardiac valve abnormalities (CVA) and stroke. The patients in this study were exposed to three appetite suppressant drugs, of which subjects (n = 1,000) had no prior use of any of the drugs used in this study. Case-control analysis was performed using age, sex, and general physician practice as controls, with additional variables added such as body mass index, diabetes, hypertension, hypercholesterolemia, and smoking status to establish reliability and validity of outcome measures.

The results of the study found that among non-users (n = 42), there were 27 cases of CVA, only one case among recent users, and 13 cases among past users. In the case-control analysis, types of stroke were divided into thrombotic (n = 38) and hemorrhagic (n = 7). Three in the thrombotic group and one in the hemorrhagic group had been exposed to a weight-loss drug. The incidence rate (IR) for each of the weight-loss drugs were calculated separately. The IR for fenfluramine use was 2.6/1000 person-years (95% CI 0.7, 9.6), dexfenfluramine yielded a1.1/1000 person-years (95% CI 0.3, 3.8), and phentermine was 0/1000 person-years (95% upper confidence limit of 12.9). When the nested case-control analysis, the odds ratio (OR) for stroke after modifying for BMI, diabetes, hypertension, hyper-cholesterolaemia, and smoking yielded an OR of 2.4 (95% CI 0.6, 9.1) Despite significant odds ratio results, overall incidence of stroke was not significant in the use of anti-obesity medications and risk of stroke. However, despite a weak association between first incidence of stoke ad medication use, the sheer volume of identifiable weight-loss drug use among women in this study was alarming. A limitation of this study cited the average age (X = 59 [41-71] as a factor not being highly correlated to first incidence of stroke. The study did collect basic demographic and a selection of health-related variables (i.e. smoking, BMI), for all subjects (N = 8243), however, perhaps an added limitation
was having access to medical records with diet and exercise related variables and not including those variables in the analysis.

Other studies on cardiac valve abnormalities have reported different findings associated with appetite suppressant drugs. The prevalence of cardiac valve regurgitation, a condition that causes insufficient closure of the valves thus causing blood to backflow through the heart, were identified among users of prescribed appetite suppressant medications. This population-based study included a five-year nested case-control analysis and involved subjects who had been given a prescription for appetite suppressants (N = 9,765) (Jick, et al., A population based study of the appetite-suppressant drugs and risk of cardiac-valve regurgitation, 1998). Of the total sample, 1,001 of those had taken at least one type of a weight-loss medication. Eleven of the subjects had a new incident of cardiac-valve disorder within the first use of the weight-loss medication, confirmed with a thorough clinical evaluation and echocardiography. Specifically, six were fenfluramine users, and five within the dexfenfluramine group, with none reported among the phentermine group. The prevalence for risk of acquiring cardiac abnormalities was even higher in those subjects who received fenfluramine and dexfenfluramine for more than four months, as determined in the five-year case control analysis. Over the five-year period of this study, 35 per 10,000 were at a greater risk of developing cardiac regurgitation with continued use of weight-loss drugs, however, no risks associated with cardiac abnormalities were found in the use of phentermine (Jick, et al., 1998).

The FDA approved Orlistat as a prescription weight-loss medication in 1998. This drug works by inhibiting gastric and pancreatic enzymes from binding with fatty molecules in the gastrointestinal tract, resulting in a reduction of fat absorption in the blood stream by up 30% (Borgstrom, 1988). Weight-loss is relatively modest but of sufficient magnitude to have
beneficial effects on cardiovascular risk, as reflected by a lowering of low-density-lipoprotein (LDL) cholesterol, blood pressure and glycaemia (Li, et al., 2005; Broom, Wilding, Stott, & Myers, 2002.). Compared with other agents, adverse effects are limited, and the most common health-related risks are the decrease of the absorption of fat-soluble vitamins and water. When used properly, clinical studies of Xenical have also found it to be a cholesterol-lowering drug, favorable for the treatment of diabetic patients, and has shown the capability of improving two known risk factors associated with premature death (i.e. weight and cholesterol) (Broom, Wilding, Stott, & Myers, 2002; Hauptman, et al., 2000).

To date, many anti-obesity clinical drug trials have been limited by high attrition rates and lack of long-term morbidity and mortality data (Rodgers, Tschop, & Wilding, 2012). Other promising anti-obesity prescription medications are in development, but are years away from clinical use. When considering the lack of successful behavioral weight-loss treatments, and coupled with the public-health implications of the obesity epidemic, the development of safe and effective drugs should be a priority. A recent review of prescription weight-loss medications pessimistically concluded that “the history of anti-obesity drug development is far from glorious, with transient magic bullets and only a handful of agents currently licensed for clinical use” (Rodgers, Tschop, & Wilding, 2012, pg. 622).

Over-the-Counter Weight-loss Supplements

The FDA does not mandate scientific-based research of over-the-counter weight-loss supplements (OTC) for the analysis of efficacy or accuracy of claims (Glazer, 2001; Moldrup, 2004; Motycka, 2004; Stafford and Radley, 2003). The FDA does provide extensive guidelines for the approval of any new OTC weight-loss aid to enter the market; however, once approved, they are immediately available for purchase and consumption by the general adult population.
Because OTC medications do not require a prescription from a physician, all OTC medications that were approved for human consumption, do not generally exclude consumption based on health status, race, ethnicity, gender.

The country that manufactures the largest amount of weight-related products is the United States, and financial experts expected its over-all worth to be approximately $310 billion by 2014 (M&M, 2009). This industry is driven by the availability of products and services, as well as greater consumer awareness and demand. The weight-loss diet pill industry (anti-obesity OTC medications) alone, is estimated to be worth approximately 139.5 billion dollars by 2017 (Mayes, 2014). In the United States, OTC weight-loss aids began to gain huge popularity among consumers, as the fitness industry boomed in the early 1980s.

After two popular prescription weight-loss medications were pulled from the market between 1995 and 1997, the medical community urged the FDA to investigate safety concerns related to the use of OTC weight-loss supplements. The concerns of the medical community were not erroneous. The deaths that resulted from ephedrine, the primary ingredient in Metabolife®, provided ample confirmation that OTC weight-loss aids needed to be more strictly overseen by the FDA (AHFS, 2006; Enders JM; USHCOCR, 2002). Thus, in order to assure the safety of the consumer, the FDA implemented additional checks and balances on OTC products, prior to the product entering the market.

These additional FDA checks and balances on OTC weight-loss products occur in The Center for Drug Evaluation and Research (CDER) (FDA(a), 2013). The CDER regulates both over-the-counter and prescription drugs, including biological therapeutics and generic drugs. Within the CDER, there are four Offices of Drug Evaluation, each of which is responsible for specific drug types. The task of making sure that safe and effective OTC drugs are available to
U.S. consumers is the responsibility of the Office of Drug Evaluation IV (ODE-IV). ODE-IV appoints the Non-Prescription Drug Evaluation Committee (NPDE) to oversee the labelling, safety, and effectiveness of OTC medications. However, OTC medications are not required to provide scientific research to support their claims and are not required by the FDA to engage in the rigorous testing of the level used for approval of prescription medications. Once CDER has approved an OTC product, application of the products’ review is then sent to The Office of Medical Products and Tobacco (OMPT). Once the OMPT approves the product, the product is ready for immediate placement in the market. Comprehensive reviews of OTC and prescription treatments are available from several sources (Campbell, 2001; Glazer, 2001; Motycka, 2004).

In the past decade, manufacturers of OTC weight-loss supplements have provided a sizable increase OTC weight-loss supplements. Consumers can select an OTC weight-loss medication that type, access, and selection of OTC weight-loss supplements. Consumers are bombarded with an overabundance of over-the-counter weight-loss aids to choose from, with a majority of those products claiming safe, fast, and effective weight-loss results. Unfortunately, the exaggerated weight-loss claims associated with many of the direct-to-consumer OTC weight-loss advertisements can be very misleading to consumers. The Federal Trade Commission (FTC) and FDA work together to regulate advertisement and claims of OTC weight-loss supplements and have specific requirements that products provide accurate information of their claims, so that the consumer can make an informed decision about the product before purchasing the product (FTC, 2001). The FDA and FTC requirements mandate that all OTC medications, regardless of type or indication for use, must clearly list all ingredients, indication for use, dosage, and age-approved usage recommendations. Due to the FDA’s previous findings on the health risks associated with these products, all OTC weight-loss aids must disclose that the
product does not have an FDA evaluation and approval of its safety and effectiveness (FDA(a), 2013). Also included in the fine print, The FDA mandates that all weight-loss products must have a clear statement that all consumers can understand, declaring that diet and exercise are an important part of any successful weight-loss program. The FDA also provides an open access list of current and past OTC weight-loss supplements that are banned and considered dangerous for human consumption (FDA (b), 2013). The FDA depends on the general public to notify the FDA of these products, and to date, the previously prescription medication orlistat (OTC brand name Alli®) is the only FDA approved OTC weight-loss drug currently available to the consumer.

In current scientific research streams, compared to the popularity of US adults using OTC weight-loss medications (Blanck, et al., 2007; Saper, Eisenberg, & Phillips, 2004), existing clinical studies do not provide statistical support for the effectiveness of OTC weight-loss supplements in reducing body weight (Morelli & Chang, 2013). Pittler & Ernst performed a systematic meta-analyses review, including only randomized double blind studies of OTC products of dietary supplements, with no prior pre-market testing of their independent weight-loss claims (Pittler & Ernst, 2004). A comprehensive search using multiple scientific databases resulted in the inclusion of systematic reviews and meta-analyses using only randomized, double-blind trials, and 25 additional trials that included data on dietary supplements. The supplements included in the study all cited weight claims as part of their direct-to-consumer advertising, and the analysis included chitosan, chromium picolinate, ephedra sinica, garcinia cambogia, glucomannan, guar gum, hydroxy-methylbutyrate, plantago psyllium, pyruvate, yerba mate, and yohimbe. Unfortunately, the analysis uncovered no significant results for weight-loss claims, however, there were minimal findings thought to be encouraging. Significant adverse
events were found in this analysis for E. sinica- and ephedrine-containing supplements, which discovered an associated higher risk for CV events. The authors concluded that evidence for most dietary supplements as aids in reducing body weight is not convincing, and none of the reviewed dietary supplements should be recommended for use to produce weight-loss.

The clinical effects and tolerability of the OTC product, comprising the two natural extracts of Sphaeranthus indicus and Garcinia Mangostana, were also scientifically tested for its effectiveness in enhancing weight-loss (Stern, Peerson, Mishra, Mathukumali, & Konda, 2013). Stern, et al., designed two separate, random assignment, double blind, placebo-controlled, clinical trials to coincide simultaneously, testing the claims of the OTC herbal product (Stern, et al., 2013). Subjects (n = 200) with a BMI between 30 and 40 kg/m², were randomized into two separate trial groups (n = 100; n = 100) for eight weeks, receiving either 400 mg of herbal blend twice daily, or two identical placebo capsules. Caloric intake was restricted to three, 2000 kcal/day meals, coupled with 30 minutes per day, 5 days per week, of low-impact walking for all subjects, for the duration of the 8-week study. Additional blood work was collected for serum glycemic, lipid, and adiponectin levels at baseline and compared to day 5 samples for any significant improvements. At study conclusion (n = 95 due to attrition), statistically significant reductions in body weight (5.2 kg; p < .0001), BMI (2.2 kg/m²; p < .0001), as well as waist (11.9 cm; p < .0001) and hip circumferences (6.3 cm; p = .0001) were observed in the herbal group compared with placebo. An increase in serum adiponectin concentration was also found in the herbal group versus placebo (p = .0008), as well as reductions in fasting blood glucose (12.2 percent, p = .01), cholesterol (13.8 percent, p = .002), and triglyceride (41.6 percent, p < .0001) concentrations. No adverse changes were reported across organ function panels, multiple vital signs, and no additional major adverse events (i.e. CV) were reported. Notably, 2 weeks
into the study, incremental weight-loss elicited by the herbal blend was statistically significant as well as reductions in waist and hip circumferences. The results of the study suggest that the herbal blend appears to be a well-tolerated and effective ingredient for weight-loss and weight management, and is effective when combined with a standard diet, and daily exercise, compared with the control group diet management and exercise alone. Garcinia Mangostana is similar to the Garcinia Cambogia extract and is currently a trending OTC weight-loss aid to be used alone. The active ingredient of both garcinias, are said to enhance weight-loss mechanisms in the human body via the hydroxycitric acid found in them. Research has shown that hydroxycitric acid inhibits adipocyte differentiation, reduces fatty acid synthesis, lipogenesis, and epididymal fat accumulation through reducing ATP-citrate lypase activity, and suppresses appetite (Cherniack, 2008; Kim et al., 2004; Saito et al., 2005). In simpler terms, it reduces the free-floating sugars and fats in the blood stream, thus preventing increased fat storage by these substances. Garcinia extracts have been available to the consumer for 10 years, with no adverse side effects officially reported to the FDA, and no statistical significance reported in clinical weight-loss research studies (Ohia et al., 2002 Saito, et al., 2005).

An examination of dietary supplement use for weight-loss and perceptions about safety, efficacy, and regulatory oversight of these products was conducted via random digit-dialed telephone survey in 2005-2006 of US adults (Pillitteri, et al., 2008). The survey assessed the beliefs and practices related to weight control in which the outcome measures included the prevalence of dietary supplement use for weight reduction, a demographic profile of supplement users, and the knowledge about safety, efficacy, and regulation of dietary supplements. Of the adults who made a serious weight-loss attempt within the past year prior to the participation in study, (n = 1,444), 33.9% reported ever using a dietary supplement for weight-loss. When
gender was included in the analysis, supplement use was more prevalent among women (44.9%) than men (19.8%). Higher use of supplements was seen for respondents between the ages of 25 and 34 years as well as being African Americans (48.7%) and Hispanics (41.6%). Significant use also occurred in Whites: 31.2%, less educated, 38.4 % high school degree or less; and 31.1% some college or more. Respondents from lower income households more commonly used supplements (41.8% < $40K, 30.3% ≥ $40K). Across the total sample, those reported being overweight was (29.1%) and obese (40.7%).

Many users and non-users of dietary supplements had misperceptions about these products, in fact, many believed the Food and Drug Administration (FDA) did perform clinical testing and/or evaluation for safety and efficacy before marketing. It was alarming that in using the term “dietary”, the majority of subjects believed that they are safer than over-the-counter or prescription weight-related medications. Rayalam et al. (2008) suggests implementing more scientific studies in which multiple natural resources are evaluated for their effectiveness in weight-loss. Examples of combing two products Raylam, et al. identifies for their potential effects on weight reduction are green tea and Garcinia Cambogia.

There is some scientific evidence in non-weight-loss based studies that green tea leaves are high in anti-oxidants, and report that the catechins in green tea, show a combination of actions. Green tea studies report in-direct, but small significant changes in suppressing appetite, a reduction in free floating triglycerides, increases in energy expenditure, as well as a decrease in lipogenic activity and adipocyte variation (Boschmann & Thielecke, 2007; Chantre & Lairon, 2002; Dulloo et al.; 1999, Hsu & Yen, 2006; Kao et al., 2000; Lin & Lin-Shiau, 2006; Moon et al., 2007, Nagao et al., 2005; Thielecke & Boschmann, 2009; Wolfram et al., 2006).
Research for the identification of natural weight-loss remedies continues to gain popularity. Other notable natural weight-loss aids showing promise in anti-obesity metabolic effects in both animal and human studies include, but are not limited to: pomegranate extract ((Lei et al., 2007); pinellia ternate (Kim et al., 2006); peanut shell extract (Arachis hypogaea) (Moreno et al., 2006); nelumbo nucifera (Ono et al., 2006); raspberry ketone (Morimoto et al., 2005); and salacia (indian herb); (Li et al., 2008). Where these are very promising findings, the human studies were small, and have not been validated with repeated study results. However, the possibility of these natural products combined in more precise dosages, might shed more light on that how they may be able to target different obesity genes and/or different stages of the adipocyte life cycle. Such findings could lead to the scientific breakthroughs in obesogens and their mechanisms leading to the exploration and identification of safer and more effective pharmacological treatment for obesity.

U.S. Physicians: Licensure, Best Practices, Role in the Obesity Epidemic

Finding a solution in how to implement successful weight-loss interventions in the general practitioner’s office is of critical importance to the health of the United States. Understanding the importance of the role medical doctors (M.D.’s) have in helping patients diagnose and treat obesity is critical to the long-term health and quality of life for the patient. Medical doctors, who are licensed to practice general family medicine, seek to promote optimal health, examine and diagnose health status, recommend necessary treatment and track progress for their patients. Equally important is the role doctors have in promoting preventive actions and encouraging positive lifestyle behaviors. The AMA has recently identified obesity as a disease, thus in addition to identifying and treating obesity and its secondary conditions and related comorbidities, counseling patients about safe and effective weight-loss and weight maintenance
Educational requirements for physicians in the US are rigorous compared to the requirements of other health professionals, and practicing family physicians enter the job force after completing an average of 8 years of higher education and training (Table 11). The American Medical Association (AMA) is the certifying professional organization through which medical doctors obtain a medical license to practice medicine in the United States (Kushner, 2003; Lyznicki, 2001). The primary care provider (PCP) or general family physician (GFP) is considered a critical team member for an overweight or obese person (USDHHS, 2013). On average, most American citizens, with either private or government sponsored medical coverage, complete three health care visits annually, mostly to their primary care physician (PhRMA, 2013). Due to the recent improvement in healthcare resources, policies, and programs in the United States, children, adolescents and adults now have affordable and accessible healthcare options available to them (CDC(c), 2005; PPACA, 2010). Commonly, it is the general family physician who is often, the first licensed medical professional that a patient will have the opportunity to discuss health status, weight status, and weight related issues with (PhRMA, 2013). General practitioners (G.P.’s/family physicians) see a wide range of health issues that commonly affect the general population. More often than not, they are the first health professionals that have the opportunity to provide patients with a medical diagnosis of obesity, classify their weight status as related to accepted BMI categories, and recommend appropriate treatment modalities to improve over-all health of their patients.
Table 8. Adapted from the 2013 Bureau of Labor Statistics: Family and General Practitioners.

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<tr>
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<tr>
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<td>Projected Employment 2020</td>
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<td>Projected 2020 Job Openings Based on Need</td>
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<td>Percent Change Projected between 2010 and 2020</td>
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<td>Doctoral or Professional Degree</td>
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<tr>
<td>4 Years of Medical School – Medical Degree</td>
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* Does not include surgeons, based on non-specialized areas of continued residency for additional training

Physicians: Best Practice in the Clinical Setting

With physicians hesitant to diagnose obesity in the early 2000’s, interest in physician-based interventions became part of mainstream literature publications. Galuska, et al., conducted a systematic review of physician-based weight-loss intervention studies (Galuska, et al., 1999). Basing study inclusion criteria on standard methods developed by the Cochrane Effective Practice and Organization of Care (EPOC), the primary objectives were: (1) “to determine the existence and effectiveness of interventions to improve health professionals' management of obesity or the organization of care for overweight and obese people; and (2) to update a previous systematic review on this topic with new or additional studies” (Galuska, et al., 1999, pg. 1566). The objective measurements included clinical practice, clinical behaviors, and patient
outcomes. Patient outcomes measurements were then categorized into disease status, and factors related to patient satisfaction, behavior, and psychological and associated weight related risk factors. Weight status was verified using statistical analysis to verify the measures that provided actual body weight, height, adiposity, and/or BMI. Six of the 18 studies were randomized controlled trials of health professional-oriented interventions (such as the use of reminders and training) and one was a controlled before-and-after study to improve collaboration between a hospital clinic and general practitioners (GPs). Ten randomized controlled trials and two controlled clinical trials of interventions comparing either the deliverer of weight-loss interventions or the setting of the delivery of the intervention were identified. The heterogeneity and generally limited quality of identified studies made it difficult to provide recommendations for improving health professionals' obesity management. To conclude, there were few solid leads about improving obesity management, although reminder systems, brief training interventions, shared care, inpatient care, and dietitian-led treatments may all be worth further investigation. Therefore, what was reported back in the early millennia has not changed much from present day findings (Appel, Clark, & Yeh, 2011), as decisions for the improvement of provision of services must be based on the existing evidence on interventions with patients and good clinical judgment. Conclusively, further research is needed to identify cost-effective strategies for improving the management of obesity.

Physicians do understand that obesity-related behavioral treatments have low to moderate success, and often report frustration in that behavioral treatments are often less effective than treatment combined with prescription weight-loss aids (Lyznicki, 2001; Galuska, et al., 1999; Garrow, 1994; Grizzard, 2002; Rose, SA; Gokun, Y; Talbert, J; Conigliaro, J., 2013; Weisburg, 2002). Health professionals, including family physicians practicing in general medicine, have a
role in counseling patients about safe and effective weight-loss maintenance programs that include both behavioral as well as medical treatments. The United States Preventive Services Task Force (USPSTF) and the American Medical Association (AMA) both developed recommendations on an expansive variety of preventive health care services and policies for primary care physicians (PCP’s) (AMA, 2013; USPSTF, 2003). Both the AMA and USPSTF have listed specific recommendations that assert guidelines for physicians. These guidelines clearly state that physicians should screen patients for obesity, offer counseling, and explain behavioral interventions to promote sustained weight-loss (USPSTF, 2003; AMA, 2013). The recommendations from both of these organizations focus predominantly on behavioral therapies, such as changing an individual’s diet and exercise habits to reflect healthy eating and regular physical activity and/or exercise routines. Based on scientific studies that go back as far as 100 years, the safety, reliability, efficacy, and validity of behavioral-based therapies consistently achieve both short term and long-term results (Blaike, 1879; Caballero, 2007).

Although the AMA considers counseling at-risk overweight and obese patient’s essential, it is not a professional requirement, and often physicians do not address obesity, or they provide patients with referrals to other health care professionals for weight-loss solutions. The ubiquitous factor physicians cite for not providing best practice to patients who are at-risk, overweight, or obese, is time (Grizzard, 2002; NCHS, 2013; Tsai, Abbo, & Ogden, 2011). With the steady rise of overweight and obesity in the United States, there are thought-provoking streams of literature that evaluate factors related to time, such as the attitudes and perceptions physicians have towards obesity that suggest time is not spent counseling the patient(Tham & Young, 2008; Bleich, Pickett-Blakely, & Cooper, 2011; Carvajal, Wadden, Tsai, Peck, & Moran, 2013; Foster, Wadden, Makris, & Swain, 2003; Grizzard, 2002; Haire-Joshue & Klein, 2012).
This stream of literature has identified that negative biases towards corpulent people do exist, and physicians’ biases are no different from the general population, despite the fact that there is a decent statistical chance that those physicians surveyed, fall into the overweight category.

Harvey, et al., sought to determine the frequency in which primary care physicians’ document (1) obesity as a diagnosis (2) weight-loss management plan (Harvey, Glenny, Kirk, & Summerbell, 2002). At the time of this study, obesity was not recognized as a medical disease, thus physicians did not have the ability to code for obesity in patient medical records, which complicated identifying results to be included in this review. Physician-patient visits between November 1, 2004, and October 31, 2005 were included for review, and the inclusion criteria was PCP-based visits for general medical examinations of patients with a BMI of 30 or greater (obese). Initially, close to ten-thousand general medical examinations (N = 9,827) were identified. Meeting the inclusion criteria was difficult, as physicians typically coded for demographic variables, BMI, and comorbidities, however, documentation of obesity and obesity management strategy was not always coded. For some physicians, codes for obesity and obesity-related management counseling was not available in those using electronic-based coding software. The sample population identified 21.3% of patients as obese, (n = 2,543), however, only 19.9% had a diagnosis of obesity documented (n = 505). Within the same sample of obese patients, only 22.6% had an obesity management plan documented (n = 574). As age increased in patients, physicians were less likely to document a diagnosis of obesity, (OR = 0.97, 95% CI [0.96, 0.98]), with similar results if the patient was male (OR = 0.60, 95% CI [0.47, 0.76]). Interestingly, despite obesity being defined as a BMI of greater than 30, physicians were significantly more likely to diagnosis obesity in those with a BMI greater than 35 (OR = 2.54, 95% CI [2.10, 3.16]); diabetes mellitus (OR = 1.40, 95% CI [1.09, 1.78] and obstructive sleep
apnea (OR = 2.34, 95% CI [1.79, 3.07]. Physicians were less likely than physician-residents to
document obesity as a diagnosis (OR = 0.55, 95% CI [0.44 to 0.69]. Diagnosis of obesity was
the strongest predictor of a physician documenting a weight management plan (OR = 2.39, 95%
CI [1.90 to 3.02], however, diagnosis was more likely to occur if multiple health problems were
also present. Within this review, even though most obese patients did not have a prior diagnosis
of obesity or an obesity management plan, physicians who diagnosed obesity within in this
review, were more likely to also document a weight-loss management plan.

Historically, the most prevalent moderating factor MD’s struggle with has been allotting
enough time to provide counseling during office visits with their at-risk patients (Grizzard, 2002;
Ashley, et al., 2001; Hsai & Tabas, 2009 ; Kraschnewski, 2013; Kushner, 1995; Tsai, Abbo, &
Ogden, 2011; Yarnall, et al., 2003). However, current streams of literature report this is not the
main challenge being cited. Currently, the reoccurring main factor reported in the mainstream
scientific literature is adequate training (Bleich, Pickett-Blakely, & Cooper, 2011; Puhl,
Adequate training includes continuing education courses that provide models for physicians to
approach and provide evidence based weight management counseling for their patients. In the
U.S., it has become socially and politically incorrect to ask a person their weight (Hilbert A,
2013; Puhl, Peterson, & Luedicke, 2012). The prevalence of this social stigma compounds the
challenge for doctors to discuss weight and weight-related issues, despite adiposity level
(Hilbert, 2013; Kushner, 2003; Moore, 2010; Weisburg, 2002). Interestingly, it is an equally
challenging factor for physicians to discuss weight with at-risk patients with abnormally low
BMI (less than 18.0), as these patients have reported discomfort discussing weight status with
their physicians (Haire-Joshu, 2011; Moore, 2010; Puhl, Peterson, & Luedicke, 2012).
Research literature streams that examine in-office physician-patient communication topics, report that patients do not turn to their family physician to discuss unhealthy weight status or BMI, and physicians do not feel comfortable addressing a patient’s’ weight status (Flocke, Clark, Schlessman, & Pomiecko, 2005). Routinely, it is the secondary medical issues associated with elevated weight status and BMI which motivate a patient to seek medical attention (Caballero, 2007; Danaei, et al., 2009; Finucane, 2011; Flegal, et al., 2002; Flegal, 2004; Hilbert, et al., 2013; , 1999; Lyznicki, et al., 2001; Ánygán et al., 2002). Therefore, it is critical that physicians, upon first appointment, address unhealthy weight status with their patients, establish baseline measures of weight, identify secondary risk factors, provide counseling, and establish a plan of action to reach a healthy weight (Haire-Joshu, 2011).

Unfortunately, studies have shown that physicians do not conduct weight counseling for the majority of their affected patients (Foster, et al., 2003; Galuska, et al., 1999; Kraschnewski, 2013; Grizzard, 2002; Lyznicki, et al., 2001; NIH, 1998; Rose, Gokun, Talbert, & Conigliaro, 2013). Physician-based barriers to conducting weight counseling and intervention include, but are not limited to, pessimism that patients can change, time limitations, and inadequate physicians training in behavioral lifestyle management (Bleich, Pickett-Blakely, & Cooper, 2011; Bray & Ryan, 2012; Carvajal, Wadden, Tsai, Peck, & Moran, 2013; Foster, Wadden, Makris, & Swain, 2003; Haire-Joshue & Klein, 2012). Further, PCP’s report having insufficient behavioral lifestyle tools to aid in weight-counseling efforts, and report existing interventions are relatively ineffective for U.S. adults (LeBlanc, et al., 2011; Tsai & Wadden, 2009; Wadden, Volger, & Sarwer, 2011; Yoong, et al., 2012).

Foster, et al, designed a study to assess physicians’ attitudes toward: (1) obese patients, (2) underlying causes of obesity, and (3) treatment of obesity. (Foster, Wadden, Makris, &
Swain, 2003). A national random sample of 5,000 primary care doctors (PCP’s) were assessed for their attitudes about obesity via a questionnaire. The sample was randomly assigned to group one (n=2,500) or group two (n=2,500), and questionnaires were randomly assigned within each sample. The only differences in the questionnaires were BMI definitions: (1) BMI of 30 to 40 and (2) BMI of 40 or greater. The aim of the Foster, et al, study was to compare physicians attitudinal responses based on patients’ weight status. Results were based on six hundred twenty physicians (n = 620) completed questionnaires, with adequate representation of both male (n = 388) and female (n = 232) doctors. Across the total sample physicians (n = 620), 12% were obese, the mean BMI was 25.5 (± 4.3), the mean age was 44.0, the mean year since completing medical school was 1982, and 81.0% were Caucasian.

Results of the Foster, et al., study found that independent variables (characteristics) of the physicians sampled, had no significant effect on any of the results pertaining to obesity, causes of obesity, and perceptions of obese patients. Physicians in this study perceived obese patients as awkward (61.7%), unattractive (53.2%), ugly (49.5%), noncompliant (50.8%), weak-willed (44.0%), and lazy (29.7%). That is, more than half of physicians completing the questionnaires in this study had perceptions of their obese patients that are representative of negative attitudes. When evaluating questions related to the causes of obesity, physicians generally reported behavioral changes, as opposed to genetic reasons, main causes of obesity. 84.3 % (p 0.0009) of the physicians cited physical inactivity as the most important cause of obesity, more so than any other cause of obesity. Related behavioral causes physicians cited as secondary and tertiary to physical activity were overeating (69.0%) and a high-fat diet (67.8%). At the bottom of the list for causes of obesity, only two genetic causes were reported, with 19.5% and 11.6% of the physicians citing metabolic defect and endocrine disorder. Obesity treatments were compared to
the treatments of 10 other chronic disease treatments for their effectiveness in the clinical setting. Physicians were asked to rank each treatment in comparison to treatments for obesity, (1 = least effective to 3 = most effective. Over-all, obesity treatment was rated as significantly less and least effective compared to 9 of the 10 other chronic conditions listed for comparison. Interestingly, past and current treatment options for chronic conditions (i.e. asthma, blood pressure, cholesterol, diabetes, depression, osteoarthritis) as well as obesity, are behavioral, medical (Rx), or a combination of both. The top 7 of the 10 chronic diseases listed in this study, historically call for the use of prescription medication(s), in which physicians report as primary and necessary treatments (Higashi, et al., 2007; Karlsson, Taft, Ryden, Sjostrom, & Sullivan, 2013; Redelmeier, Tan, & Booth, 1998). In the context of the importance of obesity medication use, 91.4% of the physicians reported that obesity is associated with serious medical conditions, 92% believed obesity is a chronic disease, however, 43.4% reported that medications to treat obesity should be limited to less than three months. When asked if reimbursement for more time spent counseling obese patients were provided, more than one-half (53.9%) reported they would spend more time working on weight management issues with their patients. Foster et al, summarize that PCP’s view obesity as mostly a behavioral problem and share the negative bias, attitudes and perceptions of the general population.

Recently, Kraschnewski, et al., (2013) assessed physicians’ role in the treatment of overweight and obese patients. Three principal variables were tested as outcomes of interest, which were either identified as physician ordered and/or delivered health education counseling for (1) weight, (2) diet, or (3) exercise. Interestingly, an additional composite variable labelled, “weight-related counseling” was included. The purpose of the inclusion of this variable was to specify if one of the three counseling variables (weight, diet, or exercise) were provided.
Primary care physician (PCP) weight-related counseling rates were compared using data from the 1995–1996 and 2007–2008 National Ambulatory Medical Care Survey (NAMC). The total sample of physician surveys regarding adult patient visits were collected (n = 32,519). The percentage of adults who were overweight and obese increased from 52.1% in 1995 to 63.3% in 2008 (BRFSS, 2013). When considering this increase, patients with a PCP diagnosis of being overweight or obese during 2007–2008, had 36 percent lower odds of receiving weight-related counseling. PCP rates of office-based weight-counseling visits declined from 7.8 percent of visits in 1995–1996 to 6.2 2007–2008. Results also concluded that PCP’s were not providing adequate weight-related lifestyle counseling. Differences in weight-related counseling for obese patients were significant: there was a decrease in the odds of receiving weight-loss counseling in 1995-1996 and continued to decline in 2007-2008. When calculated to percent of obese patients actually receiving counseling, 39.9 percent were counselled in 1995-1996 whereas only 29.9 percent were counselled in 2007-2008. The rates of patients receiving individual diet, exercise, and weight-related counseling similarly declined. Large declines in the odds of a patient with multiple obesity-related risk factors who actually received weight counseling were among those with hypertension (47%) and diabetes (59%). This is an important finding, as hypertension, diabetes, and obesity are all factors correlated to premature death. More importantly, those patients with significant co-morbidity risk factors, who did not receive the counseling, could have benefited from weight-related PCP counseling. To summarize the significance of these findings, an estimated 1.1 billion outpatient visits occurred for both 1995-1996 and 2007-2008. Of these 1.1 billion visits, 840 million PCP visits occurred without counseling for weight, exercise, and/or diet, despite physicians being aware of the high prevalence of overweight and obese patients during the time of this study.
Rose, et al. (2013) published a meta-analysis on physician weight-loss advice and patient weight-loss behavior change that lent insight into the physician-patient relationship among overweight and obese adults (Rose, Gokun, Talbert; Conigliaro, 2013). Criteria for study inclusion were (1) primary care physician (PCP) weight screening and counseling, (2) patient weight perception, and (3) patient weight-loss attempts. The final meta-analysis included 12 large studies published between 1999 and 2011 and more than two-hundred thousand patient-physician visits were included for analysis (N = 207,226). Accounting for the large sample size, 8 of the 12 studies used national U.S. survey data from either BRFSS, NHANES, or NIH funded research studies. Combined demographics across studies, reported that 60% of the patients were female and 37% were Caucasian. Nineteen percent of patients from the total sample (n = 39,310) reported receiving advice to lose weight or being told that they were overweight. When investigating for between-study moderators that could impact the association of physician advice and patient weight-loss efforts, random effects analysis found no statistically significant difference in the effectiveness of advice in studies using obese patients alone versus mixed samples (normal and overweight) (OR = 3.44, 95%; [CI 2.37, 5.00] versus mixed sample (OR = 3.98, 95%; [CI 2.53, 6.26; (P 0.63)). Studies using national versus local survey data also had no statistical significant differences in the effectiveness of physician advice when crossed against obese patients versus mixed samples (OR = 4.19, 95%; [CI 2.75, 6.38] versus (OR = 3.33, 95% [CI 1.36, 8.15, p 0.65]). Survey method (telephone; in-person survey) also reported no statistical differences (OR = 5.50, 95% [CI 3.46, 8.72 versus 3.00], 95% [CI 2.15, 4.17], P 0.04). Conclusively, the Rose, et al. meta-analysis summated that patients who did receive counseling had positive perceptions of physician weight-loss counseling, and subsequent patient-based weight-loss attempts were attempted by the patient, regardless of weight-losses or gains between
doctor visits. Furthermore, regardless of study size, positive associations were demonstrated across all patients, regardless of patient variables, who received both advanced counseling and simple PCP recognition, or a diagnosis of overweight and obese weight status. Importantly, results of this meta-analysis provide support for and encouragement of patients and physicians to establish an open dialogue concerning weight and weight-related topics.

Interestingly, from a social perspective, it could be hypothesized that the patient-based misconceptions about body weight found in the Rose, et al. (2013) meta-analysis are representative of the basic constructs within the Theory of Planned Behavior (Ajzen, 1988). Considering the social norm constructs, current attitudes and acceptance of heavier body types are generally accepted due to the increased prevalence of the exposure to more obese and super-obese people within the environment. This study did not report on the weight-loss effectiveness and outcomes in terms of actual weight-loss, however, it does provide support for physicians, in that physicians can make a positive impact through weight-loss counseling.

To assess the effectiveness and weight-loss outcomes associated with physician-based weight-loss counseling, Bardia, et al. (2007) implemented a meta-analysis of available research studies in scientifically reviewed journals. Data from systematic abstracts (n = 648) and literature reviews (n = 6,498) between 2005 and 2010 were screened to assess the effectiveness, as well as the detriments, associated with PCP weight-loss interventions for overweight and obese adults. Due to the high number of clinical trials conducted in PCP settings, studies were excluded based on strength of clinical intervention. A simple and direct rating scale was used to establish strength of study as good, fair, or poor. Behaviorally based interventions resulted in an average of 6.6 more pounds lost at 12 to 18 months than the control studies that offered no behavioral PCP interventions. Additionally, over time, patients receiving more behavioral
treatment sessions were associated with greater weight-loss. Pharmaceutical-based interventions coupled with behavioral counseling had varied results. For example, orlistat plus behavioral intervention resulted in a loss of 6.6 pounds more than did placebo, after 12 months, however, metformin (indicated for the treatment of diabetes, not weight-loss) resulted in less weight-loss than orlistat. Despite the limitations of this meta-analysis, Bardia, et al. (2007), concluded that behaviorally based PCP interventions are both safe and effective for weight-loss and continued weight-loss maintenance.

Literature streams also attempt to uncover the time barrier physicians report as problematic. Gulbrandsen, et al. (2012) sought to answer what patients perceive during their doctor visits. Perceptions of time and the extent to which they perceive the physician being rushed during encounters were evaluated. The study examined characteristics of both the patient and physician, physician communication, physicians’ influence with the patients, patient perceptions of time spent, and patient perception of the physician rushing. There were 461 audio recorded encounters of overweight or obese patients with 40 primary care physicians.

Time spent with physician and all communication about weight was calculated using the Motivational Interview Treatment Integrity scale (MITI). Surprisingly, there were 320 encounters in which weight was discussed, which are contradictive of other research findings (Grizzard, 2002; Kraschnewski, 2013; Rose, SA; Gokun, Y; Talbert, J; Conigliaro, J., 2013). Post-visit questionnaires were completed by both the patient and physician, in which they estimated the amount of time spent and perception of being rushed. When compared to physicians, patients (n = 461) estimated visits to be longer than they actually were by an average of 2.6 minutes. Patients estimated visits to be an average of 1.17 minutes shorter when physicians used weight-based statements, and 4.56 minutes longer when weight-based statements
were not mentioned. When race was evaluated, Caucasian patients perceived time as shorter than African Americans, 1.45 versus 4.28 minutes more than actual duration. Although patients, on average, did not perceive their physician to be rushed, physicians felt rushed in 66% of visits. Although variations were reported in patients' ability to estimate the length of time spent, family physicians were able to conceal feeling rushed.

Another approach used to determine how physicians communicate with their patients is through focus groups. Focus groups are commonly more intimate settings, in which a trained professional moderates subjects through a series of topics in which each participant’s opinions, experiences and recommendations are documented and then coded for statistical analysis (Tabachnick and Fidell, 2006). In 2010, Gudzune et al., used focus groups to explore how PCPs communicate with patients about weight management (Gudzune, Clark, Appel, & Bennett, 2010). Community-based PCPs (n = 26) in Maryland, who had patients enrolled in a practice-based, randomized, controlled weight-loss trial, participated in the study. Data was collected via audio-recorded sessions for each focus group; transcribed verbatim and coded transcripts were then used for content. Three communication-based themes about weight-loss counseling were reported: (1) motivating patients to lose weight, (2) partnering with the patient to achieve weight-loss, and (3) handling challenges that arise during weight counseling. The primary finding suggested that the use of patient-centered approaches to communicate with their patients about weight-loss were most successful.

The United States Preventative Task Force (USPSTF) developed a simple framework known as the “5A’s” (Ask, Advise, Assess, Assist, and Arrange) for the delivery of preventive counseling in primary care (USPSTF, 2003). The “5A” approach in weight counseling interventions are designed for the individual patient, in contrast to pre-determined larger scale
health promotion models, and this approach has been validated for efficacy, efficiency, and reliability in the PCP clinical setting (Glasgow, Emont, & Miller, 2006; Glasgow, Bull, Piette, & Steiner, 2004; Glasgow, Eakin, Fisher, & Bacak, 2011; Glasgow, Goldstein, Ockene, & Pronk, 2004). A nationally representative survey of U.S. physicians was conducted in order to determine the information physicians are actually communicating with their patients concerning diet, exercise and weight-loss (Smith, et al., 2011). Using the AMA’s physician database, 1,211 PCPs participated in the survey. Outcome measures on physician-based assessment included counseling, referral, follow-up of diet, physical activity, and weight control in adult patients with and without chronic disease were considered. Measures of the recommendation and/or use of pharmacologic treatments and surgical referrals for overweight and obesity were also included in the survey. PCP’s included in the survey were either internists (n=403), family physicians/PCP (n=388), and obstetrician/gynecologists (Ob/Gyn) (n=420). Selected survey response results are provided in Table 9.
Table 9. Survey of U.S. physicians’ communication with patients on behavioral aspects of healthy lifestyle habits.

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Total n=1211</th>
<th>Internal Medicine n=403</th>
<th>PCP n=388</th>
<th>OB/Gyn n=420</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do assess diet using general questions</td>
<td>1020 (84.2)</td>
<td>362 (89.8)</td>
<td>349 (71.5)</td>
<td>309 (73.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>I do not assess diet</td>
<td>134 (11.1)</td>
<td>27 (6.7)</td>
<td>27 (5.5)</td>
<td>80 (19.0)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>I do assess physical activity using general questions</td>
<td>1142 (94.3)</td>
<td>389 (96.5)</td>
<td>373 (76.4)</td>
<td>380 (90.3)</td>
<td>0.087</td>
</tr>
<tr>
<td>I do not assess physical activity</td>
<td>57 (4.7)</td>
<td>10 (2.5)</td>
<td>11 (2.3)</td>
<td>36 (8.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>I do assess sedentary behavior using general questions</td>
<td>697 (64.4)</td>
<td>245 (63.2)</td>
<td>270 (72.2)</td>
<td>182 (47.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>I do assess weight regularly</td>
<td>1156 (95.2)</td>
<td>378 (94.0)</td>
<td>369 (95.1)</td>
<td>409 (97.4)</td>
<td>0.19</td>
</tr>
<tr>
<td>I do assess height regularly</td>
<td>908 (77.0)</td>
<td>299 (74.5)</td>
<td>316 (81.9)</td>
<td>293 (70.9)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>I do assess BMI regularly</td>
<td>554 (48.7)</td>
<td>186 (46.4)</td>
<td>209 (55.1)</td>
<td>159 (38.7)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Adapted from Smith, et al. 2011

Smith et al. (2011) reported additional findings worthy of concern. Findings from this study provide additional support for the need of improved physician-patient communication. Disconcertingly, less than 50% of PCPs reported providing specific guidance on diet, physical activity, or weight control 100% of the time to patients, regardless of weight classification (Smith, et. al 2011). Results also indicated that regardless of patients' chronic disease status,
less than 10% of PCPs always referred patients for further evaluation, and less than 22% reported always systematically tracking behavioral risk factors for their at-risk patients for overweight and/or obesity. Overall, statistical analysis showed that family practice physicians had a better odds ratio (OR) of providing general counseling (OR = 0.82) general diet counseling (OR = 0.99) general physical activity counseling (OR = 0.85) general guidance for weight control (OR = 0.79), referrals (OR = 0.85), and systematically tracking patients progress (OR = 0.57). The percentage of physicians who did provide weight-loss guidance, 70 percent of the PCPs reported prescribing pharmaceutical weight-loss agents, and of those, 86 percent had referred their patient for obesity-related surgery. Results concluded that the majority of PCPs' do assess weight status; however, the vast majority in this study did not report providing patients with additional behavioral change strategies, tools, or interventions to achieve weight-loss. Although the underlying causes for the gap in PCP counseling are not known, evidence exists for implementing better strategies for physicians to counsel their at-risk patients. Thus, taking a closer look at clinically based PCP weight-loss interventions in primary care settings is where we can begin to understand the barriers physicians face in providing patients with successful advice, tools, and interventions.

An extensive review of physician-only based weight-loss interventions were examined for success (Tsai & Wadden, 2009). Initial on-line scientific journal searches yielded 1,672 published abstracts and titles, which specifically used PCP-based behavioral and/or pharmacotherapy interventions from 1950 to 2009. The three main inclusion criteria for studies were (1) randomization of trial, (2) obesity based intervention in US adults, and (3) primary care physician office or explicitly intended to model a primary care setting. Inclusion criteria was also based on, treatment modality, provider, setting, weight change, and attrition. Studies were
classified as (1) PCP counseling alone, (2) PCP counseling + pharmacotherapy, and (3) “collaborative” obesity care (treatment delivered by a non-physician provider). Statistical results only allowed for the summarization of studies and not pooled data due to the small number of studies that shared heterogeneity. Based on the stringent inclusion criteria, only ten (n=10) trials met the inclusion criteria for analysis. In studies (n = 4) in which PCPs provided the USTPTF recommended behavioral counseling, none reported any clinically significant weight-loss (Christian, et al., 2008; Cohen, D’Amico, & Merenstein, 1991; Martin, et al., 2008; Ockene, et al., 1999). In reviewing the studies for actual weight-loss (n = 10), the most weight-loss was reported in an all-female adult study (n = 116) and results were minimal, with not more than 16.0 pounds lost over a 1 year period of time (Ashley, St. Jeor, Schrage, & al., 2001). The longest (2 years) and largest study of sample size (n = 665) reported the least amount of weight-loss, (mean = 0.5 pounds). (Logue, et al., 2005). It is evident that further research is needed to determine what models and interventions of managing obesity in primary care practice was effective.

Lifestyle modification counseling for overweight and obese patients is another type of intervention physicians can provide their patients. Unfortunately, there is limited and often partial knowledge about lifestyle modification shared by physicians with their patients. To better understand the role of physicians in lifestyle intervention, The Dallas Heart Study (DHS) surveyed 2,097 obese subjects aged 16-65 years (n = 2097), for the duration of a year. The study documented patient utilization of health care and lifestyle counseling prior to and during participation in the DHS study (Powell-Wiley, et al. 2012). Obese participants were categorized based on the presence and number of the following cardiovascular (CV) risk factors: hypertension, hypercholesterolemia, or diabetes. Based on CV risk factor category, health-care utilization and counseling were compared. CV risk factors were then stratified by race, and
adjusted for age, sex, insurance status, and education. Results concluded that obese patients who sought medical care, were less likely to report counseling about losing weight. When regressed based on CV risk factor, likelihood of seeking weight-loss counseling was not encouraging: 41% with zero CV risk factors, 67% with one CV risk factor, and 87% with 2 or more CV risk factors. Similar results for counseling and CV risk factors were found in counseling for lifestyle dietary changes: 44% with zero, 71% in one and 85% in the 2 or more CV categories. Counseling for lifestyle physical activity changes in the zero, one and two or more CV categories were 46%, 71%, and 86%, respectively. When regressed for race, African-Americans and Hispanics without CV risk factors had lower odds of receiving counseling than Caucasians without risk factors on weight-loss. What the DHS study revealed was that in the absence of CV risk factors, lifestyle-counseling rates by physicians are suboptimal among obese patients. Physicians may advise obese patients with one or more CV risk factors to lose weight, but may not be providing enough advice and education on how to achieve lifestyle modification success.

The many barriers physicians face with providing treatment for overweight and obese patients will more than likely become increasingly harder, as the prevalence of overweight and obesity continues to rise in the general population. A possible solution to sharing some of the responsibility of health care for patients is to identify other resources for care. Investigating who physicians can turn to, as a resource for weight-based interventions, is becoming more and more important in managing the obese patient. Bleiach, et al. (2011), investigated this area of concern. A national internet-based survey of five hundred US PCPs was administered to evaluate physician perspectives related to obesity with the intent to assess: (1) causes, (2) physician competence, (3) perspectives on the health professional most qualified to help obese patients lose or maintain weight and (4) solutions for improving care (Bleich, Pickett-Blakely, &
Cooper, 2011). Physicians were divided into two categories: those with greater than 20 years’ experience, \( n = 223 \) and those with less than 20 years of experience \( n = 277 \) with the mean year of medical school completed in 1993. This allowed the statistical analysis to test the relationship of years since completion of medical school, with primary measures. Using the Institute of Medicine (IOM) as the guideline for identifying the causes of obesity, the three main causal obesity categories were: 1) biological, 2) individual behaviors and 3) physical/social environmental factors. No interaction effects were seen for years since completing medical school \( n = 500 \), and results indicated that 75% of PCPs recognized genetics or family history as an important cause of obesity, 47% recognized metabolic effect and 25% recognized endocrine disorders. The majority of physicians cited behavioral factors as the most commonly reported causes of obesity. When reviewing other important factors causing obesity, an astounding 99% of PCPs cited insufficient physical activity, 99% cited overconsumption of food, 95% cited restaurant or fast-food eating, 94% cited consumption of sugar based drinks, and 89% cited lack of will power. PCPs also identified environmental factors as important causes of obesity. Eighty-five percent of PCPs cited cultural factors, 75% cited lack of information on good eating habits, and 59% cited lack of access to healthy foods. Results from this study conclude that a majority of physicians cite behavioral factors as the most important causes of obesity, however, this information only supports previous studies of physician beliefs, and does not provide a solution to intervention and treatment modalities. The authors did, however, identify resources in which they believe the most able to aid in treatment (Table 10).
Table 10: PCP Identifying Most Qualified Health Professional to Help Obese Patients.

<table>
<thead>
<tr>
<th>Health Professional</th>
<th>Total PCP n=500</th>
<th>Percent</th>
<th>PCP Less than 20 Years n=227</th>
<th>Percent</th>
<th>PCP Greater than 20 Years n=223</th>
<th>Percent</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutritionist/Dietitian</td>
<td>223</td>
<td>45</td>
<td>166</td>
<td>48</td>
<td>67</td>
<td>41</td>
<td>0.21</td>
</tr>
<tr>
<td>Primary Care Physician</td>
<td>199</td>
<td>39</td>
<td>135</td>
<td>41</td>
<td>64</td>
<td>37</td>
<td>0.40</td>
</tr>
<tr>
<td>Behavioral Psychologist</td>
<td>57</td>
<td>14</td>
<td>30</td>
<td>9</td>
<td>27</td>
<td>20</td>
<td>0.01</td>
</tr>
<tr>
<td>Endocrinologist</td>
<td>6</td>
<td>1.0</td>
<td>3.0</td>
<td>0.7</td>
<td>3</td>
<td>1.5</td>
<td>0.45</td>
</tr>
<tr>
<td>Nurse</td>
<td>3</td>
<td>0.5</td>
<td>2.0</td>
<td>0.7</td>
<td>1</td>
<td>0.5</td>
<td>0.81</td>
</tr>
</tbody>
</table>

Adapted from (Bleich, Pickett-Blakely, & Cooper, 2011).

Notes: p-values reflect t-tests in the differences in proportions.

The overall sample of PCPs indicated that there was not one health professional who emerged as prominent. Interesting to note, only five health professionals were listed as choices on the survey, with nutritionist and dietician listed together. Perhaps this is a limitation and should have been listed in the study. The limitation being that there are various other health professionals that are qualified to help people who are overweight or obese. For example, physicians could refer a patient to a physical or occupational therapist. Such therapists often possess undergraduate degrees in an exercise related field; have achieved higher levels of
graduate education, as well as certifications related to diet, exercise, and exercise prescription (Oprescu, 2012).

Additional findings from Oprescu, et al., suggest that PCP perspectives on additional training and practice-based changes for improving obesity treatment interventions are optimistic. Three hundred and thirteen PCPs reported having received some training in obesity-related care that was helpful. In terms of practice-based solutions, using BMI as a fifth vital sign would be helpful, as it was reflected in 93 percent of the total sample. Across all physicians, helpful practice-based solutions also included: 1) diet/exercise tips in patients’ charts (89%), 2) having scales report BMI (85%), and 3) BMI should be written into patients charts (69%). PCPs reported competence in treating obese patients, with almost all PCPs feeling competent giving diet-related counselling (90%) and exercise-related counselling (92%) to obese patients. However, less than half (n = 218/44%) reported that they were usually successful in helping obese patients lose weight (Bleich, Pickett-Blakely, & Cooper, 2011). To summarize, although PCPs report adequate training concerning obesity-related issues, this study suggests that PCPs should be responsible for administering the medical education skills they are most qualified to deliver, but enhance a patient’s weight-loss success by being able to refer patients to more diversified healthcare teams and practice resources.

Thorough obesity screening policy and management to prevent integrated weight-loss interventions from failure are a central focus of the American Medical Association (AMA, 2013). The AMA, CDC, WHO and other reputable organizations advocate and promote the adoption and application of theoretical based models that provide unique management of chronic diseases (LeBlanc, et al., 2011; Bray & Ryan, 2012; Wadden, Volger, & Sarwer, 2011; Kumanyika, Fassbender, & Sarwer, 2012). Many studies provide survey research on physician
based weight-loss perspectives and programs; however, there is a need for more scientific studies from within the clinical practice that are founded in theory (Appel, Clark, & Yeh, 2011). There are many advantages to using theoretical based models to develop weight-loss programs, whether for private practice or larger scale community-based health programs. Theory-based models provide the avenue for weight-loss interventions within a clinical setting to address a myriad of physician-reported challenges in a systematic and organized manner. Additively, the use of theoretical models can also aid in the development of clinical/physician based weight-loss intervention programs to include multilevel strategies unique to the targeted population or community in which it is being offered (Appel, Clark, & Yeh, 2011; Logue, et al, 2005; Ackermann & Marrero, 2007).

To explore the effectiveness of theory based weight-loss models, researchers at Johns Hopkins University implemented the Practice-Based Opportunity for Promotion of Weight Reduction Trials (POWER) in three randomized control trials (RCT), across 4 years (2006-2011) (Appel, Clark, and Yeh, 2011; Bennett, et al., 2012; Wadden, Volger, & Sarwer, 2011; Wells, 2009). The purpose of the POWER program was to examine the effects of clinical practice weight-loss interventions based on various interventions for each trial. Each trial included only obese participants with 1 or more CV risk factor, and investigated the effectiveness of the unique interventions offered in each trial. Due to the length of each trial, in-person follow-up visits at 6, 12, and 24 months were required by all participants to avoid attrition. Results from each of the randomized control trials were not remarkable.

The first RCT was implemented across 6 primary care practices and included obese patients (N = 390), with two or more metabolic syndrome components. Intervention in this trial were (1) minimal care, (2) brief lifestyle counseling, and (3) enhanced lifestyle counseling with
either meal replacements or weight-loss medication. Statistical analysis on the effectiveness of each intervention was tested across many physician and patient-based variables. Primary patient-based data was collected at pre-determined 6, 12, and 24 month time periods. Examples of physical data collected for each obese patient were weight change, BMI, metabolic syndrome prevalence, lipid levels, blood pressure, and waist circumference. Additional data was collected on mood, quality of life, sexual functioning, psychological, and behavioral variables. At the completion of the first trial, interventions with enhanced lifestyle counseling that incorporated meal replacements or orlistat, produced an average loss of 4.3 kg. Only one third of these participants lost approximately 5% of their initial weight, however, small changes in weight-loss was also associated with improvements in CVD risk factors.

The second RCT was implemented in three community health centers and included obese patients (N = 360), low income, predominantly racial/ethnic minority patients, with a diagnosis of hypertension. Interventions in this trial compared usual care to lifestyle modification with electronic supports, plus interpersonal and socio-environmental support provided by community health workers and community resource connections. Primary patient based data was collected at pre-determined 6, 12, and 24 month time periods. Examples of physical data collected for each obese patient were weight change, BMI, metabolic syndrome prevalence, lipid levels, blood pressure, and waist circumference. Additional data was collected on mood, quality of life, sexual functioning, psychological, and behavioral variables. Results from interventions in the intervention group compared to usual care group for changes in weight was less than 1 pound, and no significant results were noted for mean changes in systolic blood pressure in the intervention groups compared to the control.
The third RCT trial obese patients in two primary care practices with hypertension, hypercholesterolemia, and/or diabetes. Interventions in this trial were more complex than the first two trials and included (1) behavioral intervention via telephone, internet, and email; without in-person counseling visits, (2) behavioral intervention via telephone, internet and email; with in-person (group sessions), (3) control intervention via usual medical care with self-directed weight methods. Baseline control measures included blood pressure, hypertension, lipid levels, HOMA-IR index, and Framingham Risk Score. Results after conclusion of the 24 month trial were disappointing. The mean change in weight from baseline reported an average loss of less than 2 pounds in the group receiving remote support only and less than 2 pounds in the group receiving in-person support. The change in weight from baseline did not differ significantly between the two intervention groups in this trial.

Despite disappointing results in all three POWER trials, results reported that no subjects any group had an increase in either weight or BMI. The authors suggest that even in the absence of in-person contact via PCP or weight-loss coach, weight-loss success can be achieved through systematic internet, or telephone-based interventions. The implications of this study further suggest that in the primary care setting, PCPs should consider the implementation of behavioral weight-loss interventions that do not necessarily have to be in-person.

Patients report to their physicians that cost is a major barrier to achieving weight-loss goals (Anderson, 2008). The literature on cost and its association to weight status, point to evidence that individualized directed advice can reduce overweight and obesity or its risk; however, the discrepancy lies within the program intervention policies and strategies themselves (Patrick, et al., 2009; Svetkey, et. al, 2008; Tate, Wing, & Winett, 2001). There are many schools of thought on the best strategies and policies, based on public health promoters, which
prove effective in the primary care setting. However, many factors can easily become obstacles in public-based initiatives provided in the private care setting of a physicians’ office/clinic. The gap in the research that needs attention, in obesity-related research, is the cost-effectiveness of such physician-based programs.

**Solutions to Barriers**

The patient barrier of cost may be resolved for some Americans who enroll in the new government-funded health insurance program. The concern of our Nation’s health has attracted the attention of current U.S. President, Barack Obama. In 2010, The Patient Protection and Affordable Care Act (PPACA; “Obamacare”) include obesity-related recommendations, similar those of the AMA and USPSTF, for both children and adults covered under Medicaid and/or Medicare services (PPACA, 2010). Simply stated, the PPACA mandate(s) require that health insurance companies cover physician counseling to help obese patients try to lose weight. The physician is now required to screen for and counsel at-risk patients with a BMI equal to or greater than 30. Additionally, there is no cost to the patient, such as a deductible, co-payment, or co-insurance fee. Since PPACA went into effect, there has been an increase in physicians referring obese patients to other professional services for specialty care. This may be due to the decreases in reimbursement physicians receive from state and government-based health coverage (Kisselman, 2011; Rubenstein & Tag, 2013). Specialty care/referral services are not limited to but may include telephone counseling, health coach visits, or placement into behavioral lifestyle programs. For example, when a physician writes a patient referral prescription, if the specialty service is covered by the patient’s insurance, a behavioral lifestyle service such as Weight Watchers™ might be prescribed. Subsequently, Weight Watchers™ might offer additional discounts or reimbursements to the client. Physicians, who treat patients
with private or no insurance, are neither required nor mandated to provide weight-related counseling by any professional organizing body. However, they can refer to the AMA, CDC, and WHO guidelines for treating overweight and obese patients. With the adoption of the newest HealthyPeople2020 physician-based guidelines, along with the current AMA’s stand on actively improving the amount of diet, exercise and prevention based health counseling physicians consistently deliver to all patients, hope for a healthier nation is ever rena\[scent (USDHHS, 2013; AMA, 2013).

In an attempt to improve and strengthen the role of physician in the primary care setting, public policy and health goals were re-evaluated. Thus, reducing the prevalence of overweight and obesity became a global effort. At the recent WHO global conference on obesity, the role of primary care physician was re-evaluated and re-defined, based on evidence that public health directives can positively impact and influence physicians willingness to become more participatory in the fight against the obesity epidemic. Due to the re-evaluation of public health policy framework(s) from across the globe, development of specific physician-based recommendations have been accepted and adopted by many countries, due to their generalizability across populations. Physicians are now provided with a universally accepted definition of overweight and obesity. Universal educational tools are also available so that physicians can effectively communicate with their patients about the major damaging health impacts that are associated with overweight or obese classification.

Certified Personal Trainers

The foundations of fitness began in the 19th century and were offered more as a social program, with focus on prevention of disease, injury, and sedentary lifestyle (Green, 1986; Wharton, 1982). In an effort to combat poor health status of the working class and to improve
work performance, physical activity was separated in two facets: (1) health is a matter of personal responsibility and (2) the body was a marker of social status (Bordo, 1993; Bordieu, 1988; Featherstone, 1982; Schwartz, 1986). Societal beliefs stereotyped people of poor health as low social status, low economic status, weak moral character, and as over-all failures (Falk, 1994; Mrzorek, 1989). The industrialization of the U.S. in the 20th century, coupled with advances in medicine and health science, re-invented physical activity through marketing and advertisement strategies. Physical activity and exercise were now viewed in society as a personal choice to improve personal health (Falk, 1994; Mrozek, 1989). This resulted in an industry that produced increasing pressure on society to place more importance on physical appearance, resulting in popular trends of physical activity in society, such as trends such as jogging, aerobics and tennis. As these trends grew, the consumer demands also grew, leading to the development of private and public fitness facilities, health foods, and athletic shoes (Kaye, 1977; Taylor, 1969; Taylor, 1972; Wharton, 1982; Vanderbilt, 1998). The increase in the fitness industry throughout the 1970’s and 1980 has helped to reshape public health advocacy, disease, and physical activity society now has access to today. Thus, public health programs and policies adjusted to meet the current needs of the public. Nineteenth century health problems such as tuberculosis, cholera, and clean air were replaced with health prevention and programs providing initiatives associated with behavioral health factors, such as smoking and physical activity (CDC, 2013).

Today, fitness is a multi-billion dollar industry, commercialized and not necessarily focused on important health issues such as disease prevention and control (MaGuire, 2009). Maguire (2001) outlines the fitness industry from a social marketing perspective, and concludes that personal training has become essential in the marketing of the fitness industry in general.
Certified Personal Trainers (CPTs) are key in the connection between the fitness industry and consumers from a social marketing perspective. Not only do they harbor the responsibility of marketing a facility, or their own independent business, but also the serious responsibility of helping a consumer with attaining personal health.

CPTs fall under the “service work” category and defy many of the traditional definitions of other professions within this category (Hochschild, 1983; Smith, 1994; Wharton, 1993; Wharton, 1999). This responsibility of aiding the consumer has been termed “emotional” responsibility by Maguire (Smith-Maguire, 2001). Although CPTs hold many responsibilities in the service industry, scholarly awareness of their importance has been far underestimated (Rapp, et al., 1999). CPTs are responsible for far more than the guidelines set forth by their organizing bodies and consumer reports. It is clear that education and intervention are necessary to reduce the incidence and prevalence of obesity and because such efforts have historically been rooted within the fitness industry, focusing on CPTs is a logical place to start.

This shift in focus has led traditional medical establishments to place more importance on how the fitness industry can influence the health of a society in general. Equally important is the rising cost of health care insurance, and because of this problem, the fitness industry was able to redirect its message and market exercise and physical activity as a preventative measure, in order to reduce consumer related health insurance costs, simply by being “fit” (Drury, 1988; Sage, 1998). Beginning in the early 1970’s, the adoption of corporate wellness programs and facilities was on the rise. Initially, work-site related research indicated that such programs lacked effectiveness due to the consumer’s willingness and level of comfort associated with a work-based physical activity program/facility (Aldana, 2001; CDC, 2005). In response, to combat this problem, industry began marketing the importance of gym memberships, emphasized the
importance of personal trainers, and how individualized exercise programs could provide additional benefits to the consumer based on factors such as cost and time. For the purpose of this research, the fitness industry is defined as a corporate business, and like any business, the bottom line is profit. Therefore, beginning in the 1970’s up until the new millennia, the consumer did not receive a marketing message from the fitness industry to spend money for intrinsic health factors, but rather for extrinsic health factors. The Health of the Nation Report provides current data on weight and health-related issues, and clearly reports a steady decline in the health of our nation since 1962 (NCHS, 2013). Direct-to-consumer marketers working for the fitness industry know that consumers respond to advertising that targets their needs, wants, and desires in terms of buying a “quick fix,” a “magic pill”, and “easy exercise” to combat obesity. Overall, marketing strategies in the fitness industry have not been based on the idea that there is a serious health-related epidemic in this nation, and that consumers have this new disease called obesity.

Certification of Trainers

A simple www.google.com Internet search of “certified personal trainers” yields over 4.1 million results, and when searching the term “personal trainers” it increases to an astonishing 29.9 billion results (Google, 2013). Certified personal trainers have been described as “the catalyst in the dynamic of learning” (Stott, 2001). There are currently an estimated 251,400 fitness trainers in the United States, with over 300 organizations that provide certification (BLS, 2012; 2013; Munson, 2003). Expectations that clients may have of a certified personal trainer are very broad. Generally, a certified personal trainer is required to provide the client with an extensive exercise prescription based on the client’s current health status, exercise history, exercise capability, and personal goals (ACSM, 2013). Clients are also encouraged to assess
their needs, evaluate the trainer’s certification and experience, and observe the certified personal
trainers exercise session standards prior to hiring a certified personal trainer (Green, 2010).
According to the Bureau of Labor Statistics, in 2010, there were an estimated 251,400 employed
fitness trainers and instructors in the United States, employed across 300 independent business
establishments (BLS, 2012; Munson, 2003; BLS-EFT, 2012). As defined by the United States
Department of Labor (USDL) (BLS, 2012):

“Fitness trainers and instructors lead, instruct, and motivate individuals or groups in
exercise activities, including cardiovascular exercise (exercises for the heart and blood system),
strength training, and stretching. Instruct or coach groups or individuals in exercise activities.
Demonstrate techniques and form, observe participants, and explain to them measures necessary
to improve their skills.”

Common job titles synonymous to fitness trainers include, but are not limited to: personal
trainer, certified personal trainer, aerobics instructor, fitness instructor, group fitness instructor,
group exercise instructor, fitness coordinator, fitness director, fitness technician, fitness trainer,
certified fitness trainer, and private trainer. Although many certified personal trainers have at
least a Bachelors Degree in an Applied Sciences related field, not one certifying organization
requires a degree (BLS-EFT, 2012). When considering fitness trainers and instructors as a
collective profession, personal training has not been acknowledged as a true profession, because
of the lack of one universal governing body, which is responsible for rules, guidelines, education,
and testing (BLS-OOH, 2012; Brooks, 1998). This does not insinuate the general implication
that fitness trainers, CPTs or other exercise related occupations are not professional in terms of
their knowledge, skills, abilities, contributions and values related to their occupation.
Compounding the argument that certified personal trainers are not validated as professionals in
health and medical-related industry is the absence of federal laws and/or regulations of personal training as a profession. Currently, the State of Louisiana is the only state in the Union that has passed and adopted legislation for attaining training certifications; however, there are still no federal licensing laws (Munson, 2003 (BLS-OOH, 2012.). Within the U.S. industry, recreational and sports facilities accounted for sixty point seven percent of fitness trainer/instructor occupational employment, with jobs in the arts, entertainment and recreation sixty-two point one percent, however, many other non-exercise or sport based jobs were verified. A percentage of occupational employment for fitness trainers and instructors in 2010 also included positions in, but were not limited to: (1) educational services at the local, state, and private levels (4.6 percent); (2) healthcare and social assistance (3.8 percent); and (3) religious, civic, political, professional, and grant based organizations (14.8 percent) (BLS-EFT, 2012).

Table 11. Summary of Wages, Employment, and Education Requirement of Fitness Trainers.

<table>
<thead>
<tr>
<th>Fitness Trainers and Instructors: Wages, Employment and Education Requirement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Annual Wage</td>
<td>$31,090 per year</td>
</tr>
<tr>
<td>Employment 2010</td>
<td>251,400</td>
</tr>
<tr>
<td>Projected Employment 2020</td>
<td>311,800</td>
</tr>
<tr>
<td>Projected 2020 Job Openings Based on Need</td>
<td>100,000</td>
</tr>
<tr>
<td>Percent Change Projected between 2010 and 2020</td>
<td>24.0 %</td>
</tr>
<tr>
<td>Education Requirement for Entry Level Certification</td>
<td>High school diploma or equivalent</td>
</tr>
</tbody>
</table>

Adapted from the Bureau of Labor Statistics, 2013
Businesses, associations, and organizations are independently responsible for providing adequate education, training, and examinations for certifications in health, exercise training, and other fitness related disciplines. Although many establishments aim to provide well-rounded exams, not all exams are equal. Most CPT certification exams access a candidate’s knowledge of basic health education, human physiology, understanding of proper exercise techniques, assessment of clients' fitness levels, and the development of exercise prescription. However, there is not a universal standard of requirements shared across all certifying organizations; therefore, each independent organization is accountable for exam content and trainer requirements necessary to become a certified personal trainer (BLS (b), 2013). Prior to hiring a fitness trainer, it is highly recommended that clients verify the level of expertise, education, certification, and experience procured by the prospective trainer. Not all fitness certifications are equivalent.

The Institute for Credentialing Excellence (ICE) was established in 1977, and has been the leading international membership organization since its inception. Formerly known as the National Commission for Certifying Agencies-Accredited Certification Programs (NCCA-ACP), ICE provides the delivery of educational and training programs, establishes quality standards for credentialing, and provides accreditation services to a variety of organizations. Within the ICE mission statement, it declares, “to help ensure the health, welfare, and safety of the public through the accreditation of a variety of certification programs/organizations that assess professional competence (ICE, 2013).” Because it is considered best practice to require employees of fitness facilities to possess a valid and current certification, it is highly recommended that potential personal trainers receive certification with an NCCA accredited program. In addition to CPT certification, NCCA accredited organizations require a valid and
current certification in cardiopulmonary resuscitation (CPR) prior to taking an exam (ICE, 2013). Therefore, it is important that clients choose a trainer who has received a certification from an organization that is accredited through the Institute for Credentialing Excellence (ICE) and meets or exceeds the criteria set forth by The NCCA (ICE, 2013) (NCCA Approved Fitness Organizations Source: Adapted from ICE 2013). While it could be argued that the “gold standard” for certification in fitness training is through the American College of Sports Medicine (ACSM), other significant and reputable organizations offer certification comparable to ACSM (BLS, 2012-13; NFPT, 2013 (ICE, 2013).(Table 12)

Table 12: NCCA Approved Fitness Organizations.

<table>
<thead>
<tr>
<th>ACRONYM</th>
<th>ORGANIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE</td>
<td>American Council on Exercise</td>
</tr>
<tr>
<td>ACSM</td>
<td>American College of Sports Medicine</td>
</tr>
<tr>
<td>AFAA</td>
<td>Aerobics and Fitness Association of America</td>
</tr>
<tr>
<td>AFTA</td>
<td>American Fitness Training of Athletics</td>
</tr>
<tr>
<td>CI</td>
<td>The Cooper Institute</td>
</tr>
<tr>
<td>ISSA</td>
<td>International Sports Sciences Association</td>
</tr>
<tr>
<td>NASM</td>
<td>National Academy of Sports Medicine</td>
</tr>
<tr>
<td>NATA</td>
<td>National Athletic Trainers' Association</td>
</tr>
<tr>
<td>NBFE</td>
<td>National Board of Fitness Examiners</td>
</tr>
<tr>
<td>NFPT</td>
<td>National Federation of Professional Trainers</td>
</tr>
<tr>
<td>NFTA</td>
<td>National Fitness Therapy Association</td>
</tr>
<tr>
<td>NPTI</td>
<td>The National Personal Training Institute</td>
</tr>
<tr>
<td>NSCA</td>
<td>National Strength and Conditioning Association</td>
</tr>
</tbody>
</table>

Adapted from ICE 2013 NCCA Accredited Organizations Offering Certification in Personal Training Adapted from ICE and Listed Organization
Table 13. Educational Requirements and Costs of Various Certifications

<table>
<thead>
<tr>
<th>ORGANIZATION NAME</th>
<th>DEGREE REQUIRED</th>
<th>APPROXIMATE* COST IN U.S. DOLLARS:</th>
<th>NCCA-ACCREDITED CERTIFICATIONS*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academy of Applied Personal Training Education (AAPTE)</td>
<td>HS Diploma or Equivalent</td>
<td>$900.00</td>
<td>Certified Personal Fitness Trainer (CPFT)</td>
</tr>
<tr>
<td>American College of Sports Medicine (ACSM)</td>
<td>HS Diploma or Equivalent</td>
<td>$414.00</td>
<td>Certified Personal Trainer (CPTC)</td>
</tr>
<tr>
<td>American Council on Exercise (ACE)</td>
<td>None</td>
<td>$399.00</td>
<td>Personal Trainer (ACE-CPT)</td>
</tr>
<tr>
<td>National Academy of Sports Medicine (NASM)</td>
<td></td>
<td>$599.00</td>
<td>Certified Personal Trainer (CPT)</td>
</tr>
<tr>
<td>National Council for Certified Personal Trainers (NCCPT)</td>
<td>HS Diploma or Equivalent</td>
<td>$699.00</td>
<td>Certified Personal Trainer (CPT)</td>
</tr>
<tr>
<td>National Council on Strength and Fitness (NCSF)</td>
<td>HS Diploma or Equivalent</td>
<td>$675.00</td>
<td>National Certified Personal Trainer (NCSF-CPT)</td>
</tr>
<tr>
<td>National Exercise and Sports Trainers Association (NESTA)</td>
<td>HS Diploma or Equivalent</td>
<td>$449.00</td>
<td>Certified Personal Fitness Trainer (PFT)</td>
</tr>
<tr>
<td>National Exercise Trainers Association (NETA)</td>
<td>None</td>
<td>$449.00</td>
<td>Certified Personal Trainer (NETA-CPT)</td>
</tr>
<tr>
<td>National Federation of Professional Trainers (NFPT)</td>
<td>HS Diploma or Equivalent</td>
<td>$479.00</td>
<td>Certified Personal Fitness Trainer (CPT)</td>
</tr>
<tr>
<td>National Strength and Conditioning Association (NSCA)</td>
<td>HS Diploma or Equivalent</td>
<td>$420.00</td>
<td>Certified Personal Trainer (NSCA-CPT)</td>
</tr>
<tr>
<td>The Cooper Institute (CI)</td>
<td>None</td>
<td>$289.00</td>
<td>Personal Trainer Certification (CPT)</td>
</tr>
</tbody>
</table>

Note: Approximate cost reflects standard prices including materials and exam fees but does not include premier packages, additional course resources, and taxes. Table does not include specialty certifications, which may require an advanced degree and additional prerequisites.
The steady increase of CPTs employed by both the public and private sector may be a direct response to the U.S. Government HealthyPeople 2010 and Healthy People 2020 initiatives (USDHHS, 2013). HealthyPeople has been providing the scientific evidence needed to research, identify, and develop nationwide objectives in order to improve the current health status of the American people since its inception in 1979 (USDHHS, 2013). Healthy People 2020 has one (1) mission; four (4) primary goals; four (4) primary health foundation measures; forty one (41) focus areas; six hundred (600) specific objectives dispersed within the focus areas; and over thirteen-hundred measures to establish quantifiable data within each objective. The framework for HealthyPeople was based on the social determinants of health (Wilkinson & Marmot, 2003). The Nutrition and Weight Status objectives (NWS) in Healthy People 2020 focus on promoting a healthy diet and maintaining acceptable body weight, with objectives that emphasize strategies to change detrimental individual behaviors and the policies and environments that incite these behaviors. The mission, goals, measures, focus areas, and objectives are non-discriminatory, and aim to improve the health of all peoples in the United States.

Specifically, the NWS health outline objectives promote health in settings such as schools, worksites, health care organizations, and communities. One specific initiative of Healthy People 2020, could eventually lead to an increase in job opportunities in both the public and private sector, utilizing CPTs as an important member of health care teams. The Nutrition and Weight Status objective number seven (NWS-7) is a developmental initiative that could be interpreted by the fitness industry as a foundation for developing programs in which CPTs are utilized as a resource in the medical industry. Such CPT-based health promotion programs could have the potential to evolve into a valid resource for primary care physicians and bridge the
previously mentioned gaps physicians face with their overweight and obese patients (USDHHS, 2013). As written in Healthy People 2020, NWS-7 is a developmental objective with the future goal to implement, measure and validate policies, programs, and interventions that propose to “increase the proportion of worksites that offer nutrition and weight management classes or counseling” (USDHHS, 2013). It has been demonstrated that CPTs have an important role in guiding patients to eat healthy, establish exercise routines, and adopt positive behavioral changes (Brooks, 1998; Claps, 2005; Davis, et al., 2009; Fox, Rejeski, & Gauvin, 2000; Gavin, 1996; Holcomb, 2010; Maguire, 2001; McClaran, 2003; Seguin, et al., 2008, Ángyán., 2002). Therefore, if the fitness industry, and/or accredited fitness organizations that certify fitness trainers, can establish the importance of the roles CPTs play in the attitudes, beliefs, perceptions, and actions clients/patients have related to diet, exercise and weight-loss products, this could lead to resource that has not been previously established and utilized both inside and outside of medical health care settings.

- Demonstrate how to carry out various exercises and routines
- Watch clients do exercises and show or tell them correct techniques to minimize injury and improve fitness
- Give alternative exercises during workouts or classes for different levels of fitness and skill
- Monitor clients’ progress and adapt programs as needed
- Explain and enforce safety rules and regulations on sports, recreational activities, and the use of exercise equipment
- Give clients information or resources about nutrition, weight control, and lifestyle issues
- Give emergency first aid if needed
Certified personal fitness trainers (certified personal trainer) are important partners in health care and are key players in the battle against obesity. Often overlooked, certified personal trainers usually have a wealth of knowledge in the areas of physical fitness and weight management. Many organizations offer fitness professionals certifications to train the general public. Previous research examined the current state of certification criteria among organizations that certify personal trainers (Lobb, Lobb, Hallam, 2008). Information about the certification exams for multiple agencies was retrieved from associated Web sites and reviewed for questions or components related to anti-obesity medications. All organizations required knowledge in the areas of nutrition, fitness, anatomy, and physiology and none evaluated included a testing component concerning pharmacotherapy for the purpose of weight-loss.

Roles of Certified Personal Trainers

In the United States, the areas of health, fitness, exercise, and recreational physical activity has turned into a multi-billion dollar industry (Maguire 2002). Beginning in the early 1970s, with the introduction of aerobic fitness by John Cooper, the fitness industry has morphed into a complex system of innovators, consumers, products, and practices. A poignant content analysis explores the development of the U.S. fitness industry, based on popular exercise manuals, between the 1970s to late 1990s (Maguire, 2008). Maguire outlined the trends of the fitness industry in a manner that explains the trends, preferences, and attitudes of fitness professionals as well as fitness consumers. This analysis provides the context in which personal training developed into the career choice it is today.

Maguire begins with an explanation of the basic concepts in which academic and lay-press literature first pursued as sources of key interest to the consumer. Research studies, texts, and magazines between the early 1970s and late 1990s shared three common themes in relation
to the fitness consumer: (1) attitude towards the body, (2) the body as a source of quantifiable rewards, and (3) outward appearance as a source of motivation (Bordo, 1993; Bordieu, 1988; Braverman, 1974; Brooks, 1998; Cohen J. D., 1988; Falk, 1994; Featherstone, 1982; Fuller, 1995; Fuller and Harding, 1994; Hochschild, 1983 McInnis, 1997; Mrozek, 1989; Nguyen, 1997; Rupp, 1999; Schwartz, 1986; Sheppard, 1998; Smith, 1994; Taylor, 1972; Taylor, 1999; Vanderbilt, 1998 Wharton, 1993; Wharton, 1982 Wharton, 1999). Overall, when deciphering the messages across sources, texts focused primarily on health education whereas research focused on testing the constructs of health education. Lay press editorials, such as lifestyle magazines, presented extrinsically motivational pieces with basic summaries of exercise programs, tips, and techniques. Although there were ride ranges of textual differences, common themes that were identified across the sources of information, as previously mentioned. One of the strongest themes that appeared amongst all of the fitness publications was the promotion of attitudes towards the body. Thus, as the fitness industry consistently immersed the consumer with positive reinforcement of attitudes related to health and the body, consumers became more knowledgeable, driven, and claimed a more active role in their personal health.

Bordieu’s work assessed what he termed as “elective affinity” between the fitness industry and consumers (Bordieu, 1988). During the 1980’s, the fitness industry was primarily geared towards Caucasian, middle class men and women with higher levels of education and income (Bordieu, 1984). This particular faction of consumers were more likely to adopt attitudes and beliefs that regarded the body: (1) as a project to be managed and improved (2) improvements are made through education and self-improvement, and (3) the body is as an integral component of self-identity and social mobility (Bordieu, 1984, Crawford, 1984; Featherstone, 1982; Featherstone, 1987). This attitude towards the body has also been correlated
to social standing, where appearance could result in increased social acceptance, status, and rewards (McGuire, 2002; Sassatelli, 2003). The knowledge provided to consumers on how to make lifestyle decisions represent health and exercise as rational outcomes, more so than health decisions (Maguire, 2001; Maguire, 2008). The presumption that behavioral changes related to physical activity is a product of receiving sufficient knowledge, education, tools and training. However, physical activity behavior and weight status are less the outcomes of rational or irrational actions, but the customary responses to other barriers (Crister, 2001; Farley & Cohen, 2001). Despite the availability of information, for a significant portion of the population, individual medical self-awareness does little to address the structural constructs that facilitate physical inactivity. Therefore, as the fitness industry continues to grow, consumers have a myriad of fitness sources for education, advice, products, and services. The enigma to solve is how can the fitness industry make a significant contribution to the obesity epidemic as rates of physical activity continues to decline, and overweight and obesity continue to rise on a global level (BLS(b), 2013; CDC(c), 2001; CDC(a), 2013)? Perhaps the answer lies within the fitness industry itself, as personal trainers are often a neglected resource (Oprescu, 2012). Rupp et al (1999) reports that a client can be assured that a certified personal trainer has completed adequate exercise education and training courses if the certified personal trainer does hold a valid certification (Rupp, 1999). Further studies show contradictions to Rupp et al’s study, and report that education, degree held (i.e. Bachelor of Science in Exercise Science), and certifying organization are significant predictors of a certified personal trainers knowledge.

Two hundred twenty eight experienced personal trainers responded to a survey of perceived role responsibilities, conflicts, and boundary issues in this emerging profession. Sex, age, and trainers’ levels of experience was analyzed from a 53-item questionnaire. Findings
provide information about why clients are believed to hire personal trainers, degrees of responsibility trainers feel for different aspects of the relationship, common conflicts experienced in this profession, and relationship behaviors considered acceptable or unacceptable. From a number of perspectives, the results suggest that trainers may engage in and take responsibility for behaviors that fall beyond their legitimate domains of competence and influence. These include such activities as giving advice to clients about nutrition, lifestyle, and psychological agendas. Significant differences were observed when results were analyzed by sex, age, and experience level. (Fuller, et al., 1995).

Malek, et al 2002, assessed certified personal trainers (n=115) training and experience compared to their actual knowledge of nutrition, health screening, testing protocols, exercise prescription and general knowledge required for training special populations (Malek, Malek, MH, & Coburn, 2002). Using a questionnaire developed for the current study, the Fitness Instructors Knowledge Assessment (FIKA (R)), we examined relations between commonly used indicators of knowledge (training and experience) and actual knowledge in the five areas of (a) nutrition, (b) health screening, (c) testing protocols, (d) exercise prescription, and (e) general training knowledge regarding special populations. FIKA provided reliable measures of knowledge in these areas, which are of critical importance in developing an optimal fitness program for the client and for avoiding unnecessary injuries. A survey of 115 health fitness professionals revealed that a bachelor's degree in the field of exercise science and possession of American College of Sports Medicine or the National Strength and Conditioning Association certifications as opposed to other certifications were strong predictors of a personal trainer's knowledge, whereas years of experience was not related to knowledge. These findings suggest that personal fitness trainers should have licensing requirements, such as a bachelor's degree in
exercise science and certification by an organization whose criteria are extensive and widely accepted, before being allowed to practice their craft. What this study revealed were that levels of education as well as organization from which certification were obtained were strong predictors of knowledge, whereas years of experience were not.

McInnis et al, found that of 82 exercise facilities surveyed, only 74 percent of clubs required a physician’s consent form, and 36 percent had an entire staff who held a bachelor’s degree (McInnis, 1997). Fuller and Harding (1994) identified a set of academic collegiate courses in the field of exercise science that were deemed necessary for a certified personal trainer. Results reported that 60 percent of those surveyed had not completed any of the courses, and 38 percent had not completed any of the key courses listed on the survey. A follow-up study by Fuller, et al., (1995), investigated the relationship between formal education, type of certifying organization and level of knowledge. Similar results were found as compared to the previous Fuller et al study; however, when identifying the certifying organization of the certified personal trainer, 74 percent of those certified by The American College of Sports Medicine (ACSM) or the National Strength and Conditioning Association (NSCA) had completed at least nine of the 13 courses listed as necessary.

Researchers at the University of California did a recent survey of fitness professionals (n=115), and concluded that certifying organization was a significant predictor of several knowledge areas of personal training (Malek 2002). Similar to previous findings, those who held an ACSM or NSCA certification averaged a knowledge score of 70-85 percent while all other subjects scored below 40 percent. Collectively, these findings indicate the need for a national standard of knowledge, training, and skills for certified personal trainers. It has been demonstrated in the past that personal trainers rely on personality and appearance far more than
level of education and certification to demonstrate soundness of skills to potential clients (Solomon, et al., 1997). Years of experience was not found to be predictive of personal trainer knowledge.

Discussion

The AMA now recognizes obesity as a disease. This is very likely due to both the increase in the prevalence of overweight/obese persons globally and the preponderance of evidence that excess weight and elevated BMI result in significant increases in morbidity and mortality. Initiatives such as those included in HealthyPeople and the PPACA also reflect the migration from considering excess weight as a lifestyle condition to a disease requiring intervention. Interventions for weight-loss include diet and exercise (lifestyle), pharmacotherapy and surgery, the latter have both been shown to benefit patients who are unresponsive to lifestyle counseling alone. For many patients with a life long history of overweight/obesity complicated by several co-morbid conditions (e.g., hypertension, diabetes, heart disease) appetite suppressants have allowed them to gain control of their dietary intake and body weight for the first time in their lives. If overweight/obesity were like any other disease, such as diabetes or hypertension, physicians would prescribe a medication only to their own patients, taking into account the potential risks and benefits as they pertain to that specific individual. Moreover, the patient would be reluctant to take a prescription from another clinician, one who may not be aware of his/her personal background and medical problems. If this were the case, diet drug usage would be well controlled and monitored. The drive to thinness is fueling the weight-loss industry. Out of desperation, some may turn to any “quick-fix” weight reduction product. Many physicians established overnight diet-pill clinics, and attracted a vulnerable public into their offices with advertisements exclaiming medical breakthroughs with quick, safe and permanent
results. In addition, commercial weight-loss programs entered into the medical prescriptive market. Through medical consultant employees, the programs prescribed diet drugs in the program center.

There remains the potential for social bias against overweight individuals and this has been shown to potentially translate into the physician’s office and the CPT session. In addition, while there is ample support that consumers generally trust their physician as a source for health care information, there is also evidence that physicians lack both the time and the information necessary to appropriately intervene in the weight-loss treatment plans of their patients. Similarly, while CPTs may be trusted sources of information regarding exercise, the variability in education and certification may lead to variability in the trust put into CPTs as sources for information and in fact, some CPTs may lack the appropriate information for valid intervention.

Beyond diet and exercise and before surgery, there is a role for pharmacotherapy, both OTC and prescription in the treatment of patients with obesity; however, without appropriate counseling and education the vulnerable public is easy prey to opportunists who make unsubstantiated claims. This leads to several research questions:

1. Determine if positive or negative source-based statements either influence or change consumer beliefs and intentions to use a weight-loss medication.

2. Determine differences in the effect of recommendations, either positive or negative, based on source between physicians and certified personal trainers.

3. Determine consumers’ attitudes about or intent to use a weight-loss medication differs by type of product.
The origins and foundations of present day health behavior-change theories are founded in early psychology-based theories of learning, expectancy-value, and consistency, such as Hider’s Balance Theory, Osgood and Tannenbaum’s Congruity Theory, Festinger’s Dissonance Theory, and Weiner’s Attribution Theory (Festinger, 1957; Heider, 1958; Fishbein, 2001; Fishbein & Ajzen, 1975; Osgood & Tannenbaum, 1955; Weiner, 1974; Weiner, 1980). Historically, within the context of public health programs and interventions, factors such as the growth of industry, environment, and population all contributed to the way in which health-based theories were viewed and utilized for the development of programs and evidence-based practices. The ecological approach to health behavior change assesses health behavior as a product of the social systems and social influencers surrounding an individual (Bronfenbrenner, 1977; McLeroy, Steckler, Bibeau, & Glanz, 1988). In other fields using ecological theories, health-based behavior change theories are unique in their inclusion of a broader evaluation of social systems, in terms of how community, organizational, and policy may influence health behavior. Based on the ecological approach to health behavior change, social influencers are categorized into five pre-determined categories: intrapersonal, interpersonal, institutional, community and public policy (McLeroy, Steckler, Bibeau, & Glanz, 1988). Examples of intrapersonal influencers are an individual’s decisions, attitudes, self-esteem, self-concept or self-regulation. Commonly used intrapersonal theories that are used to examine health behavior change, are the Health Belief Model, Theory of Planned Behavior, and the Transtheoretical Model of Change.

When entering the basic search term “Theory of Planned Behavior” into the National Center for Biotechnology Information (NCBI) all-database search option, results yield over
The Theory of Reasoned Action (TRA) preceded the Theory of Planned Behavior (TPB) and posited, that prior to an executable action; intentions to act precede decisions to execute an action (Ajzen, 1985). The primary assumption of TRA is that positive attitude and subjective norm (influence); result in increased motivation (intention) to execute a behavior (action). Figure 2 illustrates the basic constructs of the Theory of Reasoned Action. In TRA, attitudes develop based on an individual’s summation beliefs that are associated with the behavior itself, as well as the strength of each belief. Therefore, an attitude toward a behavior is a summation of: (1) products of the belief (2) strengths of the belief and (3) attitudes toward the behavior. Intentions generate from attitudes at the personal level, based on societal norms. Four decades of research in health behavior change, provide statistical validation for the high correlations that attitudes and subjective norms influence behavioral intentions (Sheppard, Hartwick, & Warshaw, 1998).

In addition to the constructs of attitudes and subjective norms, the additional concept of perceived behavioral control, emerged as a new possible construct to include in TRA. The perceived behavioral control construct originated from Self Efficacy Theory (SET) (Bandura 1977). Bandura first proposed self-efficacy in 1977, which was conceived from his original Social Learning Theory, known today as Social Cognitive Theory (Bandura, 1977; 1998, 2001). By definition, self-efficacy is "the belief in one’s capabilities to organize and execute the courses of action required to manage prospective situations" (Bandura, 1977). It is in the conviction that one can successfully execute a behavior, in order to achieve an outcome, which affects self-efficacy in an individual.

In Social Cognitive Theory, self-efficacy is the most important pre-condition for behavioral change, as it often determines the initiation of coping related behavior(s).
efficacy has consistently contributed to explaining various relationships between beliefs, attitudes, intentions, and behavior. As the theory of social learning and cognition (SCT) continued to be developed, tested, and validated in the field of psychology, it is commonly used today in many health-related fields (Anderson-Bill, Winett, & Wojcik, 2011; Annesi, 2005; Bandura, 1998). While other theoretical models base source of influence within an individual’s conceptualized cognitive space, the Theory of Planned Behavior considers social influence, based on collectivistic culture-related variables. The inclusion of culture-related variables allows for the identification of the strength of cultural-related variables as well as the influence on decision-making. It is through the inclusion of cultural-related variables that provide a better understanding of perceptions that are capable of being influenced by social norms and normative beliefs. Therefore, an individual’s health-related behavior (i.e., diet, exercise, smoking, drinking), might very well be located in, and dependent on the more predominate social networks and organizations of an individual (i.e., peer group, family, school and workplace).
As Ajzen (1991) states in the Theory of Planned Behavior, knowledge of the role of perceived behavioral control was founded on Bandura’s concept of self-efficacy (Bandura 1977). The Theory of Planned Behavior is an extension of the Theory of Reasoned Action, to theorize that attitudes toward a behavior are the function of three metrics: (1) beliefs and the associated strengths of beliefs toward the behavior, (2) subjective norms around the behavior, and (3) locus of control for the individual (Ajzen, 1985). As TRA was adopted and applied, investigational studies did not show that behavioral intention always led to actual behavior, creating a counter argument against the high relationship between behavioral intention and actual behavior, citing the concept of circumstantial limitations (Bagozzi, 1981). Specifically, the argument was based on the idea that behavioral intention cannot be the exclusive determinant of behavior, where an individual’s control over the behavior is restricted or incomplete (Bagozzi, 1981). In response, Ajzen and Fishbein acknowledged and explored this counter argument, and added the
component, “perceived behavioral control” to the TRA theoretical framework. With the inclusion of perception, the Theory of Reasoned Action could then include and account for volitional behaviors, therefore, providing an approach to identify and enhance the prediction of behavioral intention and actual behavior. It is through this addition, that the Theory of Planned Behavior was conceived (Ajzen, 1985; Ajzen, 1987; Ajzen, 1991).

Figure 3: An Illustration of the Theory of Reasoned Action and Planned Behavior.

Adapted from Azjen
The Theory of Planned Behavior also posits that behavior originates from intentions. Intentions in turn, originate from attitude about the behavior, the subjective norms concerning the behavior and an individual’s locus of control. In essence, before a person can behave in a certain manner, he, or she must first intend to do so. As such, altering a person’s intention toward a certain behavior is likely to lead in an alteration of behavior. It is possible to alter an individual’s intentions to act, by manipulating their unique attitudes about the behavior. Subjective norms represent how the person believe others will desire him or her to behave and are less correlated with behavior than attitudes.

Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TRB) each provide for the ability to measure the concept of social influence. Social norms and normative beliefs, are the direct measures used establish the foundation to identify and measure social influence in TRA. Simply stated, elaborative thoughts on subjective norms and beliefs, serve as the foundation that determine a person’s unique perceptions related to intent to act or performing the act itself. The perceptions of social expectations to perform a specific behavior are influenced by numerous sources (i.e. friends, family, and society) Establishing the degree to which social influence affects decision-making is extremely important. The identification, measurement, and establishment of social sources of influence, provide a clearer understanding of perceptions. Recently, Fishbein and Cappella (2006) stated that self-efficacy is the same as perceived behavioral control in his integrative model, which was also measured by items of self-efficacy in a previous study (Ajzen, 2002a). In previous studies, the construction and the number of item inventory of perceived behavioral control have depended on each particular health topic. For example, for smoking topics, it is usually measured by items such as “I don’t think I am addicted
because I can really just not smoke and don’t feel crave for it,” and “It would be really easy for me to quit.” Thus, simply stated, the concept perceived behavioral control is the perception of the ease or difficulty of a particular behavior. It is linked to control beliefs, which refers to beliefs about the presence of factors that may facilitate or impede performance of the behavior. It is usually measured with items which begins with the stem, “I am sure I can (i.e., exercise, quit smoking, etc.)”. Generally, a self-report instrument (i.e. questionnaire) is designed to measure the confidence toward the probability, feasibility, or likelihood of executing given behavior.

For example, consider how an individual would decide whether to take a prescription and/or OTC weight-loss aid. Table 14 provides hypothetical examples of both positive and negative subjective normative beliefs (thoughts), when presented with the decision of whether take a weight-loss aid. These (hypothetical) thoughts on weight-loss aids then influence subjective norms, which lead to the intention to act and decision to act upon the final behavior (decision take or not take the weight-loss aid).
Table 14. Examples Of Hypothetical Positive and Negative Attitudes That May Influence The Decision To Take a Weight-loss Aid

<table>
<thead>
<tr>
<th>From Peer Groups</th>
<th></th>
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<tbody>
<tr>
<td><strong>Positive:</strong></td>
<td>Most of my friends really believe that weight-loss aids are good.</td>
</tr>
<tr>
<td><strong>Negative:</strong></td>
<td>Most of my friends really believe that weight-loss aids</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From Family</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive:</strong></td>
<td>Since my spouse takes a weight-loss aid, and believes it is working, he says I should start taking a weight-loss aid too.</td>
</tr>
<tr>
<td><strong>Negative:</strong></td>
<td>My spouse tried one weight-loss aid and he did not see big results, so he believes it won’t work for me either.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>From Society Or Culture</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive:</strong></td>
<td>My doctor believes that prescription weight-loss aids really work.</td>
</tr>
<tr>
<td><strong>Negative:</strong></td>
<td>My doctor just assumes I do not need to take a prescription weight-loss aid, he thinks it just won’t help me lose more weight.</td>
</tr>
</tbody>
</table>

Source: (Original) Statements are Based on the Theory of Planned Behavior (Ajzen & Fishbein, 1987)

To summarize, the Theory of Planned Behavior posits that human behavior is guided by three constructs: "behavioral beliefs," "normative beliefs," and "control beliefs." In their respective categories, "behavioral beliefs" produce a favorable or unfavorable "attitude toward the behavior"; "normative beliefs" result in "subjective norm"; and "control beliefs" give rise to "perceived behavioral control." In combination, "attitude toward the behavior," "subjective norm," and "perceived behavioral control" lead to the formation of a "behavioral intention" (Ajzen, 2002b). In particular, "perceived behavioral control" is presumed to not only affect actual behavior directly, but also affect it indirectly through behavioral intention (Zimmerman et al., 2005).
The Theory of Planned Behavior (TPB) is a well-established, widely adopted, and applicable model for health-based behavior change research. In many areas of public health research, such as health awareness, promotion, prevention, communication, education, and policy, the simplicity of the TPB theoretical framework (see Figure 3), behavior change the model generalizable for its use within and across, (Ajzen, 1991; Ajzen, Joyce, Sheikh, & Gilbert-Cote, 2011; Taylor, et al., 2006), also, when compared to other health behavior change theoretical models, TRB is less theoretical framework complex by design with fewer constructs, thus, facilitating the improvement in the predictability of achieving changes in intended behavior(s) (Baban & Craciun, 2007). In these areas of research, the primary goal of TPB-based interventions is to increase the likelihood of positive behavior change (action/outcome), which is a direct result of an individual’s decision-making process. Remembering that the TBP’s main hypothesis is that a belief is the basic determinant of any given behavior, if an intervention can change or modify an underlying belief, then the probability of changing the behavior is higher.

Specific areas of priority in public health research, have reported positive results in behavior change interventions by implementing the TPB theory as the foundation for their research design. Examples include, but are not limited to, condom use, (Albarracin, 2001; Beadnell, et al., 2008; Taylor, 1999); diet and exercise, and obesity (Courneya, et al., 2000; Gratton, et al.).

The implementation of the Theory of Planned Behavior is also a relevant and useful framework for research studies that seek to investigate how source of credibility may be correlated to normative beliefs of weight-loss medication. In the United States, the patient/client decision to adhere to prescription and/or over the-counter medications is an area of special concern, given recent declines in the economic and health status’ of many Americans (DeNavas-
The proposed research in this study will use the Theory of Planned Behavior as its theoretical framework. The primary goal is to expand upon what is known concerning consumer preference, pertaining to source of knowledge concerning weight-loss prescription and over-the-counter weight-loss aids (Carr, et al., 2011; Fox et al., 2005). Thus, as it stands, the area of subjective norms towards obesity is unclear, medications for obesity treatment are dismissed as unimportant, and the majority of Americans are overweight or obese (Adlofsson, 2005; CDC, 2010; 2013). The “thin is in” concept is supportive of a global subjective norm against overweightness; however, with a sizeable proportion of the population living with overweightness or obesity, it is unclear what the true subjective norm is, especially at the individual level. As such, this research will focus on changes in belief, following a source credibility intervention and will assess if interaction effects will potentially confound the results.

Establishing if a consumer is more likely to determine a behavioral decision, based on source of knowledge, is important in understanding the acceptance of information about a weight-loss aid. An individual's behavioral intention cannot be the exclusive determinant of behavior, where an individual’s control over the behavior is incomplete. In investigating perceived behavioral control, the Theory of Planned Behavior can uncover relationships between behavioral intention and actual behavior. Several studies found that the theory of planned behavior would help better predict health-related behavioral intention than the Theory of Reasoned Action (Ajzen, 1988). Nair used the theory of reasoned action as a framework for an assessment of attitudes effects on medication discontinuation following the introduction of change in cost sharing in the form of copayments for prescriptions within an insurance plan. Nair evaluated several constructs and their relationship to discontinuation intentions. These
included attitudes toward prescription insurance, generic medication perceptions, formulary attitudes, and willingness to switch and how they related to prescription discontinuation (Nair, 2003).

It is in the context of the decision to obtain knowledge of a weight-loss aid, either OTC or prescription, that patients will engage an information source. Patients/clients process information from several sources, develop beliefs about the purchasing of the product such as efficacy expectations, develop an intention to purchase and purchase the medication. Assuming that the prescription represents appropriate medical care, failure to comply with a written prescription represents an opportunity for therapeutic failure and patient harm.

Both physician and CPT knowledge and attitudes related to the use of weight-loss prescription medications and supplements is reported in the literature streams. However, when comparing CPTs to physicians, the amount of literature on the knowledge and attitudes about weight-loss aids is extremely disproportionate, highly favoring physician literature streams. This lack of a drug education requirement highlights a key issue facing the increasing involvement of both pharmacotherapy and personal trainers in the fight against obesity. As a common and trusted touch point for patients working to lose weight, personal trainers have the ability to support patients engaging in diet, exercise, and pharmacotherapies to reduce weight. However, with a lack of focus on pharmacotherapy in the certification process and with thousands of certified personal trainers in the United States, it is important to understand personal trainers' views and knowledge of pharmacotherapy for weight-loss. Because patients/clients often discuss potential alternative diets and treatments with their trainers, and because of all information sources, are seen more frequently than other providers, as OTC and prescription therapies
increase in availability, personal trainers may have an increased potential to identify potentially life threatening issues.

In previous research, beliefs were found to be strongly negative toward pharmaceuticals amongst personal trainers, specifically; personal trainers were biased against pharmaceutical obesity interventions in weight-loss plans (Lobb, Lobb, Hallam 2008). This bias represents an attitude toward pharmaceutical anti-obesity therapies that is probably best assessed using an evaluation of belief formation and assessing the ability of information provided to alter preconceived beliefs about anti-obesity treatments. This begs the question, if trainers did speak positively to clients about pharmaceuticals how would that affect their clients behavioral intentions? Several theoretical frameworks exist to scientifically evaluate such effects.

However, this theoretical framework is not without limitations, the theory of planned behavior is based on cognitive processing and level of behavior change. Compared to affective processing models, the theory of planned behavior overlooks emotion variables such as threat, fear, mood and negative or positive feeling and assessed them in a limited fashion. In particular, in the health-related behavior situation, given that most individuals’ health behaviors are influenced by their personal emotion and affect-laden nature, this is a decisive drawback for predicting health-related behaviors (Dutta-Bergman, 2005). Poor predictability for health-related behavior in previous health research may be attributed to the exclusion of this variable.

Discussion

The perceptions, roles, conflicts and boundaries that challenge both physicians and certified personal trainers in the delivery of effective weight-related counseling and treatment, modalities to their clients/patients was presented in Chapter 2. Based on scientific self-report
qualitative survey research, it has also been established that certified personal trainers actually engage in and accept responsibility for giving opinions, advice, and recommendations in areas of training considered outside of their area of expertise and/or certification(s) (Gavin, 1996; Holcomb, 2010; Malek, Malek, MH, & Coburn, 2002; Malek, et al., 2002; Smith-Maguire, 2002; Smith-Maguire, 2008). This does not imply that CPTs are not qualified or should not communicate, teach and foster their clients to learn about health and medical-related topics outside of their areas of expertise and certification. In fact, based on the “gold standard” in acquiring CPT certification, it gives a plausible reason for organization(s) (i.e. American College of Sports Medicine) to develop additional specialized certifications with emphasis in areas that do not exist (i.e. knowledge of key pharmaceutical and over-the-counter medications that may have adverse effects during exercise). Considering that, a general family physician is often the first person with the opportunity to clinically intervene and provide weight-loss treatment(s), the multifarious mêlées physicians face only compound their ability to provide effective and successful long-term treatment(s) for weight-loss (Yoong, et al., 2012). Thus, the initiatives of both the U.S. The Patient Protection and Affordable Care Act and Healthy People 2020 to improve the health of Americans, through reducing the prevalence of overweight and obesity in both children and adults, lead to the development of the primary aim of this study. The weight-related initiatives in both the PPACA and Healthy People 2020, provide a myriad supportive statements that call for the identification of new external professional resources that can work in conjunction with physicians. As written, in addition to the physicians, nutritionists, and bariatric surgeons already utilized in weight-related medical treatments, the statements outlining the call for additional viable professional resources are stated simplistically, and without specific limitations (PPACA, 2010 USDHHS, 2013;).
Therefore, the primary interest of this research study is to investigate consumer beliefs about prescription (Rx) and over-the-counter (OTC) weight-loss medications. Specifically, this study will investigate the degree to which a physician (MD) and certified personal trainer (CPT) influence consumer beliefs associated with weight-loss aids. According to current literature streams, both MD’s and CPTs are traditional sources of information that consumers have relied upon for obtaining health and medical-based information. Research indicates that consumers trust physicians to provide them with reliable and valid clinically based medical information concerning their health (Bleich, Pickett-Blakely, & Cooper, 2011). The research literature also indicates that consumers trust certified personal trainers to provide them with reliable and valid exercise and diet based information (Holcomb, 2010). However, as compared to MD’s, CPTs have not been utilized by consumers as a source of information for clinically based medical information concerning their health, yet have the potential to become an extremely valuable resource for the U.S. initiatives to reduce the prevalence of overweight and obesity in the United States (Flegal, et al., 2010; Harris, Holden, & Chen, 2010; Oprescu, 2012; USDHHS, 2013).

Understanding the perceived beliefs consumers have towards both of the sources of knowledge and weight-loss medications will help to discern the process in which they form their belief systems. There are many obstacles that physicians and certified personal trainers can be challenged with their ability to provide effective intervention to overweight and/or obese patients. Using a survey to gather information concerning why clients hire a certified personal trainer, the relationship between the client and certified personal trainer, responsibility of certified personal trainer, level of conflict, and the extent to which a certified personal trainer disapprove of client interaction that extends beyond what is considered appropriate professional behavior. Two hundred and twenty-eight trainers responded with completed surveys. The
results indicated that the two primary reasons a client hired a trainer was for body shaping (82 percent) and weight management (78 percent). Notably, exercise adherence (72 percent) was also a contributing factor to hiring a trainer. Trainers also reported the following:

1. 85 % would definitely give exercise advice outside a session
2. 80 % would definitely give health and lifestyle advice
3. 61 % would definitely give nutrition advice

Thus, communication during medical encounters can improve patients' abilities to exercise appropriate control over their health. A major factor in enabling patients to increase control over their health involves developing their competencies for making decisions and enacting behaviors that can lead to desired and attainable, health outcomes. Key in education on this factor is communication around and support in decision-making about prescription medications, because whether and how to use medications are among the most common and important decisions in which patients can participate. With respect to communication about prescription medications, physicians most frequently mentioned product name (78.2 percent of consultations) and instructions for use (86.7 percent of consultations). Patients were extremely passive, rarely offering their opinion or initiating discussion about any aspect of the treatment. It was suggested that improving patients' decision-making competencies may require more discussion of benefits and risks, as well as discussion of patients' opinions about the prescribed medications and their abilities to follow through with the treatment plans. Physicians tended to overestimate the extent to which they discussed patients' ability to follow the treatment plan, elicited patients' opinion about the prescribed medication and discussed risks of the medication. Moreover, 24.3 percent of the patients left the consultation with an 'illusion of competence', a
belief that important topics had been discussed when, in fact, they had not been mentioned at all.
The pattern of results illustrates the complexity of health promotion in primary care, and
underscores the importance of attending to both perceived and actual communication in medical
encounters.

It is evident from the literature, that there exists a clear demand for pharmaceutical anti-
obesity medications, the ability to treat obesity with those agents, as well as scientific research
supporting the safety and effectiveness of the agents available. The recurring problem within the
literature is clear, no matter which pharmaceutical therapy is chosen, there continues to not only
be a need and demand for these medications, but information about these medications and the
need and demand for both is growing. Weight-loss as reported in these studies, is short term, and
as cited in Wooley’s and Garner article on the behavioral aspects of weight-loss, 90-95 percent
of all patients reported regaining weight lost. A harsh, but yet reasonable approach is to treat the
patient, not the condition. As quoted from Garner and Wooley (1994, page 309):

“The failure of fat people to achieve a goal they seem to want- and to want
almost above all else-must now be admitted for what it is: a failure not of
those people but of the methods of treatment that are used.”

Perhaps if this attitude toward obesity were accepted not only by the physician, but also
by the patient, weight-loss goals would be more achievable and sustainable without the need for
drug therapy. Attitudes among others in fields related to health also play a role in the
psychology of treating patients. Recently, the Cooper Institute in Dallas Texas looked at bias
toward obesity among exercise science students. Using the Implicit Association Test (IAT) and
the Antifat Attitudes Test (AFAT), among 136 undergraduate students and 110 graduate
students, the results showed a strong bias in good and bad attitude, coupled with motivated and
lazy stereotype associated with persons who are obese ($p < .0001$). The implications of these results suggest a negative bias to those who are obese, thus, when coupled with the responsibility of health promotion to all persons, those attitudes may contribute to the continuing discrimination against the obese. Education may be appropriate to overcome these biases; however, it is perhaps more important to understand that if the biases were overcome, how that could affect trainer/client communications and client behavior.

Treating the underlying causes of obesity, such as diet exercise and lifestyle behavior modifications should clearly be the first step in treatment. These changes in lifestyle should help attribute to long-term weight-loss. If treating the underlying causes of obesity do not improve weight-loss results, then drug therapy should be an option as a method of treatment used simultaneously with the lifestyle modifications already in place. Taking a more holistic approach towards the treatment of obesity, accelerated with pharmaceutical intervention can be an acceptable answer in the battle of fighting this epidemic. In that light, this work seeks to understand if information provided by personal trainers regarding weight-loss medications can alter consumer beliefs about those medications. When degrees of change in beliefs are present, to what extent are they comparable, or different, to beliefs if a physician were to provide the same information? This project includes eight research hypotheses that pose to evaluate the role of source of credibility (information providers) and the belief formation process of the consumer. This research explores the role of physicians and personal trainers and their influence on consumer perceptions of over-the-counter and prescription pharmaceutical weight-loss medications. Scenarios will explain medications that was used to model the intervention, with two primary sources of information: physician (MD) and certified personal trainer (CPT). This results in the following testable null hypotheses:
H10: There is no significant three way interaction between the variables medication type, physician communication and trainer communication for either attitudes or intentions to try a weight-loss medication.

H20: There is no significant two way interaction between medication type and physician communication, medication type and trainer communication, or physician communication and trainer communication for either attitudes or intentions to try a weight-loss medication.

H30: There is no significant difference in attitudes formed about weight-loss medication use based on the medication type, prescription vs. over-the-counter.

H40: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.

H50: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the trainer, positive vs. negative, about the medication.

H60: There is no significant difference in intentions to try a weight-loss medication consumption based on the medication type, prescription vs. over-the-counter.

H70: There is no significant difference in intentions to try a weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.
H86: There is no significant difference in intentions to try a weight-loss medication consumption based on the level of communication provided by the trainer, positive vs. negative, about the medication.
CHAPTER 3
RESEARCH METHODS AND DESIGN

This section describes the operationalization of the variables, selection of the sample frame and sampling methods, the design of the scenarios as stimuli, and the statistical method for modeling the results.

Study Design

The objective of this study was to evaluate the attitudes held by, and intentions of, consumers and their intent to use a weight-loss medication based on source of information (Ajzen, 1988, 1990). The study was a 2x2x2 experimental research design, which used analysis of variance (ANOVA) to test the statistical significance of differences between groups (Tabachnick & Fidell, 2006). Data was collected using a self-administered on-line survey questionnaire. Survey questionnaire items were designed to collect information about: (1) the respondents demographics, (2) treatment scenarios to test the hypotheses, and (3) the respondents’ attitudes and intentions.

Sampling

Data was collected using an online panel of respondents. Research Now® was used to recruit participants and administer the research survey questionnaire and instrument. Research Now® is a global digital data collection company that specializes in providing a myriad of high quality research-based services. Specializing in survey-based research projects, Research Now provides an extensive panel of survey participants that span across 38 countries, with over 6.5
million active members (Research Now, 2014). Recruitment for study participants was initiated by the primary researcher, in conjunction with Research Now®, and was based on the proposed study inclusion criteria (Appendix A). After excluding potential subjects using those criteria, Research Now® then developed a usable list of adult participants. Adolescents and children were not included in the study. Those who were under the age of eighteen were not recruited for participation, due to several factors, i.e. securing valid (on-line) parental approval, and levels of experience and or knowledge with physicians, diet, exercise, weight-loss medications, and the over-all complexity of the treatment scenario content. For those over the age of eighteen, the proposed inclusion criteria did not discriminate against factors such as age, gender, race, geographic location, socioeconomic status, or health status. Each study participant who met the proposed research inclusion criteria was offered equal opportunity to participate. The sample population for this study consisted of participants who were overweight or obese. Respondents who read and accepted the study description, purpose, and confidentiality pages by pressing the agreement option, were eligible to participate in the study (Appendix A).

Exclusion from the study was determined if the respondent answers yes to any of the following main exclusion criteria (Appendix A): (1) current use of weight-loss medication (Rx or OTC), (2) current weight-loss counseling (MD or CPT), and (3) valid professional license (MD or CPT), and (4) normal BMI. To date, there are no known scientific research articles that have specifically explored and tested the specific components that were proposed in this research study design. Therefore, key findings from the proposed study, added additional knowledge to existing health and medical-based weight-loss programs, and how programs can improve patient-centered weight-loss care by providing patients with more choices in who delivers weight-loss counseling and interventions.
After receiving official University approval to collect data, three pre-determined days (Waves) of data collection occurred: (1) Wave A sent 100 surveys on day one of data collection, (2) Wave B sent 100 surveys two days after day one, and (3) Wave C sent 100 surveys five days after day one. Due to University IRB mandated policies regarding research guidelines for data collection and analysis, following Wave C all data collection was closed and this analysis was based on data collected from surveys that met all study criteria.

A sample size of consumers was determined to test the three independent variables (IV). Each independent variable had two levels per IV, to the dependent variables (DV) (Hair, 1998). The independent variables were (1) physician communication (positive/negative recommendation), (2) trainer communication (positive/negative recommendation), and (3) medication type (Rx and CPT). The dependent variables were intention to use a weight-loss medication and attitudes formed about weight-loss medications, following the communication (treatment scenarios) by trainers and physicians. A priori power analysis (G-Power) was conducted to calculate an adequate sample size necessary to run a three-way ANOVA, with possibilities that two-way interaction terms and main effects might have been significant. In summary, the a priori calculations suggested that with an alpha of 0.05, a power of 0.80, and eight test cells, an adequate sample size for this study would be approximately 160 respondents. Details of this calculation are below:
**F tests** - ANOVA: Fixed effects, special, main effects and interactions

**Analysis**: *a priori*: Compute required sample size

**Input**:
- Effect size $f=0.25$
- $\alpha$ err prob $= 0.05$
- Power (1-$\beta$ err prob) $= 0.80$
- Numerator df $= 2$
- Number of groups $= 8$

**Output**:
- Noncentrality parameter $\lambda = 9.8750000$
- Critical F $= 3.0580504$
- Denominator df $= 146$
- Total sample size $= 158$
- Actual power $= 0.8016972$

Figure 4 – Power Analysis for Three-Way ANOVA. (G*Power)
**Questionnaire Design**

The survey questionnaire was developed, programmed, and hosted on the Internet. Survey data was collected using a self-administered on-line questionnaire from an online panel of respondents provided by Research Now®. All respondents volunteered to participate in the proposed research study, and our voluntary participants of the Research Now® panel. Research Now® pre-screened the panel respondents, based on historical demographics and study inclusion criteria. The survey design called for Research Now® to pre-screen respondents for inclusion criteria, and an additional screen based on study inclusion criteria was administered within the survey questionnaire. The survey questionnaire was comprised of four main sections: (1) screening page for inclusion criteria, (2) scaled survey instrument to develop a baseline understanding of pre-existing consumer-based knowledge, attitudes and intentions around weight-loss medications (Rx and OTC), source of credibility and source of information (MD and CPT), and social norms related to weight-related topics, (3) the treatment scenarios and, (4) demographic questions (Appendix A).

The scaled survey section was measured based on pre-existing Likert-type and semantic differential scales using ratings from 1 – 7. Utilizing pre-validated scales provides an increased level of statistical reliability and validity, due to the increased level of confidence that the scale measures what it is supposed to measure (Alreck and Settle, 2004). The questionnaire was reviewed by faculty at the University of Mississippi, and then pre-tested with a sample of 10 consumers selected based on study criteria. The questionnaire was then revised for clarity. The next section describes the conceptual and operational definitions of independent and dependent variable and the items used to measure them.
Variables

This study involved information variables that served as the antecedents for intentions. In total, there were three dichotomous independent variables (1) medication type (Rx and OTC), (2) physician communication (positive vs. negative) and, (3) trainer communication (positive vs. negative). The goal of the information provision (treatment scenarios) was to provide insight into consumer decision-making. The use of both positive and negative information is a logical choice, because little is known about consumer intentions to try a weight-loss medication, based solely on the source of information presented in the proposed research design (MD and CPT). Therefore, the proposition that intentions formed by clients can occur for both OTC and prescription medications for weight-loss, might be dependent upon the source of the information from which it is being presented. Based on information source (MD and CPT), information for the treatment scenarios presented about weight-loss medications, are acceptable, as this is an experimental design.

Operational Definitions of Independent Variables

Medication Type

1) Prescription Weight-loss Medication (Rx): Medications that you can only get after obtaining a prescription from a doctor.

2) Over-the Counter (OTC): Medications you can buy at any store, without having to go to a doctor or without a doctor’s prescription.

Knowledge Source

3) Medical Doctor (MD): Family/Primary Care Doctors that people visit first, for basic health care needs. The MD is the doctor who then refers/sends a patient to see other
specialists, such as heart doctors and surgeons. In the treatment scenarios, recommendations about weight-loss medication was either positive or negative in nature.

4) Certified Personal Trainer (CPT): For this study, the “gold standard” of CPT fitness professionals. A CPT with a 4-year college degree and a CPT certification (A CPT is NOT an athletic trainer or physical therapist). In the treatment scenarios, recommendations about weight-loss medication was either positive or negative in nature.

Dependent variables

The dependent variables in the proposed research design are consumers’ attitudes about weight-loss medication and intention to try the medication type. In the study, attitudes are operationalized as perceptions toward the use of a weight-loss medication. The work of Petty and Cacioppo (1986) provided the foundation for the scale used to test for attitudes and intentions to use weight-loss medications. Several studies have validated the reliability of this scale (Lobb, 2007; Jalnawala, 2005, Jalnawala and Wilkin, 2007; Sewak 2002, Sewak, Wilkin, Bentley and Smith, 2005, West, Wilkin, and Bentley, 2004).
Figure 5: Questions to assess attitudes about the use of a weight-loss medication

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>My use of an Rx weight-loss medication to support my weight-loss program would be:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Harmful</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Useless</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Ineffective</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Unnecessary</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Dangerous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Not helpful</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

*Scale to measure attitudes about use of a weight-loss medication.

The analysis of the attitude measure were conducted on the summed scale 8 items, resulting in an attitude variable with a possible range of 8 to 56. The intention variable was operationalized as consumers’ willingness to use a weight-loss medication and assessed using four semantic differential questions. The analysis for the intention DV was conducted on the summed scale of those four questions. Items that represent indicators of a consumers’ intent to use a weight-loss medication, were utilized in order to identify the unique combinations of influencers on a consumers’ decision-making process in any sub-group analyses (i.e. attitude, social norm, source credibility, source of information.) Sewak’s intention scale (2002, 2005) included constructs that are strong indicators of intent to try purchase a medication. These constructs were adapted in the proposed research to assess consumer intent to try a weight-loss medication (Appendix A).
Figure 6: Questions to assess intent to try a weight-loss medication

<table>
<thead>
<tr>
<th>Based on the information available in this scenario, how likely are you to try a prescription weight-loss medication?</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Sure to try</th>
</tr>
</thead>
<tbody>
<tr>
<td>No chance</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Likely</td>
</tr>
<tr>
<td>Unlikely</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Very possible</td>
</tr>
<tr>
<td>Not possible</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Intend to try</td>
</tr>
<tr>
<td>Intend not to try</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Intend to try</td>
</tr>
</tbody>
</table>

*Adapted from Sewak (2002, 2005)
Data Collection

After obtaining The University of Mississippi’s Institutional Review Board (IRB) approval, measures were pretested along with the rest of the instrument for clarity. For final data collection, the Research Now® administered the surveys. Research Now® provided full disclosure of their policies, terms, and use of their services. Members were required to acknowledge and agree to company disclosure terms, in order to participate in surveys. Members were free to decline or accept participation in any surveys sent to them. Guidelines for the survey were given to Research Now® and were rigorously executed during the subject selection process (Appendix A).

Standard demographic assessments occurred at the beginning of the survey, to crosscheck inclusion criteria questions about BMI, medication use, and weight-loss counseling. In the final data collection, all scales were tested for their reliability and validity, which is discussed in the next section. Treatment scenarios were developed using the three variables and their associated levels. The messages within the treatment scenarios were kept consistent across all presentations of the same variable levels throughout the scenarios. Flesch-Kincaid reading level for each scenario was set below the tenth grade reading level (Alreck and Settle 2004). All eight-treatment scenarios can be found in Appendix A.
Assuming you are the following patient as described.

Your **doctor** has advised you to start a diet and exercise program. You have started eating healthier and working out, and have decided to train with a certified personal trainer.

While the **trainer** is working with you, you ask about prescription weight-loss medications (Rx).

*very little to help and can be harmful*, we should focus on your exercise program.

The following week you have a follow up visit with your **doctor**. You then ask your doctor about prescription weight-loss medications (Rx).

The **doctor** says, "They *can be helpful* when used appropriately, with diet and exercise. In fact, I have *many patients* take them and they have had successful weight-loss results."

**Your doctor then gives you a prescription (Rx) for a weight-loss medication.**

**Data Analyses**

Analyses were conducted using the IBM Statistical Package for the Social Sciences (SPSS) version 22.0. A 2x2x2 design of information source crossed with weight-loss medication. It is important to have the ability to remove outlier responses and to have a robust enough sample to find statistical differences should they exist. Therefore, a sample size of n=160 is proposed based on the power calculation. Thus, there are eight scenarios (2x2x2). This provides for an analysis of both main and interaction effects. Testing for significance of interaction effects were tested prior to testing for the main effects. Figure 8 outlines the statistical analysis approach.
Each hypothesis was tested at the $\leq 0.05$ level using univariate ANOVA. Attitude formed about the medication was the first dependent variable tested and intention to try was the second dependent variable tested. In the analysis, the second order interaction term was analyzed at an $\leq 0.05$ level first, then the first order interactions terms at an $\leq 0.05$ level, then the main effects were tested at an $\leq 0.05$ level. If at any stage in the analysis the interaction term is significant, tests were conducted of the simple effects rather than the main effects.
Following the analysis of the interaction terms, hypotheses were tested using ANOVA at an \( \square < 0.05 \) level.

**H10:** There is no significant three way interaction between the variables medication type, physician communication and trainer communication for either attitudes or intentions to try a weight-loss medication.

**H20:** There is no significant two way interaction between medication type and physician communication, medication type and trainer communication, or physician communication and trainer communication for either attitudes or intentions to try a weight-loss medication.

**H30:** There is no significant difference in attitudes formed about weight-loss medication use based on the medication type, prescription vs. over-the-counter.

**H40:** There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.

**H50:** There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the trainer, positive vs. negative, about the medication.

**H60:** There is no significant difference in intentions to try a weight-loss medication consumption based on the medication type, prescription vs. over-the-counter.
H70: There is no significant difference in intentions to try a weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.

H80: There is no significant difference in intentions to try a weight-loss medication consumption based on the level of communication provided by the trainer, positive vs. negative, about the medication.

In addition, information was gathered from respondents to assess a priori level of: (1) source credibility for MDs and CPTs, (2) attitudes and beliefs about medications (Rx and OTC), and (3) social norms associated with various weight-loss related topics. This information was collected and used to determine potential sub-groups within the study. The identification of sub-groups allowed for statistical analyses to detect and assess for impact of both the interaction and main effect term significance. The results of this study reported on the final statistical analyses used to test for mean sub-group differences. ANOVA was used to assess and report the sub-group means and results were based on the validated scales.
CHAPTER 4

RESULTS

Introduction

This chapter provides an analysis of results of the attitudes and intentions consumers have towards the use of over-the-counter (OTC) and prescription weight-loss medications (Rx). Using the Statistical Package for the Social Sciences (SPSS), survey data was formatted for analysis of variance.

Descriptive Results: Demographics

Overall, the total sample population was one hundred and sixty-eight (N = 168). Of the total sample, the average age was thirty-six (X = 36.9; SD = 8.36) with 26.8 percent male (n = 45) and 73.2 percent female respondents (n = 123). Marital status included 48.8 percent (n = 82) single unmarried respondents and 39.9 percent married (n = 67). Work status, education, and ethnicity were: (1) full time employment (67.9%), (2) Bachelor’s degree or higher (61.4%), and (3) 80.4 percent Caucasian. Geographic location was fairly evenly distributed, and consisted of 17.9 percent from the south Atlantic region, 23.2 percent from East North Central, 12.5 percent Middle Atlantic. See Table 15 for complete geographic dispersion.
Table 15. Geographic Location per Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Number per Region</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>New England</td>
<td>7</td>
<td>4.2</td>
</tr>
<tr>
<td>Middle Atlantic</td>
<td>21</td>
<td>12.5</td>
</tr>
<tr>
<td>East North Central</td>
<td>39</td>
<td>23.2</td>
</tr>
<tr>
<td>West North Central</td>
<td>14</td>
<td>8.3</td>
</tr>
<tr>
<td>South Atlantic</td>
<td>30</td>
<td>17.9</td>
</tr>
<tr>
<td>East South Central</td>
<td>11</td>
<td>6.5</td>
</tr>
<tr>
<td>West South Central</td>
<td>15</td>
<td>8.9</td>
</tr>
<tr>
<td>Mountain</td>
<td>14</td>
<td>8.3</td>
</tr>
<tr>
<td>Pacific</td>
<td>15</td>
<td>8.9</td>
</tr>
<tr>
<td>U.S. Territory</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Other (Foreign U.S.</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Military Base)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>168</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Subjects reported taking an average of two prescription medications (Rx) per day (n = 94, X = 1.54, SD = 2.41). The average cost of those prescription medications was approximately twenty-nine U.S. dollars per month (n = 94; X = 27.85, SD = 37.46). No subjects (n = 0) were currently taking an anti-obesity weight-loss prescription medication.

Scale Reliability

The reliability of each of the scales (source credibility, attitude, intention) was assessed using Cronbach’s Alpha. All of the scales had reliability greater than 0.700, with source credibility at 0.731, attitude at 0.990, and intention at 0.992. With the reliability of the scales, the hypothesis testing proceeded as planned.
Hypothesis Testing

Hypothesis testing proceeded using the three-way univariate ANOVA for attitudes toward medication consumption and intentions to try the weight-loss medication. The first two hypotheses dealt with the second order and first order interaction terms and stated:

H10: There is no significant three-way interaction between the variables medication type, physician communication, and trainer communication for either attitudes or intentions to try a weight-loss medication.

H20: There is no significant two-way interaction between medication type and physician communication, medication type and trainer communication, or physician communication and trainer communication for either attitudes or intentions to try a weight-loss medication.

As seen in the Table 16, the three-way interaction term (MD Communication (+/-) X CPT communication (+/-) X medication type (Rx/OTC) was non-significant in the ANOVA for attitudes toward medication consumption (F = 0.062, df = 1, α = 0.803). In addition, none of the two-way interaction terms were significant for the attitude measure ((MD x CPT F=.034, df = 1, α= 0.855), (MD x Rx/OTC F=0.722, df = 1, α = 0.396), (CPT x Rx/OTC F = 0.011, df = 1, α = 0.917)). Results of the analysis of the interaction effects are detailed in Table 16.
Table 16. Tests of Between-Subjects Effects – Three-Way ANOVA
Dependent Variable: Attitude

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>783.276(^a)</td>
<td>7</td>
<td>111.897</td>
<td>41.750</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>14233.400</td>
<td>1</td>
<td>14233.400</td>
<td>5310.691</td>
<td>.000</td>
</tr>
<tr>
<td>MDx</td>
<td>739.590</td>
<td>1</td>
<td>739.590</td>
<td>275.952</td>
<td>.000</td>
</tr>
<tr>
<td>CPTx</td>
<td>17.021</td>
<td>1</td>
<td>17.021</td>
<td>6.351</td>
<td>.012</td>
</tr>
<tr>
<td>Medx</td>
<td>24.443</td>
<td>1</td>
<td>24.443</td>
<td>9.120</td>
<td>.003</td>
</tr>
<tr>
<td>MDx * CPTx</td>
<td>.090</td>
<td>1</td>
<td>.090</td>
<td>.034</td>
<td>.855</td>
</tr>
<tr>
<td>MDx * Medx</td>
<td>1.935</td>
<td>1</td>
<td>1.935</td>
<td>.722</td>
<td>.396</td>
</tr>
<tr>
<td>CPTx * Medx</td>
<td>.029</td>
<td>1</td>
<td>.029</td>
<td>.011</td>
<td>.917</td>
</tr>
<tr>
<td>MDx * CPTx * Medx</td>
<td>.167</td>
<td>1</td>
<td>.167</td>
<td>.062</td>
<td>.803</td>
</tr>
<tr>
<td>Error</td>
<td>3580.668</td>
<td>1336</td>
<td>2.680</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18597.344</td>
<td>1344</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>4363.944</td>
<td>1343</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .179 (Adjusted R Squared = .175)

Furthermore, the three-way interaction term (MD Communication (+/-) X CPT communication (+/-) X medication type (Rx/OTC)) was also non-significant in the ANOVA for intentions to try (F=0.184 \(df=1, \alpha=.668\)). In addition, none of the two-way interaction terms were significant for the intention measure ((MD x CPT F=.084, \(df=1, \alpha= 0.772\)),(MD x Rx/OTC F=2.927, \(df=1, \alpha = 0.166\)),(CPT x Rx/OTC F = 0.000, \(df=1, \alpha = 0.995\)). Results of the analysis of the interaction effects are presented in Table 17.
Table 17 Tests of Between-Subjects Effects – Three-Way ANOVA
Dependent Variable: Intention

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>1414.086a</td>
<td>7</td>
<td>202.012</td>
<td>39.708</td>
<td>.000</td>
</tr>
<tr>
<td>Intercept</td>
<td>17365.001</td>
<td>1</td>
<td>17365.001</td>
<td>3413.324</td>
<td>.000</td>
</tr>
<tr>
<td>MDx</td>
<td>1308.241</td>
<td>1</td>
<td>1308.241</td>
<td>257.152</td>
<td>.000</td>
</tr>
<tr>
<td>CPTx</td>
<td>22.527</td>
<td>1</td>
<td>22.527</td>
<td>4.428</td>
<td>.036</td>
</tr>
<tr>
<td>Medx</td>
<td>72.197</td>
<td>1</td>
<td>72.197</td>
<td>14.191</td>
<td>.000</td>
</tr>
<tr>
<td>MDx * CPTx</td>
<td>.429</td>
<td>1</td>
<td>.429</td>
<td>.084</td>
<td>.772</td>
</tr>
<tr>
<td>MDx * Medx</td>
<td>9.755</td>
<td>1</td>
<td>9.755</td>
<td>1.917</td>
<td>.166</td>
</tr>
<tr>
<td>CPTx * Medx</td>
<td>.000</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
<td>.995</td>
</tr>
<tr>
<td>MDx * CPTx * Medx</td>
<td>.938</td>
<td>1</td>
<td>.938</td>
<td>.184</td>
<td>.668</td>
</tr>
<tr>
<td>Error</td>
<td>6796.789</td>
<td>1336</td>
<td>5.087</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25575.875</td>
<td>1344</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>8210.874</td>
<td>1343</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .172 (Adjusted R Squared = .168)

Given the lack of significance for all of the interaction terms, both second order and first order for attitudes and intentions, the hypotheses tests for the main effects proceeded as proposed.

Main Effects Hypotheses Tests

Hypotheses three, four and five dealt with the differences in attitudes formed based on the variables physician communication (MD), certified personal trainer communication (CPT), and weight-loss medication type (Rx and OTC). Following the non-significance of the
interaction terms, the mean differences were tested using ANOVA. The results on hypotheses three through five:

H3₀: There is no significant difference in attitudes formed about weight-loss medication use based on the medication type, prescription vs. over-the-counter.

For hypothesis three, there was a significant difference between the mean values, and the null was rejected. When medication type was Rx, the mean attitude was significantly greater (X = 3.39, p < 0.05) than when the medication type was OTC (X = 3.12).

H4₀: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.

For hypothesis four, there was a significant difference between the mean values, and the null was rejected. When physician communication was positive, the mean attitude was significantly greater (X = 4.00, p < 0.05) than when the physician communication was negative (X = 2.51).

H5₀: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the trainer, positive vs. negative, about the medication.

For hypothesis five, there was a significant difference between the mean values, and the null was rejected. When trainer communication was positive, the mean attitude was significantly greater (X = 3.37, p < 0.05) than when the trainer communication was negative (X = 3.14).
Hypotheses six, seven, and eight dealt with the differences in intentions formed based on the variables physician communication (MD), certified personal trainer communication (CPT), and weight-loss medication type (Rx and OTC). Following the non-significance of the interaction terms, the mean differences were tested using ANOVA. The results on hypotheses six through eight:

H60: There is no significant difference in intentions to try a weight-loss medication consumption based on the medication type, prescription vs. over-the-counter.

For hypothesis six, there was a significant difference between the mean values, and the null was rejected. When medication type was Rx, the mean intention was significantly greater ($X = 3.83, p < 0.05$) than when the medication type was OTC ($X = 3.36$).

H70: There is no significant difference in intentions to try a weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.

For hypothesis seven, there was a significant difference between the mean values, and the null was rejected. When physician communication was positive, the mean intention was significantly greater ($X = 4.39, p < 0.05$) than when the physician communication was negative ($X = 2.46$).

H80: There is no significant difference in intentions to try a weight-loss medication consumption based on the level of communication provided by the trainer, positive vs. negative, about the medication.
For hypothesis eight, there was a significant difference between the mean values, and the null was rejected. When trainer communication was positive, the mean attitude was 3.73 \((p < 0.05)\) compared to when the trainer communication was negative \((X = 3.47)\).

**Final Summary Results**

All interaction terms in the ANOVAs performed were non-significant. Overall, the impact of physician communication, trainer communication and medication type on both attitudes and intentions was significant. Table 18 summarizes the statistical findings for each hypothesis.
<table>
<thead>
<tr>
<th>Table 18 – Hypotheses Test Summary</th>
<th>Support?</th>
<th>Significance</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1&lt;sub&gt;0&lt;/sub&gt;: There is no significant three-way interaction between the variables medication type, physician communication, and trainer communication for either attitudes or intentions to try a weight-loss medication.</td>
<td>Yes</td>
<td>See H&lt;sub&gt;2&lt;/sub&gt;</td>
<td>Lack of significant results: Analysis of main effects (See H&lt;sub&gt;2&lt;/sub&gt;)</td>
</tr>
<tr>
<td>H2&lt;sub&gt;c&lt;/sub&gt;: There is no significant two-way interaction between medication type and physician communication, medication type and trainer communication, or physician communication and trainer communication for either attitudes or intentions to try a weight-loss medication.</td>
<td>Yes</td>
<td>See H&lt;sub&gt;3&lt;/sub&gt;-H&lt;sub&gt;8&lt;/sub&gt;</td>
<td>Lack of significant results: Analysis of two-way interaction terms (See H&lt;sub&gt;3&lt;/sub&gt;-H&lt;sub&gt;8&lt;/sub&gt;)</td>
</tr>
<tr>
<td>H3&lt;sub&gt;c&lt;/sub&gt;: There is no significant difference in attitudes formed about weight-loss medication use based on the medication type, prescription vs. over-the-counter.</td>
<td>No</td>
<td>p &lt; 0.05</td>
<td>Medication Type and Attitudes: Rx Higher (X = 3.39) OTC (X = )</td>
</tr>
<tr>
<td>H4&lt;sub&gt;c&lt;/sub&gt;: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.</td>
<td>No</td>
<td>p &lt; 0.05</td>
<td>Communication of MD and Attitudes: Positive Higher (X = 4.00) Negative (X = 2.51)</td>
</tr>
<tr>
<td>H5&lt;sub&gt;c&lt;/sub&gt;: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the trainer, positive vs. negative, about the medication.</td>
<td>No</td>
<td>p &lt; 0.05</td>
<td>Communication of CPT and Attitudes: Positive Higher (X = 3.37) Negative (X = 3.14)</td>
</tr>
<tr>
<td>H6&lt;sub&gt;c&lt;/sub&gt;: There is no significant difference in intentions to try a weight-loss medication consumption based on the medication type, prescription vs. over-the-counter.</td>
<td>No</td>
<td>p &lt; 0.05</td>
<td>Medication Type and Intentions: Rx Higher (X = 3.83) OTC (X = 3.36)</td>
</tr>
<tr>
<td>H7&lt;sub&gt;c&lt;/sub&gt;: There is no significant difference in intentions to try a weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.</td>
<td>No</td>
<td>p &lt; 0.05</td>
<td>MD Communication and Intention: Positive Higher (X = 4.58) Negative (X = 2.61)</td>
</tr>
<tr>
<td>H8&lt;sub&gt;c&lt;/sub&gt;: There is no significant difference in intentions to try a weight-loss medication consumption based on the level of communication provided by the trainer, positive vs. negative, about the medication.</td>
<td>No</td>
<td>p = 0.055</td>
<td>CPT Communication and Intention: Positive Higher (X = 3.72) Negative (X = 3.47)</td>
</tr>
</tbody>
</table>
CHAPTER 5

DISCUSSION

Introduction

This chapter discusses the implications of this study, based on the results of the null research hypotheses presented. The purpose of this study was to explore the influence on the attitudes toward, and intent to use, a weight-loss medication among overweight and obese consumers. The exploratory treatment scenarios posed mock consultations by both an MD and CPT, and explored how attitudes and intents differed by source of information, type of communication, and medication type. The theoretical foundation used to measure intent to take a weight-loss medication was the Theory of Planned Behavior (TPB) (Ajzen, 1991). The TPB constructs that were measured within this study, included attitude, and intention.

The primary goal of this study was to explore how two different information sources influenced a person’s decision-making process, regarding the intention to use weight-loss medications. Subjects were instructed to visualize themselves in a situation in which they were seeking knowledge and information about anti-obesity medications. After being presented with the information scenarios, the survey instrument sought to discover to what extent attitudes about the intent to use a weight-loss medication changed, based on the advice of a general family physician (MD) versus a certified personal trainer (CPT). The primary contribution of this study provided insight into the concept of certified personal trainer’s as a reliable, valid, and professionally recognized resources within the clinical weight-loss setting. To the best of the
authors’ knowledge, to date, here are currently no streams of research literature that have explored and identified the CPT as a professional resource as such resources within the clinical setting. The findings of this research study have very important implications in the fight against obesity in the United States. The American Medical Association’s (AMA) recent re-classification of obesity as a disease led to the development of best practice goals, objectives, and initiatives for physicians to diagnose and treat their overweight and obese patients (AMA, 2013). Review of the weight-related AMA best practice physician initiatives, guided the concept of utilizing certified personal trainers, working alongside physicians within their clinical settings. Results of this study indicated that CPTs could become valuable resources for physicians, in order to provide meet AMA best practice goals, objectives, and initiatives.

As intended, the sample population was one based on weight-status [overweight and obese (n = 16.1%, n = 83.9 %)]. Excluding professionally licensed physicians, surgeons, nurse practitioners, and those holding a certification in exercise training, strengthened and controlled for biases that might have screwed the results. Excluding MDs or CPTs from this study, controlled for biases such as expert knowledge, and preference of one information source over the other that could have potentially yielded much different results. For example, from the TPB theoretical perspective, both MDs and CPTs have pre-existing beliefs and attitudes about the importance of diet and exercise over other weight-loss strategies, such as prescription medication use or surgery (Honda, 2004, Ko, 2008, et al., Kraschnewski, et al., 2013, 2008, Noel, et al., 2012, Yoong, et al., 2013).

The sample population (N = 168) was asked about their prior history of Rx and OTC weight-loss medications. Those who had past successful experiences with an Rx or OTC weight-loss medication were the minority for both Rx and OTC [(Rx: n = 23 (9.5 %); OTC: n =
40 (8.3 %)]. Many factors can interfere with the effectiveness of any medication, regardless of
type, however, it was not within the scope of this study to investigate reasons why a weight-loss
medication did or did not work. In this study, considering the results for past use of Rx weight-
loss medications not working, over-all, subjects were willing to try a weight-loss medication
again. When subjects were asked, prior to the treatment scenarios, if diet and exercise were not
enough, which type of weight-loss medication they would consider trying first, the responses for
weight-loss medication type were evenly distributed [ (Rx: n = 168, f = 92 (54.8 %); OTC: n =
168, f = 76 (45.2%); none: n = 0)]. The TPB theoretical construct of attitude was tested in this
question. Results implied that subjects did not have pre-formed attitudes or beliefs about he
medications, which changed their intent toward using a weight-loss medication of a particular
type, or whether or not the type of medication would work for them. This suggests that
regardless of medication type or prior experience, subjects’ pre-existing attitudes did not affect
how subjects responded to the treatment scenarios as well. Conclusively, regardless of
information source, when diet and exercise are not enough, and Rx and OTC medications were
reported to have failed in the past, results indicated that:

1. 54.8 % would be willing to try a Rx medication.

2. 45.2 & would be willing to try an OTC supplement.

3. 0% reported they would not try either.

Additionally, given the results from questions related to insurance coverage and fitness-
based topics, contributions of insurance coverage to support to weight-loss were less than
desirable. Only 12 (out of 168) respondents reported that their insurance paid for some level of
membership to a fitness facility. Even more alarming, only one person reported that they were
certain of their insurance policy paying for consultations or appointments with a certified, or non-certified, fitness or exercise personal trainer. It has already been established that obesity is an indicator of other health risk factors such as diabetes and high cholesterol (Flegal, 2013). Given current measures to prevent and treat obesity-related conditions (PPACA, 2010), it is common for a physician to refer a patient to cardiologists who employ certified physiologists to conduct appropriate tests. Under the umbrella of the cardiologist, most insurance carriers do cover the costs associated with seeing a certified physiologist. Perhaps, under the umbrella of the general family physician, it should be commonplace for insurance companies to cover further exercise and fitness-related consultations and appointments with the certified personal trainer.

_Hypothesis One and Two_

Failure to reject the first two hypotheses provided support for the idea that the subjects in this study had overall varying attitudes and intentions to try a weight-loss medication and that the interventions did not interact in a manner that necessitated an analysis of simple effects. Regardless of information source (CPT vs. MD), both the medication type and the type of communication had an effect on whether or not subjects were willing to try a weight-loss medication. In other words, when subjects were presented with all of the treatment scenarios, differences were seen across all variables and there was not an interaction effect requiring an independent variable to be held constant for analysis. This was true for both the three-way interaction term MD x CPT x Medication type as well as the two –way interaction terms (CPT x MD, CPT x Med, MD x Med). Thus, rejecting both hypotheses one and two means that there are main effects differences and to provide further explanation, main effects were analyzed to determine the extent to which each independent variable had an effect on attitudes and intentions (H3-H8).
Discussion Hypothesis 3 and 6: Attitudes and Intentions Based on Medication Type

H30: There is no significant difference in attitudes formed about weight-loss medication use based on the medication type, prescription vs. over-the-counter.

H60: There is no significant difference in intentions to try a weight-loss medication consumption based on the medication type, prescription vs. over-the-counter.

Several factors may have influenced the participants in this study towards having higher attitudes and intentions to try a prescription weight-loss medication (Rx). As discussed previously, safety and effectiveness of prescription weight-loss drugs, costs, and the higher number of available OTC weight-loss supplements to prescription medications were among the issues that could have had an impact on attitudes toward consumption. It is entirely plausible that either Rx or OTC medications were preferences for the respondents. Based on the Theory of Planned Behavior, based on over twenty years of empirical research analysis in many genres of social science fields of study, it is accepted that attitudes lead to intentions, and intentions to behaviors (Ajzen 1988).

In this study, the attitudes toward the weight-loss medication were statistically higher for the prescription medication scenarios than the OTC scenarios. Statistical analyses showed significant support for prescription medication in both the pre-and post-measured scale, regardless of SC or communication type (+/-). Preference for the Rx medication over the OTC did not change, despite the very small percentage of subjects reporting that either of the medication types had actually worked for them in the past. As discussed in Chapter 2, these
results may convey greater support for pre-existing beliefs that Rx weight-loss medications are safer and efficacious than the OTC. Collectively, the results across all hypotheses and treatment scenarios support higher attitudes and intentions for prescription weight-loss medications versus over-the-counter.

Hypotheses 4 and 7: Attitudes Based on MD Communication

H40: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.

H70: There is no significant difference in intentions to try a weight-loss medication use based on the level of communication provided by the physician, positive vs. negative, about the medication.

Hypotheses four and seven dealt with the impact of physician communication on attitudes toward and intention to use weight-loss medication. Many streams of obesity-related literature, in the medical, social, and psychological sciences, provide statistical support for the use of positive communication in weight-loss intervention(s). The impact of negative communication has not been the predominant focus of previous research. Of all the associations between attitudes and intentions for weight-loss medications, physician communication had the strongest directional effect on both dependent variables. This is consistent with prior literature and our current health care system structure.

Discussion Hypothesis 5
H5₀: There is no significant difference in attitudes formed about weight-loss medication use based on the level of communication provided by the trainer, positive vs. negative, about the medication.

Similar to MD results, attitudes were also higher towards the use of a weight-loss medication following positive communication about the medication from a personal trainer. When communication about a weight-loss medication was presented in a positive manner, the subjects showed consistently higher attitudes about the weight-loss medication, regardless of type.

Discussion Hypothesis 8: Intentions Based on Source and Communication Type

H8₀: There is no significant difference in intentions to try a weight-loss medication consumption based on the level of communication provided by the trainer, positive vs. negative, about the medication.

Ultimately, the trainer communication did not have an impact on intention to use the weight-loss medication. At the very least, this is a positive finding in that trainer communication cannot override the strength of the MD communication. In other words, “what the doctor says goes,” however, sub-analysis were conducted using the source credibility of the trainer and the impact of trainer communication on intention. For the sub- analysis, those that held the trainer as a credible source (5 or higher on a 7-point scale) were analyzed for differences from those that felt the trainers were less credible (4 or lower). While only 24 people felt that trainers were a credible source of information on medications, for those persons the intention was significantly different when CPT communication was evaluated using ANOVA (mean intention 4.13 vs. 4.84, p < 0.05). In addition, source credibility (SC) of trainers was independently associated
with mean differences in intentions toward weight-loss medication use using ANOVA (mean difference for SC 4 or less 3.45 vs. 4.49 for SC of 5 or higher, p < 0.05). Ultimately, as can be seen in Table 19, the level of source credibility led to higher intentions and at higher levels of source credibility had greater impact of CPT communication.

<table>
<thead>
<tr>
<th>Trainer Source Credibility</th>
<th>Trainer Communication</th>
<th>Mean Intention Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC less than 5</td>
<td>Negative communication</td>
<td>3.35&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Positive communication</td>
<td>3.54&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>SC 5 or higher</td>
<td>Negative communication</td>
<td>4.13&lt;sup&gt;a,c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Positive communication</td>
<td>4.84&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

a-a, b-b, c-c statistically different p < 0.05

**Limitations**

This study was exploratory and the topic was purposively selected, because to the best of the author’s knowledge, this study was the first of its kind. The absence of previous scientific research related to the unique independent and dependent variables in this study, is considered a limitation. Recalling that there are many clinical and non-clinical trainer certifications, this study was inclusive only to the non-clinically-based certified exercise personal trainer. The scientific literature that was available and reviewed at the time of this study, focused mainly on those certifications considered clinical, who work with at-risk, and specialized populations (i.e. exercise physiologists, physical therapists). In discerning and defining the CPT to the participants in this study, the goal was to reduce the limitations related to the lack of previous research specific to the purpose of this study.
There were limitations related to the study implementation and design. To ensure an adequate sample size and inclusion of specifically required study participants, a professional research-based survey company (Research Now®) was used to recruit subjects. In doing so, this did not allow for a true randomly selected sample population. Although an adequate sample was collected (N = 168) that met the requirements for running the appropriate statistical analyses, a larger sample would have yielded more distinct results. Due to time and financial limitations, it was necessary to procure Research Now® to complete this study.

Related to the limitation of sample size, hypotheses testing and results could have been improved upon, by increasing the sample size. A larger sample size would have allowed the study design to add to the null hypotheses testing. To explain, if the sample would have been eight times larger (N = 168 x 8 = 1344), random assignment of scenarios and extensive statistical analyses would have been possible rather than presenting all scenarios to each respondent. However, because of these limitations, each participant did receive all eight scenarios. Because each subject did receive all eight treatment scenarios, results were able to test all eight scenarios equally, and results reflected the collection of important consumer-based information unique to each scenario. Although it could be argued that the sample population is not generalizable outside of the sample population tested, an argument for generalizability does exist. Because the proposed research design was exploratory and adequately accounted for sample size, statistical power, and effect size, it is generalizable to the unique sample population it sought to test (adults with overweight or obese health status).

**Conclusions**
This study sought to determine whom consumers would identify as a plausible and credible source of information when considering the use of an OTC or prescription weight-loss supplement/medication. The majority of the research literature points to the physician serving as the primary source that consumers use for this type of information. According to the literature, by default, physicians are arguably the most logical and attainable health professionals that overweight or obese people do turn to for weight-related medication inquiries. Unfortunately, the literature does not indicate whether certified personal trainers are also utilized as credible weight-loss medication consultants. In this study, results clearly indicated that the physician was perceived as the preferable credible source, and this held true, regardless of preconceived attitudes/beliefs related to source, medication type, or type of communication given about the weight-loss drugs. However, given the overwhelming impact of the physician, the medication type, and to a certain extent the trainer, each had an influence on attitudes and intentions.

The study defined both the CPT and MD according to the standard and accepted descriptions in their respective fields (ACSM, AMA). Thus, it is extremely relevant to understand that the CPT was defined as a bachelor level degreed expert in physical activity and exercise, whereas the MD was defined as a licensed expert in general family medicine. Additionally, the treatment scenarios in this study were written in a manner that did not bias the subject towards favoring the recommendation of the CPT or MD, the type of medication, or whether or not to have certain beliefs or attitudes about either medication. Therefore, the treatment scenarios allowed the subjects to perceive the CPT alongside the physician as equal credible sources.

The most encouraging findings in this study revealed noteworthy support for certified personal trainers to be credible sources of information. Considering the
contribution of the other independent variables to attitude formation, subjects’ attitudes were impacted in a positive manner following positive communication by the CPT and when subjects that regarded the CPT as having a higher credibility, intentions showed significant differences. It is important to recognize that the subjects did not allow any of the CPT-based positive communication treatment scenarios to effect the overall results of the study. Unmistakably, subjects favored the advice of the physician over the CPT.

Disconcertingly, less than 50% of primary care physicians reported providing specific guidance on diet, physical activity, or weight control 100% of the time to patients, regardless of weight classification (Smith, et al., 2011). However, within the scope of this study, there are a number of reasons as to why CPTs are not viewed as the more credible source for weight-loss related information:

- Level of Education
- Certifying Organization
- Type of Certification
- Certification Knowledge and Testing Requirements
- Continuing Education and Training
- Type of Employment
- Place of Employment
- Gym Facilities and Owners
- Federal and State Laws Governing CPT Hiring and Praxes
- Industry Related Litigation, Law Suits

In turn, these factors may also affect how the CPT views how to effectively train a client. One universal licensing body, with requirements, rules, training, procedures, etc., regulates U. S. Physicians (AMA), and the majority of consumers understand how
physicians obtain a license to practice medicine. Additionally, the AMA’s official stance is to help physicians improve on how they consult with their overweight and obese patients i.e. time, communication, training, etc. It is clear that certifying CPT organizations do not have a universal and collaborative stance on the fight against obesity, as the AMA does for its physicians and other health advocates and professionals. Therefore, while trainers have a limited ability to influence decisions about medication today, the potential exists following efforts to increase trainer credibility that such an influence could exist. The lingering questions remain:

Who is asking too little or too much in the fight against obesity, the AMA of its physicians, the physician to the AMA, pharma to the physician, pharma to the consumer, the consumer to their physician, the consumer to their CPT, the organizations of their CPTs, the CPTs of their organizations, or the consumer of oneself?
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APPENDIX – SURVEY INSTRUMENT
SECTION: INTRODUCTION

My name is Linda Lobb, and I am doctoral candidate at the University of Mississippi. I am very interested in understanding what consumers think about weight-loss medications. The purpose of my study is to understand what consumers believe about the use of weight-loss medications. The title of my study is:


CONFIDENTIALITY

All personal information entered in this survey questionnaire WAS KEPT CONFIDENTIAL, and WILL NOT BE SHARED with any outside parties. All answers and information collected from the survey questions WILL ONLY BE USED FOR RESEARCH PURPOSES. The data collected will only be used to provide a general summary of the purpose of this study.

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). (Protocol #14x-172), approved as Exempt under 45 CFR 46.101(b) (#2).

The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB office at (662) 915-7482. By clicking the box below, I understand the purpose of this study and I agree to take this survey.

☐ Yes CONTINUE WITH SURVEY

☐ No TERMINATE AND SHOW “THANK-YOU FOR YOUR TIME.”
SECTION II: SCREENING QUESTIONNAIRE (SQ)

SQ1. What is your age?

______ years TERMINATE IF LESS THAN 18

SQ2. Are you a licensed physician?

1. Yes (Please check one):
   - DO
   - DDS/DMD
   - DPM
   - MD
   - OD ....AND THEN TERMINATE

2. No

SQ3. Are you a nurse practitioner?

1. Yes TERMINATE

2. No

SQ4. Do you have a certification in personal fitness training? Please check organization and certification. Multiple entries may be made.

4. Yes (after checking, TERMINATE)

<table>
<thead>
<tr>
<th>ORGANIZATION (Check all that apply)</th>
<th>CERTIFICATION (Check all that apply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE</td>
<td>CT</td>
</tr>
<tr>
<td>ACSM</td>
<td>CPT</td>
</tr>
<tr>
<td>AFFA</td>
<td>FT</td>
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<tr>
<td>AFPA</td>
<td>CFT</td>
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<tr>
<td>IFPA</td>
<td>PT</td>
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<tr>
<td>ISSA</td>
<td>CPT</td>
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<tr>
<td>NASM</td>
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<td>NCSF</td>
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<td>NESTA</td>
<td></td>
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<tr>
<td>NFPT</td>
<td></td>
</tr>
<tr>
<td>NPTI</td>
<td></td>
</tr>
<tr>
<td>NSCA</td>
<td></td>
</tr>
</tbody>
</table>
Other (Please List and Write the name of specialty certification)
5. No

SQ5a. Please enter your HEIGHT in Feet and Inches  [___] feet [___] inches

CONVERT SQ5a TO SQ5aa (inches):
SQ5aa = SQ5a (i) * 12 + SQ5a(ii)

SQ5b. Please enter your WEIGHT in Pounds (lbs)  [___] lbs

PROGRAMMER NOTE:

We need to calculate the respondent’s BMI using answers in SQ5aa, SQ5b and the following formula:

BMI = weight (lb) / [height (in)]2 x 703 (Calculate BMI by dividing weight in pounds (lbs) by height in inches (in) squared and multiplying by a conversion factor of 703).

BMI = SQ5b / (SQ5aa) 2 x 703.

SAVE BMI as a new variable in the data file.

Example: Weight = 150 lbs, Height = 5'5" (65").

Calculation: [150 ÷ (65) 2] x 703 = 24.96.
SQ6. Have you done any of the following actions in the past 30 days?

A. Had a doctor’s appointment specifically to get advice for weight-loss?
   Yes
   No

B. Met with a certified personal trainer to start a diet and exercise program?
   Yes
   No

C. Taken a prescription weight-loss medication?
   Yes TERMINATE
   No

D. Taken an over-the-counter medication for weight-loss?
   Yes
   No
SECTION III: DEMOGRAPHICS FOR SURVEY INSTRUMENT (D)

There may be some questions you may consider as sensitive and personal, however, they are only included to provide an accurate and clear report of all the data collected in this research study. Collectively, every completed survey will help to build a unique picture of the basic beliefs, needs, wants and desires of the consumers sampled in this study.

D1. Are you…?
   6. Female
   7. Male

D2. Are you a…? (Check one)
   1. U.S. Born Citizen
   2. Naturalized U.S. Citizen
   3. Non-U.S. Citizen

D3. In what AREA of the States do you live?
   (Design as scrolled where area is entered first, then state; states was coded, for data analysis OR set up as you feel is appropriate)
   1. New England
      Connecticut, Maine, Massachusetts New Hampshire, Rhode Island, Vermont
   2. Middle Atlantic
      New Jersey, New York, Pennsylvania
   3. East North Central
      Illinois, Indiana, Michigan, Ohio, Wisconsin
   4. West North Central
      Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
   5. South Atlantic
Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina Virginia, West Virginia

6. East South Central
   Alabama, Kentucky, Mississippi, Tennessee

7. West South Central
   Arkansas, Louisiana, Oklahoma, Texas

8. Mountain
   Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming

9. Pacific
   Alaska, California, Hawaii, Oregon, Washington

10. U.S. Territory
    i.e. Puerto Rico

11. U.S. Foreign Military Base
12. Other. Please specify.

D4. What is your current marital status? (Check one)

8. Single/Never Married
9. Married
10. Not Married/Committed Living Together
11. Separated/Divorced
12. Widowed
13. Decline to answer

D5. What is the highest level of formal education you have completed? (Check one)

A. Some high school
B. GED
C. High school graduate
D. Associate’s Degree
E. Technical School Graduate
F. Bachelor’s Degree
G. Master’s Degree
H. Postgraduate degree

D6. What is your race or ethnic heritage? (Check one)

14. African American
15. Asian
16. Hispanic
17. Pacific Islander
18. White
19. Other (Please specify)

D7. What is your current employment status? (Check one)

20. Full-time (40.0 hours per week)
21. Part-time (Less than 20.0 hours per week)
22. Not employed but looking for work
23. Not employed, not looking for work
24. Not employed, disabled
25. Retired
DH1. What kind of health insurance do you have? Check all that apply.

26. NONE
27. HMO
28. PPO
29. Medicare
30. Medicaid
31. Military (Active) - USDOF Health Care
32. Veteran- VA Health Care
33. Health Insurance Exchanges i.e. “Obamacare”
34. OTHER (Please List)

DH2. Currently, how many prescription medications do you take daily? ________ RANGE 0-25

SKIP DH3 IF DH2=0

DH3. On average, how much ($) do you spend monthly on all your prescription medications? $_______ per month RANGE $0-5,000

DH4. If diet and exercise is not enough, which type of weight-loss medication would you consider trying first? Check one.

1. Prescription
2. Over-the-counter (OTC)

DH5. In the past, have you taken a prescription (Rx) medication for weight-loss?

1. Yes (if yes, go to D6)
2. No (if no, go to D7)

DH6. Did the prescription weight-loss medication work?

1. Yes.
2. No.
DH7. In the past, have you taken an over-the-counter medication for weight-loss?

1. Yes (if yes, go to D8)
2. No (SKIP D8 AND SHOW DMC1)

DH8. Did the over-the-counter weight-loss medication work?

1. Yes.
2. No.

DEMOGRAPHICS CONTINUED: DEMOGRAPHICS PART IV: CPT EXPERIENCE (DMC)

DMC1. This question is for exercise and physical activity that IS NOT associated with physical therapy. Check ALL that apply: Does your insurance company provide coverage for any of the following?

A. Membership fees associated with a fitness facility i.e. gym
B. Monthly fees associated with using a fitness facility
C. Yearly fees associated with using a fitness facility
D. Exercise sessions with a fitness trainer. (NON-certified personal trainer)
E. Exercise sessions with a certified personal trainer in a fitness facility
F. Other (Please Enter)
G. NONE. My insurance does NOT cover non-injury related exercise.

CANNOT CHECK THIS OPTION WITH OTHER OPTIONS ON THIS LIST

IF DMC1(D) CHECKED SHOW DMC1a

DMC1a. A fitness trainer (FT) DOES NOT have a certificate in certified personal training. Please enter the area of training YOUR FT helped you with: Check all that apply:

1. Nutrition Counseling (planning personal calorie plans i.e. food journals)
2. Weight Counseling (planning personal exercise routines i.e. exercise journals)
3. Heart Health (cardiovascular)
4. Cross-Fit (combination aerobic/anaerobic training)
5. Aerobic Training (run, swim, treadmill, elliptical, etc.)
6. Anaerobic (Weight Training)
7. Yoga
8. Pilates
9. Other (Please Enter)
10. None. Does not apply.
IF DMC1(E) CHECKED SHOW DMC1b

DMC1b. A certified personal trainer (CPT) holds a certificate for the purpose of providing individual lessons in exercise/fitness training. Please enter the area of training YOUR CPT helped you with: Check all that apply:

1. Nutrition Counseling (planning personal calorie plans i.e. food journals)
2. Weight Counseling (planning personal exercise routines i.e. exercise journals)
3. Heart Health (cardiovascular)
4. Cross-Fit (combination aerobic/anaerobic training)
5. Aerobic Training (run, swim, treadmill, elliptical, etc.)
6. Anaerobic (Weight Training)
7. Yoga
8. Pilates
9. Other (Please Enter)
**SECTION IV: PRE-TEST THEORY OF PLANNED BEHAVIOR (TPB) CONSTRUCTS**

**QTBP.** A number of situations are described in the table below that can make it hard to stick to exercising regularly (i.e., exercising 3 or more times a week).

For each of the situations listed in the table below, please rate your level of confidence on how you can perform exercise on a regular basis under these situations. Please rate your level of confidence using a number from 0 to 100, where 0 = “Cannot do at all”, 50 = “Moderately certain can do” and 100 = “Certain can do”. You can use any number from 0 to 100. Please enter a number in each situation or row in the table below. **ALLOW TO ENTER ZEROS IN ALL ROWS SUCH THAT SUM OF ALL RESPONSES CAN BE EQUAL TO ZERO. ALLOW TO ENTER 100 IN ALL ROWS SUCH THAT SUM OF ALL RESPONSES CAN BE EQUAL TO 180.**

<table>
<thead>
<tr>
<th>Enter your rating below</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When I am feeling tired.</td>
</tr>
<tr>
<td>2. When I am feeling under pressure from work.</td>
</tr>
<tr>
<td>3. During bad weather.</td>
</tr>
<tr>
<td>4. After recovering from an injury that caused me to stop exercising.</td>
</tr>
<tr>
<td>5. During or after experiencing personal problems.</td>
</tr>
<tr>
<td>6. When I am feeling depressed.</td>
</tr>
<tr>
<td>7. When I am feeling anxious.</td>
</tr>
<tr>
<td>8. After recovering from an illness that caused me to stop exercising.</td>
</tr>
<tr>
<td>9. When I feel physical discomfort when I exercise.</td>
</tr>
<tr>
<td>10. After a vacation.</td>
</tr>
<tr>
<td>11. When I have too much work to do at home.</td>
</tr>
<tr>
<td>12. When visitors are present.</td>
</tr>
<tr>
<td>13. When there are other interesting things to do.</td>
</tr>
</tbody>
</table>
14. If I don’t reach my exercise goals.
15. Without support from my family or friends.
16. During a vacation.
17. When I have other time commitments.
18. After experiencing family problems.
SECTION V: STUDY

DEFINITIONS

Please take a moment to read this page. This section is extremely important and terms used on this page was referred to during the following questions in the survey. If you like, you can also print this page so that you can refer to the terms and definitions as you move forward.

DEFINITIONS

1. (Rx) Prescription Medication: Medicine ONLY from a doctor (MD). Your Rx medicine can come from your doctor’s office (drug sample) or from your pharmacist at the pharmacy (store or internet pharmacy).

2. (OTC) Over-the Counter Medication: Medicine you can buy at any retail or internet store, without having to get a prescription (Rx) from a doctor (MD).

3. (MD) Medical Doctor (MD): Physician with a Medical Degree to practice medicine. A physician’s assistant (PA) or nurse practitioner (NP) is NOT a physician, they help physicians see patients and prescribe certain medicines, such as antibiotics.

4. (CPT) Certified Personal Trainer: A fitness trainer who has completed a 4-year college bachelor’s degree IN ADDITION TO having a CPT certification.

Think of a CPT as a person you would have access to and would hire from a local gym. Try NOT to think of a CPT like the TV celebrities you may have seen on weight-loss reality shows. This is very important. A CPT is NOT an athletic trainer (CAT) or physical therapist (PT).
QCSB. Please tell me how you would rate your agreement with the following statements about WEIGHT STATUS.

1 = You Strongly Disagree and 7 = You Strongly Agree

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Overweight is the result of bad genetics</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>B. Obesity is the result of bad genetics</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>C. Overweight is the result of bad behaviors</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>D. Obesity is the result of bad behaviors</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>E. Being overweight is a condition in which weight-loss medications are important treatments</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>F. Obesity is a disease for which weight-loss medications are important treatments</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
QCWM. Please tell me how you would rate your agreement with the following statements about HOW TO LOSE WEIGHT.

1 = You Strongly Disagree and 7 = You Strongly Agree

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th></th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>I think diet is an important part of a weight-loss program</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>B.</td>
<td>I think exercise is an important part of a weight-loss program</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>C.</td>
<td>I think Rx weight-loss medication use is an important part of a weight-loss program</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>D.</td>
<td>I think OTC weight-loss supplement use is an important part of a weight-loss program</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>E.</td>
<td>People overestimate the use of Rx medications relative to exercise, diet and lifestyle changes</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>F.</td>
<td>People overestimate the use of OTC medications relative to exercise, diet and lifestyle changes</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
SECTION V CONTINUED: CONSUMER MEDICATION BELIEFS

QCMB. Please tell me how you would rate your agreement with the strength of your beliefs about the following statements about WEIGHT-LOSS MEDICATIONS.

1 □ Very Negative and 7 □ Very Positive

<table>
<thead>
<tr>
<th></th>
<th>Very Positive</th>
<th>Very Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Overall, what are your impressions of Rx weight-loss medications?</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>B. Overall, what are your impressions of OTC weight-loss drugs?</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>C. Rx weight-loss medications are safe</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>D. OTC weight-loss medications are safe</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>E. Rx weight-loss medications are worth paying for</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>F. OTC weight-loss medications are worth</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
QSN. Please tell me how you would rate your agreement with the following statements about WHAT YOUR FAMILY AND FRIENDS THINK ABOUT WEIGHT-LOSS MEDICATIONS.

1 [ ] Strongly Disagree and 7 [ ] Strongly Agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th></th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Some friends/family members could not lose weight without OTC medications.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Some friends/family members could not lose weight without Rx medications</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Friends/family members that use prescription medications are more likely to lose weight than those that do not</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D. Friends/family members that use prescription medications are more likely to maintain a diet and exercise regimen over time</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Friends/family members that use prescription medications are more likely to maintain any weight-loss</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F. My friends/family members that use prescription medications feel that the medications are very important to the success of the weight-loss program</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
QSC. Please tell me how you would rate your agreement with the following statements about PHYSICIANS (MDs) AND CPTS.

1  [ ] You Strongly Disagree and 7  [ ] You Strongly Agree

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. CPTs should assess their clients for their potential need for Rx weight-loss medications</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>B. MDs should assess their patients for their potential need for Rx weight-loss medications</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>C. CPTs should recommend OTC weight-loss medications</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>D. MDs should recommend OTC weight-loss medications</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>E. CPTs have knowledge about ways to lose weight that work</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>F. MDs have knowledge about ways to lose weight that work</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
</tbody>
</table>
SECTION VI: SCENARIOS TO TEST HYPOTHESIS

THERE ARE EIGHT (8) SCENARIOS TO BE SHOWN. EACH SCENARIO NEEDS TO BE SHOWN ON A NEW PAGE WITH THE FOLLOW UP QUESTION UNDER EACH.

ROTATE THE ORDER OF THE SCENARIOS SUCH THAT EACH RESPONDENT SEES A DIFFERENT ORDER. RECORD THE ORDER SHOWN IN THE DATA FILE.

The following section is going to ask you to imagine yourself in a situation with a physician (MD) or CPT (certified personal trainer). Please read the description in the scenario and answer the questions as if this situation had happened to you personally.

On the following pages, we will show you eight scenarios one by one. Each scenario is unique and different. Please take time to read each scenario and answer the questions that follow.

PAGE BREAK

Scenario 1: OTC/CPT~/MD~

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.

While the trainer is working with you, you ask about weight-loss medications that are over-the-counter (OTC).

The Trainer says, "From what I know the over-the-counter medications do very little to help and can actually be harmful, we should focus on your exercise program."

The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "In my opinion the over-the-counter medications do very little to help, the weight-loss is not lasting if the medications are stopped, and can actually be harmful, we should focus on your diet and exercise program."

The doctor recommends that you do not take OTC medications for weight-loss.
Scenario 2: OTC/CPT+/MD-

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.

While the trainer is working with you, you ask about weight-loss medications that are over-the-counter.

The trainer says, "From what I know, when taken as directed as a part of a diet and exercise program, they can be helpful."

The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "In my opinion the over-the-counter medications do very little to help, the weight-loss is not lasting if the medications are stopped, and can actually be harmful, we should focus on your diet and exercise program."

The doctor recommends that you do not take OTC medications for weight-loss.

Scenario 3: OTC/CPT+/MD+

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.
While the trainer is working with you, you ask about weight-loss medications that are over-the-counter.

The Trainer says, "From what I know, when taken as directed as a part of a diet and exercise program, they can be helpful."

The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "They can be helpful when used appropriately, with diet and exercise. In fact I have had quite a few patients take them successfully."

The doctor recommends you start taking the OTC medication.

Scenario 4: OTC/CPT-/MD+

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.

While the trainer is working with you, you ask about weight-loss medications that are over-the-counter.

The Trainer says, "From what I know the over-the-counter medications do very little to help and can actually be harmful, we should focus on your exercise program."

The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "They can be helpful when used appropriately, with diet and exercise."
Scenario 5: Rx/CPT/MD

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.

While the trainer is working with you, you ask about weight-loss medications that are prescription.

The Trainer says, "From what I know the prescriptions medications do very little to help and can actually be harmful, we should focus on your exercise program."

The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "In my opinion the prescriptions medications do very little to help, the weight-loss is not lasting if the medications are stopped, and can actually be harmful, we should focus on your diet and exercise program."

The doctor recommends that you do not take prescription medications for weight-loss.

ASK QSC FROM SECTION V HERE AND THEN PAGE BREAK

PAGE BREAK
Scenario 6: Rx/CPT+/MD-

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.

While the trainer is working with you, you ask about weight-loss medications that are prescription.

The Trainer says, "From what I know, when taken as directed as a part of a diet and exercise program, they can be helpful."

The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "In my opinion the prescriptions medications do very little to help, the weight-loss is not lasting if the medications are stopped, and can actually be harmful, we should focus on your diet and exercise program."

The doctor recommends that you do not take prescription medications for weight-loss.

ASK QSC FROM SECTION V HERE AND THEN PAGE BREAK

Scenario 7: Rx/CPT+/MD+

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.

While the trainer is working with you, you ask about weight-loss medications that are prescription.

The Trainer says, "From what I know, when taken as directed as a part of a diet and exercise program, they can be helpful."
The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "They can be helpful when used appropriately, with diet and exercise. In fact I have had quite a few patients take them successfully."

The doctor writes a prescription for a weight-loss medication.

ASSIGN RICE FROM SECTION V HERE AND THEN PAGE BREAK

BREAK PAGE BREAK

Scenario 8: Rx/CPT+/MD+

Assume that you are the following patient as described. You are starting a diet and exercise regimen on advice from your doctor. You have started working out and have decided to visit a personal trainer.

While the trainer is working with you, you ask about weight-loss medications that are prescription.

The trainer says, "From what I know the prescriptions medications do very little to help and can actually be harmful, we should focus on your exercise program."

The following week you have a follow up visit with your doctor. You ask the doctor about prescription and over-the-counter medications for weight-loss.

The doctor says, "They can be helpful when used appropriately, with diet and exercise. In fact I have had quite a few patients take them successfully."

The doctor writes a prescription for a weight-loss medication.

ASSIGN RICE FROM SECTION V HERE AND THEN PAGE BREAK

BREAK PAGE BREAK
SECTION VII - Scenario Follow-up Questionnaire

Now we will show you the same eight scenarios again. This time we want you to read them again very carefully and answer the questions that follow.

We are almost toward the end of this survey. These are the last set of questions in this survey.

SHOW SCENARIOS IN THE SAME ORDER AS SHOWN IN SECTION VI. SHOW EACH SCENARIO ON A NEW PAGE. AFTER EACH SCENARIO WE NEED TO SHOW TWO SETS OF QUESTIONS.

WHEN SCENARIOS 1, 2, 3 AND 4 ARE SHOWN, FOLLOW THE SCENARIO WITH THE FOLLOWING TWO SETS OF QUESTIONS:

QS1. My use of an OTC weight-loss medication to support my weight-loss program would be:

<table>
<thead>
<tr>
<th>Bad</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfavorable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Favorable</td>
</tr>
<tr>
<td>Harmful</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Beneficial</td>
</tr>
<tr>
<td>Useless</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Useful</td>
</tr>
<tr>
<td>Ineffective</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Effective</td>
</tr>
<tr>
<td>Unnecessary</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Necessary</td>
</tr>
<tr>
<td>Dangerous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Safe</td>
</tr>
<tr>
<td>Not helpful</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>Helpful</td>
</tr>
</tbody>
</table>

QS2. Based on the information available in this scenario, how likely are you to try an OTC weight-loss medication?

<table>
<thead>
<tr>
<th>No chance to try</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Sure to try</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unlikely to try</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Likely to try</td>
</tr>
<tr>
<td>Not possible I will try</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Very possible I will try</td>
</tr>
<tr>
<td>Intend not to try</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Intend to try</td>
</tr>
</tbody>
</table>
WHEN SCENARIOS 5, 6, 7 AND 8 ARE SHOWN, FOLLOW THE SCENARIO WITH THE FOLLOWING TWO SETS OF QUESTIONS:

QS3. My use of an Rx weight-loss medication to support my weight-loss program would be:

<table>
<thead>
<tr>
<th>Term</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfavorable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useless</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ineffective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Unnecessary</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dangerous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not helpful</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

QS4. Based on the information available in this scenario, how likely are you to try a prescription weight-loss medication?

<table>
<thead>
<tr>
<th>Term</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No chance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sure to try</td>
</tr>
<tr>
<td>Unlikely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Likely to try</td>
</tr>
<tr>
<td>Not possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very possible I will try</td>
</tr>
<tr>
<td>Intend not to try</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intend to try</td>
</tr>
</tbody>
</table>

SECTION VIII: LAST PAGE: END OF SURVEY

QLAST. Would you like your BMI Classification?

   Yes SHOW: Based on the height and weight you reported earlier in the survey, your BMI is XX (INSERT FROM BMI VARIABLE)

   No SHOW: Thank you for completing the survey. Would you like to be notified about the results of this study?

   YES
   NO

END SURVEY
VITA

Linda R. Lobb, B.S., M.Ed., Ph.D.

Mission

To instill in athletes, a sense of self-worth that enables them to build character, appreciate achievement, cultivate confidence, and progress as both competitors and women.

Philosophy

Most things in life are a constant, a given, and do not change without outside influence. Thus, “we are who we are and it is what it is.” The beliefs, attitudes, and intentions held within each human spirit are what drive actions and produce change.

Experience

2012 to Present  Self-Employed
Kingwood, TX
Independent Gymnastics Consultant
- Assisted in the personal development of collegiate gymnast’s success as students and athletes
- Consultant for competitive collegiate routines on Balance Beam and Floor Exercise

2009 to 2012  Rowland/Ballard Gymnastics  Kingwood, TX
Women’s Competitive Coach and Private Instructor
- Coached and Mentored Elite Gymnasts to Compete at District, State, Regional, and National Championships
- Developed competitive routines for Balance Beam and Floor Exercise
- Assisted in placement of Elite Gymnasts at Division I and Division II NCAA Schools

2006 to 2009  Delta Gymnastics  West Memphis, AR
Competitive Optional Girl’s Coach and Private Instructor
Coached and Mentored Elite Gymnasts to compete at District, State, Regional and National Championships
- Coordinated team activities and international meet attendance
- Developed custom competitive routines for Balance Beam and Floor events
- Assisted in placement of Elite Gymnasts at Division III NCAA Schools

2003 to 2009  Ole Miss HESRM Department  Oxford, MS
Graduate Teaching Assistant and Researcher
- Submitted final course grades
- Lectured on topics in Exercise Science, Health, Health Promotion, Exercise Physiology Syllabus development
- Course Outline development
- Lecture and Lab development
- Researcher on topics in Exercise Science, Biomechanics, Health Promotion, and Pharmacy Administration

2002 - 2006  Medical Marketing Economics, LLC.  Oxford, MS.
Office Manager/Research Assistant
- Maintain knowledge of current research in the pharmaceutical industry.
- Database management of contacts and clients.
- Editing proposals and reports for pharmaceutical marketing research.
- Scheduling calls and meetings for office personnel.
- Responsible for client management and accounts payable.
- Organization and design current filing method.
- Project coordinator for pricing strategy assessment of major pharmaceutical drug.
- Recruitment of outside field specialists to participate in medical marketing surveys.

1998-2000  Clear Creek I.S.D.  League City, TX.
Health and Fitness Teacher/Athletic Coach
- Designed, organized, and implemented health classes.
- Created innovative lessons aligned with state mandated objectives.
- Provided a positive environment for students.
- Incorporated community businesses and leaders into class projects.
- Worked closely with colleagues, integrated ideas, and developed positive relationships with fellow teachers.
- Attended local, regional, and state professional development courses.
- Acted as school representative for The Association of Texas Professional Educators (ATPE).

1997-1998  Pasadena I.S.D.  Pasadena, TX.
Science Teacher/Physical Education Teacher

- Structured, organized, and planned classes.
- Member of specialized team that designed the current computer technology curriculum for the school district.
- Attended professional meetings and continuing education courses at local, regional, and state level.
- As a first year science teacher, motivated all of my students to enter the district Science Fair in which three had district honors.

1997 University of Houston Houston, TX.
Graduate Student/Teacher Fellow

- Assisted in construction, implementation, and analysis of various research projects in the Health and Human Performance Department.
- Instructed freshman and sophomore level lecture courses.
- Planned, organized and instructed aerobic and gymnastics classes.
- Received excellent scores on student and professor based performance.

1995-1996 Louisiana State University Baton Rouge, LA.
Women’s Collegiate Gymnastics Team Manager/Program Manager and Team Coach of the University Recreational Program

- Managed and directed the LSU Children’s Recreational Gymnastics Program.
- Planned, organized, and implemented classes for recreational program.
- Interviewed potential coaches for recreational program, as well as creating work schedule, duties, and coordinating staff meetings.
- Maintained proper inventory of equipment, supplies, and uniforms for collegiate team.
- Worked closely with the head coach, her assistants, and the collegiate gymnasts to ensure all needs were met for the team.
- Represented LSU Girl’s Competitive Team as their coach at local, regional, and state competitions.

1991–2000 Dana’s Dance & Gymnastics Santa Fe, TX.
Competitive Team Girl’s Coach and Recreational Class Instructor

- Primarily responsible for coaching balance beam, levels one through ten, for the competitive girls program.
- Event coaching also included coaching floor exercise, as well as choreographing optional routines.
- Represented levels, beginning with level four, at local, district and state USAG sanctioned events.
- Assisted in the development, planning, organization and instruction of various girls and boys classes.
- Produced local, district and state event champions.
**Education**

<table>
<thead>
<tr>
<th>Year</th>
<th>Institution</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>2006-Present</td>
<td>University of Mississippi</td>
<td>University, MS</td>
</tr>
<tr>
<td></td>
<td>• Doctorate of Philosophy: Exercise Science and Health Promotion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dissertation Title: “CERTIFIED PERSONAL TRAINERS AND PHYSICIANS: AN EVALUATION OF CONSUMER PREFERENCE, INFLUENCE, AND DECISION MAKING ON INTENT TO USE A WEIGHT-LOSS MEDICATION”</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>University of Houston</td>
<td>Houston, TX</td>
</tr>
<tr>
<td></td>
<td>• Master of Education in Physical Education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Concentration area: Motor Development</td>
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</tr>
<tr>
<td>1996</td>
<td>Louisiana State University</td>
<td>Baton Rouge, LA</td>
</tr>
<tr>
<td></td>
<td>• Bachelor of Science in Kinesiology</td>
<td></td>
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<tr>
<td>1993</td>
<td>Alvin Community College</td>
<td>Alvin, TX.</td>
</tr>
<tr>
<td></td>
<td>• Associates Degree in General Studies</td>
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</tr>
</tbody>
</table>

**Organizations**

- United States Association for Gymnastics, Member 1991 to Present
  - Level One through Four-USAG: Skill Evaluator: 1990 – 2012
  - Safety Certified through USAG: 1990 - 2013
- American College of Sports Medicine Member 2004 to Present
- American Society for Health Professionals, Member 2005 to Present
Honors

- Graduated with Honors (Sum Cum Laude), University of Mississippi
- Honors Fellowship, University of Mississippi
- Dean’s Award for Academic Excellence, University of Mississippi
- Honors Fellowship, University of Houston
- Louisiana State University, Partial Athletic Scholarship, Gymnastics
- Alvin Community College, Full Scholarship
- Alvin High School, All-American Gymnast: Vault, Beam, Floor
- Alvin High School, Perfect Scores: (Optionals) Vault and Beam (Compulsory) Vault and Beam
- Alvin High School, All American Cheerleader

Peer Reviewed Publications


Published Abstracts


Invited Presentations


Poster Presentations


**Non Published Papers: Related Field Experience**


**Non Published Independent Study: Related Field Experience**


Beam Skill Sets: Improving Based on Number Sets. Fall 2002 -Spring 2003. Linda Lobb.
The Pike versus the Straddle Glide Kip: Focus on abdominal strength. Fall 2002 - Spring 2003. Linda Lobb.


