

EVALUATING THE RELATIONSHIP BETWEEN WEIGHT STIGMA AND BODY  
WEIGHT IN A SHORT TERM WEIGHT GAIN PREVENTION PROGRAM FOR  
ACTIVE DUTY MILITARY SERVICE MEMBERS

by

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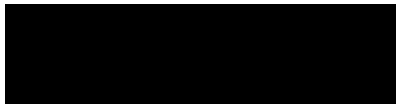
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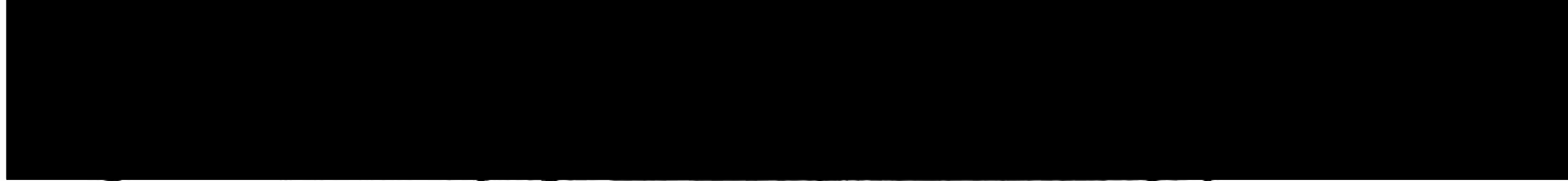
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## **DEDICATION**

This dissertation is dedicated to my family – my husband, Ola, my mother, Michele and my sisters who supported me along the way.

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Kendra Leanne Ekundayo

14 December 2018

## **ABSTRACT**

Evaluating the Relationship Between Weight Stigma and Body Weight in a Short-term Weight Gain Prevention Program for Active Duty Service Members:

Kendra Leanne Ekundayo, MS, 2016

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Rates of obesity and overweight in the United States are on the rise, which is reflected in the active duty (AD) military population. Americans struggle to meet weight and fitness standards required of AD service members for entry into the armed forces. While service members meet entry standards, many struggle with weight management following basic training. Although obesity is associated with negative health consequences, there has been increasing focus on weight stigma or anti-fat bias as a public health problem. Despite belief that antifat bias may result in increased health behaviors, it is commonly associated with avoidance behaviors, mood disturbance, body dissatisfaction and unhealthy changes in both eating behaviors and physical activity, which perpetuates antifat bias and discrimination.

The purpose of the current investigation was to examine whether a six-week weight gain prevention program could mitigate weight gain among soldiers at risk for obesity. In addition, the relationship between weight stigma and program outcomes were examined. 121 soldiers (81 men; 40 women) participated in the study and were assigned to either Fit4Duty or a health education control program. Fit4Duty is a six-week weight gain prevention program adapted from a civilian program for the purposes of this study.

At one year follow up, participants in the Fit4Duty prevention program, maintained body weight while those in the health education control evidenced weight gain. Participants in the Fit4Duty prevention program were more adherent than those in the health education control group, and men, overall, were more adherent than women. 26.4 % of this active duty, help seeking population reported experiencing weight stigma, which was also associated with depressive symptoms, weight bias internalization, BMI and both depressive and anxious emotional eating. Despite weight stigma's association with adverse emotional health factors, weight stigma was not related to weight or physical activity outcomes at one year follow up.

Reports of weight stigma in the workplace were lower than that reported by civilians; although the military population was generally of lower weight and they still reported stigmatizing experiences. Overweight and obese service members who do experience weight stigma may be at increased risk for depression, and emotional eating, creating additional barriers for engagement in health behaviors further increasing mortality risks.

This six-week prevention program appears to be successful at preventing weight gain in an active duty population at increased risk for overweight and obesity. While there was not a significant reduction in weight for participants in the active prevention group, this intervention could be beneficial to implement among normal weight servicemembers at increased risk for obesity.

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# **CHAPTER 1: Background**

## **INTRODUCTION**

Overweight and obesity have been described as national and international health crises, and the military is not immune to the impact of this epidemic. Rates of obesity and overweight are high in the United States. An estimated 69% of adults are characterized as overweight, among whom 34% are classified as obese (98; 116; 150). In the last decade, there has been a significant increase in the prevalence of overweight military members with 65% classified as overweight and, among these overweight servicemembers, 15% classified as obese (11; 32; 35; 76) .

Accession into and retention in the military are impacted by the obesity epidemic. Twenty-seven percent of American young adults between ages 17 and 24 are unable to serve in the armed services due to excess weight (32; 35). For those who are able to lose weight to join the service, many are at risk of failing weight or fitness standards later in their career, subsequently facing administrative discharge from the armed services. The Department of Defense estimates early separations for persistent failure to meet weight and body composition standards totals just over 1,400 servicemembers (161).

Veterans, too, are overweight, with an estimated 80 percent of male veterans and 60 percent of female veterans treated through the Veteran's Administration classified as overweight or obese (11; 65; 149; 165). Thus, care offered through the Veteran Affairs Medical Centers (VAMC) is impacted by the rates of overweight, obesity and related diseases.

There are several negative consequences associated with excess weight including health consequences of obesity, obesity-related disease states and increased health costs related to the treatment of these diseases. The prevention of excess weight gain among active duty service members could potentially decrease health-related obesity problems, alleviate negative

consequences to service member's careers and significantly reduce the cost of treating these problems for both the Department of Defense and the Veteran Affairs Medical Centers (VAMC)(174).

There is increasing recognition that weight stigma, defined as prejudice against "fat" or overweight, is commonly accepted and represents a public health problem in its own right (13; 88; 127; 130). Public perception is that weight discrimination may serve as a motivator to increase health behaviors among obese and overweight people (13). However, despite the popular belief that weight stigma encourages health behaviors, stigma and discrimination have a negative impact. The documented negative impact of weight stigma includes mood disorders, body dissatisfaction, detrimental changes in eating behaviors or physical activity, and healthcare avoidance (13; 96; 138; 171).

There is a paucity of research on weight stigma in the military. Schvey and colleagues found almost half of active duty soldiers in a weight gain prevention program reported some form of weight stigma (144). Stigmatizing experiences include more frequent fitness assessments, weigh-ins, denial of promotion and denial of training opportunities. Given the military's stringent weight and fitness requirements, the problem of weight stigma is likely to be commonplace in the military (144). Regulations, policies and procedures related to weight standards and appearance are designed to promote a physically fit total force (1; 3; 4). Clearly, maintenance of a fit force is important for readiness. However, the manner by which these regulations are monitored and enforced may inadvertently promote and reinforce weight stigma.

The following sections provide an overview of the impact of obesity within the DoD; current obesity treatment and prevention efforts; weight stigma and its negative consequences for

military and service members, and weight management programs, with an emphasis on servicemembers and the Fit4Duty weight gain prevention program.

## **OBESITY**

The prevalence of overweight persons in America presents a significant challenge to military recruiters must face who medically disqualify nearly  $\frac{1}{4}$  of military recruits because of excessive weight and body fat (35; 116). In addition, an estimated 70% of service members are overweight despite weight standards and regulations guiding military conduct. And, 36% of these overweight service members are obese (165). Thus, the stringent weight and physical fitness standards of each military service branch may not be enough to prevent overweight and may contribute to anti-fat biases and behaviors that can be detrimental to those who struggle the most with excess weight. Further complicating the issue of stigma, is the fact that military regulations actually place significance upon appearance and not just the functional impact of overweight and obesity status.

Currently, there is a paucity of research examining the cultural nuances of anti-fat bias in the military. Weight stigma bias has the potential of impacting health-related behaviors, military readiness, and national security due to a lack of available resources to fulfill the military's mission (35). To adequately address the problem of obesity in the military, leaders must understand the complexities of obesity, beyond creating a daily caloric deficit. This includes developing an understanding of the implications of inflicting obesity stigmatizing practices upon service members. Understanding the complexities of obesity requires an appreciation for the interaction of genetic, physiologic, environmental, psychological, social, economic, and political influences. It is important to understand the various causes of obesity so that appropriate prevention efforts and treatments can be identified and utilized amongst the general population

To date, approaches to weight gain prevention and the majority of behavioral treatments for overweight and Class I Obesity provide a “one size fits all” approach, focused on altering energy balance. Increasingly, there is recognition that the etiology is far more complex and that there are biological and behavioral subtypes of obesity. In fact, cognitive and behavioral constructs used to index problem thinking and problem behaviors associated with dysregulated eating are being examined as potential endophenotypes for obesity and other problem eating patterns. Increasingly, it is becoming clear that improvements in the efficacy of prevention and treatment approaches require tailoring to these subtypes and endophenotypes.

#### **GENETIC INFLUENCES AND PHYSIOLOGY OF OBESITY**

Obesity is commonly classified into genetic subgroups, depending on the suspected etiology. These subgroups include monogenic obesity, syndromic obesity, and polygenic or common obesity. Monogenic obesity is a severe obesity subtype that often creates a one-to-one relationship between genotype and phenotype (74). Approximately twenty single gene disruptions, identified as monogenic subtypes exist, which result in an autosomal form of obesity. In humans, obesity cases due to single gene mutations are reported in leptin, leptin receptor, proopiomelanocortin, and melanocortin four receptor genes (154). Each of these mutations affects the leptin and melanocortin pathway that is essential for the regulation of whole-body energy homeostasis and is commonly observed in cases where people report increased appetite and diminished satiation (70). Although common public perception suggests weight loss is simply a caloric deficit between energy consumed through the nutritional intake, and energy expended throughout the day, the process is simply more complex than that. Energy homeostasis involves the integration of long term afferent signals from leptin and insulin cells, with the short-term, meal related afferent signals from the stomach. Inputs of these cells are

integrated within the brain and are responsible for regulation of food intake, energy expenditure, energy partitioning, reproduction and growth. Therefore, experts continue to explore the complex interaction of genetics, physiology and environment to tailor effective weight management programs to the general population.

Syndromic obesity includes individuals classified as clinically obese who are distinguished by mental retardation, dysmorphic features and organ-specific developmental abnormalities (70; 74; 154). Syndromic obesity arises from genetic defects or chromosomal abnormalities in several genes. An estimated 25 different types of syndromic obesity have been identified (37). While researchers continue to seek a better understanding of syndromic obesity, little is understood about the root of obesity in these disorders, which makes treatment for this subtype even more challenging. (43)

Polygenic obesity is also referred to as common obesity (154). The term polygenic obesity refers to gene variants or alleles, which have a small influence on bodyweight (73). These small effects can affect obese, average weight and even lean individuals. It is suggested that if an individual has multiple polygenic variants that hold the potential to increase body weight, obesity may follow (74). Polygenic obesity affects the general population and may have associated health risks such as increased risk of cardiovascular disease and other metabolic diseases. Additionally, polygenic obesity includes the interaction between genetics and the environment, making the treatment for this form of obesity complex.

While an estimated 70% of the US Military population is categorized as overweight or obese, the military is less likely to encounter syndromic and monogenic subtypes. Both subtypes are associated with illnesses incompatible with military service. Instead, the military is comprised of individuals with polygenic obesity. As a result, it is important for experts in the

field of obesity to understand the mechanism contributing to obesity in this population and how to effectively tailor treatments to the common phenotypes.

## **PHYSIOLOGY OF OBESITY**

Society believes the system of weight regulation reduces to the difference between energy in and energy out. Although adiposity may be influenced by diet and exercise, a more complex system that involves genetics, hormones and social factors affects body composition. Additional factors that influence the system are the basal metabolic rate, physical activity, and the thermic effect of food. Hormones, which interact with the system, include insulin, leptin, and ghrelin.

Basal Metabolic Rate (BMR) is responsible for 50-70% of all energy expenditure (99). BMR refers to the speed at which the body produces energy and heat. This is energy the body needs to sustain life (e.g., breathing, heart beating). Resting Metabolic Rate (RMR) is affected by several factors, including body composition, gender, age, climate, sleep, exercise, hormonal levels and overall health. Both BMR and RMR estimate the calories used at rest. BMR measures the basal energy expenditure or the estimation of the number of calories burnt maintaining basic bodily functions (breathing, circulating blood and both generation and repair of cells). RMR measures resting energy expenditure, which determines the number of calories burnt in a 24-hour period maintaining basic bodily functions, eating and conducting small amounts of physical activity. BMR is greatest at birth and gradually declines with age. Men also have a greater BMR than females after adjusting for body composition (90). Climate also affects RMR. Populations in warmer climates also have lower BMR than those living in colder climates after controlling for body size and composition (61). Sleep affects hormones, which subsequently influences eating behaviors, as well as BMR. Sleep deprivation alters hormonal glucose

regulation. This alteration often leads to hypoglycemic episodes, increased hunger and alterations in cortisol levels (143).

Physical activity is the most highly variable component of energy expenditure (112). Estimates suggest that physical activity can account for anywhere from 10 – 30% of total energy expenditure. This effect makes weight management interventions targeting physical activity of significant importance (153). Some studies show that single exercise events and long-term training produce increases in RMR. This may be through simple exercise effects or increases in lean muscle mass (153). For any physical activity, heavier people expend higher amounts of energy than lighter weight people due to the difference in energy required to move greater amounts of physical mass. Additionally, activities requiring multiple muscle groups expend more energy than those requiring fewer muscle groups.

Another factor, which contributes to energy expended, is the thermic effect of food. Thermic effect of food (TEF) refers to the energy expended by the body to digest, absorb and metabolize food and it accounts for approximately 10% of energy expenditure within a 24 hour period (112). TEF is influenced by the type of food consumed. For example, protein has the highest TEF due to the high energy required to process the amino acids released from proteins in food, whereas fat has the lowest TEF (112)

Leptin is a hormone involved in the regulation of energy homeostasis, neuroendocrine function, and metabolism in states of energy deficiency (84). The levels of leptin circulating within the body are a gauge of energy reserves and signal the central nervous system to adjust food intake and energy expenditure (112). Leptin is secreted from fat cells. Therefore, overweight and obese individuals would be expected to secrete higher levels of leptin and, in fact, often do. Providing that leptin directly acts upon the brain to regulate appetite, it is expected

that the brain would receive, interpret this surplus of leptin as a signal to stop eating. When the leptin feedback mechanism is permanently changed, for example within individuals who make no leptin or have no leptin receptors, there is a chronic predisposition to overeat and gain weight (39). Others fall into the category of having low responsiveness to leptin. This phenotype will be explored further in subsequent paragraphs which address obesity phenotypes.

Insulin also influences appetite and is classified as an adiposity signal for the brain. It signals the reduction of food intake and an increase in energy expenditure, much like Leptin (39). Insulin is produced by the pancreas beta cells when glucose enters the bloodstream. It enables tissues to uptake glucose from the blood for cellular restoration, such as repairing muscles or for use as fuel. Excess glucose is reuptaken for adipose storage (39). Elevated levels of glucose can lead to chronically elevated insulin and is one potential mechanism for the development of insulin resistance (IR).

Ghrelin is considered the “hunger hormone,” and it is secreted by the stomach when it is empty. Ghrelin, too, plays a role in the regulation of energy homeostasis by signaling hunger, therefore triggering an individual to eat. It also adjusts energy output by signaling the production of energy and the use of fat storage. As the stomach fills, it becomes distended, and ghrelin secretion is inhibited, thereby decreasing hunger (112). Ghrelin levels are elevated during periods of fasting but decline following food intake. For individuals with metabolic abnormalities such as Prader-Willi syndrome, ghrelin levels are increased as much as fourfold compared to individuals of similar age, sex and BMI (112; 119).

Obesity and weight loss is a complex issue with genetic factors that contribute to energy homeostasis and physiological functioning. In the instances of genetic disruptions, hormonal imbalances may disrupt the bodies digestion and use of food, but it may also interact with a toxic

food environment to create additional challenges. As a result, experts within the obesity field have begun to classify obesity into various subtypes, including insulin resistant, low responsiveness to internal satiety signals, high responsiveness to external food cues, learned preferences for high-density foods, and binge eating.

## **METABOLIC AND BEHAVIORAL SUBTYPES OF OBESITY**

### **INSULIN RESISTANT OBESITY**

Insulin resistance (IR) refers to the body's inefficient use of insulin and comprises one of the key criteria for metabolic syndrome, dysmetabolic syndrome, and syndrome X. IR can be caused by both genetic factors and lifestyle influences. When cells do not use insulin efficiently, liver, muscle and fat cells are unable to absorb glucose from the blood. Consequently, blood glucose levels rise. Insulin is responsible for the breakdown of fats. When the body does not efficiently use insulin, it can respond by accumulating excessive fat (134). Individuals are categorized with IR obesity if they have three of the following symptoms; abdominal obesity, hypertriglyceridemia, low level of high-density lipoprotein cholesterol (in men), hypertension or elevated fasting glucose.

The prevalence of insulin resistance varies by population and within the United States is highest in Mexican, American, Native American and African-American women and is lowest in African-American men (41; 114). Although the precise cause of insulin resistance remains unclear, it is associated with the following conditions; overweight, high caloric diet, high/excess simple carbohydrates, sedentary lifestyle, chronic stress and endocrine conditions. Endocrine conditions associated with IR include Cushing's disease and Polycystic Ovary Disease. IR can be treated through various modalities with the first line of defense lifestyle change. IR is also treated with pharmacologic therapies (22; 66).

Despite the variety in contributing factors to the onset and development of obesity, many fail to identify differences in both causes and treatments for the various subtypes of obesity. Some researchers hypothesize that a lack of recognition of the different causes and treatments of obesity may be a reason for poor treatment outcomes despite extensive research into weight management modalities (56).

#### **LOW RESPONSIVENESS TO INTERNAL SATIETY SIGNALS.**

Impairment in appetite control is another factor implicated in weight gain and obesity. One mechanism of impairment in appetite control is low responsiveness to internal satiety signals. Satiation is part of the body's appetite control system involved in limiting caloric consumption and the cessation of eating. Satiety refers to the feeling of fullness that persists after eating. When responsiveness to satiation is not sensitive enough, one is likely to overconsume calories, resulting in an energy surplus and subsequent increases in adiposity. Anecdotal evidence from clinical observations suggests some obese individuals report a weak relationship between their energy consumption and their sensation of fullness. However, evidence from research examining satiety as a potential cause of weight gain and obesity is inconclusive (14).

Satiety is influenced by energy consumption, and both type and composition of food consumed. Satiety is also influenced by habits, social situations and responses to stressors. Satiety can be deliberately influenced by modifying macronutrient consumption. Several confounding variables in the evaluation of satiety include bodyweight, age and gender (20). Satiety can also be influenced by exposure to specific sensory stimuli and sensitivity to these stimuli tend to decline with age (20). Behavioral confounders can also affect satiety. These

factors include habitual diet, alcohol, physical activity, dietary restraint, prior knowledge or beliefs about food and the presence of others.

### **HIGH RESPONSIVENESS TO EXTERNAL FOOD CUES**

Responsiveness to external food cues refers to the tendency for an individual to use their external food environment as a determinant of eating behavior, rather than the internal sensations indicating satiety or hunger (80). Schachter's externality theory of obesity is used to describe external cue responsiveness to obesity. Schachter proposed that obese people are more reactive to external cues and less sensitive to their internal hunger and satiety signals than individuals of lean or average body composition (24). Though evidence for his original theory has been mixed, at best, there has been a growing literature on the role of attentional focus and attentional bias on food consumption. In the United States, Americans are consistently surrounded by a marketing system utilized to promote consumption of food regardless of its nutritional value. Thus, the food environment in the United States may exploit the vulnerabilities of obese or individuals prone to obesity by targeting their over-responsiveness to external food cues. Some evidence suggests there are individual differences in responsiveness of attentional biases toward food cues, which parallels relationships with other addictive behaviors such as alcohol consumption and gambling (25). For individuals whose internalized reward system is hypersensitive to food cues, they may have an increased vulnerability to overeating and obesity. This hypersensitivity manifests by increased selective attention and approach tendencies toward food-relevant stimuli (25).

### **LEARNED PATTERNS AND PREFERENCES FOR HIGH DENSITY FOODS**

Eating behaviors develop during the first years of life as both biological and behavioral processes directed towards health and development. Evidence suggests food choices and preferences of a mother during her pregnancy are transmitted through amniotic fluid and may

lead to food preferences for a child in early life (103; 141). This research suggests that food habits may also be learned during lactation, and this may result in biases to particular food flavors (102). Some researchers have hypothesized that both amniotic fluid and breast milk share common flavor profiles with foods eaten by the mother. As such, breast milk may connect the experiences with flavors in utero to those in solid foods, which are demonstrated as a child weans from breastfeeding (102). Subsequent eating patterns and exposure to nutritionally dense food, compared with calorically dense food, may further reinforce unhealthy learned eating habits. Learned eating habits also extend beyond food preference. Children may learn parent eating habits influenced by emotions or environmental cues. As a result, these patterns may serve as a baseline for childhood eating habits, which evolve into adult dysfunctional eating habits.

## **BINGE EATING**

Binge eating disorder is another contributing factor to overweight and obesity, and it is characterized by recurrent episodes of eating large quantities of food, often to the point of discomfort. The individual must report a feeling of loss of control during the binge and the experience of shame, distress or guilt afterward (27). An estimated 30% of individuals participating in weight loss programs and 70% in overeaters anonymous display binge eating disorder, although only half of individuals with BED are medically obese (45). Studies examining veterans seeking weight loss treatment show 78.2% of the population reporting clinically significant binge eating behavior (71; 107). Among veterans who binge eat, binge eaters report higher levels of depression, lower confidence in their ability to maintain healthy eating habits, and significantly more barriers to physical activity (137).

Five obesity phenotypes highlight various mechanisms that may contribute to the maintenance of obesity. Genetics, environment, learned behaviors, and emotional disturbance

may affect weight independently or as a collective whole. A better understanding is needed to understand the mechanisms contributing to and maintaining obesity. With a better understanding, treatments could be tailored to ensure long-term maintenance of health behaviors such as physical activity, eating habits, and healthy weight.

## **PHYSIOLOGY OF STRESS**

The physiological stress response is linked to anxiety, depression, insomnia and other medical and psychological disorders (51; 54; 89; 95). Situations that result in stigma can be a source of stress. Subsequently, stigma, depending upon the context, can be a chronic stressor. Stress is defined as “a dynamic process, reflecting both internal and external factors: characteristics of a person and his or her circumstances, as well as the interactions between them (21).” The definition expanded indicates “stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding their resources (21).” Stress leads to a disruption in the homeostasis of the body and various systems, which support health. As such, stress can have a negative impact on an individual’s immune system, physical and mental health.

Both physical and emotional stressors can disrupt the homeostasis of the body, over stimulating the endocrine system. The cardiovascular, immune, pulmonary and digestive systems are triggered in response to the perceived threat. Peripheral changes occur as an alarm reaction to promote an adaptive redirection of energy and as such, oxygen and nutrients are directed to the central nervous system and the body sites that require activation to preserve life (36). Neurosecretory cells in the hypothalamus transmit signals to the pituitary gland, which then release chemical messengers into the bloodstream. The chemical messengers prompt the release of epinephrine and norepinephrine into the bloodstream from the adrenal glands, which

also signals a cascade and the subsequent production of cortisol (36; 97). This signal also results in an increase in blood pressure, glucose levels and finally, suppression of the immune system (97).

Through hormonal secretions, the adrenal glands regulate biochemical balances; these biochemical balances also influence the typical stress response. The adrenal gland consists of an outer adrenal cortex and an inner adrenal medulla. When the body is exposed to chronic stress, the adrenal cortex releases mineralocorticoids and glucocorticoids. These hormones regulate sodium and water balance and subsequently affect blood volume and blood pressure (122). Glucocorticoids regulate increases in blood glucose and are responsible for the body's inflammatory response (122). After several hours, glucose reserves are often exhausted; however, the nervous system requires glucose to continue functioning. If the glucose reserves are exhausted, the body enters the stage of resistance, which results in the hypothalamus secreting corticotropin-releasing hormone (CRH). The pituitary gland responds by secreting adrenocorticotrophic hormone (ACTH) and resulting stimulation of the adrenal cortex to secrete cortisol and glucocorticoids. These processes allow the body to break down fat and protein into glycerol, fatty acids, and amino acids, which provides the body with materials to continue gluconeogenesis. Long-term elevations of cortisol lead to the suppression of the immune system. Prolonged activation of the HPA axis leads to suppression of growth hormone and inhibition of insulin-like growth factor effects on tissues (34). As a result, cortisol contributes to a change in thyroid function. Low levels of cortisol may lead to hypothyroidism, an inactive thyroid and subsequent weight gain. High cortisol levels decrease the conversion of thyroxine (T4) to triiodothyronine (T3) and subsequently, lower thyroid function and hyperthyroidism.

Stress can disrupt the healthy function of various bodily systems that support immune function overall health. Providing that weight stigma often causes emotional distress, researchers have developed a theoretical model to describe the connection between stigma, physiology and weight gain. Subsequent paragraphs will explore the relationship between weight stigma, psychopathology, health behaviors and physiological response.

#### **STIGMA, PSYCHOLOGICAL, BEHAVIORAL AND PHYSIOLOGICAL CONSEQUENCES**

Research on weight-based stigma reveals adverse psychological, behavioral and physiological consequences. Stigma is linked to an increased vulnerability to depressive symptoms, lower self-esteem and increased hostility and symptoms of anxiety than their normal weight counterparts (67). Stigma is also linked to avoidance of health behavior such as avoidance of exercise, avoidance of healthy nutrition and emotional disturbance, often left untreated due to avoidance of healthcare professionals (144; 171). As a result of the connection between psychology, behavior and physiology, the cyclic obesity/weight-based stigma (COBWEBS) model was developed as a method to characterize weight stigma as a vicious cycle, which perpetuates additional weight gain (167).

Stigma is typically described as a psychosocial stressor in the context of race, sexual minority status, and other health disparities, and recently researchers have begun to consider weight stigma as another psychosocial stressor. Psychosocial stress includes threats to social status, respect, acceptance within a group, threats to self-worth or threats believed to be out of one's control. Evidence suggests the availability of coping resources such as psychosocial support may offset the effects of exposure to stressors such as perceived stigma (26). Of note, obesity stigma may negatively affect psychosocial support. For example in scenarios where research participants wore fat suits to simulate overweight/obesity, participants reported

significantly greater feelings of anger, anxiety, depressed mood, and hurt feelings than those who did not wear the fat-suit (78). Results from other studies suggest exposure to weight-stigmatizing stimuli is associated with greater cortisol reactivity, in addition to behavioral consequences. (146).

Empirical evidence supports that weight stigma has behavioral consequences by means of influencing eating, physical exercise and engagement with medical providers. Stress influences human behavior by either reducing or significantly increasing appetite (9), however, stress' influence on appetite and eating behavior is observed in both humans and animals. Short-term exposure to high fat has reduced anxiety behaviors for rats on the elevated plus maze (128). In another study, after exposure to inescapable shock, rats drank more sucrose than saccharin. High consumption of sucrose appeared to immunize the rats from learned helplessness (47).

Humans also increase consumption of calorically dense food when exposed to stress, and according to the COBWEBS cycle, stigma is the catalyst for stress eating. One longitudinal study examining the relationship between stigmatizing comments and eating behaviors linked stigmatizing words to disordered eating. That is to say, that when participants were exposed to stigmatizing comments, they reported engaging in disordered eating in the short-term; however, exposure to stigma was not predictive of eating behaviors during the course of the eleven-year study (52). Puhl and Brownell provided that 80% of respondents reported eating food in response to weight stigma experiences, and 77% refused to diet in response to stigma (133).

Weight stigma researchers have utilized the biopsychosocial model of social evaluative threat to link psychosocial stress to physiological stress. Most often the stress response is thought to be triggered by a threat to life or limb, but Kemeny et al. explore how social threats may trigger specific psychological and physiological responses (48; 49). Threats to social esteem,

social status, and social acceptance are referred to as “social evaluative threat” (48). These threats trigger negative self-evaluation and most commonly elicit feelings of shame. This negative self-evaluation is a key component of the experience of shame, and for the individual to experience shame, they must receive a message that they are devalued. These responses precipitate specific physiological responses, specifically proinflammatory cytokine activity and increases in cortisol (48).

In experiments where participants experienced self-blame, greater increases in shame and guilt were reported than for participants where other emotions were induced (50). Increases in inflammatory responses were observed over three days (50). Additionally, participants who reported the greatest increases in shame also showed the greatest increases in proinflammatory cytokines independent of negative emotional affect (48-50). Some research has demonstrated a bidirectional relationship between psychological states and inflammatory cytokines. Specifically, psychological states may lead to alterations in cytokines, which in turn influence cognition, affect, motivation and behavior (48). Uncontrollable exposure to negative social evaluation may lead to ineffective social interactions or disengagement, submission, and social withdrawal.

## **OBESITY AND MENTAL HEALTH**

Although obesity is a medical condition, there is also a mental health contribution to the development and maintenance of this medical state. While obese persons do not have higher rates of mental illness than non-obese persons, among persons seeking treatment for obesity, psychiatric symptoms are often more prevalent than in non-treatment seeking obese counterparts (59; 168). As such, patients seeking treatment for their weight are often heavier, more disabled by their weight and subsequently more distressed than those who do not seek treatment for their weight. While researchers and clinicians agree that there is a relationship between obesity and

psychological distress, the nature of the relationship continues to be debated by experts in the field (59; 164). Previous studies have supported that treatment seekers exhibit elevated levels of depression, binge eating disorders, general psychiatric symptoms and body-image distress. Obesity is also known to be connected to various mood, psychotic, and substance abuse disorders (168).

While overweight and obesity have well established correlates with various facets of physical health, evidence suggests there is also a relationship between obesity and various factors of mental health (100). In a 2009 study, Mather and colleagues found significant associations between obesity lifetime mood or anxiety disorders when adjusting for sociodemographics and other psychiatric disorders (100). Additional findings suggested obesity had significant associations with lifetime depression, mania, panic attacks, social phobia and agoraphobia without panic disorder (100). Although the precise relationship between mood disorders and obesity is not clear, some research suggests depressive mood and obesity in childhood may be a significant predictor of adult obesity. The results from Goodman and Whitaker's 2002 study revealed adolescents who had a depressed mood at baseline were nearly two times more likely to be obese at follow-up compare to adolescents without a depressed mood while controlling for baseline BMI, age, race, sex and parental obesity. The results remained significant even while controlling for obesity at baseline, suggesting that childhood depression paired with obesity may be the greatest predictor of adult obesity (64).

Individuals with psychosis are at increased risk for overweight and obesity and various metabolic complications, including type II diabetes and hypertension (166). Thakore and colleagues found that patients with schizophrenia had higher BMI's and higher waist to hip ratios than control subjects (166). Furthermore, patients with schizophrenia also had higher

concentrations of plasma cortisol than control subjects and over three times more intra abdominal fat than control subjects. There was no difference between patients who had schizophrenia who were medicated compared to those who were not, indicating that regardless of treatment, individuals with schizophrenia are vulnerable to abdominal adiposity (166). Other researchers have attributed adiposity and lower life expectancy in individuals with psychosis to poor health behaviors (113). These health behaviors include lack of exercise and diets high in fat and low in fiber, subsequently increasing the risk for weight gain, cardiovascular disease, and diabetes (113). Additional research has supported that 75% of the population with schizophrenia are smokers, a majority have a BMI greater than 20% above average, and the symptoms associated with schizophrenia lead to an inactive lifestyle, subsequently increasing the risk for cardiovascular disease (10; 33; 69; 113).

### **Body Image Satisfaction and Self-Esteem**

Evidence supports that there is a negative relationship between obesity and body-image satisfaction (164). Body image is defined as “an individual’s psychological experience of the appearance and function of his/her body. It is one aspect of an individual’s mental representation of him/herself” (31; 164). As the weight associated with obesity increases, body image satisfaction decreases, particularly amongst females (62; 68; 101; 139). Additionally, self-perception of feeling fat places individuals at risk for emotional problems, including depression and low self-esteem, above and beyond an individual’s weight status (164). Body image dissatisfaction is also associated with unhealthy weight control methods such as overly restrictive and binge eating patterns, dieting at an early age, and uncontrolled disinhibited eating patterns (164)

A popularly held belief is that obesity and low self-esteem are common comorbidities; however, researchers suggest the correlation between self-esteem and obesity is modest (164). It appears the relationship is at least partially mediated by cultural support factors. Evidence suggests a negative correlation between beliefs in control over one's weight and self-esteem, which is mediated by both negative attitudes toward obesity and thin idealization. Both attitudes toward obesity and thin idealization are considered to be representative of cultural values (86). These cultural values and negative evaluation of individuals classified as overweight or obese causes the evaluated individual to experience stress. Not only does stress elicit negative emotional arousal, but also biochemical, physiological, and cognitive changes, but it also elicits behaviors inconsistent with maintaining health (72; 167). Both eating behaviors and the biochemical activation of cortisol is particularly common in western culture which idolizes thinness. This activation promotes eating behavior through the reward pathway, and cortisol subsequently promotes fat storage (167). This process continues as the individual gains more weight, exposing them to increased stress through weight stigma, resulting in more eating, stress, and further weight gain.

Both physical and psychosocial stressors are linked to physiological changes that over extended periods of time disrupt the body's homeostatic capabilities. Chronic stress taxes the adrenal system, elevates cortisol levels within the body and weakens the immune system. Over time, this process can also lower the efficacy of the thyroid gland and associated hormones, which are critical for the body's ability to regulate weight. In addition to standard stressors that most people encounter in day to day life, victims of weight stigma are exposed to an additional psychosocial stressor, which negatively impacts common avenues of support such as employment, the medical system, and propensity to seek out interpersonal relationships with

others. It may also result in unhelpful eating choices and avoidance of physical activity. This critical link between social stress and the public health crisis of obesity, leads experts to evaluate policies that may unintentionally expose overweight or obese individuals to publicly condoned obesity stigma and discriminatory practices.

## **MILITARY FITNESS POLICIES**

Military personnel standards are governed by military directives and policy. As such, the DoD issues directives governing personnel fitness and body fat standards within the Armed Forces. The current policy outlines that service members must maintain physical readiness through appropriate nutrition, health and fitness habits (1; 174). Additionally, this policy directs that “maintaining desirable body composition is an integral part of physical fitness, general health and military appearance and members who meet body fat standards possess a desirable characteristic for individual military readiness” (1; 174). Advocates of these policies argue that individuals with higher BMIs, compared to those within the normal BMI range, are associated with more frequent visits to primary care, time spent away from work as well as medical discharge from active duty (79; 88; 118). This translates to more money spent on medical care and a negative impact on the military mission, which subsequently justifies the need for military policies guiding fitness standards. Military leadership can reasonably defend the need for fitness standards. However, great consideration should be taken to evaluate if leaders can protect service members from the harmful consequences of stigma. This places the burden on leadership and policymakers to provide tools to support service members who struggle to adhere to military standards.

### *Air Force Fitness Policies*

Each component of the armed forces has service-specific regulations that guide the physical appearance and fitness levels of their service members. Air Force members must have their height, weight and waist measurements taken in front of a fitness leader and fellow members who are participating in the fitness assessment (1). The assessor measures the abdominal circumference of the military member three times to ensure the accuracy of the assessment. If the service member fails the waist circumference measurement, their Body Mass Index must be evaluated and must not exceed  $25 \text{ kg/m}^2$  (1). Following the body composition assessment, Airmen must complete a 1.5-mile run, push-up, and sit-up timed component. If the service member fails any component of the fitness assessment, to include body composition, they receive an overall “unsatisfactory,” and they must follow standardized procedures to report non-compliance. Finally, the policy dictates that commanders have the authority to direct unit members to enroll in a fitness intervention program if at any time the individual fails to present a professional military image while in uniform. This unprofessional image may or may not be related to physical fitness performance, and the regulations provide no objective standards for evaluating that which constitute a professional image.

#### *Army Fitness Policies*

The Army is known to be one of the most physically demanding and stringent branches of the armed forces. Accordingly, they have two instructional manuals to regulate the fitness and physical appearance of their service members. The Army Physical Readiness Test (APRT) is designed to ensure soldiers are able and ready to perform their duty assignments and combat roles (2). Soldiers must complete push-ups, sit-ups, and a timed two-mile run. Also maintained within the Army fitness regulations is a policy regarding a soldier’s appearance. According to the policy, “a soldier’s appearance measures part of his or her professionalism” (2). As such, the

Army requires that all soldiers be measured for body fat composition biannually. In addition to the requirement to conduct a waist measurement, if a soldier is considered overweight, they are required to receive education on diet and exercise, as well as to attend supplemental physical training sessions (2). Successful completion of these supplemental training sessions is evaluated through pounds lost rather than body fat percentage (2). These regulations highlight the Army's focus on physical appearance rather than health concerns associated with weight and fitness.

#### *Navy Fitness Policies*

The Navy Physical Fitness Assessment (PFA) follows similar guidelines to that of the Air Force. The intent of the program is outlined in their fitness regulations: to maintain health and decrease the risk of chronic disease (6). Sailors must complete the body composition assessment as well as pushups, sit-ups and a 1.5-mile run. Body composition is assessed using the circumference technique. Individuals who are within standards for their height and weight measurement are exempt from the circumference calculation requirement (6). Sailors must meet the minimum scores on all four components of the fitness assessment. A failure of any component of the PFA, to include the body composition assessment constitutes a fitness failure (6). Additionally, according to military regulations, both the commander and Navy Personnel Command are responsible "for ensuring PFA standards are adhered to and that compliance is incorporated into promotion, advancement, reenlistment, and transfer detailing decisions." The verbiage used within this regulation may result in commanders implementing discriminatory practices against overweight Navy personnel, as their weight and waist measurement is given equal emphasis as the performance of their official duties.

#### *Marine Corps Fitness Policies*

The Marine Corps is the only service branch which does not incorporate weight and body composition into their fitness assessment. They do maintain a separate regulation dedicated to dress and appearance (3; 4) which does address maintaining “professional” appearance. While the Marine Corps highlights that excess body fat is directly correlated with health risks, they highlight the importance of representing a “suitable military appearance.” If a Marine is unable to maintain a suitable military appearance, this regulation directly suggests that the individual fails to possess the qualities necessary to effectively lead Marines (4). This determination could result in administrative separation for the military member despite other evaluative mechanisms suggesting full capability to lead effectively.

#### **CONSEQUENCES OF FALLING OUT OF WEIGHT RANGE**

Although these policies are intended to provide guidance on physical fitness standards, professionals within the field of weight stigma are concerned that it may be used to further stigmatize individuals who struggle with their weight and may be more harmful to military members’ health than health promoting. Air Force members who fail any component of the physical fitness test are mandated to inform their commanders of the infraction; failure will automatically downgrade a performance report to a four, rather than a five out of five and a designation that the member “Does Not Meet Standards” despite their work performance in all other aspects of their career (1). Additionally, airmen who fail a fitness assessment must enroll in the BE WELL intervention program within 10 days of their fitness assessment failure (1). The airman has 90 days to take the fitness test again. Four failures within a 24 month period will result in the processing of administrative separation from active duty (1). Airmen who fail the abdominal circumference measurement but pass the remaining three components with the score of 75 points may submit a request for appeal to the wing commander.

When an Army soldier exceeds body fat standards, the commander provides the member with an official letter of counseling. Additionally, these individuals are non-promotable and cannot be assigned to any command positions (2). These records are maintained within the soldier's personnel file and may be used to prevent the member from promoting later in their career. Soldiers are also prevented from attending military schools, which would be advantageous to their military careers. Finally, these military members must enroll in a remediation training program where they are required to have their weight and body fat composition evaluated monthly (2). Failure to demonstrate satisfactory progress, as defined by a monthly weight loss of 3-8 pounds will result in disenrollment from the program and administrative separation proceedings. Although no data exists regarding the detrimental effects of a fitness failure on a military career, anecdotally soldiers are well aware that "unsoldierly appearance" and fitness test failures establish a glass ceiling for career progression.

Sailors who fail any component of the fitness assessment are subject to administrative actions by command. As previously mentioned, the Navy Fitness instructional manual mandates that fitness assessment compliance is documented and used for promotion purposes (6). As military members are often compared with their peers, any negative information within their file could result in a failure to promote or even prevent sailors from receiving orders for a new assignment or career advancing opportunity. Failing the body composition portion of the fitness assessment constitutes an overall failure. A member who fails to meet the PFA standards three times over the course of four years must be processed for administrative separation from the Navy (6). Additionally, body composition waivers for two consecutive fitness assessment cycles during a four-year period must be referred to a medical evaluation board for dismissal from the

services as excessive body fat composition constitutes a condition incompatible with military service (6).

While many people believe that the standards are in place to promote healthy lifestyle behaviors, the fact that overweight and obesity persist in the military is indicative that these standards may be at best ineffective and at worst downright harmful to the well-being of service members (144). For this reason, anti-fat biases have been identified as a public health concern as it often results in avoidance of healthy behaviors, demotivation for weight loss and the development and/or maintenance of mood disorders.

## **WEIGHT MANAGEMENT TECHNIQUES**

The National Institute of Health advocates that the most important component of weight-management programs is the prevention of weight gain from excess body fat. This framework persists in the military, wherein the population enters the workforce meeting body fat standards, gradually gaining weight and exceeding standards over time (35). The medical system has several disciplines equipped to address excess weight and obesity; however obesity remains a threat to public health. Obesity may be addressed through modifications to behavior and lifestyle, medication management, weight loss surgery, or various modalities of psychotherapy.

Cognitive-behavioral therapy has been identified as an effective weight reduction treatment modality, and it is one of the most commonly evaluated psychotherapies for weight management, alongside behavioral therapy (94; 108; 109). Both treatment approaches utilize operant conditioning, behavioral contingencies, and reinforcement principles to elicit diet and physical activity changes. CBT also incorporates methods to identify cognitive and emotional mechanisms that maintain maladaptive patterns that may interfere with healthy eating and physical activity.

Cognitive therapy has also demonstrated efficacy in the treatment of obesity through targeting maladaptive cognitions about food and body weight; however, a review of RCTs demonstrates that often cognitive therapies integrate a behavioral component (40). Cognitive therapy seeks to help patients achieve weight loss goals through changing the way patients think about food and themselves, in order to engage in healthy eating behaviors. Patients who engage in this treatment are expected to recognize unhelpful and biased thinking, dispute unhelpful thinking patterns, and finally develop more helpful and realistic thoughts(108). An example of integrated cognitive therapy and behavioral therapy successes was demonstrated in an RCT comprised of an 8-week cognitive therapy followed by 12 weeks of behavioral weight loss demonstrated greater average net weight loss over behavior weight loss alone (94). Although evidence supporting CBT for weight loss is promising in comparison to behavioral weight loss treatments, behavioral treatments are often preferred because of fewer restrictions imposed due to specialized training required of providers (94). Behavioral weight loss strategies often focus on stimulus-control techniques, operant conditioning, self-monitoring, environmental management, and modeling to ensure weight change. An example of stimulus control techniques includes limiting exposure to unhealthy foods or breaking the association between eating and other daily activities such as television watching. Although behavioral strategies may be effective in reducing weight, comorbidities of anxiety, depression and disordered eating amongst those overweight and obese seeking treatment, may highlight the importance of incorporating a cognitive element to treatment (120).

#### **WEIGHT MANAGEMENT PROGRAMS FOR ACTIVE DUTY SERVICE MEMBERS**

Providing that the effects of childhood obesity have had a significant impact on military recruitment, the DoD is also finding an increased need for weight management interventions in

order to maintain its total force within regulations for dress and appearance standards (165). Since 2006, the DoD has initiated various Healthy Choices for Life programs in an effort to combat the negative consequences that follow unhealthy lifestyles and behaviors. In response to these needs, the military developed weight management programs such as Be Well, the Army Weight Control Program, Ship Shape Weight Management Program and the Marine Corps Body Composition Program (1-4; 6).

Upon failing a physical fitness test, the Air Force refers their Airmen to the “Be Well” health education program. This acronym was developed to represent “Balanced Eating, Work Out Effectively, Living Longer (1).” Although it is open to all Airmen and their families, it is infrequently advertised to the general populations, and it becomes mandatory for airmen with unsatisfactory fitness test scores. Airmen are instructed that their physical fitness is their obligation, and upon coordination with a fitness program manager, they determine which “Be Well” intervention would be most appropriate. The options associated with “Be Well” range in content and duration, but include an online fitness class which assists Airmen with developing goals, a comprehensive five-week weight loss program, an activity-based intervention, a strength training intervention and a personal health coach (1).

Army soldiers who fail body composition requirements are automatically enrolled in the Army Body Composition Program (2). This program mandates soldiers achieve body fat standards, they will have their weight and body fat assessed both monthly and during unit training, that they participate in both self-directed physical fitness programs and commander directed programs, in addition to meeting with a registered dietician for nutritional counseling. The army has used several weight management interventions to include H.E.A.L.TH., ArmyMOVE!, and LE3AN (110). H.E.A.L.T.H. is an internet-based intervention that provides

various tools including a nutrition planner, fitness planner, Army physical fitness test planner, and various progress trackers (110). Preliminary results from the pilot study demonstrated participants were able to lose approximately 5% body weight during the intervention (110). ArmyMOVE! is an education-based intervention which consists of two or more sessions (110; 126). Results were modest in comparison to controls; however, participants who attended two sessions lost at least 5% body weight within a six month period (110).

Following suit with both the Air Force and the Army, the Navy implements their own weight management program for service members who have failed their body composition assessment standards. Shipmen who fail their fitness test must pick a nutrition program, in addition to being placed in the Fitness Enhancement Program (7; 8). In 2012 the Navy implemented their own “ShipShape” fitness program. ShipShape consists of eight sessions, which focus on weight loss, mindset, nutrition and physical activity (5; 7).

Each service branch utilizes unstandardized methods of implementing weight management programs. Service members work with a fitness monitor within their unit to identify an appropriate intervention to address their needs. Assignment to the duties as a fitness leader is not a primary responsibility for the individuals designated in this role, and they are seldom assigned this role due to advanced knowledge in this area. Frequently, an individual who excels at fitness is chosen to fill the role as a fitness manager and fulfills the role for up to three years. Lastly, these programs are reactionary. They are a retroactive attempt to bring service members to be in compliance with military fitness standards. While these programs consist of several necessary components, consistent with successful weight management methods, physical activity and nutrition, these programs may be “too little, too late.” Not only do service members have to address behavioral components to weight loss, but they must also overcome the added stress that

follows a physical fitness failure. Providing overweight and obesity are often comorbid with other medical problems, service members experience additional stressors as they attend additional medical appointments, and interpersonal strain among colleagues in addition to concerns about the impact on career progression.

#### **NEW CONCEPTUAL APPROACHES: WEIGHT GAIN PREVENTION IN THE MILITARY**

Although there are many obesity prevention programs, few have demonstrated long-term effects by means of reduction in body mass index (29; 118; 158). Unfortunately, the programs that often produce long-lasting effects are both time consuming and costly. Existing programs vary in terms of length, time and effectiveness. Civilian, military and even veteran weight management programs vary in terms of commitment, requiring from one hour up to 50 hours for some programs, with mixed reviews of effectiveness over a two-year follow-up (82; 136).

*Healthy Weight*, a weight prevention program, reduced the risk for obesity onset over a three-year follow-up period and it only comprised of three, one-hour sessions (155; 157-160). This weight gain prevention program is largely participant-driven and is done through the use of positive gains counseling or cognitive dissonance. For the present study, Healthy Weight was adapted for use in an active duty population and named Fit4Duty. The proposed study examines the relationship of weight stigma on weight gain prevention using this dissonance-based approach.

#### **EFFECTIVENESS OF DISSONANCE BASED INTERVENTIONS**

Cognitive dissonance refers to the unpleasant motivational state that results from the inconsistency between people's behaviors and cognitions (12). Festinger's Cognitive Dissonance based theory states that people will work to resolve inconsistencies between their beliefs and actions (12). As such, dissonance can be induced through causing a person to attend

to the inconsistency between thoughts and actions. In accordance with consistency theory, people prefer that their thoughts are consistent with their actions and as such, will change their behaviors to match their attitudes (44). Preference for consistency is a critical component in the effectiveness of dissonance-based interventions. It relies on the premise that people with a high preference for consistency desire to be consistent with their own responses, and therefore will be susceptible to dissonance based interventions (38). For those with a high preference for consistency, in order to reduce cognitive dissonance, people will either change their behavior or cognition, justify behaviors or cognitions by changing the conflicting cognition or justify the behavior or cognition by adding new cognitions (Figure 1 and Figure 2). Therefore, cognitive dissonance also plays a pivotal role in the determination of alternative behaviors.

Dissonance-based strategies have been reviewed as highly effective in several trials to prevent unhealthy behaviors with young women (106; 125; 160). Most recently cognitive dissonance interventions were identified as one of few eating disorder prevention programs to meet the American Psychological Association's (APA's) criteria for efficacious interventions (19), outperforming no-intervention controls, alternative interventions and having been replicated by five independent research studies (19; 156). Participants were encouraged to discuss the hazards of pursuing the thin-ideal espoused by the majority population in western culture, over the course of six one-hour group sessions. Participants assigned to the dissonance intervention displayed significant decreases in thin-ideal internalization. They also reported less body dissatisfaction, and a significant decrease in negative affect, eating disorder symptoms, and lower risk for eating pathology during the 2-3 year follow up than did control participants (156).

More recently this cognitive dissonance based strategy has evolved to include "positive gain counseling"; which causes dissonance and subsequently influences positive health behaviors

(155; 157-159) for individuals at risk for overweight or obesity. Stice and colleagues developed a positive gain counseling version of *Healthy Weight*, which incorporated verbal, written and behavioral strategies into the existing gradual healthy lifestyle change plan. The convergence of these strategies creates a positive gain counseling program to address unhealthy eating and sedentary behaviors. At the beginning of each session, the voluntary nature of participation is highlighted and the home exercise intentionally requires an increase in cognitive load to induce positive gain. All sessions are recorded to increase accountability for perspectives taken in session. During weeks one and two, participants discuss the health, interpersonal and social costs of obesity, an unhealthy diet and sedentary behavior. Participants also discuss benefits of leanness, a healthy diet and regular physical activity. Participants are encouraged to write essays about the topics discussed in session and to present them to the group. Participation in these exercises is believed to increase enthusiasm about new healthy perspectives, which will likely influence healthy behavior changes. During week three, participants discuss how society encourages unhealthy diet and sedentary behavior. They also discuss the benefits of healthy eating behavior and methods of incorporate exercise into a busy lifestyle. Finally, participants discuss recipe modification and integrating both socializing and exercise. The combination of these activities and the methods used are intended to increase the likelihood that participants make healthier choices about diet and physical activities; adhering to more congruent thoughts and activities.

## **WEIGHT STIGMA**

Weight stigma, also referred to as anti-fat bias, is considered the last socially acceptable form of discrimination in America (58; 132; 162). The Rudd Center defines weight stigma as negative weight-related attitudes toward an overweight or an obese individual (58; 148). These

attitudes are solely based upon the individual's status of being classified as overweight or obese (60). These attitudes often correlate to beliefs that individuals are either lazy, weak or lacking willpower (130; 131). Weight stigma may begin with negative thoughts or attitudes and gradually progress to verbal teasing, physical aggression and relational victimization (132).

Stigma is most commonly understood as a social construct, which is influenced by cultural values. The individual who faces stigma is perceived to be different from the social standard and they are often devalued or considered deviant by their peers (129-131). Stigma regarding weight or obesity exists in the form of subtle biases, such as assumptions about one's character and eating habits or overt discrimination such as overlooking an individual for promotion or hire and instead selecting people who are considered within the normal weight range (60; 132; 162; 169). Notably, it is estimated that nearly two-thirds of American adults are overweight or obese and in this population, 40-50 percent of these individuals experience discrimination when researchers control for race, sex, sexual orientation and socioeconomic status (30; 98).

Despite beliefs that weight discrimination may serve as a motivator to increase health behaviors among obese and overweight individuals, stigma and discrimination elicits an avoidance reaction toward health-related behaviors, such as healthy eating, exercise and engaging with healthcare or attending medical appointments (117; 129; 171). Weight stigma may result in the victim developing maladaptive coping strategies, either binge eating or compensatory dieting behaviors (111; 129). In previous studies evaluating the effects of overt weight stigma on psychological distress and weight loss outcomes, researchers have found that weight stigma is significantly associated with greater depression, binge eating and poorer weight

loss outcomes (87; 175). Negative evaluation of a person often precedes unjust or prejudicial treatment of a category of people, also referred to as discrimination.

## **WEIGHT DISCRIMINATION AND WEIGHT STIGMA**

Nearly two-thirds of American adults are overweight or obese and in the general civilian population, 40-50 percent of these overweight individuals experience discrimination when researchers control for race, sex, sexual orientation and socioeconomic status (3;6;9).

Discrimination is based upon preconceived opinions without sufficient knowledge that could support or refute such beliefs (105). Obese persons are still not considered a protected class under federal discrimination laws. Although some believe weight discrimination may serve as a motivator to increase health behaviors among obese and overweight individuals, stigma and discrimination are more likely to elicit an avoidance reaction, such as sedentary behavior instead of exercise, which perpetuates the problem (58; 63; 96).

## **WEIGHT STIGMA IN THE WORKFORCE**

Researchers have repeatedly demonstrated that weight stigma is a common discriminatory practice exhibited within the civilian workforce (169). However, little research has been conducted on this practice in the military. Although the military tracks fitness assessment scores and body fat composition among their personnel, a paucity of research exists on the attitudes towards service members who struggle to meet weight standards, the prevalence of weight stigma in the military or its impact on the armed forces and military readiness. While the avoidance response frequently elicited by weight stigma is clearly harmful to the civilian population, it may be especially harmful to military service members, as one of the core components of their job is to adhere to physical fitness standards. In conflict with military regulations, the prevalence of obese or overweight service members may be as high as 50

percent, varying by military branch (75; 88). Researchers evaluated the prevalence of weight stigma amongst a group of 119 individuals who were enrolled in a weight gain prevention program and half of the participants reported experiencing stigma. Adjusting for age, race, sex, height and body fat, weight stigma was associated with various negative health consequences, including depressive symptoms, maladaptive coping behaviors, compensatory behaviors and emotional eating (144). Military fitness doctrine was established to provide leadership with guidance on the standards for soldiers, airmen and sailors. The problem is that these policies have also contributed to an “us versus them” mentality. When individuals cannot maintain their body weight, they are considered lazy and insubordinate to military standards (144). This tends to create a snowball effect; as military members build resentment towards those who are perceived to have a blatant disregard for military standards. Additionally, fellow unit members may suffer because the overweight or obese member is no longer deployable, and coworkers may have to fulfill the obese member’s roles or deployment billets.

### **WEIGHT STIGMA: A PUBLIC HEALTH PROBLEM**

Stigma is a well-known enemy in the realm of public health. Despite evidence that obesity is a military public health problem, evaluation of obesity stigma in the civilian population leads researchers to believe that obesity stigma is also a threat to military public health. The negative impact of stigma has been studied for years in the context of discrimination based on nationality, race, sex and sexual orientation. Stigma of any kind is associated with increased stress and reduction in self-control (96) (175). In a systematic review of research studies documenting weight stigma and biases, (130) researchers concluded that weight stigma is not useful for reducing obesity or improving health. Instead, stigmatization poses serious risks to both psychological and physical health, generates health disparities and interferes with obesity

prevention efforts as members who experience weight discrimination are nearly three times as likely to become obese (130; 162). Finally, obesity stigma is understood to negatively impact the mental health and quality of life above and beyond that for individuals based on sex, race or sexual orientation. Accordingly, it is associated with increased levels of anxiety, depression, each of which contributes to deteriorating physical health.

In a society where appearance commonly assigns an individual's value, obesity can often detract from one's perceived value. Exposure to opinions and or situations which serve to remind people of their inadequacies can cause emotional pain and as a result, a natural defense mechanism is to avoid situations that elicit negative emotional reactions (13; 129). Although healthcare professionals understand the scientific mechanisms behind obesity, it does not preclude them from maintaining biased beliefs about obesity or subsequent negative interactions with their patients. In fact, in a study which examined patient characteristics that evoked a negative reaction from healthcare workers, obesity was cited by 33% of the physicians (148). Furthermore, studies suggest obese women may delay or avoid healthcare appointments if she feels her provider berates her or holds a bias against her because of her weight (77; 148). A 1994 study indicated that delaying or canceling healthcare appointments occurred in 55% of the "very obese" population, commonly cited amongst their reasons were reasons associated with embarrassment or ridicule they would face because of their weight (117; 148). Avoidance of healthcare appointments may result in inadequate preventative care for obese or overweight patients, decreased quality of life and an increased mortality rate (13; 72).

#### **DE-MOTIVATION FOR WEIGHT LOSS**

Obesity stigmatization is commonly expected to serve as a motivator for weight loss. The rapidly growing rates of obesity in the United States despite the value associated with thinness

would contradict the assumption associated with weight stigma's utility (130). In youth populations, weight-based teasing is shown to prompt more binge eating and unhealthy weight control behaviors (63; 130). Further studies indicate that among college-age women, stigma-related experiences were positively correlated with body mass and body dissatisfaction (171). Most importantly, these stigma experiences were correlated to an increased desire to avoid exercise. These findings have been replicated in a study of males and females, where individuals who reported high anti-fat attitudes and high internalization of societal standards of attractiveness were more likely to avoid exercise if they experienced higher levels of weight stigma (170). These studies suggest that weight stigma can have a negative impact on healthy eating behaviors and motivation to exercise, exacerbating the negative health outcomes associated with obesity.

Further research must be conducted to evaluate the complexities associated with weight stigma and weight management programs to explore their efficacy, especially within a military population. One weight loss program that might have particular relevance to stigma is Fit4Duty. Rather than highlighting the commonly known reasons why obesity is unhealthy and problematic for servicemembers, this intervention explores systemic reasons for maintaining healthy weight, in addition to the personal costs and benefits of both obesity and leanness. Exploring both arguments for maintaining the status quo versus changing health behaviors may motivate stigmatized individuals rather than induce shame and subsequent avoidance behavior.

#### **NEGATIVE CONSEQUENCES OF WEIGHT STIGMA FOR THE MILITARY AND SERVICE MEMBERS**

The United States Military spends millions of dollars vetting and training service members. Although a significant amount of time and effort is dedicated to equipping military members, little is done to protect them from the potential consequences of weight stigma. As a

result, service members may be negatively impacted due to weight stigma, which can have a negative impact on their careers, subsequently wasting money and returning veterans to the civilian population with the same weight concerns and negative health outcomes they had while on active duty (11). Despite body fat standards imposed on uniformed personnel, service members are experiencing similar patterns of increasing overweight and obesity depicted within the civilian population (138). This pattern indicates that the system may not be working the way it was intended and changes must occur to maintain a resilient, healthy, military force. While research pertaining to obesity stigma and its impact on health behaviors, quality of life and psychological well-being has been conducted in the civilian population, the impact of weight stigma on military service members is unknown. In the proposed study, researchers will examine these phenomena and its influence on the implementation of a weight gain prevention program.

### **INTERNALIZED WEIGHT STIGMA**

Continuous exposure to negative messages about one's personal traits leads to negative self-evaluation and negative internalized views of self. This negative evaluation of self is characterized by researchers as something that reduces the stigmatized person from a "whole and usual person to a tainted, discounted one (104; 170; 173)." As the media exposes society to thinness ideals, subtle messages about value and abilities are often internalized (28; 176). This internalization leads to reductions in self-esteem and self-efficacy, an increase in helplessness and both abnormal eating attitudes and behaviors (57; 157). It is important to note that not everyone who experiences antifat bias internalizes societal attitudes (123). In fact, evidence suggests that internalized attitudes moderate the association between weight stigma and avoidance of exercise, such that individuals high in antifat attitudes and high in internalized standards of attractiveness are more motivated to avoid exercise (57; 104). There is a paucity of

research examining the relationship between internalized weight stigma and program efficacy. Findings indicate some healthy adaptation in eating behaviors for stigmatized individuals. However, there has not been evidence to suggest efficacy at one-year follow-up (104; 115).

## CHAPTER 2: PURPOSE AND SIGNIFICANCE

Weight management programs are important to the military given that much of the active duty force are overweight or obese. In addition to physical health conditions and lifestyle limitations that may be imposed on this population, overweight and obese people are also subjected to weight stigma. Weight stigma is identified as a potential barrier for weight loss and healthy behaviors. Weight stigma affects the civilian population and also is particularly common in the military due to policies emphasizing the importance of body shape and weight (144; 145; 147). One weight gain prevention program that has particular relevance to stigma is Fit4Duty, a cognitive dissonance-based intervention that has proven effective in targeting disordered eating habits in a stigmatized civilian population.

Therefore, the purpose of the current investigation is to examine the relationship between weight stigma and program outcomes among active-duty soldiers participating in one of two weight gain prevention programs. A six-session dissonance intervention, Fit4Duty, adapted for use with an active duty population, was compared to a two-session health education control condition. The first aim of this study aim is to evaluate the prevalence of weight stigma and internalized anti-fat bias among active-duty soldiers volunteering for a weight gain prevention program. A second aim is to determine the relationships between weight stigma, demographic variables (e.g., age, sex, and rank), and indices of psychological functioning. A third aim is to examine the relationships among weight stigma, program adherence, physical activity, and body weight during the weight gain prevention programs. The fourth aim of the study is to examine the construct *preference for consistency* (PFC) as a potential moderator of the effect of the experimental program intervention on program outcomes. And the fifth aim of the study is to determine the effect of program condition across time on measures of depression, emotional eating, weight stigma, and weight bias internalization. A conceptual model depicting the

interaction amongst these variables can be found in Figure 3. Long-term goals of this research include elucidating the impact of weight stigma on weight gain prevention and developing an obesity prevention program that will be effective in reducing the harmful consequences of obesity among military servicemembers.

### **CHAPTER 3: AIMS**

The following five aims were addressed in the study:

**Aim 1: The Prevalence of Weight Stigma.** The first aim of the study is to describe weight stigma and internalized weight stigma in an active duty population volunteering to participate in a weight gain prevention program. Demographic characteristics of individuals experiencing weight stigma were compared to those who did not experience weight stigma to include sex, ethnicity, education, age, family status and pay grade. Based on previous work, 50% of participants were expected to report experiencing weight bias (49). Individuals reporting high internalized weight stigma were expected to report greater depressive symptoms. These data were expected to provide some of the first documented evidence of weight stigma among service members and to serve as an important step in beginning to address this public health problem in the military.

**Aim 2. Determine the relationship between weight stigma and psychological functioning.** The second aim of this study is to determine the relationships between weight stigma, demographic variables and indices of psychological functioning to include depression, weight bias internalization, and emotional eating. Significant positive relationships between weight stigma, depression, and eating disorder scores were expected. Rank was expected to have a negative relationship with weight stigma and internalized weight stigma.

**Aim 3. Determine the relationship between internalized weight stigma and program adherence, physical activity, and body weight at one year follow up.** Internalized stigma was expected to be negatively related to program adherence. Specifically, higher weight stigma was expected to be associated with lower session attendance and greater dropout. There was also expected to be a significant relationship between internalized stigma and weight change from baseline to one-year follow-up. However, the relationships were expected to be different for the prevention condition. Overall, individuals in the active prevention program were expected to evidence less weight gain/greater weight loss than the health education group. This would be supported by differences in adherence by intervention group, such that individuals with higher rates of internalized stigma would respond to prevention condition differently because health education provides information commonly known amongst the overweight and obese populations, likely further activating negative interpretation biases. Finally, there was expected to be a strong relationship between internalized weight stigma and physical activity. Again, this relationship is expected to be different for the prevention condition than for the health education control in part, due to differences in intervention adherence. Although health education is commonly offered among overweight/obese populations, this will not address the primary mechanism through which adiposity is maintained.

**Aim 4. Examine the construct Preference for Consistency as a potential moderator on program outcomes.** Preference for Consistency was expected to influence the strength of the relationship between prevention group and adherence, physical activity, and weight change from baseline to one-year follow-up. The Fit4Duty intervention was expected to induce cognitive dissonance, evidenced by changes in behavior. That is, participant's behavior in terms of physical activity and subsequent weight change should represent the process of cognitive

dissonance occurring. Individuals with a high preference for consistency, as measured by PFC self-report, were expected to be more susceptible to the cognitive dissonance intervention. Those more susceptible to the intervention were expected to have greater behavior change. That is, those who were susceptible to dissonance activation would evidence better program outcomes to include better program adherence, increased physical activity, and decreased body weight. Additionally, it was hypothesized that individuals reporting even the highest rates of internalized weight stigma at baseline would modify their behaviors to more consistently align with their beliefs, subsequently reducing dissonance. It was believed that this intervention would bring into their awareness, the disconnect between their beliefs and their actions (Figure 4), thereby motivating these individuals to bring their behaviors into alignment with the statements made in accordance with the intervention

**Aim 5: Determine the effect of intervention condition across time on measures of depression, emotional eating, weight stigma, and weight bias internalization.** As it is anticipated that there will be a significant main effect of intervention condition across time on primary variables of adherence, physical activity, and weight loss, it is also expected that there will be a significant interaction effect of intervention by time, such that there will be reductions in symptoms of depression, emotional eating, weight stigma, and weight bias internalization.

## **CHAPTER 4: METHODS**

Obesity remains a significant health concern in the armed forces. Despite the existence of physical fitness programs, weight loss programs and body composition programs, some service members continually fail some component of their physical fitness test. As a result of the ineffectiveness of these programs, as well as the culture that values “professional appearance” commonly associated with the appearance of being “fit,” individuals who struggle at remaining

within regulations are subjected to intense scrutiny by their command and their peers with additional negative career ramifications.

This study uses an existing dataset from Project Fit4Duty to examine the impact of weight stigma on adherence, physical activity, and body weight in an obesity prevention program compared to a health education control. At baseline, 50% of individuals were expected to report experiencing antifat bias (144). Individuals who experienced antifat bias were expected to be heavier, report less physical activity and report increased eating in response to mood disturbance, regardless of condition. Additionally, individuals reporting high weight bias internalization (WBIS) were expected to evidence less adherence, less change in activity level and a greater increase in body weight within the health education control. In contrast, participants assigned to the Fit4Duty prevention program were expected to evidence better adherence, an increased change in activity level, and either a constant or reduction in body weight.

The prevention program, Project Fit4Duty, was developed from a civilian program, Project Health. The program uses positive gain counseling, focused on eating unhealthy foods and engaging in sedentary behaviors (155; 157; 159), to induce or activate cognitive dissonance. In accordance with the literature, it is believed that participants will only be susceptible to a dissonance-based intervention if they have a high preference for consistency, that is the desire for their beliefs and actions to be consistent. Dissonance activation is expected to result in behavior change, as the participant works to bring their behaviors into alignment with their beliefs, which subsequently brings caloric intake and output into balance. Cognitive dissonance was not measured directly. Therefore, the Preference for Consistency (PFC) self-report measure, will be examined as a potential moderator between program adherence and program outcomes. Stigmatized individuals are expected to experience cognitive dissonance, as the program targets

helplessness often induced by individuals who have highly internalized weight stigma. As such, those with high PFC will work to bring their behaviors closer into alignment with their beliefs, subsequently modifying both eating and exercise habits which will affect weight and physical activity. Examining weight stigma in the context of weight gain prevention is important because further understanding of the impact of weight stigma on weight gain prevention potentially enables us to enhance weight gain prevention in the United States military population.

## **Participants**

Participants: One hundred twenty-one active duty military participants who were overweight or at risk for overweight participated in this study at Madigan Army Medical Center, Joint Base Lewis-McChord. The current project defined overweight as a BMI between 25 and 32 kg/m<sup>2</sup>. Inclusion criteria for the parent study were: 1) Age 18 years or older; 2) At risk for excess weight gain: History of overweight or family history of overweight/obesity; 3) English speaking; and 4) No planned deployment/training in the next two months. Exclusion criteria were: 1) Major physical illness (e.g., heart attack, cancer); 2) Illness/treatment affecting body weight (e.g., thyroid problems, diabetes); and 3) Planned deployment/training in next two months.

## **Procedures**

Participants were recruited through direct mailing, mass emails, online posts and flyers, which invited service members concerned about weight gain to participate in a study evaluating a weight gain prevention program. Participants were screened by telephone and email to determine eligibility and were then scheduled for a baseline visit. The purpose, procedures, risks and benefits were explained to participants by a member of the research team. Consent forms were reviewed and participants were given the opportunity to ask questions regarding study

procedures. For the primary study, participants (n=136) were eligible and willing to participate from Madigan Army Medical Center, Joint Base Lewis-McChord. Participants were randomized into Fit4Duty or Health Education. Participants were recruited in six phases into the intervention or control condition. A Microsoft Excel spreadsheet was used with unique study identification numbers that were previously determined as either control or prevention program. As participants were enrolled, each person was then assigned a unique identification code and placed into the corresponding prevention group. Research administrators at Joint Base Lewis McChord completed the randomization. Participants were notified of the randomization in the informed consent but were not randomized until after baseline screening to ensure outcome assessors remained blind to the group assignment at baseline. There were multiple recruitment waves Fit4Duty (n = 72) and HED (n = 49). See the consort diagrams in Figures 5 and 6 describing participant recruitment and data collection for weight data and physical activity data, respectively. During the final recruitment phase, participants were no longer randomized, and instead, 14 participants were directly assigned to the active Fit4Duty intervention group. Participants completed height and weight measurements, BMI, blood pressure and several self-report instruments at baseline, six weeks (end of prevention program) and one-year follow-up.

### **Program Conditions**

**Fit4Duty.** Fit4Duty is a six-week weight gain prevention program adapted from a civilian weight gain program, Project Health. The program outline and program manual can be found in Appendix A and B, respectively. Participants met weekly for 1 hour in a small to medium group with a master's level health educator trained in delivering Fit4Duty. Participants are directed to develop their health improvement plans regarding healthy changes to dietary intake and physical activity levels to bring caloric intake into balance with expenditures. The six

sessions focus on behavioral goals, weight standards and costs of obesity. Participants also discuss both the costs and benefits of food choices and behavior changes to meet goals. Next, participants discuss social cues that contribute to current eating behaviors, develop their own recipe modification plans and explore methods of incorporating friends and family into daily activities. Participants rehearse methods of refusing unhealthy food and commit to a plan they will adhere to for the next six months.

**Health Education.** The health education program is a two-session health video education series, *Healthy Eating: A Guide to Nutrition* (46). This video was delivered over two, weekly, one hour sessions either individually or in small groups. The program focuses on basic nutrition, nutrition and weight management, nutrition for sports and exercise and food safety/disease prevention. Participants learn the difference between macronutrients and micronutrients and learn about the importance of hydration and appropriate nutrition. Participants in the health education program learn about cultural issues that promote obesity, as well as the importance of physiological health.

## **Measures**

Participants completed a battery of self-report measures that were completed in person or online. Outcome measures are classified as anthropomorphic, self-report and behavioral. See Table 1 for timeline of measurement administration. All measures can be found in Appendix C.

### **ANTHROPOMETRIC MEASURES**

**1. Bodyweight.** Body weight was measured in kg to the nearest .1 using a calibrated Tanita BF 350 scale. Weight was measured at baseline, post-intervention (6 weeks) and one-year follow-up. For participants who were unable to be present for weight measurement at one year follow up, weight data was collected utilizing the electronic medical record system AHLTA.

**2. Height.** Height was measured in triplicate to the nearest 0.1 cm at baseline.

## **SELF-REPORT MEASURES**

**1. Demographic Information Questionnaire (DIQ).** The DIQ was developed for the Fit4Duty study and consists of 15 items. General and military-specific demographic information were collected incorporating categories developed as part of the DoD Health Lifestyle Assessment Program. Data included sex, ethnicity, race, service branch, education (highest attained), age, family status (marital status; spouse presence), pay grade and pay grade groups. There were also questions about illness history, eating behaviors (LOC eating) and weight history. Prevention group was coded as 0 = health education and 1 = Fit4Duty, Depressive symptomatology was measured on a continuous scale using the BDI, race was coded as a nominal variable where 1 = “Caucasian/White”, 2 = “African American/Black” and 3 = “Other” which consisted of American/Alaska Native, Asian, Native Hawaiian/Pacific Islander, and Multiracial participants, rank was coded as an ordinal variable where 1 = “Junior Enlisted”, 2 = “Non-Commissioned Officers,” 3 = “Officers” and 4 = “Senior Non-Commissioned Officers and Senior Officers”.

**2. Lifestyle Habits and Weight History Questionnaire (LHWHQ).** The LHWHQ was developed specifically for this study and it consists of 19 items and assesses weight history and changes in weight pattern during adulthood. This survey also includes questions about general health habits (e.g., tobacco use, sleep) and weight control behaviors. Sixteen queries about general health habits asked at baseline were also administered post-program (Post-Program Health Habits Questionnaire) with the addition of two questions evaluating participants’ health habits and overall health post-program compared to before starting the study. The LHWHQ is used for descriptive data on the population, to include the following information: number of years in the military, loss of control eating, the frequency of losing 20 pounds or more and gaining it back and use of compensatory

behaviors such as abuse of diet pills. There are no data available on validity/reliability of this questionnaire.

**3. Beck Depression Inventory-II (BDI-II)(16-18).** The BDI-II consists of 21 items assessing self-reported depressive symptoms during the past two weeks, including the day of completion. The purpose of the use of this measure is to examine depressive symptoms as a potential confounding variable. This survey includes questions about sadness, pessimism, feelings of failure and worthlessness, anhedonia, guilt, self-loathing, suicidality, activation, changes in concentration, energy and fatigue, sleep, irritability, changes in appetite and libido. The 21 items are rated on a 4-point Likert scale, which ranges from zero (symptoms not present) to 3 (symptoms very intense). This measure is widely used and has high concurrent validity ratings with other depression instruments such as the Minnesota Multiphasic Personality Inventory or the Hamilton Depression scale;  $r = .71$  correlation rating(16; 17). Additionally, it has a one-week test-retest reliability of  $r = .93$  and internal consistency of  $\alpha = .93$  (17).

**4. Stigma in the Military Questionnaire (SMQ) (144).** The SMQ consists of nine characteristics (e.g., weight, body shape, sex, race, learning disability) and participants indicate if and how often they are “made fun of, teased or given a hard time by coworkers or supervisors on the basis of the target characteristic. The purpose of the measure for this study is to provide descriptive statistics of the experiences of this population and to examine the association of weight stigma on program outcomes. Responses for body weight and body shape were the only two questions used for analyses. Ratings are made using a 5-point Likert scale. Higher scores indicate more frequent experiences of teasing. Previous use of this measure, adapted for the military, demonstrated acceptable reliability ( $\alpha = .72$ ) (144). The purpose of the measure for this study is to provide descriptive statistics of the experiences of this population and to examine the

association of weight stigma on program outcomes. Responses from this questionnaire are dichotomized into yes or no responses. Respondents were characterized as “no” if they responded “never” or “rarely.” Respondents were characterized as “yes” if they responded “sometimes, often, very often.”

**5. Experiences and Sources of Weight Stigma Questionnaire (ESWS) (131).** The ESWS is a 26-item measure adapted from an existing measure of weight stigma for use in a military population. This scale assesses the frequency by which individuals experience stigma in the military due to weight (e.g., being passed up for promotion due to weight/shape; being made fun of during training/drills). Participants are provided with a list of eight individuals (e.g., primary care manager, commander, fitness leader) and indicate whether and how often any of these people have teased or mocked them because of their weight. Items are rated on five-point Likert scale with higher scores indicating more frequent experiences of stigma. Responses from this questionnaire were dichotomized into yes or no responses. Responses were characterized as absent of experiencing negative interpersonal interactions if they responded “never” or “rarely.” Respondents were characterized as having experienced weight stigma if they responded “sometimes, often, very often.” Reliability from a small subset of the population was excellent ( $\alpha = .95$ ) (144).

**6. Weight Bias Internalization Scale-Modified (WBIS-M) (123).** The WBIS-M is an 11-item questionnaire designed to assesses the degree to which an individual believes negative weight-based stereotypes apply to oneself. It is valid for administration to individuals both with and without obesity. Higher scores indicate greater internalized weight bias. The WBIS-M demonstrated good reliability from a small subset of the current sample was excellent ( $\alpha = .85$ )

(144). This questionnaire will be used to determine the impact of weight stigma on program adherence, physical activity, and body weight.

**7. International Physical Activity Questionnaire (IPAQ) (23).** The IPAQ is a 7-item questionnaire designed to obtain estimates of physical activity among adults in the past 7 days. This questionnaire requests respondents consider the activities they have performed for at least 10 minutes during the past 7 days in the following categories; at work, as part of their house and yard work, to get from place to place and in their spare time for recreation, exercise or sport. They then record one of 3 intensities; vigorous, moderate, and walking. The instrument demonstrated good validity (Spearman's  $Rho = .3$ ) and reliability (Spearman's  $Rho = .8$ ) across cultures (23). This questionnaire will be used to determine the impact of weight stigma on physical activity, based on change score from baseline to 1-year follow-up; the impact of prevention group on physical activity based on change score from baseline to 1-year follow-up and to determine if preference for consistency scores moderate program outcomes such as physical activity levels. The IPAQ can be used both as a continuous measure and as a categorical measure. Using the guidelines for data processing and analysis of the International Physical Activity Questionnaire (IPAQ) – Short and Long Forms, total weekly physical activity was estimated by weighting time spent in activity intensity with estimated metabolic equivalent (MET) energy expenditure (42). The IPAQ scoring protocol assigns the following MET values to walking, moderate, and vigorous intensity activity: 3.3 METs, 4.0 METs, and 8.0 METs, respectively. A combined total physical activity MET-min/week were computed as the sum of walking, moderate, and vigorous MET-min/week scores. Participants were considered to have met CDC/ACSM physical activity recommendations if they reported at least 150 min/wk of walking, moderate, or vigorous intensity physical activity. There are no pre-established

thresholds for presentation of MET-minutes, therefore it is recommended that these data are reported as comparisons of median values.

**8. The Emotional Eating Scale (EES) (85).** The EES is a 25-item self-report measure used to assess the urge to cope with negative affect by eating. Participants rate their desire to eat in response to each emotion on a 5-point scale (No desire, Small desire, Moderate desire, Strong urge and Overwhelming urge to eat). Higher scores indicate a greater reported desire to eat in response to negative mood states. No clinical cutoffs are established for the total score. The EES generates three subscales based upon the mean of items reflecting the urge to eat in response to anger/frustration, anxiety and depression. The EES demonstrated good internal consistency and good construct and discriminant validity. In a non-clinical sample, mean subscale scores reported on the EES are 11.2 ( $SD = 8.78$ ) for anger/frustration, 6.42 ( $SD = 5.86$ ) for anxiety and 8.10 ( $SD = 4.71$ ) for depression. In a clinical sample amongst participants diagnosed with Binge Eating Disorder, the clinical cutoff established for anger/frustration was 25.4, for anxiety was 15.9 and for depression, was 12.5.

**9. The Preference For Consistency Scale (PFC) (38).** The PFC is an 18 item self-reported measure used to assess attitudes toward consistency. Participants respond using a Likert-type scale ranging from 1-9, anchored by “strongly disagree” to “strongly agree.” Sample items from the scale include; “It is important to me that my actions are consistent with my beliefs,” “I get uncomfortable when I find my behavior contradicts my beliefs,” and “I’m uncomfortable holding two beliefs that are inconsistent.” When originally tested, this scale was shown to possess good distribution properties and no significant sex differences were recorded (131). Importantly, scores on the PFC successfully predicted individuals who would and would not be vulnerable to a set of standard consistency-based effects, including positive gain counseling and cognitive balance. This measure will be used to determine if Preference for Consistency moderates program outcomes to include

adherence, physical activity, and body weight change. Across multiple validation experiments for PFC, PFC has been dichotomized into high Preference for Consistency and low Preference for Consistency. This strategy was used for the proposed moderation analyses (38). Cut-off scores in three validation studies were set at the midpoint of the scale, 5.4. Therefore, for the purpose of this study, 5.4 will mark the midpoint for low vs. high preference for consistency.

## **BEHAVIORAL MEASURES**

**Adherence** indexes participant's engagement with the study. It is calculated based on attending intervention group, health education classes and responding to follow-up surveys and measurements. Adherence was coded as a continuous variable regarding the percentage of sessions and follow up appointments attended. Adherence was measured utilizing percentile from a scale of 0-100.

## **CHAPTER 5: ANALYTIC PLAN**

All analyses were conducted using SPSS, Version 22.0. Data were examined for outliers and screened for normality. Differences were considered significant at  $p \leq .05$  and all tests are two-tailed.

### **Specific Aim 1. The Prevalence of Weight Stigma.**

The first aim of the study was to describe weight stigma in an active duty population volunteering to participate in a weight gain prevention program. Using the *Experiences and Sources of Weight Stigma Questionnaire*, participant responses were assessed using a nominal scale. The question read "In the last year, how frequently has your body weight or shape resulted in and lists various social and behavioral consequences. Participants responded by marking "Never, rarely, sometimes, often or very often," indicating their experiences of weight stigma in the military. Participants marking "sometimes, often, or very often," were identified as "yes" responders to experiencing weight stigma, whereas individuals responding "never or

rarely” were identified as “no” responders to experiencing weight stigma. Another question read “Who has given you a hard time or mocked you because of your weight/body shape in the last year.” Persons identified as the sources of stigma included: coworkers, friends, supervisors, primary care managers, spouses, strangers, PTL, and the person weighting or taping. Once again, responses included “never, rarely, sometimes, often and very often.” Participants responding never, or rarely were indicated as “no” responses, whereas participants responding “sometimes, often, or very often,” were indicated as “yes” responses to enduring stigmatizing experiences.

**Specific Aim 2. Determine the relationship between weight stigma and psychological functioning.**

The second aim was to determine the relationships between weight stigma, demographic variables and indices of psychological functioning, to include depression, weight bias internalization, and emotional eating scores. Correlation coefficients were computed to assess the relationships among age, sex, rank, BDI scores at baseline, weight stigma, weight bias internalization and emotional eating. For pairs of variables that were continuous, Pearson’s correlation was used while Spearman’s correlation was used for any pair containing an ordinal variable.

A multiple linear regression was performed to determine whether weight stigma was significantly predicted by sex, race, rank, and BDI score. A multiple linear regression was also calculated to predict internalized weight stigma based on sex, race, rank, experience of disciplinary action and depressive symptoms.

**Specific Aim 3: Determine the relationship between internalized weight stigma and program adherence, physical activity, and body weight change.**

A multiple linear regression analysis examined the relationship between prevention group and “adherence” (scored as a proportion of the number of scheduled group therapy sessions that a subject attended). Each subject had just one adherence score for the whole study; if a subject attended none of the group therapy sessions (Fit4Duty or Health Education) they were assigned a score of 0, meaning that all subjects had data for adherence. In an additional exploratory analysis, gender, LOC eating, Marital Status, Age, Number of Health Conditions, Hours of Sleep, and People in House were also included as predictor variables (along with Prevention Group, Rank, Income, Baseline BDI, and Baseline weight stigma; see below) to determine if there were any other predictors of adherence.

The original analytic plan proposed multiple linear regression analyses to develop a model for predicting service member’s body weight change from baseline to post intervention, post intervention to one year follow up and baseline to one year follow up from their reported internalized weight stigma and prevention group (Fit4Duty vs health education). Preliminary analyses revealed significant predictors of attrition (dropout) (see below), which motivated the use of linear mixed models, using maximum likelihood estimation.

Mixed models were used to determine the effects of Prevention Group, Time, and the Prevention Group x Time interaction, on weight and physical activity. In each case, the crucial test is the 2-way Prevention Group x Time interaction. A significant 2-way interaction would indicate that the change in weight or physical activity over time differed in two prevention groups.

To examine the association between baseline weight stigma and change in weight/physical activity over time, we also tested and reported the 2-way Stigma x Time interaction term.

**Specific Aim 4: Determine if Preference for Consistency influences the strength of the relationship between prevention group, physical activity change, and weight change.**

Baron and Kenny (15) moderation analysis was conducted to assess if PFC moderates the relationship between the independent variable (prevention group) and weight change. To examine moderation, a linear mixed model was conducted. The independent variables in the model were Prevention Group (Fit4Duty, health education), Visit (Baseline, End of Intervention, Follow Up), PFC (high vs. low), and pertinent interaction terms. The crucial test is the test of the 3-way PFC x Prevention Group x Visit interaction. A significant 3-way interaction would indicate that the effect of Prevention Group on weight over time differed by PFC.

Baron and Kenny (15) moderation analyses were conducted to assess if PFC moderates the relationship between prevention group and physical activity levels, measured in minutes. To examine moderation, a linear mixed model was conducted. The independent variables in the model were Prevention Group (Fit4Duty, health education), Visit (Baseline, End of Intervention, Follow Up), PFC (high vs. low), and pertinent interaction terms. The crucial test is the test of the 3-way PFC x Prevention Group x Visit interaction. A significant 3-way interaction would indicate that the effect of Prevention Group on weight over time differed by PFC.

For reasons described earlier, for the primary analyses PFC was coded as a binary variable (0 = “low PFC” (PFC score  $\leq 5.4$ ), 1 = “high PFC” (PFC score  $\geq 5.4$ )). In supplementary analyses, PFC was also used as a continuous variable; as described later the results did not change.

**Specific Aim 5: Determine the effect of intervention condition across time on measures of depression, emotional eating, weight stigma, and weight bias internalization.**

Mixed models were used to determine the effects Prevention Group, Time, and the Prevention Group x Time interaction, on depression, emotional eating, weight stigma, and weight bias internalization. In each case, the crucial test is the 2-way Prevention Group x Time interaction. A significant 2-way interaction would indicate that the change in depression, emotional eating, weight stigma, or weight bias internalization over time differed in two prevention groups.

### **Covariates**

Coefficients from linear mixed models may be biased if the missing data are not missing at random but are unbiased if missingness is “explained” by the predictors. The following 4 variables were included in all models: Rank, Income, Baseline BDI, and Baseline Weight Stigma (all coded as continuous variables). The rationale for inclusion of these variables as covariates is that each variable was significantly correlated with at least one “attrition” variable (and therefore correlated with “missingness”): Attrition before end of the program (0=No, 1=Yes), and Attrition before Follow Up (0=No, 1=Yes). Inclusion of these 4 variables as covariates should therefore make the coefficients less biased estimates of the true population coefficients. As noted above, Prevention Group was also included in all models.

## CHAPTER 6: RESULTS

### DESCRIPTIVE ANALYSES

A total of 136 participants signed up for the study, of which 121 participants met study inclusion criteria, and provided consent. Participant flow is depicted in Figures 5 and 6 for the body weight and physical activity data, respectively. Number of participants in each group varied from 3 to 16. Groups were led by two group facilitators. There were seven control groups ( $M = 7$ ;  $SD = 3.11$ , Range = 3-14), and there were eight active groups ( $M = 9$ ;  $SD = 3.81$ , Range = 6-16).

Participants were 121 active duty United States Army men and women ( $M$  Age = 31.42 years,  $SD = 7.58$ ;  $M$  BMI = 29.5 kg/m<sup>2</sup>,  $SD = 2.46$ ; 65.3% Caucasian/White, 15.7% African American/Black, 18.2% Other, .8% missing data). The BMI categorization at baseline was normal weight (6.6%) overweight (48.8%), and obese 1 (44.6%). The rank categorization for this sample was Junior enlisted (7.44%), NCO (65.29%), Junior Officers (14.05%), and Senior leadership (13.22%).

As shown in Table 2, the groups did not differ at baseline on race, sex, weight, age, rank or household income. There were no significant differences between prevention and control groups at baseline on Weight Stigma, Internalized Weight Stigma, Preference for Consistency, IPAQ-Met, Emotional Eating (anger, anxiety, and depression) or BDI-II. Data from the two groups by gender are reported in Table 3. Of note, there was a significant difference in body weight at baseline for women ( $M = 168.32$  lb.,  $SD = 19.07$ ) and men ( $M = 211.02$  lb.,  $SD = 20.94$ )  $t(119) = 10.86$ ,  $p = .000$ . Accordingly, there was also a significant difference in BMI at baseline for women ( $M = 27.74$  kg/m<sup>2</sup>,  $SD = 2.60$ ) and men ( $M = 30.30$  kg/m<sup>2</sup>,  $SD = 1.90$ ),  $t(119) = 5.54$ ,  $p = .000$ . Exploratory analyses revealed a significant difference in hours of

sleep at baseline for women ( $M = 6.38$  hrs.,  $SD = 1.21$ ) and men ( $M = 5.88$  hrs.,  $SD = .93$ )  $t(119) = -2.47, p = .02$ . There were no significant differences at baseline for number of people in household, baseline BDI, hours of sleep, or Emotional Eating (anger, anxiety, or depression subscales). Analyses revealed African American males ( $M = 242.32$  lb.,  $SD = 15.57$ ) weighed significantly more than Caucasian males ( $M = 211.88$  lb.,  $SD = 18.66$ ) or “other” ( $M = 197.14$  lb.,  $SD = 20.31$ ) participants,  $F(2, 114) = 111.26, p < .000$ . For women, weight results were not statistically significant; African American ( $M = 176.65$  lb.,  $SD = 5.00$ ), Caucasian ( $M = 162.47$  lb.,  $SD = 4.41$ ), and “Other” females ( $M = 167.65$  lb.,  $SD = 6.62$ )  $p > .05$ . A chi-square statistic was calculated to examine if there was a difference in intervention program composition by gender. The test was not found to be statistically significant ( $X^2(1, n = 121) = .223, p > .05$ ). Overall, there was an 18.2% attrition rate at post intervention, and a 33.9% attrition rate at one year follow up. There was a 4.1% attrition rate within the Health Education group and a 14% attrition rate within the Fit4Duty prevention group at post intervention. Lastly, there was a 10.7% attrition rate within the Health Education group and a 23.1% attrition rate within the Fit4Duty prevention group at one year follow up. A chi-square statistic was calculated to examine if there was a difference in attrition by intervention program at post intervention and one year follow up. The tests were not found to be statistically significant post program ( $X^2(1, n = 121) = 3.52, p > .05$ ) or at one year follow up ( $X^2(1, n = 121) = 1.99, p > .05$ ).

Gender was not associated with attrition before end of treatment (Chi Square = 0.13,  $df = 1, p = .72$ ). or attrition at follow up (Chi Square = 0.35,  $df = 1, p = .55$ ). Likewise, Race was not associated with attrition before end of treatment (Chi Square = 0.60,  $df = 2, p = .74$ ). or attrition at follow up (Chi Square = 1.95,  $df = 2, p = .38$ ).

The mean BDI-II score of the participants at baseline ( $N = 121$ ) was 9.98 ( $SD = 8.29$ ). As shown in Table 4, the Fit4Duty group had a mean of 10.46 ( $SD = 7.47$ ), while the Health Education control group had a mean of 9.29 ( $SD = 9.39$ ). Both groups were categorized as having “minimal” depressive symptoms. The mean Emotional Eating Subscale – Anger/Frustration score of the participants at baseline ( $N = 118$ ) was 9.59 ( $SD = 4.00$ ). As shown in Table 4 at baseline, the Fit4Duty group had a mean of 9.56 ( $SD = 4.18$ ), while the Health Education control group had a mean of 9.64 ( $SD = 3.76$ ). The mean Emotional Eating Anxiety Subscale score of the participants at baseline ( $N = 119$ ) was 7.92 ( $SD = 3.27$ ). As shown in Table 4 at baseline, the Fit4Duty group had a mean of 7.90 ( $SD = 3.30$ ), while the Health Education control group had a mean of 7.96 ( $SD = 3.26$ ). The mean Emotional Eating Depression Subscale score of the participants at baseline ( $N = 114$ ) was 20.09 ( $SD = 7.45$ ). As shown in Table 4, at baseline the Fit4Duty group had a mean of 19.49 ( $SD = 7.15$ ), while the Health Education control group had a mean of 20.99 ( $SD = 7.86$ ). The mean scores for anger and anxiety subscales did not meet the clinical threshold for emotional eating, although the mean score for the depression subscale did meet the clinical threshold. The mean Weight Stigma score of the participants at baseline ( $N = 121$ ) was 34 ( $SD = 13.24$ ). As shown in Table 4, at baseline the Fit4Duty group had a mean Weight Stigma Score of 34.60 ( $SD = 14.74$ ), while the control group had a mean of 33.11 ( $SD = 10.77$ ). The mean Weight Bias Internalization score of the participants at baseline ( $N = 121$ ) was 3.86 ( $SD = 1.01$ ). As shown in Table 4, the Fit4Duty group had a mean of 3.99 ( $SD = 1.05$ ), while the control group had a mean of 3.66 ( $SD = .91$ ). There are no clinical norms established for Weight Bias Internalization. All nominal categories and frequencies for BMI, BDI-II, Emotional Eating and Physical activity are presented in Table 5 (Table 5)

As noted earlier, due to concerns about missing data across time points (e.g., increasing numbers of missing data as participants progressed through intervention program), mixed model linear analyses with maximum likelihood estimation were used when appropriate, in lieu of least-squares multiple regression analyses. Due to the relatively small sample size, a limited number of covariates were included in analyses, as identified earlier (i.e., Rank, Income, Baseline BDI, Baseline Stigma). These covariates were either associated with either attrition post-intervention or at follow-up. Additionally, when necessary, categorical variables with multiple categories (e.g., race) were converted to binomial variables (e.g., white; non-white) to improve reliability by pooling participants (i.e., increasing sample sizes within categories).

### **Specific Aim 1. Experiences of Weight Stigma**

The goal of this set of analyses was to describe the experiences of weight stigma within this active duty army sample. More specifically, the goal of this aim was to determine primary experiences of weight stigma in the workplace, the sources of stigmatizing experiences and remarks, and to determine if demographic characteristics were associated with experienced stigma.

Experiencing teasing remarks by coworkers and/or supervisors was assessed using Experiences and Sources of Weight Stigma Questionnaire (131). Participants in the Fit4duty group did not differ from participants in the health education control groups on baseline measures of experiences of weight stigma. Of the 121 participants who responded to this questionnaire, 7 (5.8%) reported experiencing jokes about weight only from coworkers and supervisors, and 3 (2.5%) reported experiencing jokes about shape only from coworkers and supervisors. A total of 22 (18.2%) reported experiencing jokes about both weight and body shape from coworkers and supervisors, leaving a combine total of 32 (26.4%) having

experienced jokes about either their body weight or their body shape from coworkers or supervisors.

The primary relationships associated with disparaging remarks about weight or body shape were coworkers' relationships ( $n=21$ ), supervisor relationships ( $n=18$ ), the physical training leader or person weighing or taping service members ( $n=20$ ), friends ( $n=12$ ), significant others ( $n=9$ ), and primary care managers ( $n=5$ ). Seventy-one-point nine percent of participants denied experiencing disparaging remarks from someone with whom they had a close relationship ( $n=87$ ), 14% ( $n=17$ ) reported experiencing disparaging remarks from one close relationship, 8.3% reported these remarks from two close relationships ( $n=10$ ), and 5.8% reported these remarks from three or more close relationships ( $n=7$ ).

**Specific Aim 2. Determine the relationship between weight stigma and mental health indices.**

The second aim of this study was to determine the relationship between weight stigma and key mental health indices, namely depressive symptoms, weight bias internalization, and emotional eating. Correlation coefficients were computed to assess the relationships among age, sex, rank, BDI scores at baseline, weight stigma, weight bias internalization, and emotional eating. For pairs of variables that were continuous, Pearson's correlation was used while Spearman's correlation was used for any pair containing an ordinal variable. The correlation matrix is presented in Table 6. Weight stigma, BDI scores at baseline, weight bias internalization, and emotional eating were analyzed as continuous variables. Sex was analyzed as a binary variable, male = 0 and female = 1. Rank was analyzed as an ordinal variable with four categories: Junior Enlisted Officer = 1, Non-Commissioned Officer = 2, Officer = 3, and Senior NCOs and Senior Officers = 4.

Depressive symptomatology, as measured by the BDI-II, was positively correlated with weight stigma ( $r = .55, p < .001$ ), weight bias internalization ( $r = .65, p < .001$ ), and emotional eating ( $r = .31, p < .001$ ). Weight stigma was positively correlated with weight bias internalization ( $r = .40, p < .001$ ) and emotional eating ( $r = .29, p < .001$ ). Additional exploratory analyses demonstrated that weight stigma was also positively correlated with depressive emotional eating ( $r = .33, p < .001$ ), anxious emotional eating ( $r = .36, p < .001$ ), and BMI ( $r = .23, p < .05$ ). Weight bias internalization was positively correlated with depressive symptoms ( $R_p = .65, p < .001$ ), Anxious Emotional Eating ( $R_p = .20, p < .05$ ), and depressive emotional eating ( $R_p = .40, p < .001$ ). Race (White vs. Black vs. Other) was not associated with Weight Stigma,  $F(2, 117) = 1.74, p = .18$ , or Weight Bias Internalization,  $F(2, 117) = 0.28, p = .76$ .

**Specific Aim 3: Determine the relationship between internalized weight stigma and program adherence, physical activity and body weight change.**

A multiple linear regression with adherence as the dependent variable revealed a significant effect of Prevention Group (0 = Health Education, 1=Fit4Duty) ( $B = 0.12, SE = 0.06, t = 2.13, p = .04$ ), which is depicted in Figure 7 (Figure 7), when controlling for and Rank, Income, Baseline BDI, and Baseline Weight Stigma, indicating that adherence was higher in the Fit4Duty condition ( $M = .71, SD = .34$ ) than the Health Education condition ( $M = .62, SD = .17$ ). In an additional model, gender, LOC eating, Marital Status, Age, Number of Health Conditions, Hours of Sleep, and Number of People in House were included as additional predictor variables. In the full model, only Gender (0=Male, 1=Female) was significant, ( $B = -0.13, SE = 0.06, t = -2.21, p = .03$ ), with females having lower levels of adherence than males. Race (White vs. Black vs. Other) was not associated with adherence,  $F(2, 117) = 0.53, p = .59$ .

A linear mixed model conducted with weight as the dependent variable, and including Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates, revealed a significant Prevention Group x Visit interaction,  $F(2, 134) = 3.30, p = .04$ ), which is depicted in Figure 8 (Figure 8). The simple Prevention Group x Visit interaction comparing baseline with follow-up was significant ( $B = -5.46, SE = 2.15, t = -2.54, p = .01$ ). Individuals in the Health Education group gained weight between baseline and follow-up, (FU vs. Baseline:  $B = 3.81, SE = 1.56, t = 2.44, p = .02$ ), whereas individuals in the Fit4Duty group did not (FU vs. Baseline:  $B = -1.66, SE = 1.45, t = -1.15, p = .26$ ). In an additional model the Baseline Weight Stigma x Visit interaction was tested; this was not significant ( $p = .35$ ).

A linear mixed model conducted with total activity as the dependent variable, including Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates, did not reveal a significant Prevention Group x Visit interaction,  $F(2, 119) = 0.05, p = .95$ ). As shown in Figure 9 (Figure 9), there was a significant main effect of time,  $F(2, 118) = 10.62, p < .0001$ , with activity level declining over time. In an additional model, the Baseline Weight Stigma x Visit interaction was tested; this was not significant ( $p = .35$ ).

Overall, for Aim 3 there was some evidence that participants in the Fit4Duty group had higher adherence than those in Health Education. In addition, there was evidence that Fit4Duty prevented weight gain over time. There was no evidence that internalized weight stigma was associated with adherence, weight change, or change in activity over time.

**Specific Aim 4: Determine if Preference for Consistency influences the strength of the relationship between prevention group, physical activity and weight change.**

The effect of condition on program adherence, weight change across time points, and physical activity across time points when moderated by preference for consistency was

examined. A linear mixed model was conducted to examine whether PFC (“low” vs high”) moderated the effect of Prevention Group on weight over time. The model included binary PFC (2 levels), Prevention Group (2 levels), and Week (3 levels) as factors, and Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates. The 3-way binary PFC x Prevention Group x Week interaction was not significant,  $F(2, 127) = 1.08, p = .34$ , indicating that there was no evidence that PFC group (“low” vs “high”) moderated the effect of Prevention Group on weight over time as depicted in Figure 10 (Figure 10). A second linear mixed model was conducted to examine whether PFC (“low” vs high”) moderated the effect of Prevention Group on physical activity (totalmetmin) over time. The 3-way binary PFC x Prevention Group x Week interaction was not significant,  $F(2, 111) = 0.76, p = .47$ , indicating that there was no evidence that PFC group (“low” vs “high”) moderated the effect of Prevention Group on physical activity over time.

Although a rationale was provided to code PFC as a binary variable (described in the methods section), exploratory analyses were conducted using PFC as a continuous variable. When weight was the dependent variable, the 3-way (continuous) PFC x Prevention Group x Week interaction was not significant,  $F(2, 130) = 0.85, p = .43$ , and the same was true when physical activity (totalmetmin) was the dependent variable,  $F(2, 117) = 0.77, p = .47$ .

For the above models, the PFC x Prevention Group x Week interaction was not significant for contrasts of Time 1 (Baseline) vs. Time 2 (EOT), and Time 1 (Baseline) vs. Time 3 (Follow Up).

**Specific Aim 5: Determine the effect of intervention condition across time on measures of depression, emotional eating, weight stigma, and weight bias internalization**

The effect of condition across time on measures of depression, emotional eating, weight stigma, and WBIS was examined. Specifically, the differential impact of conditions on these measures across time was examined using mixed model linear analyses. A linear mixed model was conducted to examine the effect of Prevention Group (Fit4Duty vs Control) on BDI-II over time. The model included Prevention Group (2 levels), and Week (3 levels) as factors, and Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates. The 2-way Prevention Group x Week interaction was not significant,  $F(2, 202) = 0.13, p = .88$ , indicating that there was no evidence that Fit4Duty reduced BDI scores more over time than the Control group (Figure 11).

A linear mixed model was also conducted to examine the effect of Prevention Group (Fit4Duty vs Control) on EES over time. The model included Prevention Group (2 levels), and Week (3 levels) as factors, and Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates. The 2-way Prevention Group x Week interaction was not significant,  $F(2, 123) = 0.72, p = .49$ , indicating that there was no evidence that Fit4Duty reduced EES scores more over time than the Control group (Figure 12).

A linear mixed model was also conducted to examine the effect of Prevention Group (Fit4Duty vs Control) on EES-Anger over time. The model included Prevention Group (2 levels), and Week (3 levels) as factors, and Rank, Race, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates. The 2-way Prevention Group x Week interaction was not significant,  $F(2, 114.60) = .51, p = .60$ , indicating that there was no evidence that Fit4Duty reduced EES-Anger scores more over time than the Control group (Figure 13).

A linear mixed model was also conducted to examine the effect of Prevention Group (Fit4Duty vs Control) on EES-Anxiety over time. The model included Prevention Group (2

levels), and Week (3 levels) as factors, and Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates. The 2-way Prevention Group x Week interaction was not significant,  $F(2, 125.92) = 0.36, p = .70$ , indicating that there was no evidence that Fit4Duty reduced EES scores more over time than the Control group (Figure 14).

A linear mixed model was also conducted to examine the effect of Prevention Group (Fit4Duty vs Control) on EES-Depression over time. The model included Prevention Group (2 levels), and Week (3 levels) as factors, and Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates. The 2-way Prevention Group x Week interaction was not significant,  $F(2, 106.35) = 0.16, p = .85$ , indicating that there was no evidence that Fit4Duty reduced EES-Depression scores more over time than the Control group (Figure 15).

A linear mixed model was also conducted to examine the effect of Prevention Group (Fit4Duty vs Control) on weight stigma over time. The model included Prevention Group (2 levels), and Week (3 levels) as factors, and Rank, Income, Baseline BDI, and Baseline weight stigma as level 2 covariates. The 2-way Prevention Group x Week interaction was not significant,  $F(2, 181) = 0.97, p = .38$ , indicating that there was no evidence that Fit4Duty reduced weight stigma scores more over time than the Control group (Figure 16).

A linear mixed model was also conducted to examine the effect of Prevention Group (Fit4Duty vs Control) on WBIS over time. The model included Prevention Group (2 levels), and Week (3 levels) as factors, and Rank, Income, Baseline BDI, and Baseline Weight Stigma as level 2 covariates. The 2-way Prevention Group x Week interaction was not significant,  $F(2, 145) = 0.05, p = .95$ , indicating that there was no evidence that Fit4Duty reduced WBIS scores more over time than the Control group (Figure 17). For the analyses contrasts, the Prevention

Group x Week interaction was not significant for contrasts of Time 1 (Baseline) vs. Time 2 (EOT), and Time 1 (Baseline) vs. Time 3 (Follow Up).

## CHAPTER 7: DISCUSSION

Given the trajectory of overweight and obesity in the U.S. military and the emotional, occupational, and medical consequences of falling outside of the healthy weight range, a more thorough understanding of the effects of weight stigma on the management of weight and health is needed to promote effective weight management practices for servicemembers. Long held beliefs regarding self-discipline and moral approaches to weight may be detrimental to promoting health behaviors, particularly among those struggling to maintain weight. Additionally, weight gain prevention efforts are needed along with better tailored /customization of weight management programs to provide a customized approach to refer service members to appropriate weight management programs. The purpose of this study was to examine experiences of weight stigma among active duty soldiers presenting to a weight gain prevention program and then to examine the relationship between weight stigma and program outcomes to include program adherence, weight change, and physical activity.

In general, adherence was higher for the active prevention group and males demonstrated higher rates of adherence than female soldiers. There were no other notable differences between males and females with regard to household support, depressive symptoms, or emotional eating that might account for differences in adherence. Women weighed less and had lower BMIs than male soldiers. Soldiers in the Health Education group gained weight between baseline and follow up whereas those in the prevention group did not. Activity level declined over time, although this was irrespective of intervention program. Contrary to hypotheses, PFC did not influence the relationship between prevention group and weight, or physical activity. Neither prevention group, nor time affected symptoms of depression, emotional eating, weight stigma, or weight bias internalization.

Most participants fell within normal limits, or mild symptoms of depression on the BDI-II, except for the final Fit4Duty group, which had more participants who fell within the moderate range of depressive symptoms. While most participants fell within normal limits with regard to anger and anxiety based emotional eating, nearly one third of the population sample endorsed binge eating accompanying depressive symptoms. Although emotional eating subscales did not predict dropout, depressive emotional eating represents a barrier to weight management within the active duty population and another problem that should be effectively targeted to address overweight and obesity in the military.

### **Experiences of Weight Stigma**

Reports of weight-based stigma in the workplace exist for almost a quarter of this sample. And, while this is less than the over 50% a civilian cohort reporting stigma, it still represents a potentially significant public health problem within the military. Particularly when put in the context of body weight. Military members weigh less than their civilian counterparts. And, experiences of stigma were associated with increased body weight. Less than ten percent of the sample reported experiencing jokes about weight only, less than five percent of the sample reported experiencing jokes about their body shape only, and approximately one quarter of the sample reported experiencing jokes about both weight and body shape from coworkers and supervisors. These reports are lower than a civilian cohort of treatment seeking individuals where 54% reported stigmatizing remarks from coworkers and supervisors (133). However, the treatment seeking civilian population was heavier with 56% of the sample falling within the obese 2 or obese 3 categories (133). Reports of weight stigma in the workplace were lower than that reported by civilians; however, this population which was generally of lower weight,

reported weight stigma. There was a positive relationship between BMI, with obese soldiers reporting higher levels of weight stigma than soldiers who were overweight.

The majority of this sample denied experiencing disparaging remarks from someone with whom they shared a close relationship. For those who did experience disparaging remarks, coworkers and supervisors were the most common perpetrators. These results contrast from civilian studies where spouses were most commonly perpetrating stigmatizing language and employers were the least common aggressors (53).

### **The relationship between weight stigma and mental health indices**

Depressive symptoms were positively correlated with weight stigma, weight bias internalization and emotional eating overall. Consistent with the literature on obesity and weight stigma, which has found that weight stigma is a significant risk factor for depression, these findings have demonstrated a strong relationship between weight stigma and depression (130). Additionally, other studies have demonstrated a strong relationship between weight stigma, unhealthy eating behaviors such as binge eating (172). These findings do not address the directionality of the relationship between weight stigma and other psychological factors. And it is important to consider that this relationship may be accounted for by another factor, such as an attribution bias or a negative interpretation bias. For example, individuals with higher depression scores may be more likely to interpret emotionally ambiguous interactions with others in a negative manner (91).

The weight stigma demonstrated in western culture through negative beliefs, ridicule and discrimination paired with weight stigma demonstrated in interpersonal and/or work relationship may serve to further isolate overweight or obese servicemembers creating an additional barrier to engaging in health behaviors (83). Thus, experiences or reports of weight stigma may point to a

marker to use to engage individuals in a larger discussion about personal health and wellbeing. Reaction to stigma is not universal and it is unclear what factors differentiate individuals who experience social identity threat and increase their drive to prove others wrong in comparison to those who withdraw. This is an area for future research. Elevated self-report measures across weight stigma and depression suggests that those with elevations in weight stigma and/or depression may need additional support with achieving optimal health related outcomes.

Weight stigma was positively correlated with Weight Bias Internalization and Emotional Eating, and BDI was positively correlated with Weight Bias Internalization and Emotional Eating. Consistent with the literature, weight bias internalization within this population appeared to be linked to other self-reported distress including depressive symptoms and emotional eating (124; 135). This then suggests that elevated weight stigma is associated with internalized beliefs that one deserves to be stigmatized and discriminated against due to their weight. Such beliefs are not uncommon among stigmatized groups. The consequences of buying into society's beliefs, however, are daunting. For this study, we saw that internalized weight stigma was associated with increased risk of eating pathology. This relationship is important because weight bias is associated with adverse health outcomes and subsequent increased mortality risks above and beyond obesity itself (130; 163). Thus, the most stigmatized individuals may be likely to engage in maladaptive coping mechanisms, which increase health risk and provide additional barriers to effectively managing their weight. For the military, an organization that takes responsibility for the health and wellbeing of its members in an effort to maintain readiness and national security, mitigating weight stigma and the potential negative cascade that follows from it must clearly be prioritized.

### **The relationship between internalized weight stigma and program outcomes**

The Fit4Duty prevention group demonstrated greater program adherence than the health education control group. They evidenced better attendance, regardless of internalized weight stigma scores. This could be evidence that the use of a cognitive dissonance-based weight gain prevention program is effective in overcoming barriers presented by antifat bias and subsequently increasing engagement in health behaviors. Amongst a long list of covariates included within the model predicting adherence, gender was the only variable that produced significant findings with women less adherent. The literature on the relationship between gender and adherence is mixed. In some studies, researchers have found that being male was a significant predictor of attrition in weight management programs as well as non-adherence, wherein others have demonstrated that women evidenced lower adherence (92; 93). Other research has demonstrated that people who are of the minority group have both poorer attendance, and poorer adherence (140; 142). Although race and gender were not associated with attrition, in the context of gender, this minority group phenomena could explain why women, the minority of the population in the military and in these prevention groups, demonstrated poorer adherence than their male counterparts.

Methodological differences exist among various weight gain prevention or weight management studies in defining or operationalizing adherence, which can include adherence to energy/calorie objectives, tracking, attendance, and physical activity. This study, however, did not distinguish between the various aspects of adherence and instead focused primarily on attendance. Adherence was not associated with weight change. Providing the complex nature of weight management, with the methodology used to assess adherence, it is unclear if the intervention resulted in effective behavior change or if some other extraneous variable influenced the results.

## **Preference for Consistency as a mechanism of change**

Preference for Consistency (PFC) did not predict program outcomes. PFC was conceptualized as a means to operationalize a key factor that would predict performance in a dissonance-based prevention program. That is, as individuals were taught to adhere to one way of acting and believing, their preference for consistency would result in them behaving in concert with program recommendations. These recommendations included eating healthier and engaging in physical activity. Though we did see prevention of excess weight gain for the F4D group, we did not see a relationship between this outcome and PFC. Those with greater need for consistency did not differ from those lower in this need. Although evaluating a cognitive dissonance intervention within a military population is novel, a lack of significant effect in this study does not negate the basic conceptual framework of cognitive dissonance theory. It could simply be an added challenge of working within the military system. In order for dissonance theory to be effective, a choice must be present. Specifically, for cognitive dissonance to be induced, one must have the perception of choice. Inherently younger enlisted service members are more susceptible to command influence, and therefore may feel less freedom of choice. This could pose some complications with regard to prevention efforts within the military as weight is often emphasized at the command level. Development of a peer led program for healthy lifestyle could reduce the appearance of command influence with reference to referrals for weight management resources and offer a more supportive environment for service members who struggle with their weight.

## **Prevention group, time, and emotional indices of functioning**

Analyses also did not support anticipated changes in the prevention group on indices of emotional functioning such as depression, emotional eating, weight stigma or weight bias

internalization. In general, most participants depressive symptoms were within normal limits at all three time points. Changes on the measure of emotional eating did not reach clinical significance across time point or prevention group. Depressive emotional eating was the only subscale score that represented clinical levels of disordered eating as demonstrated in validation studies (85). Finally, changes on the measure of weight bias internalization did not reach clinical significance across time point or prevention groups. Even weight bias internalization scores remained within normal limits for both groups at all three time points.

## **STUDY STRENGTHS**

This study raises some interesting thoughts for consideration with relation to dissonance prevention efforts and their effectiveness within a military population. Overall, participants in the Fit4Duty dissonance-based program did better than the health education control group by demonstrating weight maintenance over time, while the control group gained weight between baseline and one year follow up. These results suggest that the approach may have merit for preventing weight gain. Given the short prevention program (6 weeks), these findings are worth following up.

The mechanism of action with regard to this intervention remains unclear. Preference for consistency may not influence susceptibility to cognitive dissonance interventions. Focus of the sessions included topics such as maintaining healthy lifestyle for the service member and for the wellbeing of their family. Topics also included the benefits of adherence to Army fitness standards and how it would affect their effectiveness in combat. Imbedded within the prevention program were the connection between fitness program and intentions for participants as soldiers, as mentors, and fulfilling their roles in combat. The nature of this dissonance intervention shares similarities with motivational interviewing techniques, such that it

emphasizes a collaborative relationship, highlights the individual's autonomy to change, and makes connections with the patient's goals and values for health, family, and their role as soldiers.

Dissonance should be further examined within the context of rank. Furthermore, emphasis on healthy weight and healthy lifestyle choices may be important to emphasize to individuals immediately upon leaving technical school, and before service members are able to resort to unhealthy behaviors learned prior to entering the service. Moreover, a peer led program could reduce organizational pressure, and possibly even promote a sense of choice in relation to weight management resources. Notably due to the rules, regulations, and policies deeply embedded within the Department of Defense culture, there remains an element of reduced choice or free will for service members.

Additionally, this study expands on existing research on the topic of weight stigma, and more specifically it evaluates weight stigma within the workplace. Researchers have identified the significance of biological, psychological and social factors in contributing to adverse health consequences, however limited studies have evaluated weight stigma in the context of the workplace, and even more specifically weight stigma amongst the active duty military population (121; 130).

This study also expands upon existing literature with regard to experiences of weight stigma and various mental health indices. Previous studies have suggested frequent experiences of weight stigma are positively associated with general psychiatric symptoms, psychological distress, and global psychological symptoms (58). Six additional studies found a significant positive relationship between weight stigma and depression (55; 58; 81; 87). Although within these studies greater depressed mood was associated with older age and lower education for

white obese patients, and “ignoring negative interactions” among African American obese patients (55). More frequent stigmatizing experiences were found to be significantly related to higher depressive symptoms. The factors contributing to success for stigmatized individuals within weight management programs has not yet been clarified, therefore it is important for researchers to address how to effectively engage stigmatized individuals with severe depression in weight management resources. In this program, depression did account for 20% of the variance in program adherence. Therefore perhaps a stepwise approach to care could be most effective for meeting patients at their basic level to ensure adequate engagement and successful outcomes in weight management programs. Future directions for research could include evaluating outcome variables for multiple weight management programs while considering their levels of stigmatizing experiences, depression rates, and emotional eating.

This study also adds to the literature with regard to program adherence within a weight management prevention intervention, cognitive dissonance, and weight stigma. Results from this study suggested a negative relationship between BDI and adherence, although it did not provide a significant relationship between weight stigma and adherence (121). Although the literature suggests that weight stigma may significantly predict program adherence, this was not clearly demonstrated within this study. Instead, we found that there may be clinical implications for individuals who report elevations in depressive symptoms. Those participants with higher BDI scores were less likely to remain engaged with this weight gain prevention program. This could signify the importance of ensuring patients with comorbid depression and obesity receive coordinated care to effectively target both health risks.

## **LIMITATIONS**

The study had several limitations including generalizability of the findings beyond the sample, study drop out during follow up, and measurement of outcome variables. The study sample differed from the active duty population on several demographic characteristics including age, sex composition, race, marital status, and rank. Approximately one third of study participants were women, which represents an approximate 100% higher representation of women in comparison to the active duty army population (152). Individuals who identified as Multiracial/other were overrepresented in this study, comprising approximately nearly one fifth of the study sample compared to 7% of the active duty force (152). This may simply represent a problem with the race/ethnicity categorization of participants as categorization or race/ethnicity/culture remains difficult to pinpoint while maintaining significant power in research. On the other hand, it could suggest that this population may need further assistance with health and weight loss efforts. The literature demonstrates that African American women are generally more overweight and have difficulty maintaining weight loss than Caucasian women. In this study African American women were more overweight than Caucasian women, although race was not predictive of program outcomes or attrition. Upon evaluating predictors of intervention outcome such as adherence, physical activity, and weight change, gender was the only significant predictor of intervention adherence. Females attended fewer follow-up sessions than male counterparts.

Altogether, the data on rank suggest the sample represents a subset of the military population primarily composed of noncommissioned officers with a higher proportion of females and multiracial military service members than surveillance studies estimate the composition of the total force. While these factors could limit the generalizability of the study findings, it also could suggest demographic characteristics associated with overweight/obesity within the

military. In one surveillance study, researchers estimated females represent over 50% of the obese service member population (11). Similarly to other obesity studies of the military population, the prevalence of obesity is significantly associated with race and/or ethnicity (151). The prevalence of obesity is often greater among non-Hispanic African Americans/Black individuals than among non-Hispanic whites or Hispanics, and this population seems to adequately represent the overweight/obese civilian population. Finally, the significant presence of noncommissioned officers within this population may demonstrate a population at risk for overweight and obesity, which could highlight the need for future prevention efforts from a public health perspective.

Although consistent with the literature with reference to participants being lost to follow up in weight management studies, in this study an estimated 50% of the population was lost to follow up. The reasons varied from permanent change of station, to separation from active duty, which presents some difficulties in interpreting the data. This population is particularly vulnerable to stress associated with weight stigma, which could result in a significant proportion of the population being lost to follow up. Incomplete outcome data due to participant attrition often weakens both the internal and external validity. Within this study, there were few analyses that resulted in statistical significance despite the body of literature on cognitive dissonance and health behaviors. Within this study, there may also be weakened external validity such that the sample included only active duty army personnel, and the army has a culture that differs significantly from both the civilian, and other military branches.

Researchers did not identify career fields among this population, and according to several army leaders, this perspective could be unique to servicemembers within the combat arms professions. Within these populations, significant emphasis is placed on physical appearance

and physical fitness capabilities. As such a greater emphasis could be placed on leaders within the combatant career fields than those in noncombatant professions.

This sample also consisted primarily of treatment seeking servicemembers who were classified as overweight or obese. Treatment-seeking individuals within the civilian population are often characterized as experiencing greater distress and greater psychopathology than community samples due to weight. As such, this also limits reports to individuals who are overweight and obese rather than included the total military population who may also experience stigma and psychopathology, but they are not actively engaged in a weight management program despite experiencing stigma and/or struggling with weight management concerns.

Finally, one should note some methodological limitations. First, as noted earlier, participants were treated in groups, which may lead to clustering of responses and violation of the assumption that residuals are independent of one another, resulting in p values which are anticonservative. Future research with this sample and other similar samples can examine whether there is sufficient clustering to warrant analysis using a linear mixed model, which takes into account clustering and yields appropriate p values. Second, although participants were randomly assigned to groups (clusters), toward the end of the study all participants were assigned to the Fit4Duty condition, which has the potential to undermine the internal validity of the study. Note, however, that the Fit4Duty and Control groups generally did not differ on study covariates.

## **FUTURE DIRECTIONS**

This study suggests the Fit4Duty program may be an effective strategy for preventing weight gain within the active duty military population in comparison to health education standard interventions. Fit4Duty may provide benefits to servicemembers through identifying

specific health behaviors that need to be addressed in order to support their weight management efforts at a relatively low cost.

Providing that this prevention effort was intended to serve as a weight gain prevention program, it would likely be most beneficial if used among a younger sample of active duty service members, rather than amongst a population that may be facing career ramifications for failure to meet standards. If active duty service members are within regulations, the DoD may be able to mitigate the risk of weight gain, subsequent weight stigma, and negative health consequences for service members early in their career.

It will be important for future studies to evaluate weight stigma within a larger sample of the military population to enhance the generalizability of findings. This could afford weight management researchers the opportunity to understand weight stigma in the context of the greater military system. Providing that weight stigma is commonly associated with health avoidant behaviors, educating leaders on how to most effectively engage with their service members who are overweight or obese could be beneficial from the population health perspective.

As demonstrated through the extensive background of weight management, and weight loss studies; obesity is a complex issue that often has multiple factors which may become barriers for effective weight loss or engagement in health behaviors that may lead to weight loss. Several variables were included as covariates, although due to the nature of this study being significantly underpowered inclusion of factors such as command support, history of “yo-yo dieting,” and the inclusion of multiple predictors of adherence such as homework completion in addition to attendance, sleep, experiences of discrimination, and family support for health related behaviors would be beneficial to include in future studies.

**Figure 1. Dissonance Paradigm**

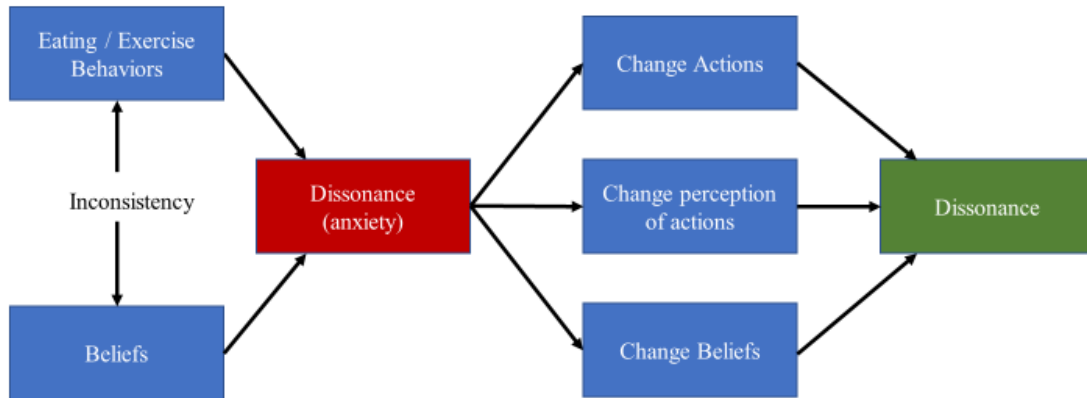


**Figure 2. Low Preference for Consistency effects on behavior**

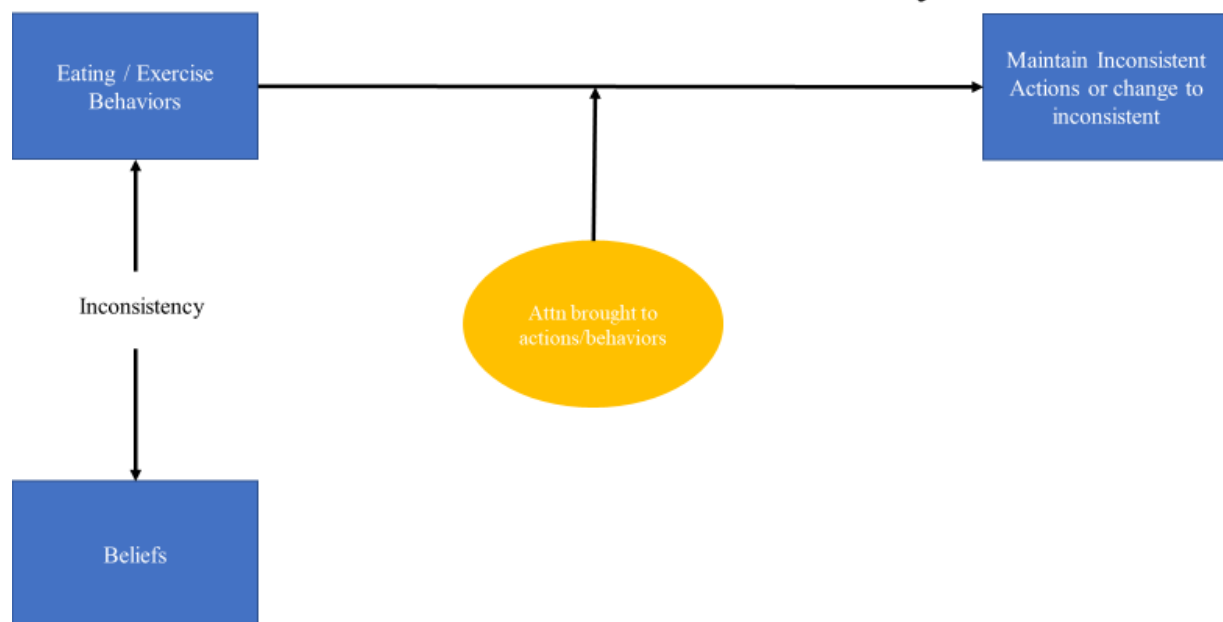


**Figure 3. Conceptual Model**

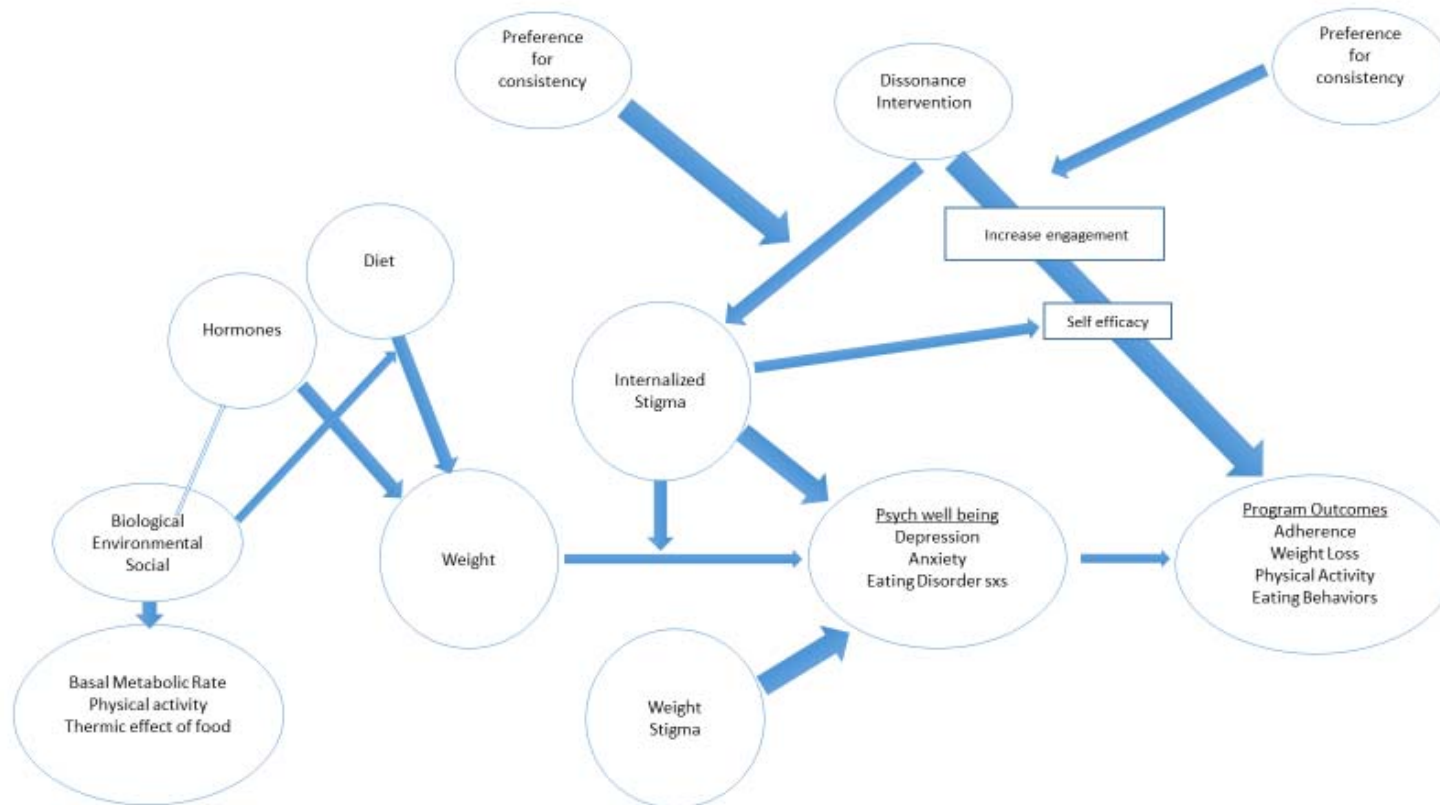


**Figure 4. Effect by prevention condition**

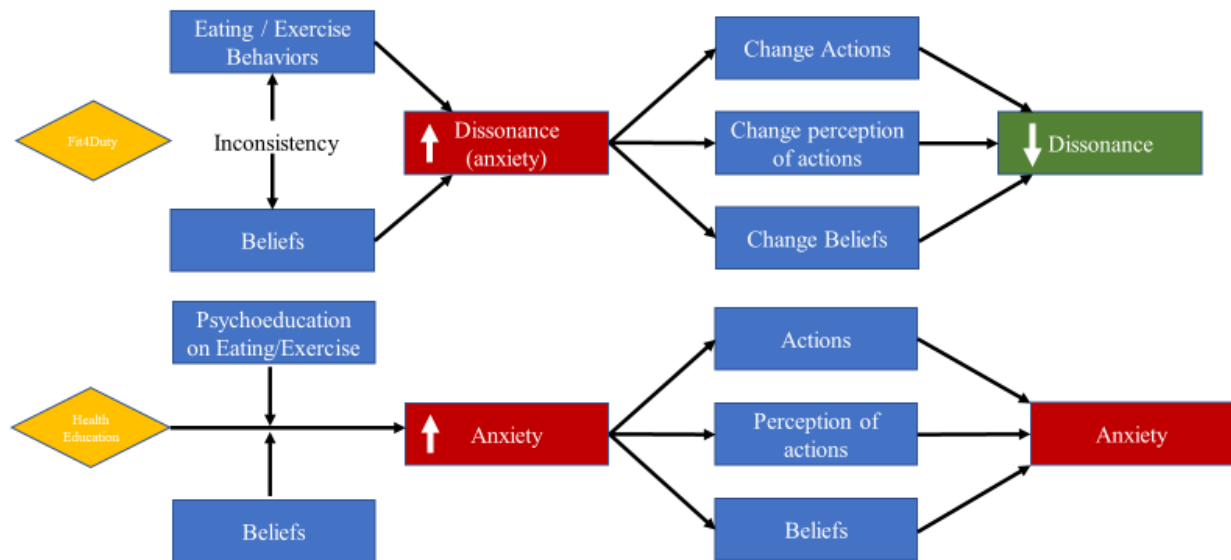


**Figure 5. Participant Flow Diagram – Body Weight**

## CONSORT Flow Diagram

Body Weight

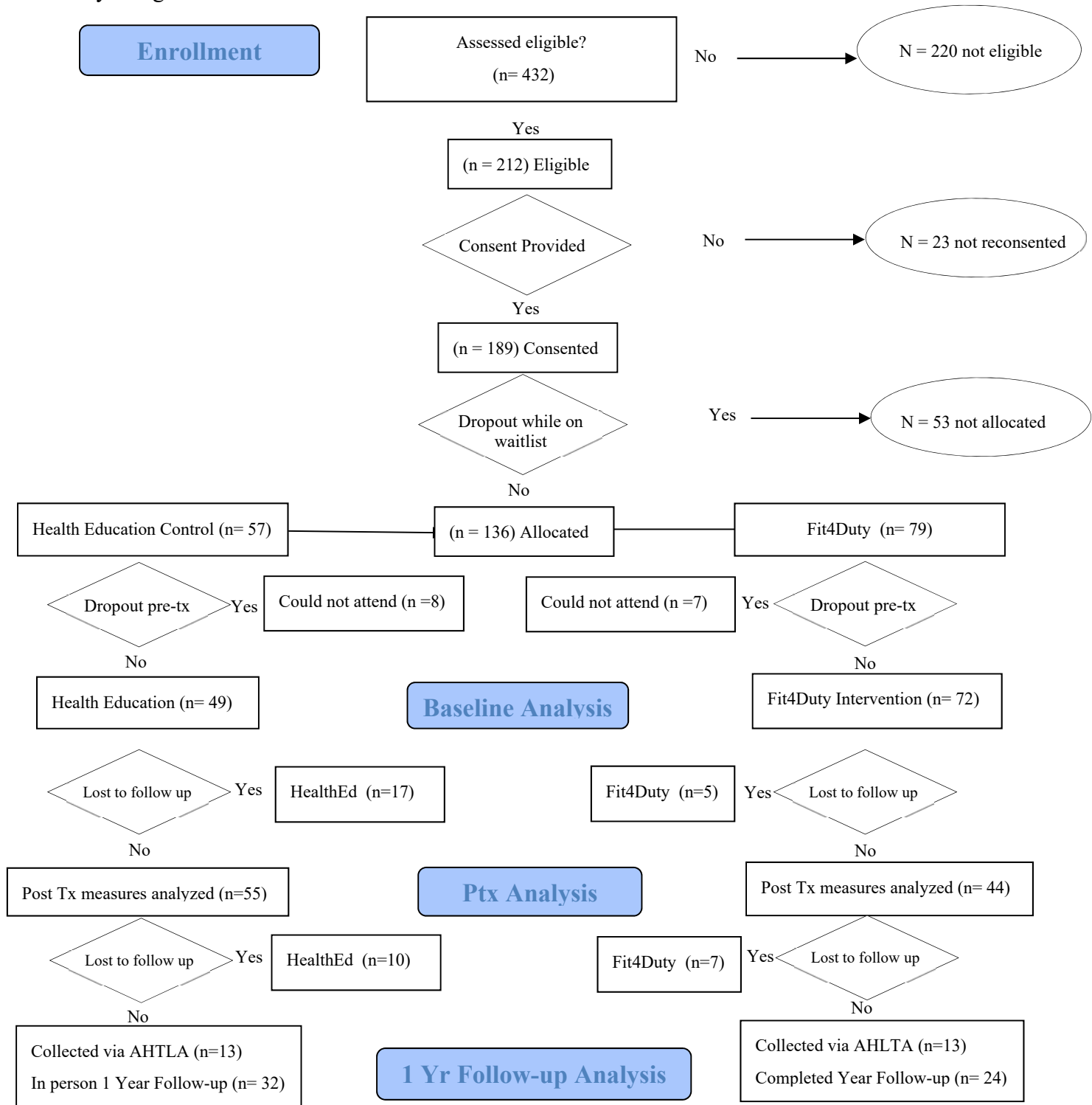
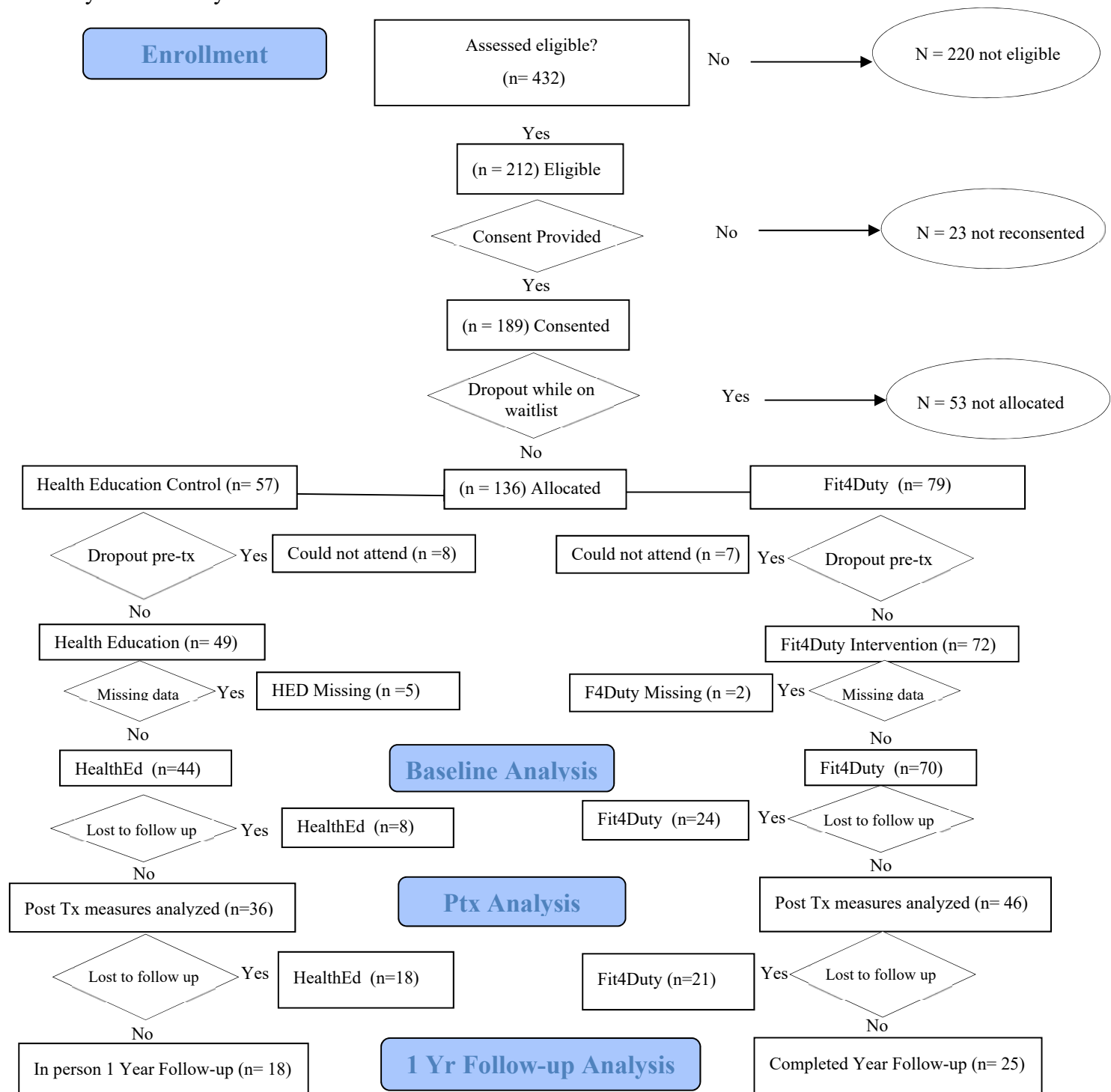


**Figure 6. Participant Flow Diagram Physical Activity**

# **CONSORT Flow Diagram**

## Physical Activity



\*\*Participants were initially randomized into treatment/control conditions. Due to low enrollment and problems associated with IRB and reconsent; participants were primarily assigned to the F4D condition for waves two and three via simple assignment. Further discussed as a limitation in the discussion section of this study.

**Figure 7. Adherence by Condition**

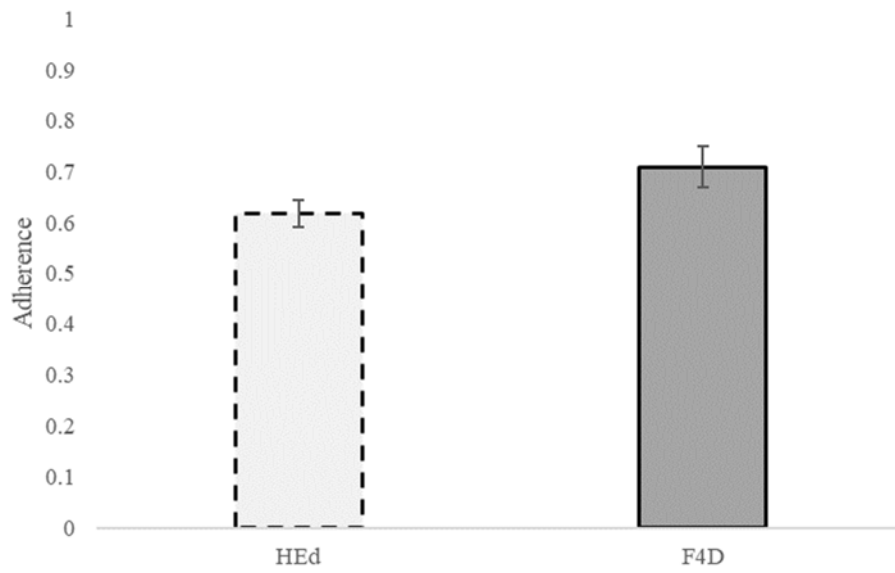


**Figure 8. Weight Change by Prevention Condition over Time**

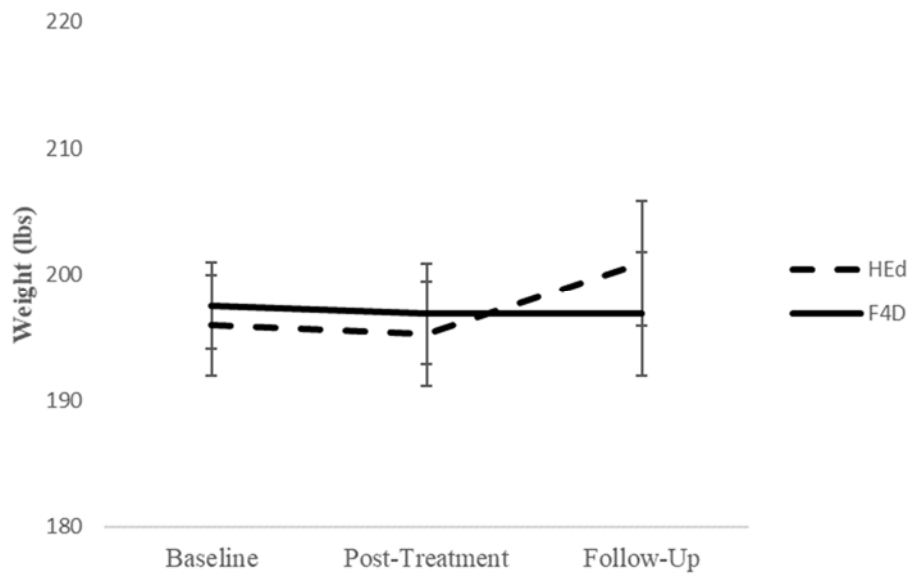


**Figure 9. Activity Change by Prevention Condition over Time**

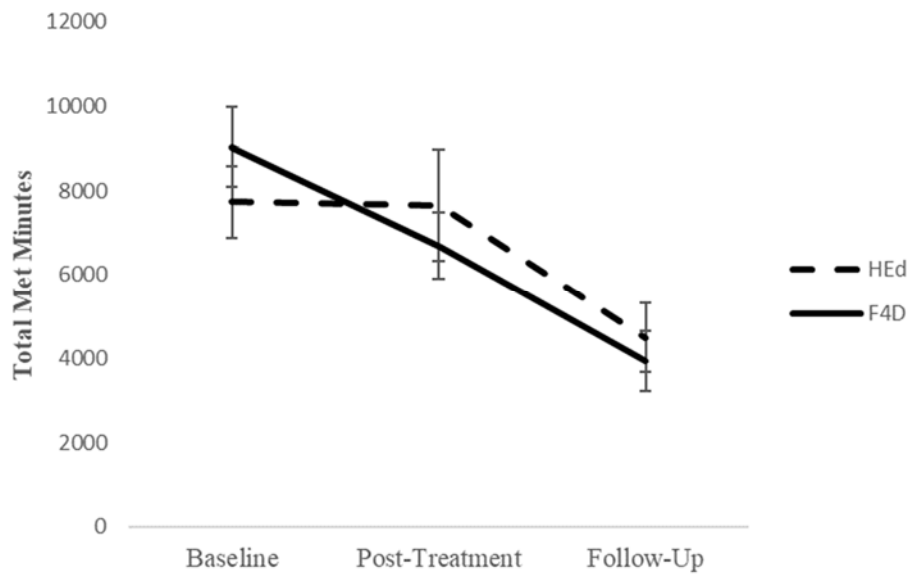


**Figure 10a. Weight Change by Prevention group for “low” PFC over Time**

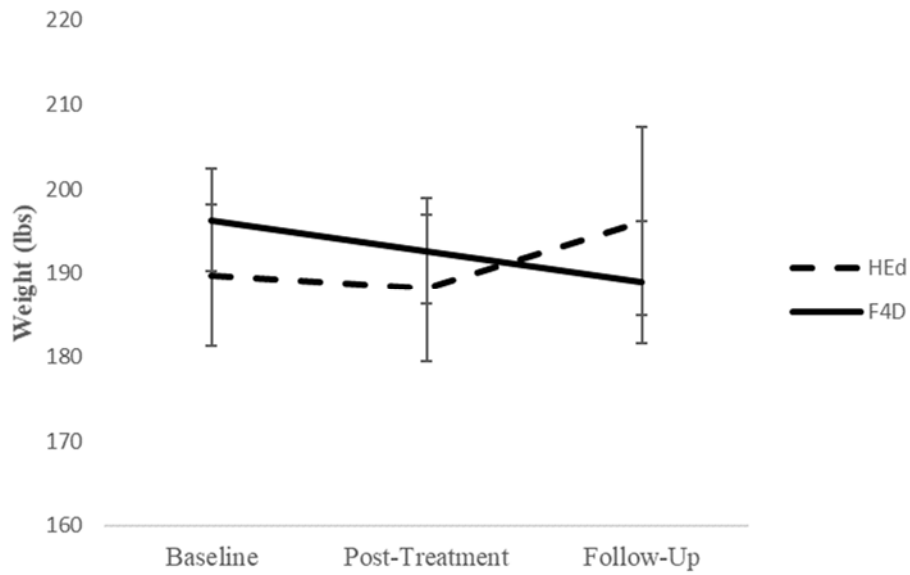


**Figure 10b. Weight Change by Prevention group for “high” PFC over Time**

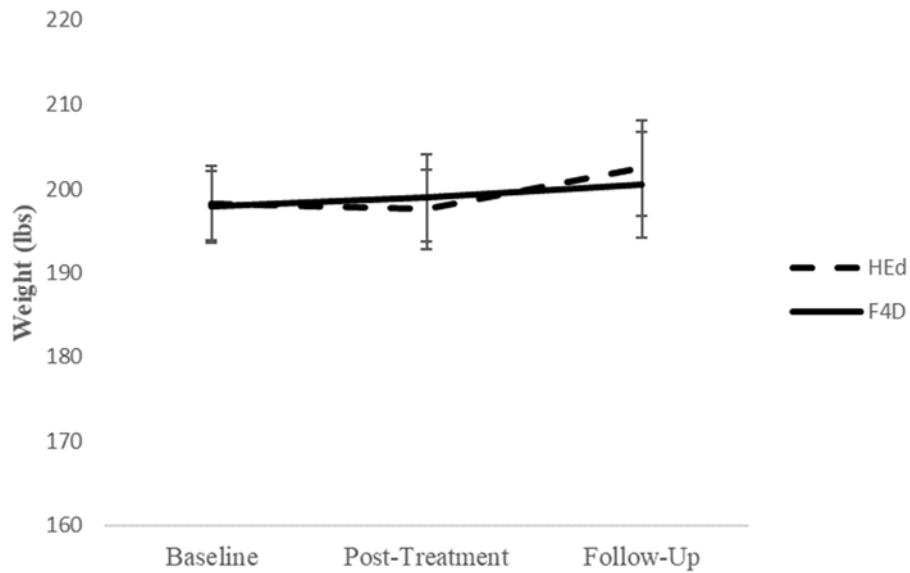


**Figure 11. Changes in BDI-II by Prevention Group over Time**

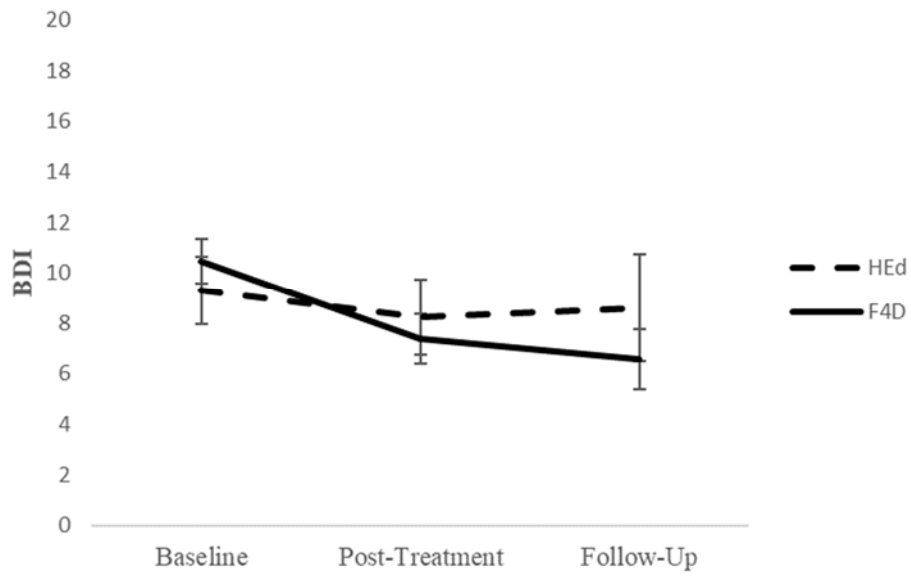


**Figure 12. Emotional Eating by Prevention Group over time**

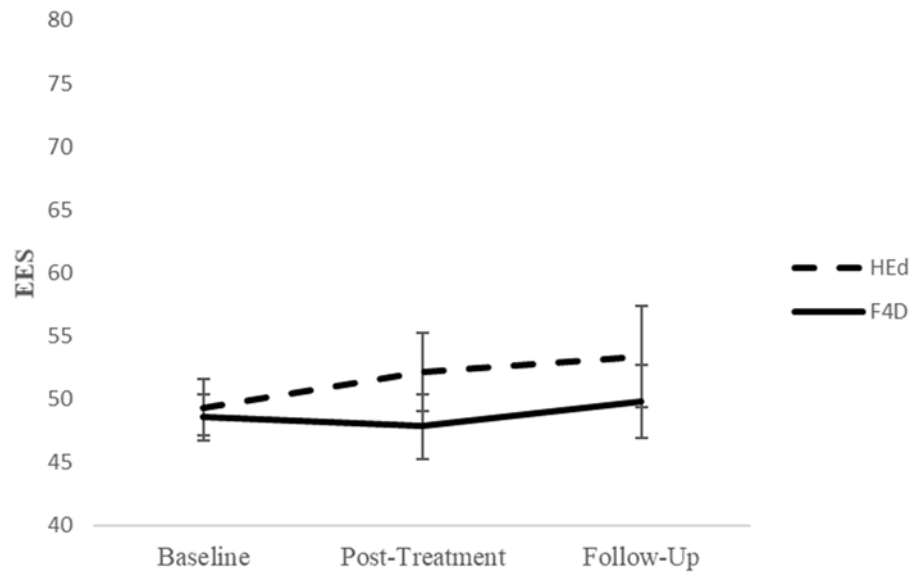


**Figure 13. Emotional Eating - Anger by Prevention Group over time**

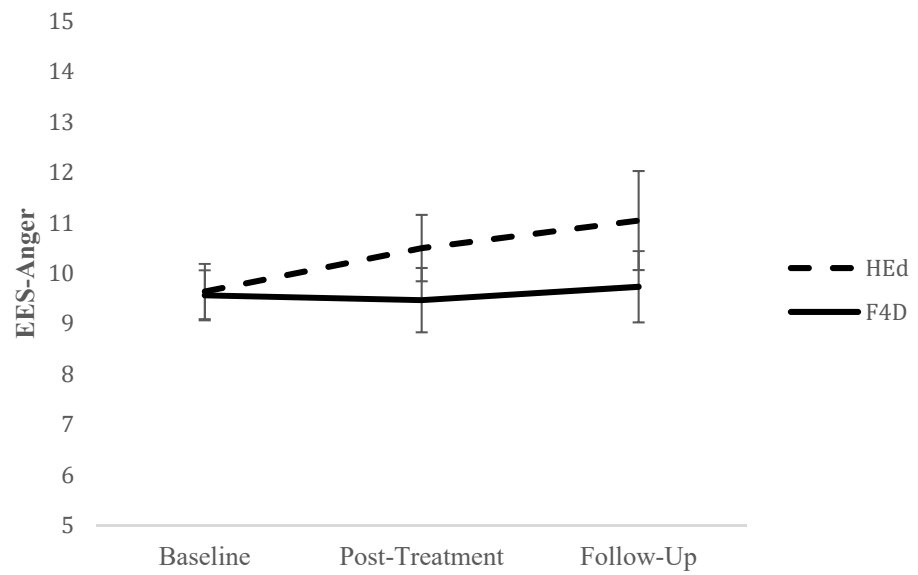


**Figure 14. Emotional Eating - Anxiety by Prevention Group over time**

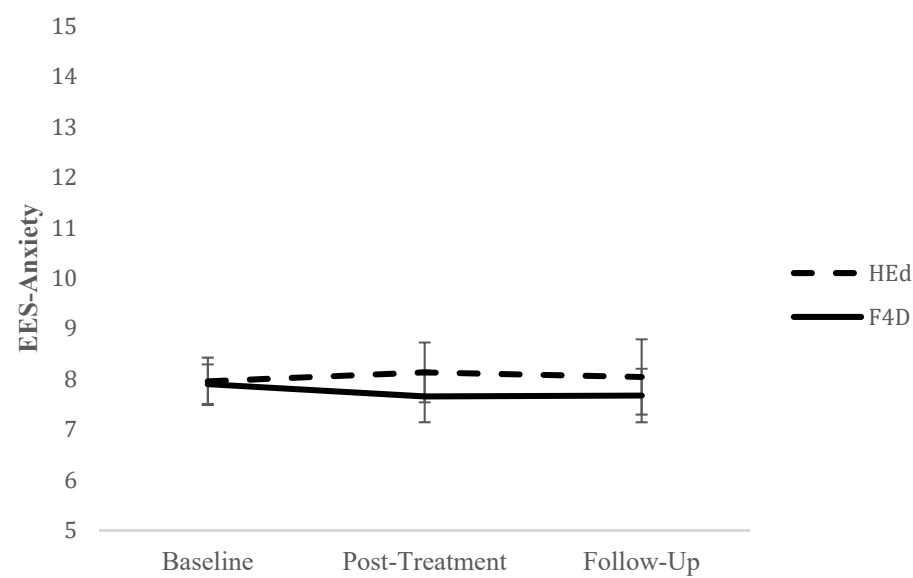


**Figure 15. Emotional Eating - Depression by Prevention Group over time**

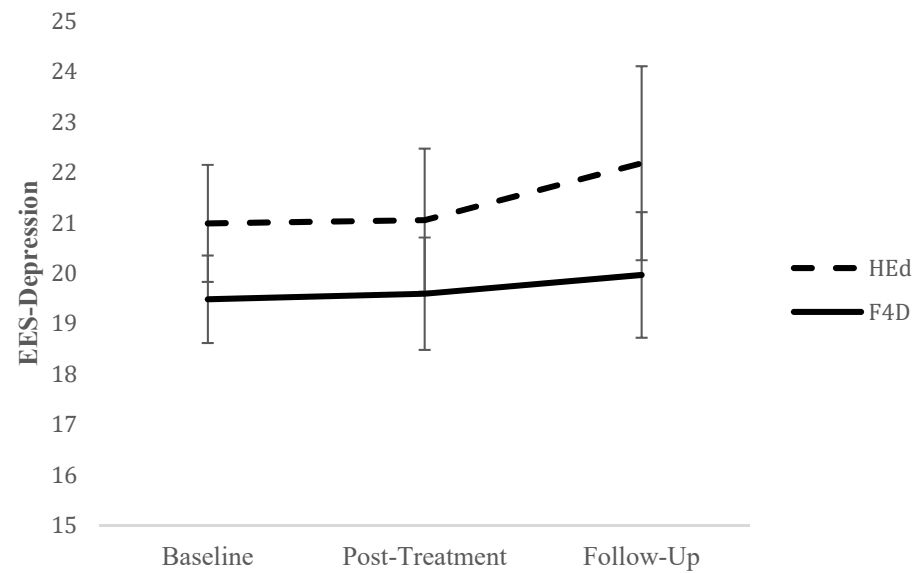


**Figure 16. Weight Stigma by Prevention Group over time**

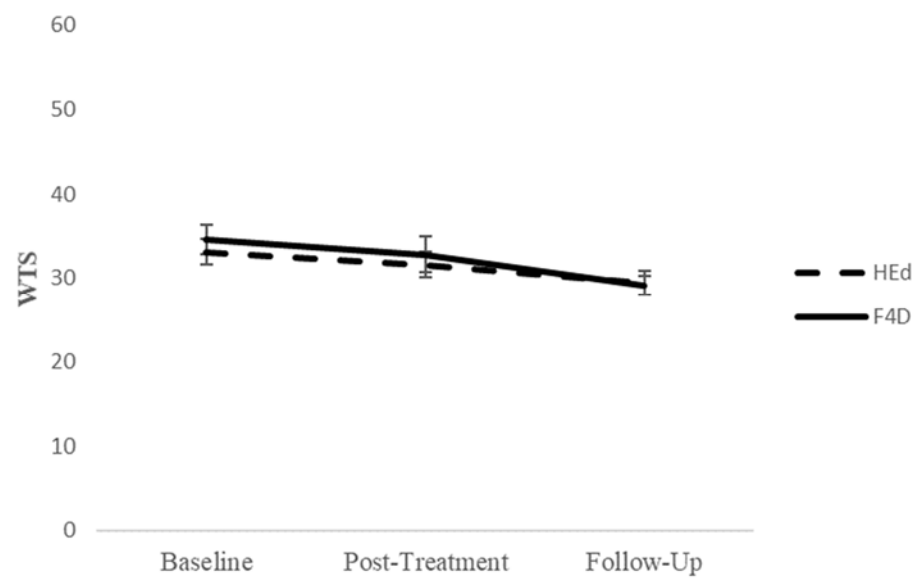


Figure 17. Weight Bias by Prevention Group over time

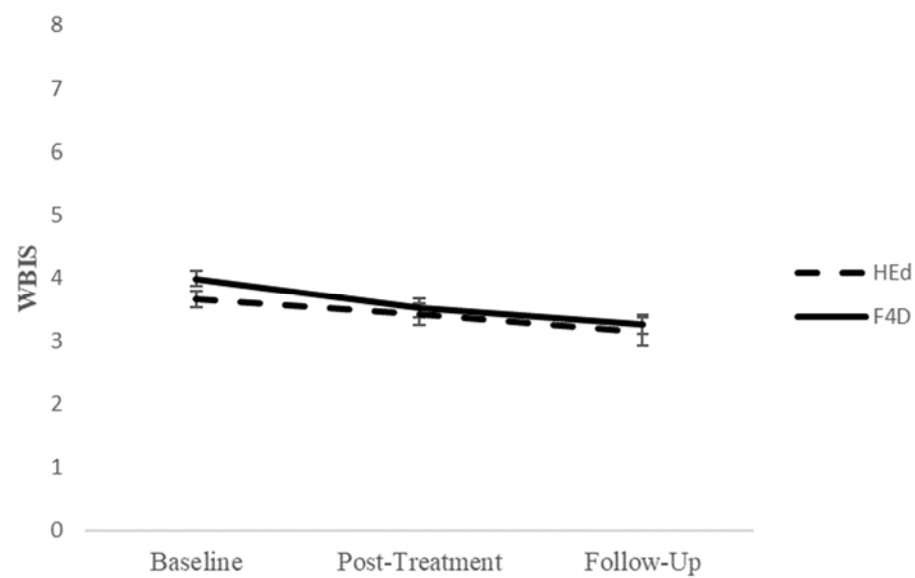


Table 1. Measure Administration Timeline

| Measure                                       | Time            |                     |                         |
|-----------------------------------------------|-----------------|---------------------|-------------------------|
|                                               | <u>Baseline</u> | <u>Post-program</u> | <u>1 Year Follow Up</u> |
| <b>Anthropomorphic Measure</b>                |                 |                     |                         |
| Height                                        | X               | x                   | x                       |
| Weight                                        | X               | x                   | x                       |
| BMI                                           | X               | x                   | x                       |
| Waist Measurement                             | X               | x                   | x                       |
| Hip Measurement                               | X               | x                   | x                       |
| <b>Self-Report Measures</b>                   |                 |                     |                         |
| Demographic Information Questionnaire         | X               |                     |                         |
| Lifestyle Habits & Weight History             | X               | x                   | x                       |
| Beck Depression Inventory - II                | X               | x                   |                         |
| Weight Stigma and Antifat Bias                | X               | x                   | X                       |
| Preference for Consistency Scale              | X               | x                   | X                       |
| International Physical Activity Questionnaire | X               | x                   | X                       |
| Eating Disorder Diagnostic Scale              | X               | x                   | X                       |
| Emotional Eating Scale                        | X               | x                   | X                       |
| Lifestyle Change for Health and Weight        | X               | x                   | X                       |
| <b>Behavioral</b>                             |                 |                     |                         |
| Adherence                                     | X               | x                   |                         |

Table 2. Participant Demographics

|                              | All Subjects<br><i>N</i> =121 | Health Ed<br>Control<br><i>n</i> =49 | Fit4Duty<br><i>n</i> =72 | <i>t</i> / $\chi^2$ | <i>df</i> | <i>p</i> value |
|------------------------------|-------------------------------|--------------------------------------|--------------------------|---------------------|-----------|----------------|
| Age, <i>M</i> (SD)           | 31.42 (7.58)                  | 30.82 (7.50)                         | 31.80 (7.66)             | -<br>0.67           | 113       | .50            |
| Weight (lbs)                 | 196.91(28.59)                 | 195.98<br>(28.23)                    | 197.54<br>(29.02)        | -<br>0.29           | 119       | .77            |
| BMI (kg/m <sup>2</sup> )     | 29.45 (2.46)                  | 29.44 (2.54)                         | 29.46 (2.42)             | -<br>0.03           | 119       | .98            |
| # of People in Household     | 2.93 (1.59)                   | 3.04 (1.98)                          | 2.85 (1.27)              | 0.66                | 118       | .51            |
| Sex, No. (%)                 |                               |                                      |                          | 0.22                | 1         | .64            |
| Female                       | 40 (33.06)                    | 15 (30.61)                           | 25 (34.72)               |                     |           |                |
| Male                         | 81 (66.94)                    | 34 (69.39)                           | 47 (65.28)               |                     |           |                |
| Race, No. (%)                |                               |                                      |                          | 0.97                | 2         | .62            |
| Caucasian/White              | 79 (65.29)                    | 31 (63.26)                           | 48 (66.66)               |                     |           |                |
| African<br>American/Black    | 19 (15.70)                    | 7 (14.29)                            | 12 (16.67)               |                     |           |                |
| Other                        | 22 (18.18)                    | 11 (22.45)                           | 11 (15.28)               |                     |           |                |
| Missing                      | 1 (00.83)                     | 0 (0)                                | 1 (1.39)                 |                     |           |                |
| Marital Status, No. (%)      |                               |                                      |                          | 4.42                | 2         | .11            |
| Married/Living as<br>Married | 88 (72.72)                    | 31 (63.26)                           | 57 (79.17)               |                     |           |                |
| Separated/Divorced           | 15 (12.40)                    | 7 (14.29)                            | 8 (11.11)                |                     |           |                |
| Single                       | 18 (14.88)                    | 11 (22.45)                           | 7 (9.72)                 |                     |           |                |
| Rank, No. (%)                |                               |                                      |                          | 0.95                | 1         | .33            |
| Junior Enlisted              | 9 (7.44)                      | 4 (8.16)                             | 5 (6.94)                 |                     |           |                |
| NCO                          | 79 (65.29)                    | 32 (65.31)                           | 47 (65.28)               |                     |           |                |
| Officers                     | 17 (14.05)                    | 10 (20.41)                           | 7 (9.72)                 |                     |           |                |
| Senior NCOs &<br>Officers    | 16 (13.22)                    | 3 (6.12)                             | 13 (18.06)               |                     |           |                |
| Household Income (\$), No. % |                               |                                      |                          | 2.28                | 1         | .13            |
| Under 20,000                 | 1 (0.83)                      | 1 (2.04)                             | 0 (0)                    |                     |           |                |
| 20,000 – 29,999              | 22 (18.18)                    | 12 (24.49)                           | 10 (13.89)               |                     |           |                |

|                              |            |            |            |      |   |     |
|------------------------------|------------|------------|------------|------|---|-----|
| 30,000 – 39,999              | 22 (18.18) | 10 (20.41) | 12 (16.67) |      |   |     |
| 40,000 – 49,999              | 14 (11.57) | 6 (12.24)  | 8 (11.11)  |      |   |     |
| 50,000 – 59,999              | 12 (9.92)  | 1 (2.04)   | 11 (15.27) |      |   |     |
| 60,000 – 69,999              | 12 (9.92)  | 3 (6.12)   | 9 (12.50)  |      |   |     |
| 70,000 – 99,999              | 24 (19.83) | 8 (16.33)  | 16 (22.22) |      |   |     |
| 100,000 – 149,999            | 8 (6.61)   | 4 (8.17)   | 4 (5.56)   |      |   |     |
| Above 150,000                | 2 (1.65)   | 1 (2.04)   | 1 (1.39)   |      |   |     |
| Missing Data                 | 4 (3.31)   | 3 (6.12)   | 1 (1.39)   |      |   |     |
| Health Conditions (#), No. % |            |            |            | 1.21 | 5 | .28 |
| 0                            | 65 (53.71) | 30 (61.22) | 35 (48.61) |      |   |     |
| 1                            | 28 (23.14) | 10 (20.41) | 18 (25.00) |      |   |     |
| 2                            | 21 (17.36) | 6 (12.24)  | 15 (20.83) |      |   |     |
| 3                            | 5 (4.13)   | 2 (4.08)   | 3 (4.17)   |      |   |     |
| 4                            | 1 (0.83)   | 1 (2.04)   | 0 (0.00)   |      |   |     |
| 5                            | 1 (0.83)   | 0 (0)      | 1 (1.39)   |      |   |     |
| IPAQ–MET Baseline, No. %     |            |            |            | 1.70 | 2 | .48 |
| Inactive                     | 0 (0)      | 0 (0.00)   | 0 (0.00)   |      |   |     |
| Minimally Active             | 25 (20.66) | 9 (18.37)  | 16 (22.22) |      |   |     |
| Hepa Active                  | 85 (70.25) | 35 (71.43) | 50 (69.44) |      |   |     |
| Missing                      | 11 (9.09)  | 5 (10.20)  | 6 (8.34)   |      |   |     |

Table 2 Note. *ns* are Health Education ( $n=49$ ), Fit4Duty ( $n=72$ ) except: Age ( $n=45$ ,  $n=70$  respectively); People in Household ( $n=49$ ,  $n=71$  respectively); Race ( $n=49$ ,  $n=71$  respectively); Income ( $n=46$ ,  $n=71$  respectively). Chi Square statistic for Rank, Household Income, and Health conditions pertained to Linear-by-Linear Association Test, reflecting the fact that Rank, Household Income, and Health conditions are ordered categorical (ordinal) variables.

Table 3 Participant Demographics by Gender

|                                                        | Male                  |                      | Female                |                      |
|--------------------------------------------------------|-----------------------|----------------------|-----------------------|----------------------|
|                                                        | Health Ed<br>(n = 34) | Fit4Duty<br>(n = 47) | Health Ed<br>(n = 15) | Fit4Duty<br>(n = 25) |
| Age, <i>M</i> (SD)                                     | 31.97 (7.65)          | 31.18 (7.25)         | 28.53 (6.84)          | 32.92 (8.38)         |
| Weight (lbs)                                           | 208.06 (21.96)        | 213.17 (10.13)       | 168.16 (18.35)        | 168.16 (18.35)       |
| BMI (kg/m <sup>2</sup> )                               | 30.24 (2.01)          | 30.33 (1.84)         | 27.62 (2.74)          | 27.81 (2.57)         |
| # of People in Household                               | 3.1 (1.8)             | 3 (1.2)              | 2.93 (2.05)           | 2.54 (1.32)          |
| Race, No. (%)                                          |                       |                      |                       |                      |
| Caucasian/White                                        | 24 (70.59)            | 37 (78.73)           | 7 (46.66)             | 11 (44)              |
| African<br>American/Black                              | 3 (8.82)              | 3 (6.38)             | 4 (26.67)             | 10 (40)              |
| Other                                                  | 7 (20.59)             | 7 (14.89)            | 4 (26.67)             | 4 (16)               |
| Marital Status, No. (%)                                |                       |                      |                       |                      |
| Married                                                | 24 (70.59)            | 37 (78.72)           | 6 (40)                | 18 (72)              |
| Living as Married                                      | 0 (0)                 | 0 (0)                | 1 (6.67)              | 2 (8)                |
| Separated                                              | 2 (5.88)              | 2 (4.26)             | 0 (0)                 | 1 (4)                |
| Divorced and not<br>living as married                  | 2 (5.88)              | 3 (6.38)             | 3 (20)                | 2 (8)                |
| Single, never<br>married, and not<br>living as married | 6 (17.65)             | 5 (10.64)            | 5 (33.33)             | 2 (8)                |
| Rank, No. (%)                                          |                       |                      |                       |                      |
| Junior Enlisted                                        | 1 (2.94)              | 3 (6.38)             | 3 (20)                | 2 (8)                |
| NCO's                                                  | 24 (70.59)            | 32 (68.09)           | 8 (53.33)             | 15 (60)              |
| Junior Officers                                        | 7 (20.59)             | 4 (8.51)             | 3 (20)                | 3 (12)               |
| Senior Leadership                                      | 2 (5.88)              | 8 (17.02)            | 1 (6.67)              | 5 (20)               |
| Income, No. (%)                                        |                       |                      |                       |                      |

|                   |           |          |          |          |
|-------------------|-----------|----------|----------|----------|
| Under 20,000      | 0 (0)     | 0 (0)    | 1 (0.83) | 0 (0)    |
| 20,000 – 29,999   | 10 (8.26) | 8 (6.6)  | 2 (1.65) | 2 (1.65) |
| 30,000 – 39,999   | 7 (5.79)  | 7 (5.79) | 3 (2.48) | 5 (4.13) |
| 40,000 – 49,999   | 3 (2.48)  | 6 (4.96) | 3 (2.48) | 2 (1.65) |
| 50,000 – 59,999   | 1 (0.83)  | 9 (7.4)  | 0 (0)    | 2 (1.65) |
| 60,000 – 69,999   | 1 (0.83)  | 6 (4.96) | 2 (1.65) | 3 (2.48) |
| 70,000 – 99,999   | 6 (4.96)  | 8 (6.61) | 2 (1.65) | 8 (6.61) |
| 100,000 – 149,999 | 3 (2.48)  | 2 (1.65) | 1 (.83)  | 2 (1.65) |
| Above 150,000     | 1 (0.83)  | 0 (0)    | 0 (0)    | 1 (.83)  |
| Missing Data      | 2 (1.65)  | 1 (.83)  | 1 (.83)  | 0 (0)    |

Table 4. Means and Standard Deviations for Baseline Continuous Measures of Weight Stigma, Depressive Symptoms, Emotional Eating, Preference for Consistency and hours of sleep.

|                            | All Subjects<br><i>N</i> =121 | Health Ed<br>Control<br><i>n</i> =49 | Fit4Duty<br><i>n</i> =72 | <i>t</i> | <i>df</i> | <i>p</i><br>value |
|----------------------------|-------------------------------|--------------------------------------|--------------------------|----------|-----------|-------------------|
| Preference for Consistency | 6.14 (1.14)                   | 6.29 (1.06)                          | 6.04 (1.20)              | 1.16     | 119       | .25               |
| BDI-II                     | 9.98 (8.29)                   | 9.28 (9.39)                          | 10.46 (7.47)             | -.76     | 119       | .45               |
| EES Total                  | 48.84 (15.68)                 | 49.32 (15.54)                        | 48.51 (15.88)            | .28      | 119       | .78               |
| EES Anger                  | 9.59 (4.00)                   | 9.64 (3.76)                          | 9.56 (4.18)              | .10      | 116       | .92               |
| EES Anxiety                | 7.92 (3.27)                   | 7.96 (3.26)                          | 7.90 (3.30)              | .09      | 117       | .93               |
| EES Depression             | 20.09 (7.45)                  | 20.99 (7.86)                         | 19.49 (7.15)             | 1.06     | 112       | .29               |
| WS Total                   | 34 (13.24)                    | 33.11 (10.77)                        | 34.60 (14.74)            | -.61     | 119       | .55               |
| WBIS                       | 3.86 (1.01)                   | 3.66 (.91)                           | 3.99 (1.05)              | -1.80    | 119       | .07               |
| Hours of Sleep             | 6.04 (1.05)                   | 6.13 (1.09)                          | 5.99 (1.03)              | .72      | 117       | .48               |

Table 4 Note. EES = Emotional Eating Scale; WS = Weight Stigma; WBIS = Weight Bias Internalization. *ns* are Health Education (*n*=49), Fit4Duty (*n*=72) except: EES Anger (*n* = 47, *n*=71 respectively); EES Anxiety (*n* = 48, *n*=71 respectively); EES Depression (*n* = 46, *n*=68 respectively); Hours of sleep (*n* = 47, *n*=72 respectively)

Table 5. BMI, BDI, and Activity by Multinomial categories

|                      | Health Ed Control |            |            | Fit4Duty   |            |            |
|----------------------|-------------------|------------|------------|------------|------------|------------|
|                      | Baseline          | Ptx        | 1Yr        | Baseline   | Ptx        | 1yr        |
| BMI, N (%)           |                   |            |            |            |            |            |
| Normal               | 3 (2.48)          | 3 (2.48)   | 2 (1.65)   | 5 (4.13)   | 4 (3.31)   | 4 (3.31)   |
| Overweight           | 23 (19.01)        | 22 (18.20) | 14 (11.57) | 35 (28.93) | 27 (22.31) | 22 (18.18) |
| Obese 1              | 19 (15.70)        | 19 (15.70) | 20 (16.5)  | 30 (24.79) | 24 (19.83) | 16 (13.22) |
| Missing              | 4 (3.31)          | 5 (4.13)   | 13 (10.74) | 2 (1.65)   | 17 (14.05) | 30 (24.79) |
| BDI, N (%)           |                   |            |            |            |            |            |
| WNL                  | 32 (26.45)        | 27 (22.31) | 14 (11.57) | 36 (29.75) | 34 (28.10) | 20 (16.53) |
| Mild                 | 6 (4.96)          | 6 (4.96)   | 3 (2.48)   | 21 (17.36) | 8 (6.61)   | 6 (4.96)   |
| Moderate             | 1 (.83)           | 0 (0)      | 1 (.83)    | 7 (5.79)   | 2 (1.65)   | 1 (.83)    |
| EES – Anger, N (%)   |                   |            |            |            |            |            |
| WNL                  | 33 (27.27)        | 30 (24.79) | 16 (13.22) | 58 (47.93) | 37 (30.58) | 23 (19.01) |
| Clinical             | 14 (11.57)        | 8 (6.61)   | 6 (4.96)   | 13 (10.74) | 10 (8.26)  | 7 (5.79)   |
| Missing              | 2 (1.17)          | 3 (2.48)   | 27 (22.31) | 0 (0)      | 25 (20.66) | 42 (34.71) |
| EES – Anxiety, N (%) |                   |            |            |            |            |            |
| WNL                  | 45 (37.19)        | 31 (25.62) | 19 (15.70) | 63 (52.07) | 43 (35.54) | 30 (24.79) |
| Clinical             | 3 (2.48)          | 6 (4.96)   | 3 (2.48)   | 8 (6.61)   | 4 (3.31)   | 1 (.83)    |
| Missing              | 1 (.83)           | 12 (9.92)  | 27 (22.31) | 1 (.83)    | 25 (20.66) | 41 (33.88) |
| EES – Depress, N (%) |                   |            |            |            |            |            |
| WNL                  | 10 (8.26)         | 8 (6.61)   | 5 (4.13)   | 15 (12.40) | 10 (8.26)  | 5 (4.13)   |
| Clinical             | 36 (29.75)        | 29 (23.97) | 17 (14.05) | 53 (43.80) | 37 (30.58) | 26 (21.49) |
| Missing              | 3 (2.48)          | 12 (9.92)  | 27 (22.31) | 4 (3.31)   | 25 (20.66) | 41 (33.88) |

Physical Activity, No.  
(%)

|                     |            |            |            |            |            |            |
|---------------------|------------|------------|------------|------------|------------|------------|
| Inactive            | 30 (24.79) | 11 (9.09)  | 1 (.83)    | 55 (45.45) | 11 (9.09)  | 1 (.83)    |
| Minimally<br>Active | 1 (.83)    | 14 (11.57) | 3 (2.48)   | 2 (1.65)   | 16 (13.22) | 9 (7.44)   |
| HEPA Active         | 2 (1.65)   | 6 (4.96)   | 14 (11.57) | 3 (2.48)   | 14 (11.57) | 16 (13.22) |
| Missing             | 16 (13.22) | 18 (14.9)  | 31 (25.62) | 12 (9.92)  | 31 (25.62) | 47 (38.84) |

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Table 6. Intercorrelations among Baseline Continuous Measures of Age, Sleep, Weight and Weight Stigma, Depressive Symptoms, Emotional Eating, and Preference for Consistency

|      | 1.   | 2.   | 3.     | 4.    | 5.     | 6.    | 7.     | 8.     | 9.     | 10.    | 11.    | 12. |
|------|------|------|--------|-------|--------|-------|--------|--------|--------|--------|--------|-----|
| AGE  | 1    |      |        |       |        |       |        |        |        |        |        |     |
| SLP  | .09  | 1    |        |       |        |       |        |        |        |        |        |     |
| LBS  | -    | -.09 | 1      |       |        |       |        |        |        |        |        |     |
|      | .002 |      |        |       |        |       |        |        |        |        |        |     |
| BMI  | .02  | -.14 | .80*** | 1     |        |       |        |        |        |        |        |     |
| BDI  | -.12 | -.15 | -.05   | .07   | 1      |       |        |        |        |        |        |     |
| PFC  | .08  | .11  | .04    | -.06  | .04    | 1     |        |        |        |        |        |     |
| EES  | -.01 | .14  | -.04   | -.03  | .31**  | .24** | 1      |        |        |        |        |     |
| EAN  | .03  | .14  | .05    | .05   | .16    | .04   | .81*** | 1      |        |        |        |     |
| EAX  | -.12 | .13  | -.10   | -.10  | .31**  | .22*  | .81*** | .61*** | 1      |        |        |     |
| EDP  | -.03 | .14  | -.13   | -.12  | .37*** | .27** | .91*** | .58*** | .73*** | 1      |        |     |
| WST  | -.18 | -.08 | .14    | .23*  | .55*** | -.06  | .29**  | .09    | .36*** | .33*** | 1      |     |
| WBIS | -.15 | -.12 | -.12   | -.002 | .65*** | .21*  | .14    | -.02   | .20*   | .24*   | .40*** | 1   |

Note.  $N = 115$ . SLP = Hours of Sleep; PFC = Preference for Consistency; EES = Emotional Eating Scale; EAN = EES Anger; EAX = EES Anxiety; EDP = EES Depression; WST = Weight Stigma; WBIS = Weight Bias Internalization.

\*\*\* $p < .001$

\*\* $p < .01$

\* $p < .05$

## Appendices

Appendix A: Fit4Duty and Health Education Program Outlines

Appendix B: Fit4Duty Treatment Manual

Appendix C: Self Report Measures

## Appendix A

### Fit4Duty Program Outline

**Week 1.** The 1 hour session will focus on identifying individual health behavior goals, discussing the purpose of the military weight standards and costs of obesity on service member performance, personal and general costs of obesity and the importance of making small healthy changes to diet and activity level. Participants were asked to use a nutrition facts label to correctly identify a serving size of food and be taught to weigh it on a food scale, which they were given to use throughout the program.

**Week 2.** The 1 hour session will build on information learned in session 1 in addition to discussing costs and benefits of unhealthy and healthy foods, evaluating the pros and cons of behavior change to meet participant-identified health goals, reviewing calories in beverages and completion of an interactive demonstration showing the amount of calories from sugar in different beverages.

**Week 3.** The 1 hour session will build upon the previous two sessions and include the following activities: discussing how the food industry and society encourage overeating, writing a letter about the ways that overeating is encouraged, discussing the costs of being sedentary and the benefits of exercise and apply session discussions to their weekly routine through two home exercises. Participants are asked to complete a recipe modification worksheet and to incorporate a family member or friend into their exercise routine between sessions.

**Week 4.** The 1 hour session will build upon the previous three sessions and include the following activities: applying cognitive reappraisals to unhealthy food, reviewing participants' modified recipes, discussing the importance of eating healthy meals daily and an in-session food activity assisting participants with increasing fruit and vegetable intake.

**Week 5.** The 1 hour session will build upon the previous four sessions and include the following activities: role playing how to refuse unhealthy food and drinks, writing a letter to one's future self, planning to prevent relapses to old eating habits and helping participants better understand the foods they eat.

**Week 6.** The 1 hour final session will allow participants review all the lessons learned in the previous sessions. Also, participants will be asked to write down a food and activity change that they will commit to for the next six months.

## Health Education Control

**HE Program.** HE is a two session health video education program designed to be delivered over two weekly 1 hour sessions in small groups of 6-9 participants using the video education series, *Healthy Eating: A Guide to Nutrition*, (46) a guide to health eating and nutrition developed for young adults. The series will focus on basic nutrition, nutrition and weight management, nutrition for sports and exercise and food safety/disease prevention. Participants who are unable to attend will be offered the opportunity to “make up” the sessions by streaming the same videos remotely.

### **Week 1.** Basic Nutrition and Weight Management.

- a. Basic Nutrition. This 25 minute program reviews basic concepts of healthy eating and the principal nutrients that keep the human anatomy functioning properly. The video explains the difference between macronutrients and micronutrients, highlights the virtues of whole grains and addresses the dangers of dehydration and vitamin deficiency.
- b. Weight Management. This 25 minute program focuses on poor eating habits as the primary cause of America’s obesity epidemic. The program also addresses the lack of exercise along with cultural and technological issues that promote obesity. A basic understanding of energy balance is also conveyed.

**Week 2.** Nutrition for Sports, Exercise and Disease Prevention. This 25 minute video series of two videos shows how active adults need to make healthy eating a priority as they pursue sports and fitness. The four main categories of physiological health—cardiovascular and respiratory fitness, muscle strength and endurance, flexibility and body composition are reviewed along with the role of energy production and utilization. The role of nutritional supplements is also examined. Risk related to contaminants also is reviewed including bacteria (such as salmonella and *E. coli*) and gastrointestinal viruses as well as the potentially dangerous pesticides, herbicides, hormones and antibiotics used in agriculture. The program promotes fruits, vegetables and whole grains as well as “superfoods.”

## Appendix B

### TABLE OF CONTENTS

#### OVERVIEW

#### FACILITATOR FACT SHEET

#### Project Fit 4 Duty Sessions

##### SESSION 1:

- I. Introduction (1 min)
- II. Voluntary Commitment, Overview Group Rules & Soldier Intros (6 min)
- III. Discuss Purpose of Army Weight Standards and Costs/Benefits of Obesity/Leanness on Soldier Performance (10 min)
- IV. Discuss Personal/General Costs of Obesity and Benefits of Leanness (8min)
- \*\* In Session Food Activity 1: How Much Is One Serving Size (8 min)
- V. Small Healthy Changes to Diet and Activity Level (20 min)
- VI. Home Exercise: Smart Goal Setting (5 min)
- VII. Session Evaluation (2 min)

##### SESSION 2:

- I. Reinforcing Voluntary Commitment (1 min)
- II. Goal Setting Debriefing (12 min)
- III. Discussing Costs of an Unhealthy Diet/Benefits of Healthy Diet (8 min)
- \*\* In-Session Food Activity 2: What's In Your Drink? (8 min)
- IV. In-Session Writing Exercise: Evaluating Pros/Cons of Change (9 min)
- V. Small Healthy Changes to Diet and Activity Level (15 min)
- VI. Home Exercise: How Society Encourages Overeating (5 min)
- VII. Session Evaluation (2min)

##### SESSION 3:

- I. Reinforcing Voluntary Commitment (1 min)
- II. Presentations about How Society Encourages Overeating (10 min)
- III. Discussing How Food Industry/Society Promote Overeating (10 min)
- IV. In-Session Writing Exercise: Letter About Ways Overeating is Encouraged (10 min)
- V. Discussing Costs of Sedentary Behaviors/Benefits of Exercise (5 min)

- VI. In-Session Writing Exercise: Making Exercise Count (7 min)
- VII. Small Healthy Changes to Diet and Activity Level (15 min)
- VIII. Home Exercise: Recipe Modification/Exercising with a Friend (2 min)
- IX. Session Evaluation (2min)

#### **SESSION 4:**

- I. Reinforcing Voluntary Commitment (1 min)
- II. Recipe Modification and Exercise with a Friend Debriefing (10 min)
- III. The Importance of Eating Healthy Meals Every Day (3 min)
- IV. In-Session Writing Exercise: Healthy Cognitive Reappraisals (9 min)
- V. In-Session Writing Exercise: Lifestyle Changes vs. Transient Dieting (5 min)
- VI. Small Healthy Changes to Diet and Activity Level (15 min)
- VII. Home Exercise: Healthy Reappraisal Application (5 min)
- VII. Session Evaluation (2min)

#### **SESSION 5:**

- I. Reinforcing Voluntary Commitment (1 min)
- II. Healthy Reappraisal Debriefing (10 min)
- III. Role-Play: Unhealthy Food/Drink Refusal (12 min)
- IV. In-Session Writing Exercise: Slip Response Plan (9)
- V. Small Healthy Changes to Diet and Activity Level (15 min)
- VI. Home Exercise: Letter to Your Future Self (5 min)
- VII. Session Evaluation (2min)

#### **SESSION 6:**

- I. Reinforcing Voluntary Commitment (1 min)
- II. Letter to Your Future Self Debriefing (10 min)
- III. Small Healthy Changes to Diet and Activity Level (15 min)
- IV. In-Session Writing Exercise: Acknowledging Gains (9 min)
- V. In-Session Writing Exercise: Small Healthy Changes for the Next 6 Months (9 min)
- VI. Finding Healthy Food Options Exercise (5min)
- VII. Closure (10 min)
- VIII. Session Evaluation (2min)

## **Fit 4 Duty: Facilitator Fact Sheet**

### Civilian Obesity epidemiology:

- Obesity is one of the most serious public health problems of the 21<sup>st</sup> Century and is a leading preventable cause of death worldwide, with increasing prevalence rates in both adults and children and authorities view it as one of the most serious public health problems of the 21st century.
- As of 2005 the WHO estimates that at least 400 million adults worldwide (9.8%) are obese, with higher rates among women than men.
- From 1980 to 2002, obesity rates have doubled in the U.S., reaching the current rate of 34% of the adult population. In the U.S., 58 million adults are overweight; 40 million are obese; 3 million are morbidly obese.
- Rates of obesity vary by ethnicity and gender. In the US, as of 2007, 33% of men and 35% of women are obese.
- About 65 percent of Americans are now considered either overweight or obese.
- Nineteen percent of children between the ages of 6 and 11 are overweight, up from 4% in the 1970s.
- The U.S. military is experiencing trends in overweight diagnoses that mirror those among the general population.
- 62% of military personnel aged 20 or older are overweight.
- 45% of military personnel under age 20 are overweight.
- In 2005, nearly two-thirds of active duty military personnel sampled were classified as either overweight or obese with a higher percentage being overweight.
- 60% of service members who reported being overweight did not consider their weight to be a problem.
- Overweight military personnel are more likely to be male, older, African American or Hispanic, married and enlisted personnel.
- More than 9 million young adults (27% of all Americans aged 17-24) are too overweight to join the military.
- Approximately 13% of active duty personnel age 20 or older were classified as obese according to the Body Mass Index (BMI), which met the Healthy People objective of  $\leq 30.5\%$  and was lower than the civilian estimate of 33.9%. The Army (16.1%) and Navy (15.0%) reported the highest rates of obesity and the Marine Corps reported the lowest rate (5.0%).

### Physical activity:

- Less than 32% of US adults get regular physical activity (defined as light/moderate activity five times or more per week for 30 minutes or more each time and/or vigorous activity three times or more per week for 20 minutes or more each time).
- Decrease in physical activity is related to increased accessibility to elevators, escalators, remote controls, driving instead of walking, etc.
- U.S. Surgeon General recommends moderate physical activity on most days of the week of at least 30 minutes per day for adults.... important for weight loss, maintenance of weight loss and general good health.

- Today's youth are considered the most inactive generation in history caused in part by reductions in school physical education programs and unavailable or unsafe community recreational facilities.
- Starting in adolescence, girl's physical activity declines 7.4 percent per year, while boys' activity decreases 2.7 percent per year.
- In 1969, an average of 48 percent of all students and 90 percent living no more than a mile away walked or bicycled to school. In 1999, only 19 percent of children walked to or from school and 6 percent rode bicycles to school.

## Weight Management, Physical Activity and Nutrition

### Healthy Weight:

- Over one-third (34.7%) of active duty personnel age 20 or older were classified as a healthy weight, exceeding the Healthy People objective of  $\geq 33.9\%$  and the civilian estimate of 30.8%. The Marine Corps (40.0%) and Air Force (40.2%) reported the highest rates of healthy weight compared to all other services.
- Across all ages, 35.7% of personnel reported a healthyweight, with 57.6% of females and 31.8% of males classified in the healthy range. In particular, females in the Marine Corps (82.5%) and males in the Marine Corps (38.6%) and Air Force (36.6%) were more often a healthy weight compared to all other services.

### Overweight/Obesity:

- Across all ages, 51.2% of service members were overweight, most often in the Coast Guard (57.2%) than all other services. For males, over half (54.2%) were classified by the BMI as overweight and a little over one-third (34.4%) of females were overweight. (Note: BMI does not account for body muscle mass which may contribute to the high rate of overweight service members.)
- The majority of active duty personnel engaged in physical activity, with 74.9% reporting moderate or vigorous physical activity in the past 30 days, far exceeding the Healthy People objective of  $\geq 47.9\%$  and the civilian estimate of 43.5%. The Army (79.6%) and Marine Corps (77.8%) reported the highest rates of physical activity compared to all other services.
- For all ages, 12.4% of service members were classified as obese, most often in the Army (15.8%) and Navy (14.9%). For females, 6.4% were classified as obese and for males, 13.5% were considered obese.
- Among all personnel, 10.5% were required to lose weight before joining the military, of which 13.1% were females and 10.0% were males; 3.2% of service members were currently enrolled in a mandatory weight control program and the majority of personnel (96.0%) passed their most recent physical fitness test.

### Physical Activity:

- Service members were physically active, with 63.1% reporting 150 minutes or more of moderate activity and 42.6% reporting 150 minutes or more of vigorous physical activity

per week. The Army (46.3%) and Marine Corps (46.3%) reported the most vigorous physical activity compared to other services.

- Close to half (45.5%) of service members reported strength training 3 or more days per week in the past 30 days, with the Marine Corps reporting strength training more often than other services (51.0%).

#### Nutrition:

- Active duty personnel reported intake of key healthy foods at lower rates than recommended by nutritional standards of three or more servings per day, including consumption of fruits (11.2%), vegetables (12.9%) and whole grains (12.7%). On the other hand, service members reported consuming unhealthy foods at least two times or more per day, including snack foods (8.5%), sweets (8.7%) and sugary drinks (19.3%). Also, one-third (33.2%) of active duty personnel reported consuming caffeinated drinks at least two times or more per day.
- Just over one-third (37.2%) of personnel reported daily supplement/multivitamin use.

#### Cigarette Use:

- About one-quarter (24.5%) of service members reported cigarette use in the past 30 days, which did not meet the Healthy People objective of  $\leq 12.0\%$  and was higher than the civilian estimate of 20.6%. The Marine Corps reported the highest rate of cigarette use (31.9%) and the Air Force reported the lowest rate (17.2%).

#### Smokeless Tobacco Use:

- The prevalence of smokeless tobacco use among all personnel in the past 30 days was 12.8%, which did not meet the Healthy People objective of  $\leq 0.3\%$  and was higher than the civilian estimate of 2.3%. Similar to cigarette use, the Marine Corps reported the highest rate of use (21.3%) and the Air Force reported the lowest rate (8.7%).

#### Binge Drinking:

- Approximately one-third (33.1%) of active duty service members reported binge drinking in the past 30 days, which did not meet the Healthy People objective of  $\leq 24.4\%$  and was higher than the civilian estimate of 27.1%. The Marine Corps reported the highest rate of binge drinking (48.6%) and the Air Force reported the lowest rate (22.9%) and was the only service to meet the Healthy People objective.

#### Sleep:

- Less than half (40.9%) of active duty personnel reported getting the recommended 7 to 8 hours of sleep per night. The Army, Navy and Marine Corps reported the least amount of sleep.

#### Sexual Health:

- Service members in the Marine Corps more often reported new sexual partners in the past 12 months, with 23.9% reporting 2 or more new partners. Across all services, the self-reported prevalence of STIs in the past year was 1.4% and the lifetime rate was 10.8%.

#### Promoting Healthy Behaviors in Children Living with Military Personnel

- Across all services, 40.7% of active duty personnel reported living with 1 or more children, with 10.6% of Army personnel reporting 3 or more children in the home.
- The majority (94.7%) of active duty service members reported that they always or often promoted healthy food and beverage choices in their children.

#### Military and Personal Stressors, Stress Coping Behaviors and Gender-Related Stress

- The most commonly reported military-related stressors were being away from family and friends (42.3%) and changes in work load (41.5%). In general, women and heavy drinkers more often reported military-related stress than men and lower drinking levels.
- Regarding personal stressors, problems with money (30.2%) and family members' health problems (28.9%) were most frequently endorsed. Females more often reported personal stressors than males and heavy drinkers more often reported problems with money and relationship problems (i.e., divorce/break-up, infidelity) than personnel with lower drinking levels.
- The most commonly endorsed methods for coping with stress were thinking of a plan to solve the problem (86.2%) and talking to a friend or family member (72.2%), with females more often reporting both of these strategies than males. Also, males more often reported having a cigarette (21.5% vs. 17.7%) and drinking alcohol (23.8% vs. 21.0%) and females more often reported getting something to eat (52.8% vs. 42.8%) and sleeping (64.5% vs. 48.6%) as strategies to cope with stress.
- Over half (50.7%) of females reported stress related to their gender, whereas 25.5% of males reported gender-related stress.

#### Obesity costs:

- Obesity in the U.S. carries an annual health care cost of about 100 billion dollars. Direct medical costs of obesity are easiest to calculate, coming in at \$93 billion, or 9%, of our national medical bill.
- In 2000, health care costs associated with physical inactivity were more than \$76 billion.
- According to the United States Department of Agriculture, healthier diets could prevent at least \$71 billion per year in medical costs, lost productivity and lost lives.
- Americans spend over \$40-50 billion per year on diet-related produces.

- Recent reports in *MILITARY TIMES* show military personnel are resorting to unhealthy ways of losing weight in order to make BMI or tape standards (e.g., laxatives, fasting, liposuction, etc.).
- Approximately 80% of new recruits who exceed military weight-for-height standards at entry leave the military before they complete their first term of enlistment, increasing the cost of recruitment and training.
- The 2003 Institute of Medicine report on military weight management states overweight and obesity have become a major threat to the long-term welfare and readiness of U.S. military forces.

#### Nutrition:

- Researchers recommend eating from the four food groups and cutting normal portions in half for three balanced meals a day.
- Sweets, desserts, soft drinks, energy drinks and alcoholic beverages account for nearly 25 percent of all calories consumed by Americans. Salty snacks and fruit-flavored drinks add another five percent. Sodas alone contribute 7.1 percent of total calories eaten. Healthy fruits and vegetables make up only 10 percent of caloric intake in the U.S. diet.
- Annual sales of food and beverages to young consumers exceeded \$27 billion in 2002. Food and beverage advertisers collectively spend \$10 billion to \$12 billion a year to reach children and youth. Of that, more than \$1 billion is spent on media advertising to children and \$3 billion is spent on packaging designed for children.
- Consumption of away-from-home foods comprised 20 percent of children's total caloric intake in 1977, rising to 32 percent by 1996.
- More than 60 percent of young people eat too much fat and less than 20 percent eat the recommended five or more servings of fruits and vegetables each day.
- By 14 years of age, 32 percent of adolescent girls and 52 percent of boys in the United States are consuming three or more eight-ounce servings of sweetened soft drinks daily.
- Americans are consuming more calories than they did 30 years ago and the rate of increase is three times greater in women than men.
- Women increased their daily calorie consumption 22 percent between 1971 and 2000, from 1,542 calories per day to 1,877 calories. The calorie intake for men increased 7 percent from 2,450 calories per day to 2,618 calories.
- Only 25% of U.S. adults eat the recommended five or more servings of fruits and vegetables each day.
- Household income spent on away-from-home foods rose from 25% of total food spending in 1970 to nearly 50% in 1999.
- Military personnel often elect to eat at fast food restaurants on bases rather than at the Dining Facility (D-Fac).

#### Obesity and socio-economic status:

- Obesity is more common among poorer individuals, particularly in women.
- Low-income women in minority populations appear most likely to be overweight.

#### Obesity and age:

- Women are more likely to become overweight (BMI of 25 or more) as they become older.
- Obesity (BMI of 30 or more) has increased among U.S. women of all age groups over the last decade.
- Middle-age women are at a particularly high risk of becoming obese. The prevalence of obesity among middle-age women (ages 35 to 64) has increased at a minimum of 2 percentage points per year over a 40-year time period from 1960 to 2000.

#### Obesity and race:

- Among U.S. adults, African American women have the highest prevalence of overweight (78 percent) and obesity (50.8 percent).
- Mexican American adults have the second highest prevalence of overweight (72%) and obesity (40%).
- 57.5% of White adults in the U.S. are overweight and 30% are obese.

#### Mortality rates of obesity:

- Obesity results in about 300,000 deaths per year in the United States (Public Health Service), which is more than all of the service members who lost their lives in WWII (estimated to be approximately 250,000).
- When BMI exceeds 30, the relative risk of death related to obesity increases by 50 percent.

According to a report by the Trust for America's Health titled, *F as in Fat: How Obesity Policies Are Failing in America 2009*:

- Adult obesity rates increased in 23 states and did not decrease in a single state in the past year.
- The percentage of obese or overweight children is at or above 30 percent in 30 states.
- The economic downturn may be exacerbating the obesity epidemic. Food prices, particularly for more nutritious foods, are rising. In addition, due to the strain of the recession, rates of depression, anxiety and stress, which are linked to obesity, are increasing.

#### Neuroscience findings

- Regular consumption of energy dense foods, such as fast foods, increases responsivity of brain reward valuation and attention regions to food cues (e.g., fast food billboards,

aromas of fried food, TV commercials for unhealthy foods), which prompts food cravings and overeating.

- At the same time, regular consumption of very energy dense foods reduces responsivity of reward regions to food intake, which may prompt people to overeat to experience the same degree of satisfaction.
- High levels of adipose tissue (fat) appears to cause inhibitory regions of the brain to shrink, increasing vulnerability for further overeating
- A period of obesity alters the expression of your genes, rendering any children you have at much higher risk for obesity (even if you lose weight before childbirth!).

## SESSION 1

**Prep:** Email/call/text each participant before this session to remind them about the time and location of the first group.

**Materials:**

Handout—Group Rules

Handout—Food and Activity Changes

Handout—Ideas for Healthy Eating Changes

Handout—Ideas for Activity Change

Handout—Home Exercise: Smart Goal Setting

Handout—Session Evaluation Form

Audio recorder

Video recorder

Attendance Tracker

**Topics:**

I. Introduction (1 min)

II. Voluntary Commitment, Overview Group Rules & Soldier Intros (6 min)

III. Discuss Purpose of Army Weight Standards and Costs/Benefits of Obesity/Leanness on Soldier Performance (10 min)

IV. Discuss Personal/General Costs of Obesity and Benefits of Leanness (8min)

\*\* In Session Food Activity 1: How Much Is One Serving Size (8 min)

V. Small Healthy Changes to Diet and Activity Level (20 min)

VI. Home Exercise: Smart Goal Setting (5 min)

VII. Session Evaluation (2 min)

## I. INTRODUCTION (1 MIN)

*Thanks for joining us. My name is \_\_\_\_\_ and this is \_\_\_\_\_. We will be facilitating your group sessions each week. All of you decided to take part in this group because of your desire to either achieve or maintain a healthy body weight.*

The group leader begins by introducing him/herself to the group.

*The goal of these 6 weekly meetings is to help you select lasting lifestyle improvements that will allow you to balance caloric intake with caloric needs and thereby achieve a lasting healthy weight and a better relationship with food and exercise.*

## II. VOLUNTARY COMMITMENT, OVERVIEW AND GROUP RULES (6 MIN)

**Pass out participant binders.**

*These binders have the info we'll cover each week as well as forms for you to track the progress you make on your goals – something we'll get to in a moment.*

### Group Rules:

*Inside, you will find a **Group Rules Handout**, which describes what is expected of you as group members and us as facilitators. One thing we ask is that you please turn your cell phones off during the sessions and don't text. We know that 'tuning out' from everything that's waiting for you when you leave here is difficult but we want this one hour each week to focus entirely on you, to be YOUR time and in order to do that we all need to be here 100%.*

*It is important to note that participation is voluntary. Is each of you willing to participate in today's session and commit to this group?*

*We'll be asking you this every week because it's important to us that you're here because you want to be.*

Have each participant verbally confirm that they are willing to actively participate. Do this in a natural, friendly way (no need to make it awkward).

Recording:

*It's important for us to record our sessions together. The reason for this is to make sure that we, the facilitators, are doing our job and delivering the program to you correctly. Is everyone ok with recording the sessions?*

Start audio and video recorder.

Attendance:

*You're all here because you want more for yourselves. Whatever your reason, we're really glad you're here.*

*If you need to miss a session, please let us know as soon as you can. We know from running these groups that the people who get the most benefit are those who make it to all 6 sessions, participate verbally and complete the session exercises. We will be in contact with you if you need to miss a meeting to check in, find out how you're doing and get you caught up with everyone before the next week's meeting.*

Group leaders should **call, email, or text participants** two days before each session to remind them about the session and to bring completed home exercise assignments. If a participant must miss a session, please schedule a brief (15 minute) individual make-up session or phone call to discuss key points from the session and get the participant "caught up" before the next session. Ask them to complete the home exercises before the next session too.

*Now we'd like to take a moment to get to know you. Please tell us your full name and what you like to be called. Then finish this sentence: "I will eat anything put in front of me except \_\_\_\_\_."*

Group leaders should spend a few moments speaking with each participant.

*We have one group rule that is **essential** for making this program work; **we do not allow excuses to get in the way of reaching our goals.***

*Each week we will ask you to identify one area of your eating and exercise routines that can be improved. This is very important – viewing lifestyle changes as multiple steps you will take over time, rather than a super intense group of changes you make all at once, sets us up for success long-term.*

*Has anyone ever tried to make changes and found that things didn't go as planned? What happened? (What was the change and why didn't it work out as planned?)*

Answers:

- poor planning, sets one up to fail
- tried too much too soon
- didn't have enough information before changing
- lack of social support, couldn't do it alone
- not enough...time, motivation, money, etc

*We want you to be honest with us about challenges that you face but we also want you to look for solutions. We are here to help you 1) identify your goals, 2) create a plan that fits your lifestyle and 3) take steps each week to make progress toward reaching your self-identified nutrition and fitness goals.*

*If you aren't sure what changes to make at first, we can offer ideas but ultimately, you know what works best for you. Make sense? (look for the nods) Great!*

### **III. DISCUSSING PURPOSE OF ARMY WEIGHT STANDARDS & COSTS/BENEFITS OF OBESITY/LEANNESS ON SOLDIER PERFORMANCE (10 MIN)**

*As you know, Americans are carrying more weight than ever and the military is experiencing the same trend. More than 40% of the Military Health System (MHS) population is overweight and about 25% are obese. An estimated 61% of men and 39% of women serving on active duty are overweight and 12% of active duty personnel are obese.*

*Do those numbers surprise you?*

*For Soldiers, what does it mean to be obese in the military?*

*If you failed to meet the Army's fitness standards, how would that impact/affect your life? Your career?*

Answers (write main responses brought up in the discussion on the **white board**):

- Can't get promoted
- Make less money
- Not eligible to participate in certain trainings or military school programs
- Stigma/flagged
- May get discharged due to failure to make weight

*Why do you think you are required to stay within a certain weight range and meet standards?*

Answers:

- Responsible for protecting America's freedom and each other
- Fight terrorists
- Carrying extra weight is particularly detrimental for Soldiers because the stakes are higher. As a result, the Army enforces weight and fitness standards that the general population doesn't have to worry about.
- Excess weight is related to poor health and in order to take care of others, Soldiers must take care of themselves.

*As a soldier, what are the benefits of meeting the Army's fitness and weight standards?*

Answers:

- In better shape
- Better overall health, reduced risk of disease
- More effective in combat.
- Can better accomplish orders involving marches and other exercises.
- Better able to assist fellow soldiers (e.g., move quickly with body armor and heavy equipment, conduct combat patrols or individual battle drills quickly and efficiently).
- More likely to be fit and not have joint/back pains that might limit my mobility and readiness.
- Can be a better role model and mentor to junior troops

*What steps do you take to meet weight and fitness standards?*

*If you aren't getting the results you want, or need, that's the time to stop and reassess. What is it that is no longer working?*

#### **IV. PERSONAL/GENERAL COSTS/BENEFITS OF OBESITY/LEANNESS (8 MIN)**

*We like to use your first names in here because we want to remember that the choices we make are not just done for the Army, they are not solely done to make weight or meet standards set for you by the Army. The choices you make now affect your health and the health of your family for the rest of your life.*

*How might your life be different if you were obese? What are (or would be) the most significant costs to you of being overweight or obese?*

Get each person to visualize how his/her life would change and verbalize for the group. Do not allow anyone to avoid describing the negative consequences of obesity that would affect their health, career, family (burden to spouse or children) etc. because avoiding admitting potential personal consequences allows participants to prevent dissonance.

*What do you see as the greatest personal benefit to you of maintaining a healthy body weight?*

*Now, a bit of trivia: How many extra calories do you need to eat per day to gain 1 pound in a week?*

*Answer: 500 calories per day. This is roughly equivalent to a serving of sweet and sour pork, half of a small cheese and sausage pizza, half of a pint of Ben and Jerry's vanilla ice cream, or 3 Odwalla bars. It is not hard to become overweight or obese by eating too many calories in today's food-rich world.*

Answer/Teaching Point:

- Often it is more a result of eating too much rather than exercising too little that leads to gaining weight. To stay the same weight that you are right now you have to eat the exact same amount of energy each day as your body expends. By energy, I mean calories. To gain 1 pound of fat in a year you would need to eat about 10 extra calories more each day than you burn. To gain 10 pounds in the next year you would need to eat 100 calories more each day than you burn.
- That means it's very easy to become overweight. There are numerous everyday cues urging us to overeat, eat more than we burn, or eat for reasons other than because we're hungry.
- In fact, the average American gains one to two pounds a year throughout much of adulthood. Yet studies show that even small changes in eating and exercise habits can prevent or minimize this weight gain.

**\*\* IN SESSION FOOD ACTIVITY: HOW MUCH IS ONE SERVING? (8 MIN)**

Refer to Food Activity Worksheet.

## V. SMALL HEALTHY CHANGES TO DIET AND ACTIVITY LEVEL (20 MIN)

*Each week when we meet, for the next 6 weeks, we will ask each of you to make one healthy change to your diet and one healthy change to your activity level the following week, with the ultimate goal of balancing caloric intake with caloric needs to help you meet YOUR self-identified health goals.*

*Think about the least healthy part of your weekly diet. Or consider the portion size mistakes you might be making. Also think about the best way to increase physical activity and improve your fitness. If you look in your binder, you'll see a **Food and Activity Changes** form. Write down the changes you want to make on this form.*

*We recommend that you pair up with someone from this group or at home for doing your new exercise activities. You could also pair up and prepare a healthy potluck or shop together. Having a partner will make the healthy lifestyle changes more fun and will increase your accountability. Can you think of someone in your life who would assist you in your efforts?*

*Let's go around the room to see what healthy changes you have selected. Next week we will ask how you did with your change goals.*

### **Only if participants are struggling to come up with changes on their own:**

*If you're having a hard time coming up with changes here are two handouts to give you some ideas. **Ideas for Healthy Eating Changes** and **Ideas for Activity Change**.*

## VI. HOME EXERCISE: SMART GOAL SETTING (5 MIN)

*In your packet is the **Smart Goal Setting Handout**. Does everyone have one of these? Great. This will help you with your first at-home exercise. It's really simple and shouldn't take much of your time.*

*For your at-home exercise, please write your health goals and your reason(s) for each goal on this form. Feel free to work with others to come up with ideas or refer to the handout to help you get started.*

*Please bring this home exercise form to our next meeting so you can read it to the group.*

*Great. Is everyone able to commit to completing the 'My Goal' form for next week's group and telling the group about your progress with the food and activity changes you want to make this week? Please include your full name and signature on your letter. I will collect all home exercises next session.*

*Does anyone have any questions? Does everyone feel they can do this?*

Get some form of public commitment from each participant.

*Now that you've committed to making changes to meet your goals this group is part of your support network, here to cheer you on and help you.*

Address any concerns in a supportive way. Speak to participants individually after the group if additional discussion is warranted.

## **VII. SESSION EVALUATION (2MIN)**

*That's all for today. Please take a moment to complete this brief **Session Evaluation Form**.*

*It will help us make changes to better serve you! Thanks for coming. We will be in touch to see if you have any questions later this week and we look forward to seeing you next session – same time and place!*

## SESSION 2

**Prep:** Email/call/text each participant before this session to remind them about the time/location of group and to complete each home exercise.

**Materials:** Handout—Fast, Healthy Food  
Handout—Calories in Beverages  
Handout— In-Session Writing Exercise: Evaluating the Pros and Cons of Change  
Handout—Home Exercise: How Society Encourages Overeating  
Handout—Session Evaluation Form  
Audio recorder  
Video recorder  
Attendance tracker

**Topic Areas:** I. Reinforcing Voluntary Commitment (1 min)  
II. Goal Setting Debriefing (12 min)  
III. Discussing Costs of an Unhealthy Diet/Benefits of Healthy Diet (8 min)  
\*\* In-Session Food Activity 2: What's In Your Drink? (8 min)  
IV. In-Session Writing Exercise: Evaluating Pros/Cons of Change (9 min)  
V. Small Healthy Changes to Diet and Activity Level (15 min)  
VI. Home Exercise: How Society Encourages Overeating (5 min)  
VII. Session Evaluation (2min)

### I. REINFORCING VOLUNTARY COMMITMENT (1 MIN)

Start audio recorder. Start video recorder.

*Hi everyone, welcome back. So just like last week I want to emphasize that participation is voluntary. Is each of you willing to be here and ready to get started with today's session?*

Go around the room and make sure you get verbal commitment or a nod from each participant. Do this in a natural, friendly way (no need to make it awkward).

## II. GOAL SETTING DEBRIEFING (12 MIN)

*We asked you to write your health goals and your reason(s) for each goal. Can each of you please read what you wrote?*

Have each participant read her/his goals. For those who may be hesitant, allow them to go last.

*You all did a really great job of incorporating what we talked about last week. Did anyone notice anything about their eating habits or exercise routines that they wanted to tweak? Were there any behaviors you found yourself doing that got in the way of meeting your goals (eating healthy, exercising regularly)?*

Have participants discuss actions during the week that they had not believed before were getting in the way of being healthy and meeting their goals. Write down what each participant says and refer to the discrepancy between what they thought they were doing and what they described doing in later sessions as appropriate.

## III. DISCUSSING COSTS OF AN UNHEALTHY DIET AND BENEFITS OF A HEALTHY DIET (8 MINS)

*The next exercise is to discuss the costs of an unhealthy diet. What food groups and types of foods come to mind when you think of ‘unhealthy foods’?*

Answer: Make sure people bring up each of the following unhealthy food types, prompting as necessary:

- High-fat food, such as ice-cream, donuts, chips, fries, pastries (e.g., scones/muffins at Starbucks)
- High-fat meats, such as hamburgers, steaks
- High-sugar foods, such as candy, soda, sports drinks, or sweetened coffee drinks

*What’s similar about all of the foods you just named?*

- Highly processed
- Additives
- Preservatives

*What is the most consumed vegetable in the U.S.?*

- French fries (a high-fat food)

*What are some of the drawbacks of eating high-fat and high-sugar foods?*

- Feel stuffed, sleepy.
- If you feel like you have a brick in your stomach, you may not feel like exercising.
- Unhealthy weight gain.
- Eating a lot of sugar increases preferences for sweet tastes in a self-perpetuating cycle, causes sugar crash, may be as addictive as drugs, contributes to unhealthy weight gain.
- Refined sugars, white bread, soft drinks and highly processed foods can cause skin blemishes or acne in some people.
- Reduce testosterone and sex drive.
- The more we eat the more we crave.
- Long-term health problems

*Wow. The list of negatives associated with eating fat and sugar is pretty long. How do you think sugar substitutes affect appetite and weight?*

- Increase preferences for sweet tastes.
- Associated with weight gain because give your body false signals about the energy content of foods (i.e., although foods with sugar substitutes taste like they have a lot of calories, they do not, leading to weight homeostasis disruption).
- There have been medical problems from some sugar substitutes in the past.

*When we have a low-fat alternative in the grocery store it usually means that fat has been removed from that food and replaced with something else.*

*What ingredients often get added to make up for removing the sugar or fat from the regular version?*

- Sugar substitutes
- Sodium
- Preservatives

Teaching point: *Note that ingredients are listed in the order of the quantity they occur. If sugar or some form of it is near the top of the list or there are multiple types of sugar listed on the ingredient list you can be pretty certain it isn't going to keep you feeling full for very long.*

*How does consuming unhealthy food make life harder for you, as Soldiers?*

- More likely to be sick or injured (e.g., diabetic, have joint/back problems)
- Less efficient fighters.
- More often fail to meet weight or fitness requirements.
- Receive less favorable performance evaluations
- May face retention boards for repeat failures of weight/fitness requirements, adversely affecting livelihood.
- Get passed over for promotion selection, recommendations for schools or awards and other career benefits

*Ok, great. Let's change gears. What are some benefits for you of eating healthy foods?*

- More energy
- Easier to concentrate
- Clear complexion
- Feel better about how they are treating their bodies
- Sex is better

*What gets in the way of eating well? Who creates these barriers and how?*

Possible answers:

- Government subsidies of crops like corn and soybeans make highly processed food cheap
- Fresh produce is more expensive than fast food
- A lot of fast food restaurants are open 24-7
- Food is in places it never used to be like gas stations and hardware stores
- Lack of time to prepare healthy meals
- We create barriers by not allowing down-time to eat well
- The food industry creates barriers to eating well with advertisements and accessibility of unhealthy food
- Few healthy restaurants on or near military bases

*Brain imaging research indicates that the more you eat high-sweet or high-fat foods, the more sugar or fat you need to add to your food in order to taste these flavors, which prompts escalated intake of sugar and fat.*

*The more you eat it, the more you crave it. Sometimes the problem is that we don't know just how much artificial 'stuff' we are consuming and we inadvertently undo all our hard work.*

**\*\* IN-SESSION FOOD ACTIVITY: WHAT'S IN YOUR DRINK? (8 MIN)**

*Often we don't realize how many calories are in the things we drink. Marketing drinks as 'free' is a gimmick used by the food industry and it creates a barrier to eating well. Advertising high-calorie drinks loaded with sugar as the right options for energy and nutrition is one of the oldest tricks in the book.*

Refer to Food Activity Worksheet.

*In your packet you'll find the **Fast, Healthy Food** handout that describes quick healthier fast food options for breakfast, lunch and dinner and a **Calories in Beverages** handout to help you make informed choices. Keep this in mind when you are considering small changes to your diet each week.*

#### IV. IN SESSION WRITING EXERCISE: EVALUATING PROS/CONS OF CHANGE (9 MIN)

*In your packet is an Evaluating the Pros and Cons of Change handout. Let's take a couple minutes to fill in the chart using your health goals.*

*Once everyone is done, I'd like each of you to share what you wrote.*

After the majority of group members have written their statements, ask each to share.

#### V. SMALL HEALTHY CHANGES TO DIET AND ACTIVITY LEVEL (15 MINS)

*We asked each of you to make one healthy change to your diet and one healthy change to your activity level over the last week. We suggested pairing up with someone to exercise or eat with. How did it go for everyone? This is for you, so please be honest about whether you met your goals. This will help us brainstorm solutions to help you succeed next time. For those who did not meet your health change goals, what will you do differently to succeed next week?*

Go around the room and ask each participant how their change plan went. Ask for specific examples of what they did. After each participant has reviewed his/her goals, cross-reference this information with what you recorded on your tracking sheet for the person.

*Did you find the buddy system helpful?*

*Great. Let's talk about how this last week went and then come up with changes for this week.*

If people begin to give excuses, say, “We are not going to focus on excuses for not making healthy changes – instead we want to focus on making positive changes and carrying this momentum into the future.” If a participant needs suggestions or problem solving, allow the other group members to come up with the ideas first (e.g., Have others come across the same problems? How have you handled it?); only jump in if needed.

*Is each of you willing to continue these changes and add another healthy change to your diet and activity level next week? You should continue the changes that you made last week and add another change to diet and activity level this week.*

Have each participant describe behavioral goals.

*It would be best if you worked with your buddy again when making these new healthy lifestyle changes.*

Go around the room and get a verbal commitment from each participant that is highly specific. Have them write down the changes on their handout and sign it. Each participant should be making two healthy changes to their diet and two healthy changes to their activity level. If a certain participant is already exercising a lot, encourage cross-training or flexibility-focused exercises.

Record the dietary change goal for each participant on the tracking sheet for the group.

## **VI. HOME EXERCISE (5 MINS)**

*This week your home assignment is to pay attention to and write down, ways that society or the media encourage overeating or mislead us about food or health claims. We want you to be mindful of the barriers to meeting your goals because knowing what gets in our way is important to making changes.*

*Topics can cover how work environments and the food industry contribute to overeating. People have talked about junk food ads aimed at children, the availability of junk food on base or during deployment, difficulty finding healthier food options, the low cost/huge portions of fast foods and how the food industry creates junk foods to be more appealing or make misleading health claims. You could look at the packaging in the food you have in your home and see if it contains any untrue or misleading health claims. You can take note of the availability (or lack thereof) of healthy foods in the vending machine where you work, fast food coupons in your mailbox, the way products are placed on grocery store shelves, the prices of different types of foods, the number of fitness classes at the gyms on base, etc.*

*Write down as many as you can throughout the week and bring them with you to share with the group next session. Bring in an example of an ad showing product placement, making a health claim for unhealthy food.*

*In your packet is the **How Society Encourages Overeating** home exercise form.*

*Can someone use their own words to describe the home exercises?*

Ask a participant to paraphrase the assignment back to you.

*Again, experience shows that participants get the most out of this class when they do the exercises the best they can. Does everyone feel that they can do this?*

Get some form of public commitment from each participant.

*Can one or two of you tell me something that “hit home” in this session?*

*We want this exercise to be fun as well as thought provoking, so please feel free to talk about it with others between group sessions.*

## **VII. SESSION EVALUATION (2MIN)**

*That’s all for today. Please take a moment to complete the session evaluation. We really appreciate your feedback and look forward to seeing you next week!*

## **SESSION 3**

**Prep:** Email/call/text each participant before this session to remind them to complete each home exercise.

**Materials:**

Handout—Sneaky Sugar  
Handout—In-Session Writing Exercise: Letter: How Society Encourages Overeating  
Handout—Metabolic Rate  
Handout—In-Session Writing Exercise: Making Exercise Count  
Handout—Take-Home: Recipe Modification How-To  
Handout—Home Exercise: Recipe Modification Worksheet  
Handout—Healthy Substitutions  
Handout—Session Evaluation Form  
Audio recorder  
Video recorder  
Attendance tracker

Stop watch

- Topic Areas:**
- I. Reinforcing Voluntary Commitment (1 min)
  - II. Presentations about How Society Encourages Overeating (10 min)
  - III. Discussing How Food Industry/Society Promote Overeating (10 min)
  - IV. In-Session Writing Exercise: Letter About Ways Overeating is Encouraged (10 min)
  - V. Discussing Costs of Sedentary Behaviors/Benefits of Exercise (5 min)
  - VI. In-Session Writing Exercise: Making Exercise Count (7 min)
  - VII. Small Healthy Changes to Diet and Activity Level (15 min)
  - VIII. Home Exercise: Recipe Modification/Exercising with a Friend (2 min)
  - IX. Session Evaluation (2min)

## **I. REINFORCING VOLUNTARY COMMITMENT (1 MIN)**

Start audio recorder. Start video recorder.

*Welcome back - is each of you ready to participate in today's session?*

Go around the room and make sure you get verbal commitment or a nod from each participant. Do this in a natural, friendly way (no need to make it awkward).

## **II. PRESENTATIONS ABOUT HOW FOOD INDUSTRY/SOCIETY ENCOURAGES OVEREATING (10 MIN)**

*First, let's go over the home exercise from last week. We asked you to write down ways in which our society encourages overeating or misleads us.*

*Can we go through some of the things you noticed this week? Go ahead and toss out your favorites.*

Write answers on **white board**.

Make sure that all participants provide at least 1 response.

*We have to be advocates for our own health and the health of our loved ones. What did you think when you realized \* \_\_\_\_ reflect 2-3 participants' responses \_\_\_\_ \*. Were you fired up knowing that information?*

*Let's continue along this topic for a few minutes. By the way, you all did a fantastic job paying attention to the sneaky tactics that slip by so many of us.*

### **III. DISCUSSING HOW FOOD INDUSTRY/SOCIETY PROMOTE OVEREATING (10 MIN)**

*It's easy in today's society to make choices that are not in line with our health goals. What are some of the ways the food industry or society encourage us to overeat?*

Answers (write main responses brought up in the discussion on the white board):

- Fast food restaurants are everywhere.
- Cues (signs) for unhealthy foods are everywhere and places they never used to be (e.g., the shoppette), prompting cravings for those foods.
- Commercials for unhealthy foods, but not for healthy foods, are extremely common.
- Unhealthy food is cheaper than healthy food.
- Restaurant and fast food portion sizes

*What are some of the ways in which government regulations promote overeating?*

- Subsidies for growing corn, which are used to produce high-fructose corn syrup.
- Does not do a good job regulating health claims made by food producers.
- Does not require that healthy foods be served in our schools.

*What are some ways overeating is promoted on this base? How does this affect your ability to stay fit?*

- High-fat foods served in the short-order line at the D-Fac cafeterias.

- Fast food restaurants are on every military installation/garrison and may be closer to the barracks than the D-Fac.
- AAFES has contracts with Burger King and other fast food restaurants but not healthier restaurants.
- Few options near the base that serve healthy foods.

*What are some of the tactics that food companies use to trick us into thinking we're eating healthy foods when we are not or are eating more than we need? Identify what's wrong with each of the following claims/ads:*

1. Nestle giving away free exercise sessions by submitting proof-of-purchase vouchers for 24 of their products highest in sugar and fat (e.g., Kit Kat bars).
2. Cocoa Krispies made by Kellogg's can boost immunity. Frosted Mini-wheats helps kids do better in school.
3. Vitamin Water is "healthy hydration for every occasion." (It contains 33 grams of sugar. Soda has around 39 grams.)
4. Nutella is a delicious hazelnut spread with a hint of cocoa that moms can serve as part of a balanced breakfast. (The first ingredient for Nutella is sugar; contains 21 grams of sugar and half of the calories in a serving come from fat).
5. 100 calorie snacks. (What's actually in them? Trans fat, white sugar and preservatives).
6. Military discounts offered at many fast food restaurants local to military bases.
7. Energy drinks are marketed to military groups and are prevalent on military bases and in deployed settings.

*Nutrition labeling can certainly be misleading.*

Pass out the **Sneaky Sugar Handout**.

*Did you know that sugar comes in so many forms? Using multiple versions of it allows food companies to avoid listing it as the first ingredient even if a food primarily contains sugar.*

Bring an example of this – maybe a "sports bar" or anything with multiple varieties of sugar listed (and in significant quantities) that is marketed as healthy.

*Who benefits from us eating too much, eating when we're not hungry, or eating food that isn't nutritious or that is filled with addictive ingredients such as sugar? Who gains financially while we gain weight?*

Food companies, diet industry, food advertisers.

#### **IV. IN SESSION WRITING EXERCISE: LETTER ABOUT WAYS OVEREATING IS ENCOURAGED (10 MIN)**

*We talked about several ways that the food industry and society encourage us to eat when we aren't hungry. Our next activity is to write a letter to a younger friend, sibling, or someone else you know about the tricky ways we get encouraged to overeat, why it's important not to fall into those traps and how we can avoid them (**Letter: How Society Encourages Overeating**).*

*Can each of you please read what you wrote?*

Have each participant read her/his letter. For those that may be hesitant, allow them to go last. Encourage everyone to read as much of their letter as possible.

Collect the in-session exercises.

Make sure each participant has written their name on it and signed their name.

*Moving on to a different topic....*

#### **V. DISCUSSING COSTS OF SEDENTARY BEHAVIORS AND BENEFITS OF EXERCISE (5 MIN)**

*You mentioned how important it is to you to stay fit.*

*How many hours a week do you think the average person spends on a computer and watching TV?*

Answer: 40 hours per week.

*What are some benefits of being active on a regular basis?*

- Improved fitness, PT test score, performance in sports
- Easier to make weight
- More restful sleep
- Less stress, anxiety, depression
- Stronger immune system, less illness, quicker recovery time
- Increased self-confidence
- Higher metabolism
- Can eat more

*Unless you're recovering from an injury, you all engage in PT regularly. Are there other things do you do to stay active and fit? What benefits do you notice when you are able to stay active/exercise regularly?*

*How long do you need to exercise to see a significant boost in attention and problem-solving skills?*

Answer: 10 minutes. Even short bursts of activity improve focus and mood. The more intense the exercise the better but even moderate activity has benefits. And taking a short walk before or after eating also aids digestion and metabolism of your meal.

*How many of you have cars?*

*What does it take to make your car run well? What happens if you put the wrong gasoline in your car?*

Answer: Performance is seriously impaired and the life span is shortened.

*Our bodies are like high-performance engines. What happens to a high-performance vehicle if you put low-grade fuel in it?*

Answer: Performance is seriously impaired and the life span is shortened.

*What happens if you fill the fuel tank with sugar?*

Answer: It won't run.

*Your body is a high-performance engine that needs high-quality fuel to function and requires regular maintenance, just like your vehicle.*

*How does everyday life encourage you to be sedentary, what gets in the way of fitting in enough activity to prevent gaining weight?*

- Sitting at computer all day in your job
- Playing video games
- Watching TV/movies
- Spending a lot of time on Facebook/Twitter/Skype to communicate
- Taking elevator
- Driving long distances/to and from work
- Parking as close as possible (it rains a lot in WA)

*You've noted some of the barriers to eating healthy included long workdays and home responsibilities. Is it accurate to say that these are common facets of the average Americans' life and of all Soldiers? How do other people fit in time to maintain a healthy weight – eat healthy and fit in regular physical activity – despite these obligations?*

*How would your health behaviors change if those obligations weren't there? Would they change?*

*What can you do to stay active and maintain a healthy weight if you work at a desk, or other work that involves excessive sedentary behavior, or if you get injured?*

*In your packet is a handout with information about your **Metabolic Rate**. It will show you how to calculate how many calories you require to maintain your weight based on your weight, gender and activity level.*

## VI. IN-SESSION WRITING EXERCISE: MAKING EXERCISE COUNT (10 MIN)

*It's time to do another brief writing exercise.*

*Some of you may be required to go to PT every day and PT is designed to help with maintenance of weight and fitness. If fitness level is decreasing or body weight starts getting difficult to maintain, what do you think is the most important factor?*

- eating too much
- not pushing yourself hard enough during workouts
- skipping workouts

*Please find the **Making Exercise Count worksheet** and take a few minutes and write down 2 or 3 reasons to give it your all during exercise and 2 or 3 reasons to take time to do a little more working out on your own time or make room for other kinds of physical activity in your life outside of mandatory requirements or duty hours. Once everyone is done, I'd like each of you to share what you wrote.*

After the majority of group members have written their statements, ask each to share.

## VII. SMALL HEALTHY CHANGES TO DIET AND ACTIVITY LEVEL (15 MIN)

*Last week we asked each of you to make two healthy changes to your diet and two healthy changes to your activity level. We encouraged you to find someone to work out with. Was each of you able to make your planned health improvements?*

*Have you noticed any benefits since making these changes?*

Take time to go around the room and ask each participant how things went. After all participants have reviewed their goals, cross-reference this information with what you recorded on your tracking sheet for the person.

*How are things working out with the buddy system?*

If people begin to give excuses, say, “Again we are not going to focus on excuses for not making these healthy changes – instead we want to focus on making positive changes and carrying this momentum into the future.” If a participant needs suggestions or problem solving, allow the other group members to come up with the ideas first and only jump in if needed.

*Is each of you willing to continue these changes and add another healthy change to your diet and activity level next week?*

Go around the room and get a verbal commitment from each participant that is specific. Ask them to write down their changes on their handout and sign it. Each participant should identify three healthy changes to their diet and three healthy changes to their activity level.

Record the dietary change goal for each participant on the tracking sheet for the group.

*Do any of your friends or family know about the changes you are making? Telling others increases the odds of successfully making these changes.*

## **VIII. HOME EXERCISE: RECIPE MODIFICATION/EXERCISE WITH A FRIEND (2 MIN)**

*For your home exercise, I would like to ask you to make an exercise plan with a friend, family member, or someone from the group to do something fun together. For instance, you could go play basketball, go for a run, kayak, wakeboard, take a hike, take a bike ride, or lift weights. Starting with something small and manageable is fine, though you should also feel free to try to make some more significant healthy behavior changes.*

*Write down what you did and how it went and bring it back next week to tell us all how it went.*

*In addition, we know that some of our favorite recipes are sometimes loaded with stuff that feels comfortable and familiar but is simply too calorie-dense to eat on a regular basis and can be substituted with more natural, healthier ingredients without compromising taste.*

*Just making a few small changes to a recipe can make it a better fit for the healthy lifestyle you're creating without sacrificing the taste and flavors you love.*

*This week's at-home exercise is not only to incorporate someone into your active lifestyle, but to tweak one of your favorite recipes so that it's a little healthier for you. We have **Recipe Modification**, **Recipe Modification Worksheet** and **Healthy Substitutions** handouts for you with examples of modified recipes as well as a list of substitutions/modifications for commonly used items to help you with this. If you have trouble, please don't hesitate to contact us – we'd be happy to help you!*

*Write down your recipe and the changes you made on the **Recipe Modification Worksheet**.*

*Can someone use their own words to describe the home exercises?*

Ask a participant to paraphrase the assignment back to you.

*Again, experience shows that people get the most out of this class when they do the exercises the best they can. Does everyone feel that they can do this?*

Get some form of public commitment from each participant.

*We want this exercise to be fun as well as thought provoking, so please feel free to talk about it with others between group sessions and we encourage you to incorporate your spouses, children, roommates, or friends in one or both of the activities. The more people who are on-board with the changes you want to make the better.*

Time permitting:

*Can one or two of you tell me something that "hit home" in this session?*

## **IX. SESSION EVALUATION (2MIN)**

*That's all for today. Please take a moment to complete the session evaluation. Thanks for coming. We look forward to seeing you next week!*

## SESSION 4

**Prep:** Email/call/text each participant before this class to remind them to complete each home exercise.

**Materials:** Handout—Adding Fruits and Vegetables to Your Diet  
Handout—Green Smoothies  
Handout—In-Session Writing Exercise: Reappraisal Form  
Handout—In-Session Writing Exercise: The Benefit of Small Permanent Changes  
Handout—Home Exercise: Healthy Reappraisal Application  
Handout—Session Evaluation  
Audio recorder  
Video recorder  
Attendance tracker  
Stop watch

**Topic Areas:**

- I. Reinforcing Voluntary Commitment (1 min)
- II. Recipe Modification and Exercise with a Friend Debriefing (10 min)
- III. The Importance of Eating Healthy Meals Every Day (3 min)
- IV. In-Session Writing Exercise: Healthy Cognitive Reappraisals (9 min)
- V. In-Session Writing Exercise: Lifestyle Changes vs. Transient Dieting (5 min)
- VI. Small Healthy Changes to Diet and Activity Level (15 min)
- VII. Home Exercise: Healthy Reappraisal Application (5 min)
- VII. Session Evaluation (2min)

## **I. REINFORCING VOLUNTARY COMMITMENT**

Start audio recorder. Start video recorder.

*Welcome back - is each of you willing to participate in today's session?*

Go around the room and make sure you get verbal commitment or a nod from each participant. Do this in a natural, friendly way (no need to make it awkward).

## **II. RECIPE MODIFICATION/EXERCISE WITH A FRIEND DEBRIEFING (10 MINS)**

*Last week we asked you to come up a few changes to a favorite recipe to make it more healthy and incorporate someone in your life into your exercise routine. I'd like to hear what each of you chose and how it went. Who wants to go first?*

Have each participant share their recipe results and exercise experiences.

Review with each group member. Check to see if they used this event to tell this friend about their planned healthy changes (to create more accountability for success).

*Small changes can make a big difference. Do you think you can do this for other recipes? What role does social support play for you in the kitchen or at the gym? Was it a factor this week?*

*Keep this in mind as you consider what small changes you want to make this week and who in your life could help or hinder your efforts.*

**\*\*Note:** If participants have stories related to loved ones helping their efforts to change eating habits or exercise routines, encourage them to continue this behavior and to start thinking about other people in their lives they might share their changes with.

If participants have negative experiences or are reluctant to share their changes with others, this is an indicator of either their family/friends' nervousness of their changes or the participants'. Try to

encourage extra participation during cognitive reappraisal exercises from these participants during the session.

### III. THE IMPORTANCE OF EATING HEALTHY MEALS EVERY DAY (3 MINS)

*What we're going to talk about next is the importance of eating consistent, nutritious meals every day. We know that you're very busy and may be on limited budgets and we want to get to know a little about your daily routines and how you fuel your body.*

*Raise your hand if you live on post.*

*What's the meaning of the word 'breakfast'?*

The purpose of a breakfast meal is to break the overnight fast.

*How important do you consider breakfast? What do you think happens to the body when we skip breakfast?*

Answers:

- Poor concentration, memory and brain functioning.
- Worse work performance.
- Depressed or anxious mood.
- Breakfast skipping increases risk for weight gain and heart disease (high levels of "bad" cholesterol) because it increases the reward value of unhealthy foods.
- Can cause insulin changes that lead to diabetes.
- Can also cause menstrual problems.

*The American Dietetic Association recommends 5-9 servings of fruits and vegetables a day. Here's a list of fruits and vegetables you might want to try. One reason everyone pushes fruits and veggies so much is because they are the most nutritiously dense foods you can eat while being the least calorically dense. We've grouped the vegetables and fruits by color and the benefits associated with them in the **Fruits and Vegetables Handout**.*

*Look over this form and see if there are at least a few fruits or vegetables that you are eating each week from each column. Are you willing to add some new healthy foods to your diet?*

*The FDA has also changed its dietary recommendations from the “Food Guide Pyramid” to the “Choose My Plate” format to help people visually understand how much of each food group we should be eating. You can access this information at [www.choosemyplate.gov](http://www.choosemyplate.gov) and we also have the new format shown on the first page of your Fruits and Vegetables Handout.*

*We know that it’s a challenge to add fruits and vegetables to your diet. One solution to this is a smoothie. There are many ways to create a healthy smoothie using natural ingredients. For suggestions on how to get started we have a handout for you (**The Awesome Green Smoothie Handout.**)*

*As a thank you for participating we have a beverage container for you to keep, for when you make your own healthy drinks.*

#### **IV. IN-SESSION WRITING EXERCISE: HEALTHY COGNITIVE REAPPRAISALS FOR REDUCING FOOD TEMPTATIONS (9 MIN)**

*Not only are we talking this week about how changing the way we think about fruits and vegetables can make them more enjoyable but we’re talking about how the way we think affects our behavior toward other foods as well.*

*Brain imaging research reveals that just seeing tempting foods wakes up reward regions of our brain while areas that help us control ourselves take a nap. Our brain starts saying “I really want that dessert!” and stops saying “Eating that would take me away from my goals.”*

*Fortunately, research also reveals that when we think of the health costs of eating the food or the health benefits of not eating the food, it changes the way our brain responds, which reduces our food cravings.*

*Sometimes you may think or have heard someone say “skinny people are so lucky, they can eat whatever they want!” but these automatic “STOP” thoughts naturally occur to people who don’t seem to struggle with their weight – they see tempting food and may have the momentary*

*thought; “That looks kind of good,” but very quickly their brain also says “eh, it’s not worth it.” The “it” in “it’s not worth it” is different for each person.*

*Using the **Cognitive Reappraisal Form**, please write down two personally meaningful health costs of eating unhealthy foods and two personally meaningful health benefits of not eating those foods. If you prefer, you can generate two appearance or career costs of eating the unhealthy foods and two appearance or career benefits of not eating these foods.*

Give participants a few minutes to write down their cognitive reappraisals. These reappraisals are long term consequences of consuming unhealthy food or benefits of not consuming the food.

*Now I would like you to read these “cognitive reappraisals” to the group.*

*We get what we train for, physically or mentally. Getting into the practice of thinking a certain way becomes automatic, it becomes habit. I hope you will try to think these thoughts when confronted with unhealthy food temptations, because doing so will help reduce food cravings.*

## **V. IN-SESSION WRITING EXERCISE: LIFESTYLE CHANGES VERSUS TRANSIENT DIETING (5 MIN)**

*Next, I’d like to do a brief writing exercise. Hopefully I’ve been clear that what we are aiming for in Fit4Duty is not a diet! The research is clear –temporary weight loss diets don’t work. Please use the **Small Permanent Changes form** to write down 2 reasons why making small but permanent changes in what you eat and how much you exercise are much better than going on a temporary diet. Once everyone is done, I’d like each of you to share what you wrote.*

After the majority of group members have written their statements, ask each to share.

*What are some of the unhealthy dieting behaviors Soldiers sometimes use to make weight?*

- Laxative/diuretic use
- Vomiting for weight control
- Saunas

- Wearing thermal bodysuits (or “Saran Wrap” suits)
- Fasting
- Taking dietary supplements
- Excessive exercising (long duration >3 hr., or multiple times that total 4+ hr.)
- Combinations of the above (e.g., fasting, diuretic usage and excessive exercising)
- Liposuction

*How do you these behaviors affect a person? Mentally? Physically?*

*Do these behaviors make better soldiers?*

No! They make you less able to fight well!

## **VI. SMALL HEALTHY CHANGES TO DIET AND ACTIVITY LEVEL (15 MIN)**

*Last week we asked each of you to make three healthy changes to your diet and three healthy changes to your activity level. Was each of you able to make your planned health improvements? Did you work with your buddy on the healthy changes assignment?*

*Have you noticed any benefits since making these changes?*

Go around the room and ask each participant how their changes went. After each participant has reviewed her/his goals, cross-reference this information with what you recorded on your tracking sheet for the person.

If people begin to give excuses, say, “Again we are not going to focus on excuses for not making these healthy changes – instead we want to focus on making positive changes and carrying this momentum into the future.” If situations come up when a participant needs suggestions or problem solving, allow the other group members to come up with the ideas first and only jump in if needed.

*Is each of you willing to continue these changes and add another healthy change to your diet and activity level next week? We encourage you to continue working with your buddy.*

Go around the room and get a verbal commitment from each participant that is specific. Ask them to write down their changes on their handout and sign it. Each participant should identify four healthy changes to their diet and four healthy changes to their activity level.

Record the dietary change goal for each participant on the tracking sheet for the group.

## **VII. HOME EXERCISE: HEALTHY REAPPRAISALS (5 MIN)**

*For the home exercise, we would like to ask you to apply your cognitive reappraisals when confronted with tempting unhealthy foods. For example, you could think of the health, career, or appearance benefits of not eating the food. Please apply this at least twice, if not more frequently. The more you do it, the more habitual it will become. Also please complete the home exercise form to tell us how it worked for you.*

Direct participants to the **Healthy Reappraisal Application** form in their packet.

*Can someone tell me the home exercises in their own words?*

Ask a participant to paraphrase the assignment back to you.

*Again, experience shows that people get the most out of this class when they do the exercises the best they can. Does everyone feel that they can do this?*

Get some form of public commitment from each participant.

*We want this exercise to be fun as well as thought provoking, so please feel free to talk about it with others between group sessions.*

Time permitting:

*Can one or two of you tell me something that “hit home” in this session?*

## **VII. SESSION EVALUATION (2 MIN)**

*That’s all for today. Please take a moment to complete the session evaluation. Thanks for coming. We look forward to seeing you next week!*

## SESSION 5

**Prep:** Email/call/text each participant before this class to remind them to complete each home exercise.

**Materials:** Handout—In-Session Writing: Slip Response Plan (2 pages)  
Handout—Home-Exercise: Letter to your Future Self  
Handout—Session Evaluation  
Audio recorder  
Video recorder  
Attendance tracker  
Stop watch

**Topic Areas:**

- I. Reinforcing Voluntary Commitment (1 min)
- II. Healthy Reappraisal Debriefing (10 min)
- III. Role-Play: Unhealthy Food/Drink Refusal (12 min)
- IV. In-Session Writing Exercise: Slip Response Plan (9)
- V. Small Healthy Changes to Diet and Activity Level (15 min)
- VI. Home Exercise: Letter to Your Future Self (5 min)
- VII. Session Evaluation (2min)

### I. REINFORCING VOLUNTARY COMMITMENT

Start audio recorder. Start video recorder.

*Great to see all of you! Is each of you willing to participate in today's session?*

Go around the room and make sure you get verbal commitment or a nod from each participant. Do this in a natural, friendly way.

## **II. APPLICATION OF HEALTHY COGNITIVE REAPPRAISALS (10 MIN)**

*Last week we asked you to apply the health or appearance cognitive reappraisals when confronted with temptation to eat unhealthy foods. For example, you could think of the health, career, or appearance benefits of not eating the food.*

*Let's go around the room and hear from each of you about how this worked for you.*

*Do you think you could apply this strategy of changing the what you tell yourself before you eat unhealthy foods on a regular basis?*

*Are you willing to commit to giving this a try again this week and reporting back next session?*

## **III. ROLE-PLAY: UNHEALTHY FOOD/DRINK REFUSAL (12 MIN)**

*Next, we'd like to discuss dealing with pressure from others to eat unhealthy food because these 'slips' create a barrier to healthy living.*

*To do this let's role-play refusing unhealthy foods and beverages. We'll practice how to politely but firmly refuse an invitation or request to eat something that conflicts with our standards and say what the benefit is to you of not engaging in eating the food.*

*The same way that cognitive reappraisals become more automatic with practice, the more we practice food refusals, the easier it is to respond when real-life situations catch us off-guard.*

You can use some of the examples below if necessary. Try to use examples that are particular to your participants in their environment. There are typically restaurants that are known for unhealthy choices (e.g., well known burger places). Ask participants about places that serve unhealthy foods. Try to keep the exercise playful. Try to do two role-plays per participant.

*We'll demonstrate:*

*Facilitator 1: "Let's get some beers after work"*

*Facilitator 2: "No thanks, I have a PT test in a month and that's not the six pack I need to worry about. I can't put beer first but you can come with me to the gym if you want."*

*Let's go around the room so that each of you can try.*

Sample statements:

*I have been craving pancakes and bacon for breakfast – want to go to the brunch buffet with me and get some?*

- *Maybe there is a lower-fat version you can make at home. The more high-fat and high-sugar food I eat the more I crave it so I think I'll pass.*

*Hey, the LT brought in some doughnuts – wanna grab one?*

- *That's just going to make me hungry in an hour. I'll pass.*

*I'm hungry from running so hard on that PT test. We both pass, so let's go get McDonald's!*

- *I don't want low-grade heart-attack causing meat as a reward. But don't let me stop ya from a Big Mac and an angiogram.*

*Have you tried one of those deep-fried Twinkies at that new diner? We should go get one!*

- *Nah, I'm pretty grossed out when I think how Twinkies are made. Then when I think of a gelatinous cream-stuffed*

*Do you want to go to Burger King for lunch?*

*Let's go grab a 6-pack to celebrate the shop passing inspection.*

*I bet I can finish that extra-large pizza faster than you can!*

*We don't have time to get food before my shift, let's just grab some chips/candy from the shoppette!*

*Look at those cookies in the window; they look so good! Want to get one?*

*It's sunny outside, want to go get some ice cream?*

*I am going to run down to the shoppette for a Monster – can I get you one?*

*I have been craving a milkshake – want to get one with me?*

*Did you want to go out to pizza for dinner?*

*I know you're full but just try one of these cookies—they are SO good.*

*Your aunt Alice sent these brownies just for your birthday, so you'd better have more.*

*We worked so hard on that drill — let's treat ourselves to some dessert!*

*Do you think that you are better prepared to refuse unhealthy food offers now?*

#### **IV. IN-SESSION WRITING EXERCISE: SLIP RESPONSE PLAN (9 MIN)**

*Sometimes people “slip” and eat things they have been avoiding or just decide to blow-off a planned workout. Other times, people get into really stressful situations (like an upcoming field exercise or deployment) and they drop their healthy eating and exercise patterns. Often people use this as an excuse to give up on their healthy changes and go back to their old, unhealthy lifestyle. Don't do it!*

*People who maintain a healthy weight have plans in place to deal with stressful times and avoid slips and, if a slip occurs, they “get back on the horse if they fall off.” Slips can happen—no one is perfect. The trick is to not let the slip talk you into stopping all of the improvements you are making in your lifestyle.*

*What are you going to do as you progress in your career or after you are deployed to maintain a healthy weight?*

*Are there particular things you expect to encounter that will make this difficult?*

Direct participants to the **Slip Response Plan** handout (2 pages) in the packet.

*Write down 3 things you will do if you encounter events that might make it difficult to maintain a healthy weight?*

After the majority of group members have written their statements, ask each to share.

#### **V. SMALL HEALTHY CHANGES TO DIET AND ACTIVITY LEVEL (15 MIN)**

*Last week we asked each of you to make four healthy changes to your diet and four healthy changes to your activity level. Was each of you able to make your planned health improvements? Were you able to work with your buddy?*

*Have you noticed any benefits since making these changes?*

Take time to go around the room and ask each participant if they did it (ask for specifics). After each participant has reviewed her/his goals, cross-reference this information with what you recorded on your tracking sheet for the person.

If people begin to give excuses, say, “Again we are not going to focus on excuses for not making these healthy changes – instead we want to focus on making positive changes and carrying this momentum into the future.” If a participant needs suggestions or problem solving, allow the other group members to come up with the ideas first and only jump in if needed.

*Is each of you willing to continue these changes for next week? If any of you want to add other healthy changes to your diet and activity level, that’s fine but it’s also okay to just focus on continuing to make the changes to your eating and activity level that you have already committed to.*

*And again, we encourage you to work with your buddy to make these healthy lifestyle changes.*

Go around the room and get a verbal commitment from each participant that is specific. Ask them to write down their changes on their handout and sign it. Each participant should identify all of the healthy changes to their diet and activity level that they are committed to.

Record the dietary change goal for each participant on the tracking sheet for the group.

## **VI. HOME EXERCISE: LETTER TO YOUR FUTURE SELF (5 MIN)**

*For the home exercise, we would like you to imagine yourself five years from now and write a letter to your future self. Where do you want to be? Are you doing what’s needed to get there? Can you commit to being healthy for the rest of your life? Is being healthy a big priority for*

*you? Write a letter to yourself as you see that person five years from now based on these questions.*

*Please write your name and address on the envelope provided so we can mail your letter to you in 6 months.*

Direct participants to the **Letter to Your Future Self** handout in the packet.

*Can someone tell me the home exercises in their own words?*

Ask a participant to paraphrase the assignment back to you.

*Again, experience shows that students get the most out of this class when they do the exercises the best they can. Does everyone feel that they can do this?*

Get some form of public commitment from each participant.

*We want this exercise to be fun as well as thought provoking, so please feel free to talk about it with others between group sessions.*

Time permitting:

*Can one or two of you tell me something that “hit home” in this session?*

## **VIII. SESSION EVALUATION (2MIN)**

*That’s all for today. Please take a moment to complete the session evaluation. Thanks for coming. We look forward to seeing you next week!*

## SESSION 6

**Prep:** Email/call/text each participant before this class to remind them to complete each home exercise.

**Materials:**

Handout—Letter to your Future Self (bring extra copies)

Handout—In-Session Writing Exercise: Acknowledging Gains

Handout—In-Session Writing Exercise: Healthy Changes for Next 6 Months

Handout—Tips for Eating Out

Handout—Session Evaluation

Audio recorder

Video recorder

Attendance tracker

Stop watch

**Topic Areas:**

I. Reinforcing Voluntary Commitment (1 min)

II. Letter to Your Future Self Debriefing (10 min)

III. Small Healthy Changes to Diet and Activity Level (15 min)

IV. In-Session Writing Exercise: Acknowledging Gains (9 min)

V. In-Session Writing Exercise: Small Healthy Changes for the Next  
6 Months (9 min)

VI. Finding Healthy Food Options Exercise (5min)

VII. Closure (10 min)

VIII. Session Evaluation (2min)

### I. REINFORCING VOLUNTARY COMMITMENT

Start audio recorder. Start video recorder.

*Glad you could make it to our final meeting! Is each of you willing to participate in today's session?*

Go around the room and make sure you get verbal commitment or a nod from each participant. Do this in a natural, friendly way.

## **II. LETTER TO YOUR FUTURE SELF DEBRIEFING (10 MIN)**

Pass around envelopes and pens.

*Last week we asked you to write a letter, imagining yourself five years from now. Did everyone have an opportunity to write their letter? We want to mail these letters to you six months from now so please complete the envelope with your home address.*

*We would also like to hear your letters if you are willing to read them to the group. Who wants to start?*

Go around the room and make sure everyone has a chance to read their letter. For anyone who did not complete their letter, pass them a **Letter to Your Future Self** handout to complete before leaving the session.

## **III. SMALL HEALTHY CHANGES TO DIET AND ACTIVITY LEVEL (9 MIN)**

*Last week you each committed to maintaining several healthy changes to your diet and activity level this week. Was each of you able to maintain your planned health improvements? Where you able to work with your buddy?*

Take time to go around the room and ask each participant if they did it (ask for specifics). After each participant has reviewed her/his goals, cross-reference this information with what you recorded on your tracking sheet for the person.

Remind people to avoid giving excuses and to focus on making positive change in the future. Let group members help each other problem solve.

#### **IV. IN-SESSION WRITING EXERCISE: ACKNOWLEDGING GAINS (15 MIN)**

*Next, I'd like to do a brief writing exercise focusing on what you have accomplished in this group and what benefits you are seeing. In your packet you will find an **Acknowledging Gains** handout. Would each of you write down 5 positive changes you have made or noticed as a result of being in Fit 4 Duty? Once everyone is done, I'd like each of you to share what you wrote.*

After the majority of group members have written their statements, ask each to share. Have everyone sign their statements and collect them once everyone has shared.

#### **V. IN-SESSION WRITING EXERCISE: SMALL HEALTHY CHANGES FOR THE NEXT 6 MONTHS (9 MINS)**

*Is each of you willing to continue these small healthy changes to your diet and activity level for the next 6 months?*

Hand out **Healthy Changes for the Next 6 Months**.

Go around the room and get a verbal commitment from each participant that is highly specific. Have each participant write down a food and activity change that they will commit to for the next 6 months.

#### **VI. FINDING HEALTHY FOOD OPTIONS (5 MIN)**

*For the last exercise in this group, we'd like you to continue seeking healthy options, no matter where you go. For this last exercise, we would like you to find healthier food choices at your favorite restaurant. You may wish to get a copy of the menu to help you with this exercise. Think about the menu items you would normally order and then search for some healthy alternatives. This goes for food and beverage choices.*

Hand out **Tips for Eating Out** form.

## **VII. CLOSURE (10 MIN)**

*How do you feel about your lifestyle now after making changes over these last 6 weeks?*

*Do you view yourself differently now compared to 6 weeks ago?*

*(e.g., has their self-concept changed from pride in living dangerously by eating unhealthy foods to thinking of themselves as people who typically make healthy food and activity choices).*

*What level of support can you expect from family and friends?*

*What are your weight and health goals?*

*What do you see as potential barriers to success?*

*Did any particular activity stand out as particularly helpful to you?*

*Has making the healthy change altered how you feel about your body?*

*Has anyone commented on your healthy lifestyle changes?*

*Do you feel optimistic that you can continue these healthy changes into the future?*

*Once again, thanks again for deciding to be a part of this group. We have been impressed with your thoughtful comments and participation—they are much appreciated!*

*Remember, this class has been shown to be effective in the long-run, so we want to encourage you to continue making tweaks to your lifestyle to make it healthier.*

*Finally, if you've come to all six sessions, I would like to offer each of you another giveaway item. Please select something that appeals to you.*

## **VIII. SESSION EVALUATION (2MIN)**

*But before you go, please take a moment to complete the session evaluation. We really appreciate all the feedback you've given us so we can make this a better program.*

*Be sure to come back next week for post treatment measurements!*

## Appendix C

### Demographics and Medical History Questionnaire for Fit4Duty

The following questions ask you to give some background information about yourself. This information will help us to understand and interpret the study's results. The information will be kept completely confidential. Please answer the best question. If you feel more than one answer describes you, please choose the most accurate on how you would define yourself.

#### **Demographics**

Date of Birth \_\_\_\_\_

Height \_\_\_\_\_

Weight \_\_\_\_\_

#### **1. What Service are you in?**

☐ Army

☐ Navy

☐ Marine Corps

☐ Air Force

#### **2. What is your pay grade?**

##### ENLISTED

☐ E1-E3

☐ E4-E6

☐ E7-E9

##### OFFICER

☐ Trainee

☐ W1-W5

☐ O1-O3

☐ O4-O10

#### **3. What is your highest level of education now?**

☐ Did not graduate from high school

- ☐ GED or ABE certificate
- ☐ High school diploma
- ☐ Trade or technical school graduate
- ☐ Some college but not a 4-year degree
- ☐ 4-year college degree (BA, BS, or equivalent)
- ☐ Graduate or professional study but no graduate degree
- ☐ Graduate or professional degree

**4. How old are you?**

*Enter your age in the boxes. Use both boxes, ONE number to a box.*

**YEARS OLD**

**5. Are you male or female?**

- ☐ Male    ☐ Female

**6. What is your marital status?**

- ☐ Married
- ☐ Living as married (living with fiancé, boyfriend, or girlfriend but not married)
- ☐ Separated and not living as married
- ☐ Divorced and not living as married
- ☐ Widowed and not living as married
- ☐ Single, never married and not living as married

**6a.** ☐ Yes    ☐ No    Have you had any relationship status changes in the past 12 months?

**6b.** IF YES, please describe: \_\_\_\_\_

**7. What is your race? (please select all that apply):**

- ☐ Caucasian/White
- ☐ Black or African American
- ☐ American Indian or Alaskan Native
- ☐ Asian (Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese)
- ☐ Native Hawaiian or other Pacific Islander (Samoan, Guamanian, Chamorro)
- ☐ Other, please describe: \_\_\_\_\_

**8. Are you Spanish/Hispanic/Latino?**

- ☐ No, not Spanish/Hispanic/Latino
- ☐ Yes, Mexican/Mexican-American/Chicano
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, other Spanish/Hispanic/Latino

**9. Is your spouse or live-in fiancé, boyfriend or girlfriend now living with you at your present duty location?**

- ☐ Yes
- ☐ No
- ☐ I have no spouse or live-in fiancé, boyfriend or girlfriend

**10. Is your spouse also on active duty?**

- ☐ Yes
- ☐ No
- ☐ I do not have a spouse

**11.** Do you have any children living with you?

- ☐ Yes
- ☐ No
- ☐ I have no children

**12.** In what type of housing do you currently live? (If your dependents are with you, mark type of family housing.)

- ☐ Housing that you rent or lease
- ☐ Housing that you own
- ☐ On board ship
- ☐ Military barracks/dormitory or bachelor quarters
- ☐ Military family housing
- ☐ OCONUS quarters in theater
- ☐ Other (e.g., embassy housing)

**13.** How many people live in your household including yourself? \_\_\_\_\_

**14.** What is your household income before taxes? (please check one)

- ☐ Under \$20,000
- ☐ \$20,000-29,999
- ☐ \$30,000-39,999
- ☐ \$40,000-49,999
- ☐ \$50,000-59,999
- ☐ \$60,000-69,999
- ☐ \$70,000-99,999

☐ \$100,000-149,999

☐ Above \$150,000

**15. What is your religious preference?**

☐ Jewish

☐ Protestant/Christian

☐ Catholic

☐ Muslim

☐ Hindu

☐ Other, please describe: \_\_\_\_\_

### **Lifestyle Habits and Weight History Questions**

**The next set of questions asks about your health habits since you entered the military.**

1. How many years have you been in the military? \_\_\_\_\_
2. Have you ever lost 20 pounds or more – when you weren't sick – and then gained it back?
  - ☐ Never ("No")
  - ☐ Once or Twice
  - ☐ Three or Four times
  - ☐ Five times or more
3. Is your current weight more, less, or the same as your weight when you joined the military?

**MORE THAN**

**LESS THAN**

**SAME**

4. What has been your highest weight while in the military (for women, please exclude times when you were pregnant)? \_\_\_\_\_ lbs.
5. What has been your lowest weight while in the military? \_\_\_\_\_ lbs.
6. How do you perceive yourself, based on your CURRENT weight?

**Underweight**

**Healthy-weight**

**Overweight**

**Obese**

7. How many meals do you typically eat in one day? \_\_\_\_\_
8. How many snacks do you typically eat in one day? \_\_\_\_\_

9. How many hours of sleep do you typically get on a given night? \_\_\_\_\_

10. Have you ever smoked cigarettes, used electronic nicotine delivery products (e.g., E-cigarette), chewing tobacco, snuff, or any other form of smokeless tobacco?

☐ Yes      ☐ No (**SKIP TO QUESTION 14**)

**10a.** If YES, please check all that apply:

- ☐ Cigarettes
- ☐ Electronic nicotine delivery products
- ☐ Chewing tobacco
- ☐ Snuff
- ☐ Other form of smokeless tobacco

11. When was the last time you smoked a cigarette or used an electronic nicotine delivery product, chewing tobacco, snuff, or any other form of smokeless tobacco?

- ☐ Today
- ☐ During the past 30 days
- ☐ 1-6 months ago
- ☐ 7-12 months ago
- ☐ 1-3 years ago
- ☐ More than 3 years ago

12. On how many of the past 30 days did you smoke a cigarette or use an electronic nicotine delivery product, chewing tobacco, snuff, or any other form of smokeless tobacco?

**Number of days (from 0 to 30):** \_\_\_\_\_

13. On average, how many cigarettes do you smoke PER DAY?

**OR**

On average, on the days when you use chewing tobacco, snuff, or other smokeless tobacco, how many times PER DAY do you use it?

**Number per day on average (from 0 to 99):** \_\_\_\_\_

14. How many times do you exercise per week? \_\_\_\_\_

15. Overall, how would you rate your health habits:

**Excellent      Good   Average      Below average      Poor**

15a. How are your health habits now compared to prior to entering the military?

- ☐ My habits are much healthier now than before I entered the military
- ☐ My habits are slightly healthier now than before I entered the military
- ☐ My habits are the same now as they were prior to entering the military
- ☐ My habits are slightly less healthy now than before I entered the military
- ☐ My habits are much less healthy now than before I entered the military

16. Overall, how would you rate your general health:

**Excellent      Good      Average      Below average      Poor**

16a. How is your health now compared to prior to entering the military?

- ☐ My health is much better now than before I entered the military
- ☐ My health is slightly better now than before I entered the military
- ☐ My health is the same now as it was prior to entering the military
- ☐ My health is slightly worse now than before I entered the military
- ☐ My health is much worse now than before I entered the military

17. Are you currently participating in any sort of diet regimen? ☐ Yes ☐ No

17a. If yes, please describe any restrictions to your diet:

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**18.** During the past **THREE MONTHS**, did you ever take more than twice the recommended dose of a diet pill in order to avoid gaining weight?

☐ Yes ☐ No

**19.** During the past **THREE MONTHS**, did you ever take more than twice the recommended dose of supplements in order to avoid gaining weight after binge eating?

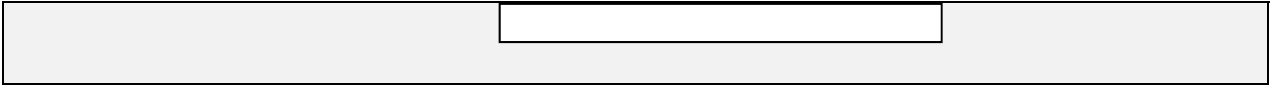
☐ Yes ☐ No

The experience of weight-based teasing is increasingly common. The purpose of these questions is to see whether or not any of these experiences apply to you. Please answer the following questions as accurately and honestly as possible. Please remember that all of your answers are kept completely confidential. Thank you for taking the time to complete this form.

Please note: if there are any questions that make you uncomfortable, you may leave them blank

How often have you been made fun of, teased, or given a hard time by coworkers or supervisors because of your:

|                                                 | Never                 | Rarely                | Sometimes             | Often                 | Very Often            |
|-------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. Body <b>weight</b> (the number on the scale) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Body <b>shape</b> (the way your body looks)  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Gender                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Race/Ethnicity                               | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Sexual Orientation                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Religion                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Physical Disability                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. Learning Disability                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. Overall Appearance                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. Something else                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Please indicate in the box:                     |                       |                       |                       |                       |                       |



What is the **MOST** common reason (pick **ONE**) that you are made fun of, teased, or given a hard time at work (*please circle one item only*)

|                                                 |
|-------------------------------------------------|
| 1. Body <b>weight</b> (the number on the scale) |
| 2. Body <b>shape</b> (the way your body looks)  |
| 3. Gender                                       |
| 4. Race/Ethnicity                               |
| 5. Sexual Orientation                           |
| 6. Religion                                     |
| 7. Physical Disability                          |
| 8. Learning Disability                          |
| 9. Overall Appearance                           |
| 10. Something else<br>Please indicate: _____    |
| 11. I am not made fun of or treated badly       |

**In the last YEAR, have you received disciplinary action (e.g., by fitness leader/PTL, supervisor, or commander) as a result of your BODY SHAPE OR WEIGHT?**

| Never                 | Rarely                | Sometimes             | Often                 | Very Often            |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**If yes, please specify nature of disciplinary action:**

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In the last YEAR, how frequently has your **BODY WEIGHT OR SHAPE** resulted in:

|                                                                                     | Never                 | Rarely                | Sometimes             | Often                 | Very Often            |
|-------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. Being laughed at                                                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Being left out/excluded from social groups or activities                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Being given a nickname that refers to your weight/shape                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| <b>If yes, please specify:</b><br>_____                                             |                       |                       |                       |                       |                       |
| 4. Coworkers/friends asking intrusive or personal questions about your weight       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. People joking about your weight/shape                                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Others spreading rumors or gossip about you                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. People assuming that you overeat or binge eat                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. People assuming you are lazy                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. Being sent mean emails/IMs/texts/chat messages referring to your weight or shape | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. Being hit or physically attacked because of your weight/shape                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. Being passed up for a promotion/award due to your weight or physical appearance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                                                                                                 |                       |                       |                       |                       |                       |
|-------------------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <p>OPTIONAL:</p> <p><b>If yes, please specify award or promotion</b></p> <p>_____</p>           |                       |                       |                       |                       |                       |
| 12. Being the only heavy person or the heaviest person at work                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. A primary care manager (PCM) saying your weight is a problem even if you are in good health | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. People assuming you are out of shape/not physically fit                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 15. Being told, "All you need is a little willpower"                                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. Having a PCM recommend a diet even if you did not come in to discuss weight loss            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. Being ignored or avoided by others because of your weight.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. Having others comment on what you are eating (e.g., "you really shouldn't be eating that")  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 19. During fitness tests, being called names (e.g., "doughboy" "lazy")                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 20. Being made fun of/mockd during drills or training                                           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 21. Being told that your shape/weight didn't meet military standards                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                                                                                     |                       |                       |                       |                       |                       |
|-------------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 22. Being told you were unattractive/ugly by a coworker                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 23. Overhearing weight-related jokes (even if not directed specifically at you)     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 24. Being given unsolicited tips about weight loss/prevention of weight gain        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 25. Receiving negative weight or appearance-related feedback on performance reports | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**Who has given you a hard time or mocked you because of your weight/body shape in the last year?**

|                               | Never                 | Rarely                | Sometimes             | Often                 | Very Often            |
|-------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. Coworker/Classmate         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Friend                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Supervisor or Commander    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. Primary Care Manager       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. Spouse/Significant Other   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. Stranger                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. Fitness Leader / PTL       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. Person weighing/taping you | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

**People react to being teased or made fun of in different ways. Using the scale below, please indicate whether and how often, you have had any of the following reactions after you were made fun of or treated badly because of your weight or shape.**

|                                                                                   | Never                 | Rarely                | Sometimes             | Often                 | Very Often            |
|-----------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. I laughed it off or joked about it                                             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. I ignored the situation                                                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. I felt badly about my body                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 4. I avoided physical activity                                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 5. I ate more food                                                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 6. I attempted to hide my shape with baggy clothes                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 7. I told off the other person                                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 8. I tried eating healthier to lose weight                                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 9. I went on a strict diet or fasted                                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 10. I used laxative/diuretics or made myself vomit                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 11. I talked to supportive friends                                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 12. I started exercising more                                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 13. I ate my favorite foods to make myself feel better                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 14. I reported it to a supervisor/commander or Military Equal Opportunities (MEO) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

|                                                                                  |                       |                       |                       |                       |                       |
|----------------------------------------------------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 15. I felt less confident in myself/my abilities                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 16. I felt less camaraderie within my unit                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 17. I felt less motivated to lose weight/get in better shape                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 18. I tried to lose weight quickly (e.g., using diet pills, saunas, body wraps): | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| If yes, please specify method in the box:                                        | <input type="text"/>  |                       |                       |                       |                       |

Have you had any other negative consequences because of your weight/body shape at work (e.g., more frequent PT tests/weight-ins than others) or at home:

At work: \_\_\_\_\_

\_\_\_\_\_

At home: \_\_\_\_\_

\_\_\_\_\_

Please rank the following factors in terms of how important they are in causing obesity.

Use the following scale to record your answers.

= Not at all Important      = Somewhat Important      = Moderately Important      = Very Important      = Extremely Important

|                        | Not at all Important | Somewhat Important | Moderately Important | Very Important | Extremely Important |
|------------------------|----------------------|--------------------|----------------------|----------------|---------------------|
| 1. Physical Inactivity | 1                    | 2                  | 3                    | 4              | 5                   |

|                                      |   |   |   |   |   |
|--------------------------------------|---|---|---|---|---|
| 2. Overeating                        | 1 | 2 | 3 | 4 | 5 |
| 3. High Fat Diet                     | 1 | 2 | 3 | 4 | 5 |
| 4. Genetic Factors                   | 1 | 2 | 3 | 4 | 5 |
| 5. Poor Nutritional Knowledge        | 1 | 2 | 3 | 4 | 5 |
| 6. Psychological Problems            | 1 | 2 | 3 | 4 | 5 |
| 7. Repeated Dieting (Weight Cycling) | 1 | 2 | 3 | 4 | 5 |
| 8. Restaurant Eating                 | 1 | 2 | 3 | 4 | 5 |
| 9. Lack of Willpower                 | 1 | 2 | 3 | 4 | 5 |
| 10. Metabolic Defect                 | 1 | 2 | 3 | 4 | 5 |
| 11. Endocrine Disorder               | 1 | 2 | 3 | 4 | 5 |

**Please indicate your level of agreement or disagreement with the following statements.**

|                                                                              | <b>Strongly<br/>Disagree</b> | <b>Disagree</b> | <b>Somewhat<br/>Disagree</b> | <b>Neither<br/>Agree<br/>Nor<br/>Disagree</b> | <b>Somewhat<br/>Agree</b> | <b>Agree</b> | <b>Strongly<br/>Agree</b> |
|------------------------------------------------------------------------------|------------------------------|-----------------|------------------------------|-----------------------------------------------|---------------------------|--------------|---------------------------|
| <b>1.</b> Fat people tend toward bad behavior                                | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |
| <b>2.</b> Fat people are sloppy                                              | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |
| <b>3.</b> Sometimes I think that fat people are dishonest                    | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |
| <b>4.</b> Fat people have bad hygiene                                        | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |
| <b>5.</b> In general, fat people don't think about the needs of other people | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |
| <b>6.</b> I would not want to have a fat person as a roommate or coworker    | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |
| <b>7.</b> I like fat people                                                  | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |
| <b>8.</b> I don't enjoy having a conversation with a fat person              | 1                            | 2               | 3                            | 4                                             | 5                         | 6            | 7                         |

|                                                                                                                            |   |   |   |   |   |   |   |
|----------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| <b>9.</b> I would be comfortable having a fat person in my group of friends                                                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>10.</b> I would like having a fat person at my place of worship or community center                                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>11.</b> I find fat people attractive                                                                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>12.</b> Fat people make good romantic partners                                                                          | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>13.</b> I find fat people to be sexy                                                                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>14.</b> Fat people are a turn-off                                                                                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>15.</b> I find fat people pleasant to look at                                                                           | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>16.</b> Special effort should be taken to make sure that fat people have the same rights and privileges as other people | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>17.</b> I would not trust my doctor if s/he was fat                                                                     | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

**Directions:** Please circle the response that corresponds with the answer that is most appropriate to you.

|                                                                                    | <b>Strongly Disagree</b> | <b>Moderately Disagree</b> | <b>Slightly Disagree</b> | <b>Neutral</b> | <b>Slightly Agree</b> | <b>Moderately Agree</b> | <b>Strongly Agree</b> |
|------------------------------------------------------------------------------------|--------------------------|----------------------------|--------------------------|----------------|-----------------------|-------------------------|-----------------------|
| <b>1.</b> Because of my weight, I feel that I am just as competent as anyone.      | 1                        | 2                          | 3                        | 4              | 5                     | 6                       | 7                     |
| <b>2.</b> I am less attractive than most other people because of my weight.        | 1                        | 2                          | 3                        | 4              | 5                     | 6                       | 7                     |
| <b>3.</b> I feel anxious about my weight because of what people might think of me. | 1                        | 2                          | 3                        | 4              | 5                     | 6                       | 7                     |
| <b>4.</b> I wish I could drastically change my weight.                             | 1                        | 2                          | 3                        | 4              | 5                     | 6                       | 7                     |
| <b>5.</b> Whenever I think a lot about my weight, I feel depressed.                | 1                        | 2                          | 3                        | 4              | 5                     | 6                       | 7                     |
| <b>6.</b> I hate myself for my weight.                                             | 1                        | 2                          | 3                        | 4              | 5                     | 6                       | 7                     |
| <b>7.</b> My weight is a major way that I judge my value as a person.              | 1                        | 2                          | 3                        | 4              | 5                     | 6                       | 7                     |

|                                                                                                        |   |   |   |   |   |   |   |
|--------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|
| <b>8.</b> I don't feel that I deserve to have a really fulfilling social life, because of my weight.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>9.</b> I am OK being the weight that I am.                                                          | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>10.</b> Because of my weight, I don't feel like my true self.                                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| <b>11.</b> Because of my weight, I don't understand how anyone attractive would want to date/marry me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

# PFC

|                                                                                                                                                         | <u>Strongly</u><br><u>Disagree</u> |   | <u>Neither Agree</u><br><u>Nor Disagree</u> |   | <u>Strongly</u><br><u>Agree</u> |   |   |   |   |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|---|---------------------------------------------|---|---------------------------------|---|---|---|---|--|
| 1. I prefer to be around people whose reactions I can anticipate.                                                                                       | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 2. It is important to me that my actions are consistent with my beliefs.                                                                                | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 3. Even if my attitudes and actions seemed consistent with one another to me, it would bother me if they did not seem consistent in the eyes of others. | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 4. It is important to me that those who know me can predict what I will do.                                                                             | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 5. I want to be described by others as a stable, predictable person.                                                                                    | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 6. Admirable people are consistent and predictable                                                                                                      | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 7. The appearance of consistency is an important part of the image I present to the world.                                                              | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 8. It bothers me when someone I depend upon is unpredictable.                                                                                           | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 9. I don't like to appear as if I am inconsistent.                                                                                                      | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 10. I get uncomfortable when I find my behavior contradicts my beliefs.                                                                                 | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 11. An important requirement for any friend of mine is personal consistency.                                                                            | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 12. I typically prefer to do things the same way.                                                                                                       | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 13. I dislike people who are constantly changing their opinion.                                                                                         | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 14. I want my close friends to be predictable.                                                                                                          | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 15. It is important to me that others view me as a stable person.                                                                                       | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 16. I make an effort to appear consistent to others.                                                                                                    | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 17. I'm uncomfortable holding two beliefs that are inconsistent.                                                                                        | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |
| 18. It doesn't bother me much if my actions are inconsistent.                                                                                           | 1                                  | 2 | 3                                           | 4 | 5                               | 6 | 7 | 8 | 9 |  |

## INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

\_\_\_\_\_ **days per week**

☐

No vigorous physical activities      ➔ **Skip to question 3**

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

☐

Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe

somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

\_\_\_\_\_ **days per week**

☐ No moderate physical activities → *Skip to question 5*

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

\_\_\_\_\_ **days per week**

☐

No walking → ***Skip to question 7***

6. How much time did you usually spend **walking** on one of those days?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

☐

Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

6. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

\_\_\_\_\_ **hours per day**

\_\_\_\_\_ **minutes per day**

☐

Don't know/Not sure

**This is the end of the questionnaire, thank you for participating.**

**Instructions:** This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in sleeping Pattern) or Item 18 (Changes in Appetite).

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>1. Sadness</b></p> <p>0 I do not feel sad.</p> <p>1 I feel sad much of the time.</p> <p>2 I am sad all the time.</p> <p>3 I am so sad or unhappy that I can't stand it.</p> <p><b>2. Pessimism</b></p> <p>0 I am not discouraged about my future.</p> <p>1 I feel more discouraged about my future than I used to be.</p> <p>2 I do not expect things to work out for me.</p> <p>3 I feel my future is hopeless and will only get worse.</p> <p><b>3. Past Failure</b></p> <p>0 I do not feel like a failure.</p> <p>1 I have failed more than I should have.</p> <p>2 As I look back, I see a lot of failures.</p> <p>3 I feel I am a total failure as a person.</p> <p><b>4. Loss of Pleasure</b></p> <p>0 I get as much pleasure as I ever did from the things I enjoy.</p> <p>1 I don't enjoy things as much as I used to.</p> <p>2 I get very little pleasure from things I used to enjoy.</p> <p>3 I can't get any pleasure from the things I used to enjoy.</p> <p><b>5. Guilty Feelings</b></p> <p>0 I don't feel particularly guilty.</p> <p>1 I feel guilty over many things I have done or should have done.</p> <p>2 I feel quite guilty most of the time.</p> <p>3 I feel guilty all of the time.</p> | <p><b>6. Punishment Feelings</b></p> <p>0 I do not feel I am being punished.</p> <p>1 I feel I may be punished.</p> <p>2 I expect to be punished.</p> <p>3 I feel I am being punished.</p> <p><b>7. Self-Dislike</b></p> <p>0 I feel the same about myself as ever.</p> <p>1 I have lost confidence in myself.</p> <p>2 I am disappointed in myself.</p> <p>3 I dislike myself.</p> <p><b>8. Self-Criticalness</b></p> <p>0 I don't criticize or blame myself more than usual.</p> <p>1 I am more critical of myself than I used to be.</p> <p>2 I criticize myself for all of my faults.</p> <p>3 I blame myself for everything bad that happens.</p> <p><b>9. Suicidal Thoughts or Wishes</b></p> <p>0 I don't have any thoughts of killing myself.</p> <p>1 I have thoughts of killing myself, but would not carry them out.</p> <p>2 I would like to kill myself.</p> <p>3 I would kill myself if I had the chance.</p> <p><b>10. Crying</b></p> <p>0 I don't cry any more than I used to.</p> <p>1 I cry more than I used to.</p> <p>2 I cry over every little thing.</p> <p>3 I feel like crying, but I can't.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**11. Activation**

- 0 I am no more restless or wound up than usual.
- 1 I feel more restless or wound up than usual.
- 2 I am so restless or agitated that it's hard to stay still
- 3 I am so restless or agitated that I have to keep moving or doing something.

**12. Loss of Interest**

- 0 I have not lost interest in other people or activities.
- 1 I am less interested in other people doing things than before.
- 2 I have lost most of my interest in other people or other things.
- 3 It's hard to get interested in anything.

**13. Indecisiveness**

- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make decisions than usual.
- 2 I have much greater difficulty in making decisions than I used to.
- 3 I have trouble making decisions.

**14. Worthlessness**

- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile & useful as I used to.
- 2 I feel more worthless as compared to other people.
- 3 I feel utterly worthless.

**15. Loss of Energy**

- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

**16. Changes in Sleep Pattern**

- 0 I have not experienced any change in my sleeping pattern.
- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.
- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.
- 3a I sleep most of the day.
- 3b I wake up 1-2 hours early and can't get back to sleep.

**17. Irritability**

- 0 I am no more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all the time.

**18. Changes in Appetite.**

- 0 I have not experienced any change in my appetite.
- 1a My appetite is somewhat less than usual.
- 1b My appetite is somewhat greater than usual.
- 2a My appetite is much less than before
- 2b My appetite is much greater than usual.
- 3a I have no appetite at all.
- 3b I crave food all of the time.

**19. Concentration Difficult**

- 0 I can concentrate as well as ever.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on anything for very long.
- 3 I find I can't concentrate on anything.

**20. Tiredness or Fatigue**

- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.

**21. Loss of Interest in Sex**

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

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