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ABSTRACT

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INDIVIDUAL DIFFERENCES AND SHORT-TERM MILITARY FACTORS ASSOCIATED WITH UNHEALTHY WEIGHT CONTROL BEHAVIORS AMONG ACTIVE DUTY AND RESERVE ARMY SOLDIERS

by

CPT Laurel K. Cofell

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

INTRODUCTION

Introduction

Individuals in the military are exposed to unique circumstances including challenging physical environments (Adam et al., 2008; Milroy, 1987), military culture (Dunivin, 1994), and regulations prescribing fitness and health requirements. Among these regulations is Army Regulation 600-9: The Army Weight Control Program (September 2006), which requires service members to maintain a non-overweight physique. Individuals who are weighed annually or semi-annually and found to be over military weight standards are barred from positive actions such as promotions or awards, and can even lose their jobs. In order to meet these weight standards, service members may engage in a number of unhealthy weight loss behaviors such as vomiting, fasting, or excessive exercise (Brunken, 1991; Carlton et al., 2005; Lauder et al., 1999; McNulty, 1997, 2001).

The pressure associated with mandatory military weight requirements is superimposed on societal pressure to maintain a specific body weight and shape (Vartanian, Herman, & Polivy, 2005). Women are generally expected to be thin (White, 1992) and men are expected to be muscular (Pope et al., 2005), although, in general, women perceive more pressure to meet certain standards of appearance (Cash, Melnyk, & Hrabosky, 2004). In addition to gender differences, some subgroups in the population may place greater emphasis on members of their group embodying certain physical ideals. For example, as discussed below, numerous studies have demonstrated that Caucasian women tend to perceive and internalize a greater emphasis on being thin compared to African-American women (Wildes, Emery, & Simons, 2001).

In summary, military personnel are exposed to numerous sources of pressure to meet specific physical standards. Not only are military personnel required to pass weight standards, but military culture emphasizes physical fitness and societal pressure also may emphasize physical attributes to a greater or lesser extent, depending on the individual's cultural background. Individuals in the military also are expected to be able to perform physically and mentally in a variety of often stressful situations. This emphasis on military readiness is in some ways at odds with weight requirements if military personnel engage in unhealthy behaviors, including purging, fasting or even smoking, to control weight. The current research focuses on the individual differences and military factors associated with unhealthy weight loss behaviors and disordered eating cognitions. In addition, this research attempts to determine weight and health-related behaviors that may have a negative impact on military readiness.

This research is important because previous research has primarily focused on the prevalence of unhealthy weight loss behaviors in the military, whereas this research focuses on the various determinants and "paths" to disordered eating among military personnel. In addition, this research attempts to identify factors that can negatively impact military readiness, which can ultimately impact the military's ability to carry out missions. Ultimately, the purpose of this research is to provide additional information to researchers and military leaders seeking ways to improve the readiness and quality-of-life of United States military personnel.

Disordered Eating Behaviors in the Military

Eating disorders and disordered eating behaviors such as vomiting, binge eating, extreme caloric restriction, and excessive exercise impact a significant percentage of the armed forces (Lauder et al., 1999; McNulty, 1997, 2001; Sweeney & Bonnabeau, 1990) by decreasing physical and mental health of individuals engaging in such behaviors (Polivy, 1996; Sweeney & Bonnabeau, 1990). These behaviors are even more dangerous in military environments (i.e., in combat) where service members may be subjected to extreme physical and psychological strain (Adam et al., 2008; Milroy, 1987). Therefore, eating disordered behaviors may not only affect the health of the individuals using these behaviors, but also affect military readiness and successful completion of missions.

Past research has demonstrated that eating disorders and eating disordered behaviors may have a higher prevalence among service members than among the general population. According to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV-TR,* APA, 2000) the lifetime prevalence of anorexia nervosa (AN) is about 0.5% among females and about 0.05% among males, and the lifetime prevalence of bulimia nervosa (BN) is approximately 1%-3% among females and 0.1%-0.3% among males (2000). In military populations, these prevalences are significantly increased. A study of 3,613 Active Duty female service members revealed that at the time of the survey 1.1% met the criteria for AN and 8% met the criteria for BN (McNulty, 2001). A study of a sample of 1,425 Active Duty Navy men revealed similar prevalences: 2.5% met the criteria for AN and 6.8% met the criteria for BN (McNulty, 1997).

The high prevalence of AN and BN in the military is only part of the picture: Service members may also engage in physically harmful weight loss behaviors that do not meet the criteria for AN or BN, but may cause significant physical and psychological harm. These sub-clinical disordered eating behaviors may be referred to as Eating Disorder-Not Otherwise Specified (EDNOS), a diagnostic category in the *DSM-IV-TR* (APA, 2000) used when there is significant and impairing eating pathology present that does not fit the current diagnostic criteria for AN or BN. Individuals who engage in sub-clinical disordered eating may regularly vomit, misuse laxatives, binge eat, or exercise excessively in a manner that or distressing to the individual or impairs his or her ability to function, but does not meet the criteria for AN or BN. Although there may be a tendency to minimize the impairment and severity of the pathology of EDNOS, evidence has emerged that EDNOS in fact may be at least as severe and impairing as bulimia nervosa. A recent study by Fairburn and colleagues (Fairburn et al., 2007) demonstrated that individuals diagnosed with EDNOS displayed comparable eating disorder psychopathology to those diagnosed with BN, as measured by the Eating Disorder Examination (EDE) (Cooper, Cooper, & Fairburn, 1989).

In civilian populations, these sub-clinical disordered eating behaviors may be two or more times as prevalent as AN and BN (Ricciardelli & McCabe, 2004; Shisslak, Crago, & Estes, 1995). Although actual point prevalences of sub-clinical disordered eating behaviors are difficult to assess due to varied research definitions of "disordered eating," studies using military samples indicate a prevalence of sub-clinical disordered eating behaviors among males ranging from 7.0% to 41.4% (McNulty, 1997; Warner et al., 2007) and among females ranging from 3.0% to 62.8% (Lauder et al., 1999;

McNulty, 2001). In addition, individuals in the military may also engage in smoking as a means of controlling weight (Peterson & Helton, 2000; Russ, Fonseca, Peterson, Blackman, & Robbins, 2001), an addictive behavior which has been shown to have a number of negative short-term physiological consequences, as well as long-term increased risk for disease (Sherman, 1991). These behaviors, although not technically warranting a diagnosis of AN or BN, are harmful and may occur as a result of significant pressure to lose weight in Active Duty military environments.

Reserve personnel are not exempt from pressures to lose weight and also display unhealthy weight loss behaviors. Sweeney and Bonnabeau (1990) surveyed a Reserve Component (RC) medical unit for use of negative weight loss behaviors such as strict caloric restriction (<1200 kCal a day), use of popular diets, self-induced vomiting, taking laxatives, taking diuretics, or taking prescription or non-prescription diet pills. Of the 342 anonymous questionnaires that were returned, they found that 32.2% of respondents reported use of one or more of these unhealthy weight loss techniques at least twice a year, 40.7% would use these techniques two to five times a year, and 27.1% reported using these techniques more than five times a year. According to respondents, these behaviors were especially common in preparation for weigh-ins and reporting to military training, where soldiers are typically required to pass an Army Physical Fitness Test (APFT) and weigh-in. Harrow, Cordoves, and Hulette (2006) found that 25% of soldiers admitted to skipping meals in an effort to lose weight during Reserve Component Annual Training, which is often a physically demanding two weeks of training. Despite generally less exposure to a military environment and culture, Reserve soldiers are still affected by military factors associated with unhealthy weight loss behaviors.

Cultural Factors Contributing to Disordered Eating in Military and Civilian Populations

The alarmingly high numbers of eating disordered behaviors just discussed reflect a large population of soldiers, sailors, airmen, and Marines who are engaging in a wide variety of unhealthy eating and weight loss behaviors. The apparent disparity in prevalence of eating disordered behaviors between military and civilian populations (Peterson, Talcott, Kelleher, & Smith, 1995), as well as between subgroups of the civilian population (McCabe & Vincent, 2003; White, Kohlmaier, Varnado-Sullivan, & Williamson, 2003), has led many researchers to explore why some people are more likely to engage in eating disordered behaviors than others (Halliwell & Harvey, 2006; Neumark-Sztainer, Story, Falkner, Beuhring, & Resnick, 1999; White et al., 2003). Subsequent research has shown that a number of factors may influence an individual's propensity to engage in disordered eating behaviors. Some of these factors are reflected in studies of civilian populations, and reflect a "culture of pressure" to be thin that tends to be more internalized in some sub-groups of the population than others. For example, many studies have demonstrated that eating disorders and eating disordered behaviors and cognitions are more prevalent in females than in males across the lifespan (Keel, Baxter, Heatherton, & Joiner, 2007). Peak prevalence of these behaviors generally occurs in adolescence and early adulthood (Hudson, Hiripi, Pope, & Kessler, 2007), a time when many people first join the military (Warner et al., 2007). Although body dissatisfaction and disordered eating behaviors displayed by males is generally less than that displayed by females, men tend experience increased body dissatisfaction and disordered eating as they transition enter adulthood and gain weight. In contrast, as women enter adulthood they tend to display increased body satisfaction and fewer disordered eating behaviors,

although many adult women continue to display elevated levels of body image disturbance (Heatherton, Mahamedi, Striepe, Field, & Keel, 1997). Various researchers have posited that women display higher eating disordered behaviors and cognitions when compared to men because they perceive more social pressure to be thin and also may be more likely to believe that physical appearance is an important indicator of their value as a person (Stice & Shaw, 2002). As a result of this pressure and the perceived importance of being thin, very few women in America are satisfied with their bodies. This "normative discontent" results in many American women continuously struggling with their weight and body image (Rodin, Silberstein, & Striegel-Moore, 1984).

In addition to sex, culture and ethnicity may play a role in the etiology of disordered eating behaviors, although studies are equivocal: Some studies find that individuals of certain ethnicities engage in higher prevalences of disordered eating behaviors, whereas others do not. For example, numerous studies have demonstrated that Caucasian and Latina females engage in more disordered eating behaviors than African-American and Asian-American women (Crago, Shisslak, & Estes, 1996; Wildes et al., 2001), whereas other studies find general equivalence between various ethnicities (Franko, Becker, Thomas, & Herzog, 2007). The most robust differences have been between African-American and Caucasian women, with Caucasian women consistently displaying more disordered eating behaviors and cognitions (Abrams, Allen, & Gray, 1993; Atlas, 2002; Striegel-Moore et al., 2003). It also has been found that acculturation to Caucasian-American society may influence disordered eating behaviors because minorities may adopt mainstream societal standards of beauty and acceptable body size and shape as they acculturate (Cachelin & Regan, 2006). These findings may indicate

that it is the acceptance of cultural norms as applying to oneself that may put an individual at risk for disordered eating behaviors.

Currently, no studies have been published examining the impact of acculturation to the *military* on eating and weight control behavior, as few studies have examined the impact of acculturation to the military on behavior in general. Although not a culture that most individuals are exposed to in their early developmental years, entry into the military requires that an individual adopt certain behaviors and underlying values, and there are a number of social norms that the individual is expected to abide by. The military can traditionally be thought of as a stereotypically masculine culture, the ideals and values of which include conservatism, homogeneity of individuals, and exclusion of and hostility towards those who do not meet the criteria of "masculine warriors." Although recently the military has become more inclusive and egalitarian, nonetheless there is continued significant pressure to conform to "masculine warrior" ideals (Dunivin, 1994). Because fatness often is not associated with this warrior image, there is considerable disdain shown towards overweight individuals in the military. For example, individuals enrolled in the Army Weight Control Program are colloquially referred to being in "the fatboy program."

Although not yet tested or demonstrated by research, the pressure to comply with this warrior image and military culture may cause these values and ideals to become internalized over time. Consequently, individuals in the military may engage in dysfunctional weight control and exercise regimens to meet the cultural standard. As such, it would be expected that individuals more exposed to military culture, for example, Active Duty soldiers, would engage in more disordered eating and weight loss behaviors

than individuals less exposed to military culture, for example, Reserve soldiers and civilians. Thus, although duty status is not commonly thought of as an individual difference, duty status may represent long-term exposure to specific cultural factors and pressures, much like other individual differences.

The Path to Disordered Eating

A number of risk factors may predispose individuals to engage in disordered eating behaviors such as being a Caucasian female and being in the military. Many of these risk factors are associated with increased real and perceived long-term social pressure to be physically "ideal," as well as increased cognitive factors associated with disordered eating, such as body dissatisfaction. A number of studies have demonstrated that individuals exposed to a culture steeped in significant and long-term social pressure to fit certain physical criteria (for example, thinness) are likely to adopt, or "internalize," a cognitive attitude or schema supporting those physical criteria (Grabe, Ward, & Hyde, 2008; Ricciardelli, McCabe, Williams, & Thompson, 2007; Warren, Gleaves, Cepeda-Benito, Mdel, & Rodriguez-Ruiz, 2005). Furthermore, internalization of these often unrealistic standards may lead to body dissatisfaction, as most individuals are unable to meet these standards (Halliwell & Harvey, 2006; Stice & Shaw, 2002), and body dissatisfaction in turn may influence eating and weight loss behaviors (Stice & Shaw, 2002; Vartanian et al., 2005).

The pathway from awareness of physical standards, to perceived pressure to meet these standards, to internalization of these standards, to body dissatisfaction, dieting, and disordered eating is present for both males and females (Halliwell & Harvey, 2006).

Interestingly, however, in some cases researchers have found that internalization of these standards is not necessary. Instead, in some cases perceived pressure is linked directly with cognitive factors, such as body dissatisfaction, whether or not internalization is present (Stice, Maxfield, & Wells, 2003). In fact, perceived social pressure has been linked directly with behaviors, such as dieting and disordered eating, whether or not internalization or body dissatisfaction is present (Halliwell & Harvey, 2006; Stice & Shaw, 2002). On a broader scale, perceived social pressure is an important mediating variable in the link between attitudes, or cognitive schemas, and behavior. Even temporary and situational perceived social pressure may significantly weaken the relationship between espoused attitudes and behavior (Wallace, Paulson, Lord, & Bond, 2005). The role of perceived social pressure is important for the study of eating disordered behavior in the military because, regardless of how an individual feels about his or her body, and whether or not he or she has internalized cultural standards, he or she is likely to perceive significant pressure to meet circumscribed physical ideals (Lauder et al., 1999; McNulty, 1997, 2001).

In the absence of strong mediating factors such as counter-active social pressure, eating disordered cognitions can be used to predict disordered eating behaviors. In general, individuals with low disordered eating cognitions are generally less likely to engage in disordered eating behaviors, whereas individuals with high levels of disordered eating cognitions are more likely to engage in disordered eating behaviors (Stice & Shaw, 2002). Disordered eating cognitions often are measured by instruments such as the Eating Inventory (EI, also known as the Three-Factor Eating Questionnaire [TFEQ]), which measures dietary restraint, disinhibition of restraint, and hunger (Stunkard & Messick,

1985), and the Eating Disorder Inventory (EDI), which measures drive for thinness, bulimia, and body dissatisfaction, as well as a number of other psychological factors associated with disordered eating (Garner, 1991, 2004). The dietary restraint scale of the EI is used to measure successful dieting behavior, and has been found to be associated with self-reported caloric intake (Laessle, Tuschl, Kotthaus, & Pirke, 1989). The body dissatisfaction, bulimia, and drive for thinness subscales of the EDI are collectively known as the Eating Disorder Risk Composite (Garner, 2004). Both the drive for thinness and bulimia subscales are associated with diagnosis of eating disorders. In addition, drive for thinness seems to be associated with eating disorder severity. Elevated scores on the body dissatisfaction subscale are often associated with overweight or obesity, and indicate internalization of societal values about appearance (Garner, 2004). In summary, measurement of disordered eating cognitions can provide insight into an individual's cognitive schemas about body weight and shape, as well as often predict disordered eating and weight control behaviors. However, these schemas are only predictive of disordered eating behaviors (or lack thereof) to the extent that there are no counteracting forces, such as social pressure or job requirements to comply with specific weight and shape. Individuals in the military are in a unique situation in that there are very concrete consequences for failure to meet certain physical standards. Unfortunately, very rarely do military leaders consider the consequences of unhealthy weight loss attempts to meet these standards.

Impact of Disordered Eating Behavior in a Military Environment

The physical and environmental stress present in many military environments makes extreme weight loss behaviors especially inappropriate. Despite being instructed to consume a sufficient amount of water and nutritious food (U.S. Army Research Institute of Environmental Medicine [USARIEM], n.d.), military personnel who engage in caloric restriction, meal skipping, or fasting, in extreme environments or vigorous physical activity can develop dangerous physical conditions such as hyponatremia and insufficient balance of other electrolytes (Harrow, Cordoves, & Hulette, 2006; Sweeney & Bonnabeau, 1990). In addition to electrolyte imbalance, many unhealthy weight loss behaviors may result in dehydration (Milroy, 1987). Although military personnel are frequently reminded to drink water in hot environments, vomiting, diuretics, or laxatives may negate extra water consumption and increase the likelihood of a heat injury or heat stroke (Cooper, 1997; Noakes, 1998). Nonetheless, facing imminent fitness testing and weigh-in, or simply responding to society's standards of physical beauty, a service member may decide that the potential consequences of failing the weight standards outweigh acute illness due to electrolyte imbalance or dehydration.

Although dieting in a deployed or rigorous training environment is potentially mentally and physically harmful, some service members may see the deployment or training exercises as an opportunity to lose weight. Harrow, Cordoves, and Hullete (2006) open their descriptive study of weight loss behaviors utilized by soldiers during Reserve Component (RC) Annual Training (AT) with a case report of a female soldier who had been skipping meals to lose weight during AT and subsequently developed nausea, near-syncope, and exhaustion. Their study revealed that 62% of the soldiers who

responded to an anonymous survey were trying to lose weight during AT and 25% of soldiers skipped meals during AT. Although this study has not been replicated on a wider scale and with Active Duty troops, it reveals a potential disturbing trend of service members seizing the "opportunity" to lose weight in military environments that require sufficient energy intake for basic survival and functioning.

In addition to the potential physical dangers of calorie restriction and unhealthy weight management techniques in extreme military environments, mental deficiencies also can occur. Failure to maintain adequate caloric intake or following a diet that lacks important nutrients can have a variety of negative physical and psychological effects including negative affect and decreased cognitive functioning (Rogers, 2001). In a comprehensive review of the literature, Polivy (1996) found that individuals displaying restrained and restrictive eating patterns were more emotionally responsive to fear inducing situations, less able to concentrate on routine tasks while experiencing noise or other distraction, and generally more irritable and lethargic. Particularly in an operational environment, the ability to make quick and correct decisions is critical for successful functioning in a variety of frightening and stressful situations. These combined physical and mental consequences of caloric restriction during military operations not only put the "dieting" individual in danger, but also can place other service members in danger as well.

In addition to short-term physical and psychological consequences of extreme weight loss behaviors, service members also may experience long-term physical harm if they engage in repeated weight loss attempts. Female service members may be especially vulnerable to a cluster of physical symptoms known as the female athlete triad (Institute

of Medicine [IOM], 1998). This phenomenon is characterized by disordered eating, menstrual dysfunction, and osteoporosis. As already reviewed, disordered eating is fairly common among both military women and men; however, the increased physical activity associated with military training environments, such as Basic Combat Training (BCT), has been shown to be especially problematic for young women. Women generally show a much higher incidence of stress fractures and other muscoskeletal injuries during basic training than men (IOM, 1998). Furthermore, decreased body fat may attenuate available estrogen, leading to impaired reproductive functioning and menstrual dysfunction, and attenuated bone growth, further contributing to osteoporosis and possible fractures. McNulty's analysis of female soldiers, sailors, airmen, and Marines found that female Marines, with the most stringent weight control standards, have significantly higher levels of amenorrhea than women in other services (McNulty, 2001).

Purpose of the Current Study

The purpose of the current study is to investigate how individual differences and short-term military factors may affect disordered eating behaviors and cognitions. It is assumed that individual differences have resulted in long-term exposure to social pressures to meet certain physical ideals. These individual differences may, as a result, be associated with increased internalized disordered eating cognitions and increased disordered eating behaviors. Short-term military factors, on the other hand, may not result in internalized disordered eating cognitions. Instead, individuals may engage in disordered eating behaviors due to the extreme organizational and social pressure to lose weight. Finally, this study also seeks to investigate the impact of weight status

(overweight or underweight), disordered eating behaviors, and smoking on military readiness (i.e., lost duty time after fitness testing and weigh-in). This final study aim is important because very little research has focused on the impact of various weight loss behaviors, as well as smoking and weight status, on readiness.

Specific Aims and Hypotheses

Specific Aim One: The first aim of this study was to explore the impact of individual differences such as sex, ethnicity, and duty status on disordered eating cognitions and behaviors. As mentioned previously, it has been shown that certain subgroups of the population are more likely to internalize sociocultural physical ideals, which may contribute to disordered eating behaviors and unhealthy weight loss methods. The first hypothesis (Hypothesis 1a) of this aim reflected this proposition: Female soldiers were hypothesized to be more likely to report disordered eating cognitions and behaviors than male soldiers. It was further hypothesized that there would be less of a gender difference in military situationally-based weight loss behaviors (MRWLB and FTRWLB), than in long-term weight loss behaviors (LWLB). The second hypothesis (Hypothesis 1b) also reflected the influence of individual differences: African-American female soldiers, like African-American females in the general population, were hypothesized to report fewer eating disordered behaviors and cognitions than Caucasian female soldiers. Power analyses conducted prior to commencing this study revealed that there was insufficient power to assess disordered eating behaviors and cognitions between male soldiers of different ethnicities, so no hypothesis was made concerning the impact of ethnicity as an individual difference for male soldiers. Further, duty status (i.e. whether the soldier

belongs to the Active Duty or Reserve component of the Army) is conceptualized as an individual difference. Although Active Duty and Reserve soldiers are exposed to the same military standards and regulations, Active Duty soldiers are more "steeped" in military culture and expectations of physical prowess and fitness. Thus, it was hypothesized (Hypothesis 1c) that Active Duty soldiers would display more disordered eating behaviors and cognitions than Reserve soldiers. Finally, to assess whether or not Active Duty soldiers internalize the importance of passing weight standards, the final hypothesis (Hypothesis 1d) in this aim posited that Active Duty soldiers would be more supportive of weight standards than Reserve soldiers, who might perceive the standards as less fair because they are less entrenched in military culture, and may not have "bought in" to the importance of weight standards as much as Active Duty soldiers.

Specific Aim Two: The second aim sought to explore the impact of perceived likelihood of failing weight standards on eating disordered behaviors. The purpose of this aim was to assess the impact of transient military factors and situational pressure on unhealthy weight loss behaviors in different contexts (e.g. long-term, military-related, and fitness testing related unhealthy weight loss behaviors). The current study hypothesized that individuals would be more likely to engage in unhealthy weight loss behaviors if they have a high Body Mass Index (BMI; kg/m^2; Hypothesis 2a), a history of failing weight standards or being enrolled in the Army Weight Control Program (Hypothesis 2b), worry about failing the weight standards, or if they tried to lose weight before the last weigh-in (Hypothesis 2c) because these factors would increase their belief that they may fail weight standards. Individuals who have a history of difficulty passing the weight

standards may be more likely to engage in these unhealthy behaviors because of previous negative experiences associated with inability to pass standards. Furthermore, individuals with higher BMI and those trying to lose weight before weigh-in may have reason to believe that they may be unable to pass weight standards and may try extreme weight loss behaviors as a result. Since some commanders may more strictly enforce weight and fitness standards than others, it also was hypothesized (Hypothesis 2d) that individuals who perceive that their commanders strictly enforce weight standards would be more likely to engage in unhealthy weight loss behaviors than those with low perceived command emphasis. Finally, it was hypothesized (Hypothesis 2e) that there would be an interaction of perceived command emphasis and worry about failing weight standards, such that those who are concerned about failing weight standards would be likely to engage in unhealthy weight loss behaviors only if they reported a high level of command enforcement.

Specific Aim Three: The third aim involved three hypotheses and concerned the impact of military weight standard-related concerns and disordered eating cognitions, as well as the interaction of these two factors, on unhealthy weight loss behaviors. It was assumed that disordered eating cognitions, measured by the EDI and EI in the current study, reflect internalized sociocultural ideals valuing specific physical ideals. Therefore, these cognitions were hypothesized (Hypothesis 3a) to be more strongly associated with regular disordered eating behavior than situational disordered eating behaviors. In contrast, unhealthy weight loss behaviors engaged in only to lose weight for *military situations* were hypothesized to be less strongly associated with disordered eating

cognitions as these behaviors may simply be the result of perceived social pressure to lose weight and not internalization of physical ideals. It also was hypothesized (Hypothesis 3b) that there would be an interaction of disordered eating cognitions and long-term unhealthy weight loss behaviors such that disordered eating cognitions will poorly predict situationally-based weight loss behaviors in the absence of long-term weight loss behaviors. Finally, it was hypothesized (Hypothesis 3c) that worry about failing weight standards and history of failing weight standards would better predict situational disordered eating behaviors and disordered eating cognitions would better predict long-term disordered eating behaviors.

Specific Aim Four: The purpose of the final aim of this study was to explore the impact of unhealthy weight loss behaviors, smoking, BMI, on military readiness, operationalized as lost duty time after fitness testing. Although lost duty time after fitness testing is only a partial measure of military readiness, it may indicate the inability of an individual's body to recover from the physical strain of a physical fitness test. It was hypothesized (Hypothesis 4a) that individuals who engage in unhealthy weight loss behaviors would be more likely to lose duty time after fitness testing than those who do not engage in unhealthy weight loss behaviors. Because BMI has been associated with increased injury risk in military samples (Knapik et al., 2007), it also was hypothesized (Hypothesis 4b) that BMI would be associated with lost duty time such that individuals who reported missed duty time would have a significantly higher BMI than those who had never missed duty time after fitness testing. It also was expected (Hypothesis 4c) that those individuals who report smoking to avoid weight gain would be more likely to engage in

other unhealthy weight loss behaviors. Finally, because smoking has been found to be a better predictor of poor military readiness in the past than BMI (Haddock, Pyle, Poston, Bray, & Stein, 2007), it was hypothesized (Hypothesis 4d) that smoking would be associated with lost duty time after fitness testing, and that smoking (current or past) would be more strongly associated with lost duty time than BMI or use of unhealthy weight loss behaviors.

METHODS

Data Collection

The original data were collected between August 1998 and January 1999 from all military services (Army, Navy, Air Force, Marines, and Coast Guard) and all components (Active Duty, Reserves, and National Guard). An anonymous survey was given to 4,326 service members at several U.S. military installations. After excluding participants from all branches other than Active Duty Army and Army Reserve, the current study retained 871 participants including 269 female participants (173 Active Duty, 96 Army Reserve) and 595 male participants (365 Active Duty, 230 Army Reserve) and seven participants who declined to specify sex. In addition, 10 soldiers declined to specify their heights and weights, and 14 soldiers declined to specify their ethnicity. This sample had a mean age of 33.2 years (*SD* = 8.3), a mean height of 67.9 inches (*SD* = 4.3), and a mean weight of 168.5 pounds (*SD* = 28.7). Additionally, this sample was primarily Caucasian (44.4%, *n* = 387), followed by African-American (38.5%, *n* = 335), Hispanic (7.3%, *n* = 64), other ethnicity (4.1%, *n*= 36), and Asian (4.0%, *n* = 35). Fourteen people (1.6%) declined to specify their ethnicity (See Table 1).

Recruitment was conducted at two major Army installations in the DC/Virginia area. Prior to administering the Questionnaire to participant samples, USUHS researchers coordinated Memorandums of Understanding with installation commanders. Participants were brought to large assembly rooms by installation and unit leaders. Potential participants were briefed about the survey content and process by researchers, and were told that participation was not mandatory and they could refuse to fill out the survey with no negative consequences. The survey was passed out in blank envelopes. Participants

were told to fill out the survey, seal the unmarked envelope, and drop the envelope in a box before leaving the room. At no point were commanders or other unit leadership allowed to view survey responses. As a non-coercive incentive, individuals who chose to complete the survey were given certificates of appreciation signed by the NNMC commander, which they could put in their personnel files.

The procedure for informed consent for this survey was a simple cover letter signed by the Principal Investigator, Commander Evelyn Lewis, M.D., explaining the purpose of the study, a general overview of the Questionnaire, and the exhortation that study participation requires completion of *all* portions of the survey. The first page of the survey, on which participants record demographic data, also states that "completion of this survey constitutes consent to participate in the study." In addition, the cover letter provides the contact information of the Principal Investigator and Tracy Sbrocco, Ph.D., from the Medical Clinical Psychology Program at USUHS. Finally, participants were told prior to administration of the survey that they were not required to fill out the survey and there would be no negative consequences for refusal.

The original project was funded by a grant from the Department of Defense, and approval was obtained in 1997 from the Uniformed Services University of the Health Sciences (USUHS) Institution Review Board (IRB). The original study was entitled "The Prevalence of Disordered Eating Among Active Duty Military Personnel," IRB protocol number RO8154. Permission to use the data for this study was obtained from the USUHS IRB in May 2008 (see Appendix A for letter of exemption). Furthermore, written permission to use the data set was obtained from the Principal Investigator, Dr. Evelyn Lewis (see Appendix B).

Measures

The survey included a variety of measures, including the USUHS Weight Management Strategy Questionnaire (WMSQ), the Eating Disorders Inventory (EDI), and the Eating Inventory (EI). There were 134 initial questions in the survey, although some of these questions included several components and follow-up questions to initial questions. In total, the participants had the opportunity to answer 204 survey questions.

Demographic information. Participants were asked a number of basic demographic questions, including their sex, ethnicity, age, duty status (Army Active Duty or Reserve), rank, and military job. Because only 11 participants reported their rank, this variable was not assessed. For the purposes of this study, only sex, ethnicity, age, and duty status were analyzed. Military job was not considered an important demographic or environmental factor because military job is not always related to the type of unit to which a soldier is assigned. For example, healthcare providers are frequently assigned to combat units, and soldiers with combat military jobs may be assigned to a recruiting position.

Body Mass Index (BMI). Body Mass Index (BMI) was calculated based on self-reported height and weight, and was expressed in units of kilograms per meter^2. BMI is directly and indirectly linked to numerous health indicators, including future health problems such as hypertension, type 2 diabetes, and coronary heart disease (National Heart Lung and Blood Institute [NHLBI], 1998), health-related quality-of-life (Hassan, Joshi, Madhavan, & Amonkar, 2003) and overall longevity (Shiner & Uehlinger, 2001). Although BMI is an imperfect measure of body composition because there is no direct

measurement of body fat percentage or distribution, it is nonetheless a good health indicator for most people (NHLBI, 1998).

Disordered eating behaviors. The USUHS Weight Management Strategy Questionnaire (WMSQ) was used to assess normal eating and exercise habits and a variety of eating and weight loss methods considered to be unhealthy, such as purging behaviors (vomiting, laxatives), diuretic and diet pill use, fasting, and less common behaviors, such as chewing and spitting out food. WMSQ also included questions about whether participants engaged in unhealthy eating and weight loss behaviors regularly (operationally defined as at least twice a week for a period of three months to match *DSM-IV-TR* [APA, 2000] bulimia nervosa criteria), before the Army Physical Fitness Test (APFT), and prior to military schools or special events, such as weddings. There is also a seven-item assessment of participant attitudes towards the military weight and fitness standards, as well as questions concerning tobacco use. See Appendix C for the complete WMSQ as filled out by participants.

For the purposes of this study, disordered eating behaviors included the following behaviors engaged in specifically for weight loss or weight control: Vomiting, use of laxatives, use of diuretics, fasting (missing more than one meal per day), meal skipping (missing one meal a day), chewing food and spitting it out, taking over-the-counter (OTC) diet pills, taking prescription diet pills, using a sauna to lose weight, exercising in a rubber suit to lose weight, or severely restricting caloric intake (eating less than 1200 calories a day for women or less than 1600 calories a day for men). Mild caloric restriction (defined as eating 300 to 600 fewer calories a day or stopping snacking or ordering desserts) and exercise were not considered disordered eating or weight control

behaviors because they are generally considered healthy ways to lose weight. Furthermore, the Questionnaire item pertaining to exercise was asked in a way that might be confusing to many participants. Specifically, the question asking about exercise frequency was worded in a way that indicated a length of time rather than a frequency of engaging in the behavior (see WMSQ item 39b). It is difficult to determine the intensity or excessiveness of an exercise routine without information on exercise frequency, and thus this item was excluded.

Participants were asked whether they had ever engaged in the above-mentioned disordered eating and weight loss behaviors, whether they engaged in these behaviors on a regular basis (at least twice a week for a period of at least three months). They also were asked whether they engaged in these behaviors prior to fitness testing and weigh-in, and prior to attending military schools or special events (for example, weddings or class reunions). Note that weight control behaviors prior to fitness testing and weigh-in are also included in weight control behaviors in behaviors in military situations. For the purposes of this study, individuals were defined as engaging in "long-term weight loss behaviors (LWLB)" if they endorsed engaging in any of the unhealthy weight loss behaviors listed above "regularly," defined as at least twice a week for a period of three months. Specifically, an individual was considered to have engaged in LWLB if he or she responded affirmatively to Questionnaire items 27a, 28a, 29a, 30a, 32a, 33a, 34a, or 38. Participants were categorized as engaging "military-related weight loss behaviors (MRWLB)" if they engaged in unhealthy weight loss behaviors to prepare for fitness testing *or* military schools. The use of weight loss behaviors to prepare for military schools was included in this variable because most military schools require that soldiers

pass a fitness test and weigh-in at the beginning of the course. Specifically, if individuals responded affirmatively to items 27b, 27f, 28b, 28f, 29b, 29f, 30b, 30f, 31a, 31e, 32b, 32f, 33b, 34c, 35a, 36a, or 37a, individuals were categorized as engaging in MRWLB. Individuals were categorized as engaging in "fitness testing-related" weight loss behaviors (FTRWLB) if they endorsed engaging in unhealthy weight loss behaviors in order to prepare for military fitness testing and weigh-in. Specifically, if participants affirmatively answered WMSQ items 27b, 28b, 29b, 30b, 31a, 32b, 33b, 34c, 35a, or 37a, they were categorized as having engaged in MRWLB. As a conservative measure, individuals who did not respond to an item, or who responded "no" to an item, were classified as not engaging in that behavior.

Disordered eating cognitions. The Eating Disorder Inventory (EDI) and the Eating Inventory (EI) were used to assess disordered eating cognitions. The EDI-2 is a widely used self-report measure that assesses cognitive and behavioral signs and symptoms of anorexia and bulimia nervosa (Garner, 1991). The original 64-item EDI included eight subscales to measure the following characteristics: Drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness, and maturity fears. This study limited analysis to the three primary behavioral/attitudinal subscales (drive for thinness, bulimia, and body dissatisfaction), which together comprise the Eating Disorder Risk Composite (EDRC) scale. These behavioral and psychological traits have been shown to correlate with various common characteristics of bulimia nervosa (BN) and anorexia nervosa (AN). The EDI is commonly used as a treatment outcome measure for clinical populations, as well as a screening tool to identify individuals at risk for eating disorders (Allison, 1995).

Overall, the EDI is a reliable and valid measure of eating disordered cognitions and behaviors.

The Eating Inventory (EI) assesses three eating-related psychological factors; cognitive restraint of eating behavior, disinhibition of this restraint, and susceptibility to hunger (Stunkard & Messick, 1985). The EI is thought to measure actual intake of food in everyday life as a function of these psychological factors. For the purposes of this study, only the cognitive restraint subscale was included in the survey. The cognitive restraint subscale consists of 11 true-or-false items and nine Likert-scale items, including an item assessing overall level of dietary restraint. The cognitive restraint subscale has proven to be strongly negatively correlated to caloric intake (Bellisle et al., 2004; Laessle et al., 1989).

Missed duty time. Missed duty time was assessed based on participants' responses to the WMSQ item 21, inquiring how much duty time they had missed after a fitness test and weigh-in. This item was used as a proxy for military readiness because an inability to recover from a fitness test and complete the duty day may indicate impaired physiological readiness. Responses to item 21 were dichotomized to reflect whether or not participants had missed *any* duty time. Therefore, if participants reported that they had missed all or part of a duty day following a weigh-in and fitness test due to illness, injury, or fatigue, they were classified as having missed duty time. In total, only 36 individuals (4.2%) reported missing any duty time after fitness testing.

Attitudes towards weight and fitness standards. Participant support of weight and fitness standards was assessed using WMSQ items 41, 43b, and 44. These items were all seven-point Likert scales inquiring about participants' subjective assessment of the

importance of military weight standards for general appearance and fitness for duty, as well as the fairness of weight standards, and whether or not participants would choose to maintain weight standards if they were not required to by the military.

Importance of weight and appearance in self-evaluation. The WMSQ items 22 and 23 were seven-point Likert scales used to assess the importance of appearance and weight in self-evaluation, respectively. These items were used as an additional measure of disordered eating cognitions, indicating overvalued importance of appearance and weight on one's perceived value of oneself as a person.

History of failing the weight standards. Based on self-reported weight history on the WMSQ, individuals were designated as having a history of failing the weight standards if they reported that they have ever been over the prescribed weight standards, if they have ever been in the weight control program, if they are currently enrolled in the weight control program, or if they were not within weight table standards at their most recent weigh-in.

Concern about failing weight standards. "Concern" about failing weight standards was operationalized based on two Questionnaire items: Whether or not the person reported that they were trying to lose weight for their most recent weigh-in (WMSQ item 19) and how worried individuals were about "making weight" (WMSQ item 45).

Command enforcement of weight standards. Two WMSQ items were used to assess perceived command support (item 42) and enforcement (item 43) of weight and fitness standards using seven-point Likert scales.

Tobacco use. Participants were asked a number of questions about their tobacco use habits on the WMSQ. Questions pertaining to current use of tobacco and use of tobacco for weight control purposes were used for this study.

Data Analytic Strategies

Chi-square analyses were conducted to determine ethnicity, sex, and active duty status differences in prevalence of eating disordered behaviors. Analyses of variance were conducted to compare EDI subscale scores and other continuous measures. To determine factors of unhealthy weight loss behaviors in various situations (e.g., regularly and to prepare for military weigh-ins), logistic regression analysis was conducted. For these analyses, sex was considered as a covariate. Interactions were assessed by calculating interaction term by multiplying two variables to create a third variable, and assessing the significance of the two original variables and the third variable. For example, to assess the interaction of worry and command enforcement of weight standards, these two variables were multiplied to create an interaction term, which was assessed for significance. Logistic regression was also used to determine factors associated with lost duty time after fitness testing. For this analysis, sex, age, and ethnicity were included as covariates. Specific factors entered into each logistic regression, as well as interaction terms, will be discussed in the results section for each hypothesis. Statistical significance level for all inferential statistics was set at an alpha level of 0.05, two-tailed unless otherwise noted. In addition, unless otherwise noted, no statistical corrections were used to control for multiple tests.

RESULTS

Participant Characteristics

The majority of Army participants were Caucasian (44.4%, *n* = 387), male (68.3%, *n* = 595), Active Duty (62.1%, *n* = 541) soldiers. Because only 11 soldiers reported their military rank, rank was not analyzed. Participants' age ranged from 18 to 59 years old, with an average age of 33.16 years old (*SD* = 8.28). More than half of participants reported completing some college (31.2%, *n* = 272) or post-graduate education (21.1%, *n* = 184), indicating a highly educated sample. Participants' average BMI was 25.58 (±3.32) kg/m^2, with a range of 18.29 to 41.40 kg/m^2. See Table 1 for participant demographic characteristics and overall EDI and EI subscale means.

Preliminary Data Inspection

Disordered eating behaviors. Twenty-nine percent of participants reported using at least one long-term weight loss behavior (LWLB). Over a third (35.6%) of participants reported engaging in at least one disordered eating behaviors prior to fitness testing and weigh-in or military schools (Military-Related Weight Loss Behavior; MRWLB). In addition, over a third (35.1%) of participants reported using at least one disordered eating behavior to prepare for fitness testing and weigh-in (Fitness Testing-Related Weight Loss Behavior; FTRWLB).

Aim One: Individual Differences in Disordered Eating Behaviors and Cognitions

Hypothesis 1a: Sex. Although women (*M* = 24.51, *SD* = 2.59) had a significantly lower BMI than men (*M* = 26.04, *SD* = 3.05), $t(445.70) = 6.07$, $p < .001$, $d = .58$, they

were 1.57 times ($CI_{.95}$ = 1.17 – 2.09) more likely to have a history of failing the weight standards (53.2%) than men (42.0%), $\chi^2_{(1, N = 864)} = 9.28$, $p < .01$. Women (42.4%) were 2.51 times ($CI_{.95}$ = 1.84 - 3.41) more likely than men (22.7%) to report engaging in disordered eating behaviors on a regular basis (i.e., at least twice a week for a period of at least three months), $\chi^2_{(1, N = 864)} = 35.01$, $p < .001$. Similarly, women (49.1%) were 2.28 times ($CI_{.95}$ = 1.69-3.06) more likely than men (29.7%) to report engaging in disordered eating behaviors in any military situation (i.e., before fitness testing or before attending military schools), $\chi^2_{(1, N = 864)} = 30.11$, $p < .001$. Finally, women (48.0%) were 2.19 times ($CI_{.95}$ = 1.63 – 2.95) more likely than men (29.6%) to report engaging in disordered eating behaviors to prepare for fitness testing, $\chi^2_{(1, N = 864)} = 27.39$, $p < .001$. See Table 2 for a percentage breakdown of individual disordered weight control behaviors (e.g., vomiting, laxatives, diuretics, etc.) by sex and by context (i.e., regularly, before military schools, and to prepare for fitness testing). There were no significant differences in the EDI bulimia subscale scores between men and women, $t(420.82) = 1.34$, $p = .18$. However, women reported significantly higher EDI drive for thinness subscale scores (M = 4.93, SD = 5.29) than men (M = 2.97, SD = 3.90), $t(396.64) = 5.30$, $p < .001$, $d = 0.53$. Women also demonstrated significantly higher EDI body dissatisfaction subscale scores (M = 10.04, SD = 7.18) than men (M = 4.76, SD = 4.54), $t(350.48) = 10.71$, $p < .001$, d = 1.14. Finally, women (M = 8.44, SD = 4.94) displayed significantly higher levels of dietary restraint, as measured by the *Eating Inventory,* than men (M = 6.44, SD = 4.43), $t(457.71) = 5.52$, $p < .001$, $d = 0.52$. Women (M = 5.68, SD = 1.54) also reported that weight was significantly more important in their self-evaluation than men (M = 5.34, SD = 1.68), $t(840) = 2.80$, $p < .01$, $d = 0.19$. However, there were no significant gender

differences in the importance of appearance in self-evaluation, $t(847) = 1.06$, $p = .29$, $d = 0.07$.

Hypothesis 1b: Ethnicity. The current sample included 119 Caucasian females and 104 African-American females. African-American females ($M = 25.16$, $SD = 3.46$) had a significantly higher BMI than Caucasian females ($M = 23.69$, $SD = 3.30$), $t(218) = 3.23$, $p < .01$ but were not significantly more likely to have a history of failing weight standards, ($\chi^2_{(1, N = 223)} = 3.51$, $p = .06$). African-American and Caucasian females did not show significant differences in their likelihoods of engaging in unhealthy weight loss and disordered eating behaviors regularly ($\chi^2_{(1, N = 223)} = 1.62$, $p = .20$), in military situations ($\chi^2_{(1, N = 223)} = 0.00$, $p = .95$), or prior to fitness testing and weigh-in ($\chi^2_{(1, N = 223)} = 0.10$, $p = .75$). See Table 3 for a percentage breakdown of individual weight control behaviors by ethnicity and by context. Similarly, EDI drive for thinness, $t(213) = .76$, $p = .45$, $d = 0.10$, bulimia, $t(209) = 1.33$, $p = .19$, $d = 0.18$, and body dissatisfaction, $t(207) = .16$, $p = .87$, $d = 0.02$, subscale scores did not differ significantly between African-American and Caucasian women. However, Caucasian women ($M = 9.43$, $SD = 4.89$) reported significantly higher levels dietary restraint than African-American women ($M = 6.92$, $SD = 4.71$), $t(209) = 3.79$, $p < .001$, $d = 0.52$. When asked to evaluate the importance of weight and appearance in their self-evaluation, Caucasian women ($M = 5.71$, $SD = 1.45$) reported appearance as less important than African-American women ($M = 6.12$, $SD = 1.22$), $t(219) = 2.22$, $p < .05$, $d = 0.30$. African-American women ($M = 5.84$, $SD = 1.44$) reported weight as more important in self-evaluation than Caucasian women ($M = 5.44$, $SD = 1.57$), $t(217) = 1.99$, $p < .05$, $d = 0.27$.

Hypothesis 1c: Duty status. Active Duty and Reserve soldiers had similar average BMI, $t(619.06) = 1.42$, $p = .16$, and were as likely to have a history of failing weight standards, $\chi^2_{(1, N = 871)} = 0.17$, $p = .68$. Contrary to the hypothesis, Active Duty soldiers were similar to Army Reserve soldiers in the frequency of long-term disordered eating behaviors, $\chi^2_{(1, N = 871)} = 3.27$, $p = .07$, in the frequency of disordered eating behaviors in military situations, $\chi^2_{(1, N = 871)} = 1.18$, $p = .28$, and in the frequency of weight loss behaviors prior to fitness testing, $\chi^2_{(1, N = 871)} = 1.03$, $p = .31$. See Table 4 for frequencies of individual unhealthy weight loss behaviors by duty status and by context. There were no significant differences between Active Duty soldiers and Army Reserve soldiers in either the EDI drive for thinness, $t(760.69) = 1.47$, $p = .14$, or body dissatisfaction, $t(780) = 1.51$, $p = .13$, subscale scores. However, Active Duty soldiers ($M = 1.49$, $SD = 2.72$) had a higher average EDI bulimia subscale score than Army Reserve soldiers ($M = 1.07$, $SD = 2.26$), $t(752.83) = 2.40$, $p < .05$, $d = 0.17$. In addition, Active Duty soldiers ($M = 7.38$, $SD = 4.72$) demonstrated significantly more dietary restraint, as measured by the *Eating Inventory*, than Army Reserve soldiers ($M = 6.64$, $SD = 4.61$), $t(790) = 2.17$, $p < .05$, $d = 0.15$. There were no differences between Active Duty and Reserve soldiers in levels of perceived importance of appearance in self-evaluation, $t(854) = 1.15$, $p = .25$, $d = 0.08$, or perceived importance of weight in self-evaluation, $t(847) = .81$, $p = .42$, $d = 0.06$.

Hypothesis 1d: Duty status and attitudes towards weight and fitness standards. In contrast to the hypothesis, Active Duty soldiers were less supportive of fitness and weight standards than Army Reserve soldiers. Active Duty soldiers ($M = 4.05$, $SD = 2.03$) perceived the military weight and fitness standards as significantly less fair than Army

Reserve soldiers (M = 4.63, SD = 1.89), $t(845) = 4.13$, $p < .001$, $d = 0.28$. Active Duty soldiers (M = 5.54, SD = 1.44) also reported that they believe the standards are less important for general appearance than Army Reserve soldiers (M = 5.8, SD = 1.41), $t(699.16) = 2.55$, $p < .05$, $d = 0.19$. In addition, Active Duty soldiers (M = 5.72, SD = 1.51) reported that they believe the standards are less important for fitness for duty than Army Reserve soldiers (M = 6.06, SD = 1.29), $t(762.17) = 3.45$, $p < .01$, $d = 0.25$. Despite these differences, there were no significant differences between Active Duty and Army Reserve soldiers in desire to maintain the standards if they were not required, $t(841) = .203$, $p = .84$, $d = 0.01$.

Aim Two: Disordered Eating Behaviors Associated with Military Factors

Hypothesis 2a: Body mass index. The BMI of individuals who regularly engaged in disordered eating behaviors (M = 26.47 kg/m^2, SD = 3.48) was significantly higher than those who did not regularly engage in disordered eating behaviors (M = 25.22 kg/m^2, SD = 3.19), $t(857) = 5.06$, $p < .001$, $d = 0.35$. BMI also was higher for individuals who engaged in disordered eating behaviors to prepare for fitness testing/weigh-in and military school (M = 26.88 kg/m^2, SD = 3.27) than those who did not engage in disordered eating behaviors (M = 24.86 kg/m^2, SD = 3.13) in military situations, $t(857) = 8.92$, $p < .001$, $d = 0.61$. Finally, BMI was higher for individuals who engaged in disordered eating behaviors to prepare for fitness testing and weigh-in (M = 26.88 kg/m^2, SD = 3.27) than for those who did not engaged in disordered eating behaviors prior to weigh-in (M = 24.88 kg/m^2, SD = 3.13), $t(857) = 8.77$, $p < .001$, $d = 0.60$.

Hypothesis 2b: History of failing weight standards. Individuals who had a history of failing the weight standards were 3.20 times ($CI_{.95}$ = 2.35 – 4.35) more likely to report regularly engaging in disordered eating behaviors (41.4%) than those who have no history of failing the weight standards (18.1%), $\chi^2_{(1, N = 871)} = 57.34$, $p < .001$. Similarly, those who had ever failed the weight standards were 5.35 times ($CI_{.95}$ = 3.95 – 7.24) more likely to report engaging in disordered eating behaviors (55.6%) in military situations than those with no history of failing weight standards (18.9%), $\chi^2_{(1, N = 871)} = 126.25$, $p < .001$. Finally, those who had a history of failing the weight standards were 5.13 times ($CI_{.95}$ = 3.79 – 6.95) more likely to engage in disordered eating behaviors (54.5%) before fitness testing than those with no history of failing the standards (18.9%), $\chi^2_{(1, N = 871)} = 120.09$, $p < .001$.

Hypothesis 2c: Concern about failing weight standards. Individuals who reported that they attempted to lose weight prior to their most recent weigh-in were 5.35 times ($CI_{.95}$ = 3.88 – 7.38) more likely to engage in disordered eating behaviors regularly (53.8%) than those who were not trying to lose weight (17.9%), $\chi^2_{(1, N = 852)} = 113.63$, $p < .001$. Similarly, individuals trying to lose weight for the most recent weigh-in were 11.24 times ($CI_{.95}$ = 7.99 – 15.82) more likely to engage disordered eating behaviors (73.5%) in military situations than those who were not trying to lose weight (19.8%), $\chi^2_{(1, N = 852)} = 225.68$, $p < .001$. Further, individuals trying to lose weight before the most recent weigh-in were 10.72 times ($CI_{.95}$ = 7.63 – 15.04) more likely to engage in disordered eating behaviors (72.3%) to prepare for fitness testing than those who were not trying to lose weight for their most recent weigh-in (19.6%), $\chi^2_{(1, N = 852)} = 218.73$, $p < .001$. In addition, individuals who engaged in disordered eating behaviors regularly reported greater worry

about weight standards (M = 3.70, SD = 2.42) than those who did not engage in disordered eating behaviors regularly (M = 2.08, SD = 1.81), t(366.49) = 9.48, p < .001, d = 0.76. Those who engaged in disordered eating behaviors to prepare for military situations also reported significantly more worry than individuals who did not use unhealthy weight loss behaviors to prepare for military situations (M = 3.79, SD = 2.36 vs. M = 1.86, SD = 1.63), t(472.17) = 14.01, p < .001, d = 0.95. In addition, individuals who engaged in disordered eating behaviors to prepare for fitness testing reported significantly more worry about passing weight standards than individuals who did not engage in pre-fitness testing disordered eating behaviors (M = 3.80, SD = 2.36 v.s. M = 1.87, SD = 1.63), t(464.29) = 12.64, p < .001, d = 0.95.

Hypothesis 2d: Perceived command support and enforcement of weight and fitness standards. Overall, command support for weight standards and command strength of enforcing weight standards did not appear to be related to unhealthy weight loss behaviors in any context. There were no significant differences in levels of perceived command support for weight and fitness standards (t(846) = 0.28, p = .78, d = 0.02) and levels of perceived strength of command enforcement of weight and fitness standards (t(844) = 1.71, p = .09, d = 0.12) between individuals who engaged in disordered eating behaviors regularly and individuals who did not. Furthermore, there were no significant differences in perceived command support (t(846) = 1.07, p = .29, d = 0.07) or enforcement (t(844) = 0.87, p = .39, d = 0.06) between individuals who engaged in disordered eating behaviors to prepare for military situations and individuals who did not. Finally, there were no significant differences in perceived command support (t(846) = 1.22, p = .22, d = 0.08) and enforcement (t(844) = 0.69, p = .49, d = 0.05) between

individuals who used disordered eating and unhealthy weight loss behaviors to prepare for fitness testing and weigh-in and individuals who did not.

Hypothesis 2e: Interaction of command enforcement of fitness and weight standards and worry about failing weight standards. Logistic regression analyses were conducted to assess the interaction of command enforcement and worry about failing the weight standards on the frequencies of disordered eating behaviors engaged in regularly and prior to fitness testing. Sex was entered into the first set of both logistic regression analyses because sex was found to be a significant factor associated with disordered eating behaviors. The second set consisted of "worry" about failing weight standards, command enforcement of weight standards, and an interaction term created by multiplying these two variables.

The interaction of command enforcement and worry about failing weight standards at the most recent weigh-in was not a significant factor associated with regularly-utilized disordered eating behaviors or disordered eating behaviors used to prepare for military situations or fitness testing. There also were no main effects of command enforcement and worry about failing weight standards at the most recent weigh-in. Sex was significantly associated with regularly-utilized disordered eating behaviors (LWLB) and disordered eating behaviors utilized to prepare for military situations and fitness testing (MRWLB and FTRWLB) both before and after entering command enforcement and worry about failing weight standards at most recent weigh-in (see Table 5, 6, & 7, respectively). The change in Cox and Snell R^2 was relatively small in all three logistic regressions. There was a 0.10 change in Cox and Snell R^2 between the first (Cox and Snell $R^2 = 0.04$) and second (Cox and Snell $R^2 = 0.14$) sets of the

regression predicting long-term, regular disordered eating behaviors (LWLB). There was a 0.17 change in Cox and Snell R^2 between the first (Cox and Snell $R^2 = 0.03$) and second (Cox and Snell $R^2 = 0.20$) sets of the regression assessing factors associated with disordered eating behaviors in military situations (MRWLB). Similarly, there was a 0.16 change in Cox and Snell R^2 between the first (Cox and Snell $R^2 = 0.03$) and second (Cox and Snell $R^2 = 0.19$) sets of the regression assessing factors associated with disordered eating behaviors prior to fitness testing (FTRWLB).

Aim Three: Disordered Eating Cognitions, Behaviors, and Interactions with the Environment

To test this aim, three series of logistic regressions were run. The first series simply attempted to ascertain the contributions of various disordered eating cognitions on unhealthy weight loss behaviors in various contexts. This series was run simply to determine if disordered eating cognitions were associated with unhealthy weight loss behaviors, an important assumption of this study. The second logistic regression series tested for the main effects of disordered eating cognitions, as well as the interaction of disordered eating cognitions and long-term unhealthy weight loss behaviors, on military-situational weight loss behaviors. This series was run to determine if situationally-based unhealthy weight loss behaviors occurred in the presence or absence of regularly-occurring unhealthy weight loss behaviors. The third series of logistic regressions attempted to test for individual contributions of disordered eating cognitions, history of failing weight standards, worry about failing weight standards, and the interaction of worry and disordered eating cognitions.

Hypothesis 3a: The associations between disordered eating cognitions and disordered eating behaviors. In order to assess how strongly disordered eating cognitions are associated with disordered eating behaviors a logistic regression was conducted using dietary restraint, drive for thinness, bulimia, and body dissatisfaction subscales as predictors of engaging in disordered eating behaviors regularly, in military situations, and before fitness testing. Sex was entered in the first set of each bivariate logistic regression in order to partial out significant differences in EDI subscale scores between males and females. In the second set, the dietary restraint, drive for thinness, body dissatisfaction, and bulimia subscales were entered in a forced entry manner.

Dietary restraint, drive for thinness, and body dissatisfaction were significantly associated with disordered eating behaviors engaged in on a regular basis (see Table 8). The change in Cox and Snell R^2 between the first set (Cox and Snell $R^2 = 0.04$) and the second set of the regression (Cox and Snell $R^2 = 0.22$) was 0.18. Furthermore, the addition of disordered eating cognitions between the first and second sets of the regression resulted in sex no longer being a significant factor associated with disordered eating behaviors engaged in on a regular basis (LWLB).

Similarly, dietary restraint, drive for thinness, and body dissatisfaction were significantly associated with disordered eating behaviors used in military situations (see Table 9) and prior to fitness testing and weigh-in (see Table 10). The addition of disordered eating cognitions in the second set of both regressions resulted in sex losing statistical significance as a factor associated with disordered eating behaviors. The change in Cox and Snell R^2 between the first (Cox and Snell $R^2 = 0.03$) and second sets (Cox and Snell $R^2 = 0.23$) of the regression assessing factors associated with disordered

eating behaviors in military situations was 0.20. Similarly, the change in Cox and Snell R^2 between the first (Cox and Snell $R^2 = 0.03$) and second sets (Cox and Snell $R^2 = 0.21$) of the regression assessing factors associated with disordered eating behaviors prior to fitness testing and weigh-in was 0.18.

Hypothesis 3b: Interaction of disordered eating cognitions and regular disordered eating behaviors. A bivariate logistic regression analysis was conducted using disordered eating behaviors related to military situations as the dependant variable and disordered eating cognitions and the interaction of disordered eating cognitions and disordered eating behaviors engaged in on a regular basis as factors predicting disordered eating behaviors (independent variables). Interaction terms were calculated by multiplying each disordered eating cognition subscale (dietary restraint, bulimia, drive for thinness, and body dissatisfaction) by the variable indicating whether or not that participant had engaged in disordered eating behaviors on a regular basis (a dichotomous variable). Sex was entered into the first set of the logistic regression (see Table 11), and was a factor significantly associated with disordered eating behaviors in military situations.

The second set of the logistic regression added disordered eating cognition subscales and the interaction of these subscales and disordered eating behaviors engaged in on a regular basis. Among the variables entered into the second set of the model, dietary restraint, drive for thinness, and body dissatisfaction were significantly associated with disordered eating behaviors in military situations. None of the interaction terms were significant factors, and sex was no longer a significant factor in the second set of the

logistic regression. The change in Cox and Snell R^2 between the first (Cox and Snell R^2 = 0.03) and second sets (Cox and Snell R^2 = 0.22) of the regression was 0.19.

Hypothesis 3c: Interaction of worry about failing weight standards, history of failing weight standards, and disordered eating cognitions. The purpose of this series of logistic regression was to determine how disordered eating cognitions, history of failing weight standards, worry about failing weight standards, and the interaction of worry and disordered eating cognitions contribute to long-term disordered eating behaviors and disordered eating behaviors in military situations. To assess the interaction of disordered eating cognitions and worry about failing weight standards, interaction terms were calculated by multiplying EDI subscales and reported "worry" about failing the most recent weigh-in (item 45). These interaction terms, as well as the original EDI subscales, self-reported "worry" about failing last weigh-in, and self-reported history of failing weight standards, were entered into the second block of a bivariate logistic regression (sex was entered into the first set). When entered into both bivariate logistic regressions, the interactions of disordered eating cognitions and worry about failing weight standards were not significantly associated with disordered eating behaviors engaged in regularly (see Table 12) or in military situations (see Table 13).

Body dissatisfaction, drive for thinness, dietary restraint, worry about failing, and history of failing weight standards were significantly associated with regularly engaging in disordered eating behaviors (see Table 12). The change in Cox and Snell R^2 between the first (Cox and Snell R^2 = 0.04) and second sets (Cox and Snell R^2 = 0.25) of the regression predicting long-term disordered eating behaviors was 0.21.

Similarly, body dissatisfaction, dietary restraint, worry about failing, and history of failing weight standards also were significantly associated with engaging in disordered eating behaviors to prepare for military situations (see Table 13). The change in Cox and Snell R^2 between the first (Cox and Snell $R^2 = 0.03$) and second sets (Cox and Snell $R^2 = 0.32$) of the regression assessing factors associated with disordered eating behaviors in military situations was 0.29.

Aim Four: Predictors of Missed Duty Time.

As mentioned previously, only 36 (4.2%) participants reported missing all or part of a duty day after fitness testing and weigh-in. There were no significant differences in age ($t(37.12) = 0.30$, $p = .77$), ethnicity ($\chi^2_{(4, N=857)} = 7.57$, $p = .11$), sex ($\chi^2_{(1, N=864)} = 2.34$, $p = .13$), and duty status ($\chi^2_{(1, N=871)} = 1.39$, $p = .24$), between those who did and did not lose duty time after fitness testing.

Hypothesis 4a: Missed duty time and disordered eating behaviors. As hypothesized, individuals who engaged in disordered eating and weight loss behaviors to prepare for military situations were 2.09 ($CI_{.95} = 1.07 – 4.08$) times more likely to miss duty time after fitness testing (6.1%) than those who did not utilize these behaviors (3.0%), $\chi^2_{(1, N=871)} = 4.84$, $p < .05$. In addition, individuals who engaged in disordered eating behaviors to prepare for fitness testing were 2.13 ($CI_{.95} = 1.09 – 4.17$) times more likely to miss duty time after fitness testing (6.2%) than those who did not utilize unhealthy weight loss behaviors (3.0%), $\chi^2_{(1, N=871)} = 5.13$, $p < .05$. However, contrary to the hypothesis, individuals who regularly engaged in disordered eating behaviors were no

more likely to miss duty time than those who did not report regularly engaging in these behaviors, $\chi^2_{(1, N=871)} = 3.08$, $p = .08$

Hypothesis 4b: Weight and missed duty time. There were no significant differences in the BMI of those who had missed duty time ($n = 36$) and those who had never missed duty time after fitness testing ($n = 823$), $t(857) = -.88$, $p = .38$. This result may be attributed to the small number of soldiers who reported missing duty time, which limited the power of the statistical test (observed power = .142).

Hypothesis 4c: Smoking and disordered eating behaviors. As hypothesized, individuals who reported regularly engaging in unhealthy weight loss behaviors were 7.7 times ($CI_{.95} = 2.07 – 28.66$) more likely to smoke to control weight (3.6%, $n = 9$) compared to those who did not engage in disordered eating behaviors regularly (0.5%, $n = 3$), $\chi^2_{(1, N = 871)} = 12.75$, $p < .001$. Similarly, those who engaged in disordered eating behaviors to prepare for military situations were 5.6 times ($CI_{.95} = 1.50 – 20.70$) more likely to smoke to control weight (2.9%, $n = 9$) than those who did not use unhealthy weight loss behaviors to prepare for military situations (0.5%, $n = 3$), $\chi^2_{(1, N = 871)} = 8.24$, $p < .01$. Finally, those who engaged in disordered eating behaviors to prepare for fitness testing and weigh-in were 5.7 times ($CI_{.95} = 1.53 – 21.13$) more likely to smoke to control weight (2.9%, $n = 9$) than those who did not use unhealthy weight loss behaviors to prepare for military situations (0.5%, $n = 3$), $\chi^2_{(1, N = 871)} = 8.49$, $p < .01$.

Hypothesis 4d: Factors associated with missed duty time. A logistic regression was conducted using missed duty time as the outcome variable. Demographic factors (age, sex, and ethnicity) were entered into the first block of the regression. In the second block, smoking status, BMI, and reported use of disordered eating behaviors regularly

and prior to fitness testing were entered into the equation. None of the demographic factors entered in the model were significantly associated with missed duty time, although Asian ethnicity approached significance (see Table 14). Furthermore, only smoking was a significant predictor of missed duty time. Results indicated that participants who smoked were 3.34 ($CI_{.95}$ = 1.57 – 7.11) times more likely to lose duty time following fitness testing and weigh-in than those who did not smoke, $p < .01$. The change in Cox and Snell R^2 between the first (Cox and Snell $R^2 = 0.02$) and second sets (Cox and Snell $R^2 = 0.03$) of the regression was 0.01, indicating that factors entered into the second set of the equation produced little change to the model.

DISCUSSION

Summary of Findings

The primary purpose of this study was to determine the relationship between individual differences, disordered eating behaviors, and military, psychological, and weight-related factors. Furthermore, this study also sought to identify factors associated with lost duty time after fitness testing to help understand the impact of various unhealthy behaviors on military readiness. Overall, this study found a very high prevalence of disordered eating behaviors in the military. Over a quarter of participants endorsed using unhealthy weight loss behaviors for an extended period of time. Over a third of participants reported using unhealthy weight loss behaviors to meet military weight requirements. Many unhealthy weight loss behaviors were associated with pressure to pass weight standards, and individuals who had reason to believe they may not pass weight standards were more likely to engage in unhealthy weight control and weight loss behaviors.

Aim One: Individual Differences in Disordered Eating Behaviors and Cognitions

As hypothesized, women were more likely than men to engage in military-related weight-loss behaviors, pre-fitness testing weight control behaviors and long-term, regular weight control behaviors. Although there were no differences in bulimia subscale scores, women also reported significantly more disordered eating cognitions than men and felt that weight was significantly more importance in their self-evaluation than men. These results are not surprising, given numerous previous studies indicating greater disordered eating behaviors and cognitions among women (Johnson, 2004; Nagel & Jones, 1992;

Neumark-Sztainer, Sherwood, French, & Jeffery, 1999). However, given that it was originally hypothesized that differences between males and females would be smaller for military-associated (MRWLB and FTRWLB) weight loss behaviors, this hypothesis is only partially supported. It was believed that long-term and more pathological unhealthy weight loss behaviors may be more associated with cognitions, and that situationally-based unhealthy weight loss behaviors may be more associated with the influence of the environment. Women would display higher levels of disordered eating cognitions leading to long-term weight loss behaviors, but because the influence of the environment would be roughly equivalent for both males and females, it was believed that the differences in unhealthy weight loss behaviors related to the military environment would be smaller than differences in long-term unhealthy weight loss behaviors. Although the sex differences in odds of military-associated weight loss behaviors was smaller than the sex differences in odds of long-term weight loss behaviors, this disparity was small. This lack of disparity may be attributed to differences in environmental pressure on males and females. Because female soldiers have more stringent weight standards (Bathalon et al., 2006), they also may be compelled to lose more weight, despite having a lower average BMI than male soldiers. Therefore, there may be additional situational pressure on females to pass weight standards, which may explain high and roughly equivalent levels of military-situational weight loss behaviors and long-term weight loss behaviors among female soldiers. In contrast, the lack of significant differences between male and female bulimia subscale scores may be attributed to the nature of the subscale. Because the bulimia subscale is more behaviorally-focused than the drive for thinness and body dissatisfaction subscales, the relatively high scores for males may be related to the

situational pressure they feel in a military environment, even if there was no long-term internalization of other cognitions associated with disordered eating. Therefore, male soldiers may feel the pressure to use unhealthy weight loss behaviors to lose weight, but may not manifest these behaviors, or display other cognitions associated with unhealthy weight loss behaviors.

Contrary to the hypothesis, Caucasian women were no more likely to utilize unhealthy weight loss behaviors both on a regular basis and prior to fitness testing than African-American women. Perhaps counter-intuitively, African-American women, on average, reported that weight and appearance were more important to their self-evaluation than Caucasian women. Although there were no differences in drive for thinness, bulimia, and body dissatisfaction, Caucasian women reported significantly more dietary restraint. These findings contrast with previous studies indicating greater disordered eating behaviors and cognitions among Caucasian women than among African-American women (Abrams et al., 1993; Crago et al., 1996; Johnson, 2004; Stice, 2003; Warren et al., 2005; Wildes et al., 2001). One possible explanation for the discrepant findings of this study is the acculturating influence of the military. Previous studies have demonstrated that African-American women exposed to the dominant Caucasian-American culture tend to experience increased body dissatisfaction, drive for thinness, and disordered eating behaviors (Abrams et al., 1993; Cachelin & Regan, 2006). Although there are no studies examining the impact of acculturation to military culture, a number of values prevalent in military culture could influence disordered eating cognitions and behaviors, including the emphasis on physical fitness, the importance of appearance and "military bearing," and the derision heaped upon those in the "fat boy"

(Weight Control) program. African-American women in the military may experience higher levels of disordered eating behaviors and cognitions because of exposure to a culture that emphasizes the importance of physical fitness and appearance.

For the purposes of this study, duty status was classified as an individual difference due to Active Duty and Reserve soldiers being exposed to different environments and cultures for extended periods of time. The results seem to indicate that, although disordered eating behaviors are about the same between the two groups, Active Duty soldiers have increased levels of disordered eating cognitions relative to Reservists. Specifically, Active Duty soldiers and Reservists only differed in the more behaviorally-focused disordered eating subscales, bulimia and dietary restraint. There were no significant differences between the two groups in disordered eating subscales related to body image (drive for thinness and dietary restraint). In addition, although the tendency to engage in disordered eating behaviors is about the same between the two groups, there are a number of unhealthy weight loss behaviors that Active Duty personnel are more likely to engage in than Reservists, such as fasting, meal skipping, using the sauna to lose weight, and taking over-the-counter diet pills (see Table 4). Furthermore, Active Duty soldiers seem to resent weight standards more than their Reservist counterparts.

These results may indicate that Active Duty soldiers experience more environmental pressure to maintain a specific shape or weight or pass the weight standard and, as a result, not only develop more behaviorally-related disordered eating cognitions, but also are more resentful towards Army regulations and, in some instances, may engage in more disordered eating behaviors. Reservists, on the other hand, may be under less environmental pressure, but ultimately still have to pass weight standards, which may

explain why Active Duty and Reserve soldiers did not greatly differ in their levels of overall disordered eating behaviors, but differed in disordered eating cognitions. Currently, there are very few published studies assessing psychological and behavioral differences in eating, weight loss, and health behaviors between Active Duty soldiers and Reservists. Perhaps the only study directly comparing the two groups on any of those factors found that Active Duty soldiers experienced more "hierarchical" motivation to engage in health behaviors than Reservists and civilians, meaning that motivation to engage in health behaviors was at least partially motivated by command and leadership structure (Wynd & Ryan-Wenger, 2004). Authors posited that this difference was due to mandatory fitness training and weight standards, although Army Reserve soldiers are also required to pass weight and fitness standards. It should be noted, however, that Active Duty soldiers generally depend on their military career as their *primary* career and source of income, and Reservists may not view their military career with as much importance since they may have another full-time career. Ultimately there are very few studies examining differences in behavior between Active Duty and Army Reserve soldiers, assessing the impact of acculturation to military culture, or examining the role of individual differences in a military environment.

Aim Two: Disordered Eating Behaviors Associated with Military Factors

The findings of this study indicate that unhealthy weight loss behaviors are strongly associated with history of failing weight standards and worry about failing weight standards. In addition, the realistic concern about failing weight standards associated with increased BMI also was associated with unhealthy weight loss behaviors.

However, given the cross-sectional nature of this study, it is impossible to demonstrate the temporal sequence necessary to show a causative link between failing weight standards and subsequent unhealthy weight loss behaviors. These results indicate that the environmental pressure linked to the requirement to pass military weight standards may be associated with unhealthy weight loss behaviors.

The environmental pressure associated with military weight standards is similar to environmental pressures found in non-military situations. For example, individuals who have been teased or bullied about body weight or shape by family or peers are more likely to develop disordered eating behaviors and cognitions, engage in unhealthy weight loss behaviors like purging, and develop full-syndrome eating disorders (Eisenberg & Neumark-Sztainer, 2008; Neumark-Sztainer et al., 2002; Rukavina & Pokrajac-Bulian, 2006). Although the procedure to determine whether a soldier passes the weight standard is not intended to be a humiliating or "bullying" experience, there is often significant disapproval directed towards individuals who have difficulty passing weight standards, although there are no formal studies assessing the perceptions of these individuals. Individuals who have had difficulty passing weight standards in the past may, like the bullied adolescent, engage in unhealthy weight loss behaviors to avoid repeating the experience.

In addition to the humiliation associated with failing weight standards, there also is a potential loss of livelihood. As mentioned previously, soldiers who are unable to pass weight standards often are barred from being promoted and receiving awards or other favorable actions. Furthermore, soldiers actually may be separated, or "chaptered out," of the Army if they are repeatedly unable to pass weight standards. There are a number of

non-military careers that also require that individuals comply with certain weight or body image standards, and many of these careers are similarly associated with unhealthy weight loss behaviors. For example, athletes who play sports associated with leanness such as gymnastics or wrestling are more likely to engage in unhealthy weight loss behaviors than athletes involved in other sports (Dale & Landers, 1999; Engel et al., 2003; Sundgot-Borgen, 1994; Torstveit, Rosenvinge, & Sundgot-Borgen, 2008). Wrestlers may even be more likely to engage in unhealthy weight loss behaviors during wrestling season than during "off-season," much like soldiers may engage in unhealthy weight loss behaviors in the months prior to the APFT and weigh-in (Dale & Landers, 1999). Performing artists such as dancers also may be more likely to engage in unhealthy weight control behaviors (Abraham, 1996; Koutedakis & Jamurtas, 2004; Maloney, 1983). Soldiers who are invested in their careers and dependent on the military as their source of income may, like other individuals in careers requiring certain body weights or shapes, engage in unhealthy weight loss behaviors to avoid losing their livelihood. Future studies could further elucidate this finding by comparing unhealthy weight loss behaviors used by military personnel to unhealthy weight loss behaviors used by individuals in careers that also require meeting weight or shape standards.

Command enforcement and support of standards may be unconnected to disordered eating behaviors due to uniformity of the level of enforcement between different military units. Although commanders may or may not personally support weight standards, generally they are required to follow the standards as directed by Army Regulation 600-9: The Army Weight Control Program (September 2006). Similarly, commanders are required to assess fitness by ensuring soldiers take the Army Physical

Fitness Test (APFT) every six months (Army Field Manual 21-20: Physical Fitness Training, October 1998). Because the standards for conducting weigh-ins and fitness tests are so clearly delineated in various regulations, command enforcement of weight and fitness standards may not vary significantly. Furthermore, because commanders may not want to undermine the official position of the Department of the Army about the importance of soldiers' fitness and military appearance and bearing, they may be reluctant to publicly criticize official Department of the Army policy. Even those commanders who publicly express misgivings about weight and fitness standards are still bound by the same regulations as commanders who publicly support these policies. This lack of variance in support and enforcement may explain the limited impact of commander support and enforcement on unhealthy weight loss behaviors.

Aim Three: Disordered Eating Cognitions, Behaviors, and Interactions with the Environment

Not surprisingly, disordered eating cognitions predicted disordered eating behavior. When disordered eating cognitions are controlled for, sex loses its significance as a factor associated with disordered eating behaviors. The connection between disordered eating cognitions and situational disordered eating behaviors (MRWLB and FTRWLB) was not dependent on the individual engaging in regular disordered eating behaviors (LTWLB). In addition, although disordered eating cognitions are associated with both military-related weight loss behaviors and long-term weight loss behaviors, cognitions were more strongly associated with long-term weight loss behaviors and

worry about failing and history of failing were more strongly associated with military related weight loss behaviors.

These findings seem to indicate that situational disordered eating behaviors are more influenced by environmental contingencies, whereas long-term disordered eating behaviors are more influenced by cognitive and psychological factors. These findings are bolstered by research using civilian samples. The long-term disordered eating behaviors associated with AN and BN tend to be strongly associated with disordered eating cognitions (Garner, 2004; Rukavina & Pokrajac-Bulian, 2006). In contrast, shorter-term unhealthy weight loss behaviors may be associated with environmental stressors, such as wrestling "in season" (Dale & Landers, 1999). What currently is unknown is whether repeated periods of disordered eating behaviors due to discrete environmental factors place individuals at higher risk for developing full-syndrome eating disorders. Repeated periods of extreme weight loss behavior may reinforce that purging, fasting, or excessive exercise are "good" ways to lose weight. In fact, many individuals with full syndrome eating disorders start by engaging in repeated periods of dieting behaviors (Fairburn, Cooper, Doll, & Davies, 2005; Howard & Porzelius, 1999; Kirkley, 1986), but the assumption, which may not be true, is that these individuals already have internalized cognitive factors such as body dissatisfaction and drive for thinness. The individuals in the current study may engage in unhealthy weight loss behaviors strictly to pass weight standards, with no associated internalization of disordered eating cognitions. Because of the non-experimental nature of this study, it is difficult to determine if exposure to a military environment causes internalization of disordered eating cognitions. Future longitudinal prospective research could better illuminate the important question of

whether or not the military environment causes internalization of disordered eating cognitions and development of long-term eating disturbance.

Aim Four: Predictors of Missed Duty Time

This Aim's primary dependent variable, missed duty time after a fitness test, was meant to be an indicator of possible military readiness, as well as inability to recover physiologically after a stressor. Despite the limited number of participants endorsing missed duty time and despite the limitations inherent in using a single question to represent a broad construct such as "readiness," there were several significant findings. We found that unhealthy weight loss behaviors put individuals at risk for losing duty time after fitness testing. We also found that that smoking is a principal predictor of missed duty time and that individuals who engage in unhealthy weight loss behaviors also may smoke to control body weight.

One important finding is that, although individuals who engaged in disordered eating behaviors regularly were no more likely to miss duty time after fitness testing, individuals who were using unhealthy weight loss behaviors to prepare for military situations and specifically for fitness testing were more likely to miss duty time after fitness testing. This finding indicates that the use of unhealthy weight loss behaviors prior to fitness testing may actually be physiologically dangerous to an individual. This finding is reflected in other studies. As mentioned previously, women who are physically active may be at risk for the "female athlete triad;" menstrual dysfunction, low bone mineral density, and disordered eating (Beals & Meyer, 2007). Female athletes with one or more components of the triad are more likely to report strains, sprains, and other soft tissues

injuries (Beals & Manore, 2002), and numerous studies have demonstrated the link between low bone mineral density and stress fractures (Carbon, 1992; Cobb et al., 2003; Rencken, Chesnut, & Drinkwater, 1996), possible contributing to missed duty time. Furthermore, disordered eating has been independently linked to poor bone health (Baker, Roberts, & Towell, 2000; Tudor-Locke & McColl, 2000). Individuals who engage in disordered eating behaviors may be at risk for other negative physiological effects. For example, even short-term unhealthy weight loss behaviors such as vomiting and laxative misuse can lead to dehydration and electrolyte imbalance, pharyngeal and esophageal inflammation, oral trauma, aspiration, esophageal-gastric tears, and digestive system complications (Sansone, 1984).

Even though chi-square analyses indicate the unhealthy weight loss behaviors contribute to missed duty time, the results of the logistic regression indicate the smoking is a more important indicator of missed duty time after fitness testing. In fact, after all other demographic and fitness-related variables were accounted for, smoking was the only significant predictor of missed duty time after fitness testing. This is reflected in findings from a larger study using data from the 2002 Department of Defense Survey of Health-Related Behaviors among Military Personnel which demonstrated that smoking was a better predictor of poor military readiness across four domains (physical health, mental health, substance abuse, and legal problems) than weight status (Haddock et al., 2007). Smoking has also been associated with increased military training and exercise-related injuries (Altarac et al., 2000; Kaufman, Brodine, & Shaffer, 2000; Knapik et al., 2001). The current study supports the notion that smoking may actually have a greater negative impact on soldiers than overweight, underweight, and unhealthy weight loss

behaviors. This study also demonstrated that some soldiers reported smoking as a means of weight control, and those who reported engaging in unhealthy weight loss behaviors were also more likely to report smoking as a means of weight control. Previous studies have demonstrated that some individuals in the military may be reluctant to quit smoking due to concern about gaining weight and consequently being unable to pass weight standards (Peterson & Helton, 2000; Russ et al., 2001). Although the military has a number of programs targeting tobacco cessation (Nelson & Pederson, 2008), military leaders have not been able to effectively address this concern. As suggested in a previous study (Peterson & Helton, 2000), military leaders may want to consider allowing military personnel who are attempting to quit smoking to be temporarily excused from having to pass weight standards, especially considering that smoking may have a more negative impact on military readiness than excessive body weight. Unfortunately, until this concern is addressed, military personnel may continue to have a reason to smoke to maintain lower body weight.

Implications

This study has a number of important implications. This study highlighted the different factors that influence unhealthy behaviors in different contexts. As mentioned in the introduction, disordered eating cognitions often are associated with unhealthy weight loss behaviors unless there are countervailing environmental or social factors. Environmental and military influences appeared to impact situational disordered eating behaviors more than long-term disordered eating behaviors, which could partially be attributed to disordered eating cognitions. The contrasting factors associated with

different behaviors in different contexts indicate that individuals may engage in behaviors but may not completely internalize cognitions associated with these behaviors. This statement may at first appear obvious, but it raises important questions about the relative influences of environmental factors, cognitive factors, and internalized cultural factors. If indeed some cultural upbringings are more likely to predispose an individual to certain behaviors through internalized cognitions and cognitive schemas, but immediate environment factors provide a counteracting influence, than which influence "wins," and ultimately influences behavior? Furthermore, what influence does a stressful environment have on influencing the manifestation of latent eating pathology, or other mental health problems? Further elucidating these questions may help military and non-military leaders foster environments that provide a positive influence on the individual, while still acknowledging differences in predisposed tendencies due to cultural upbringing.

One especially interesting finding concerned the impact of individual differences on disordered eating behaviors and cognitions within a military environment. Because the military is a distinct culture, military personnel may find themselves engaging in activities that they may not normally engage in to facilitate "fitting in" with the culture. Individuals join the military with their own cultural "baggage," and military culture may interact with previously learned norms and values to increase or decrease the likelihood of engaging in healthy or unhealthy behaviors. For example, African-American females in the military may not be as "protected" as non-military African-American females against disordered eating behaviors and cognitions due to acculturation to the military culture of fitness. In addition, there may be a dose-response relationship between exposure to military culture and unhealthy weight loss behaviors and cognitions, as

demonstrated by several significant differences in disordered eating behaviors between Active Duty and Reserve soldiers. As mentioned previously, there are no current ways to measure or even conceptualize acculturation to military culture, and the impact of exposure to military norms and beliefs. Because military culture is more than simply a "culture of fitness," acculturation to military culture may impact a number of behaviors. For example, for many years military leaders have attempted to reign in the "drinking culture" in various military environments. Nonetheless, a recent study demonstrated that the military is still very much a "drinking culture," and sailor beliefs about military drinking culture could influence drinking behaviors (Ames, Cunradi, Moore, & Stern, 2007). Further studies of both the positive and negative aspects of military culture could help military leaders develop work environments that encourage responsible behavior.

In addition to social pressure to be physically fit or thin, military personnel may also find themselves engaging in unhealthy weight loss behaviors due to fear of failing weight standards. The Army Regulation governing the Army Weight Control Program is not intended to be punitive. However, military personnel may be highly motivated to avoid failing weight standards due to fear of possible consequences. Military personnel may indeed be so motivated to avoid failing weight standards that they maintain a significantly unhealthy behavior, smoking, in order to avoid the weight gain associated with tobacco cessation. Military leadership places significant emphasis on health and readiness. However, despite the evidence that overweight and obesity do not impact readiness as negatively as smoking (Haddock et al., 2007), there are still no provisions allowing individuals who are quitting smoking to be temporarily excused from passing weight standards. There is ample evidence that fear of failing weight standards

contributes to unhealthy weight loss behaviors and smoking behaviors. Nonetheless, military regulations and directives require that the services hold their members to a weight standard that may have little, if any, real-world indication of health and readiness.

In summary, there are three overarching themes stemming from this research. The first theme involves that interplay of predisposed cultural and cognitive factors, and how these factors interact with the immediate environment. The second theme concerns the question of how acculturation to a military culture interacts with pre-existing cultural history within the individual, and how this interaction can influence behavior. Finally, the third theme of this study is the perhaps misguided emphasis on body weight at the expense of readiness and encouraging service members to engage in other unhealthy behaviors. These themes raise important questions that may be addressed in future research with the ultimate goal of understanding the interplay of individual differences, culture, cognitions, and environmental contingencies on health behaviors, both in military populations and in non-military populations.

Limitations

There were a several limitations of this study, including limitations due to the study design, limitations due to the measurement instruments, and limitations related to the conceptualization of various constructs.

A problematic aspect of this study is its retrospective non-experimental nature. Many survey questions ask if the participant has *ever* done a particular behavior. Other questions inquire about the frequency or duration of a behavior. If an individual engaged in a particular weight loss behavior several years ago, he or she may be unable to

accurately recall the frequency or duration of the behavior. Furthermore, the non-experimental nature of this study makes it challenging to draw causal conclusions. Although a number of hypotheses can be made using non-experimental, cross-sectional research, causality cannot be demonstrated without the elements of experimental or quasi-experimental research, including deliberate manipulation of one or more variables, a causal time sequence, and elimination of other possible causes (Sarafino, 2005). However, given the long-term nature of some of the variables and behaviors in question, it would be difficult, if not impossible, to manipulate variables or eliminate other possible causes without significantly sacrificing the external validity of the study. Therefore, barring the ability or resources to conduct a prospective longitudinal study, this current study design is probably preferable to experimental or quasi-experimental designs.

Further limitations of this study are the length and self-reported nature of the survey. Because all questions were answered anonymously by participants, there is no way to verify the veracity of responses. Although the survey was anonymous, and steps were taken to assure participants that their results would not be transmitted to commanders, some participants may have under-reported unhealthy weight loss behaviors due to concern about others somehow finding out their answers. Some individuals may also have deliberately over-reported or over-exaggerated symptoms or other answers, perhaps to alter the results of the study. Alternatively, participants may have assumed the researchers *wanted* to find a high prevalence of disordered eating behavior, and may have responded accordingly due to a social desirability bias, which is a common problem in survey research and affects the internal validity of the study

(Krosnick, 1999). Thus, the self-report survey nature of this study was a significant drawback.

Another problem inherent in this study is the extended length of the survey. As they completed the survey, participants may have become more and more fatigued. As a result, they may have engaged in "satisficing;" changing strategies for answering survey questions (Krosnick, 1999). Instead of completing each question carefully and thoroughly, participants may have started quickly selecting the answers that sounded most reasonable at the time, or even selecting answers that would seem reasonable to the interviewer. Therefore, the survey questions filled out in the beginning of the survey may be more reflective of reality than those filled out hastily at the end of the survey, leading to "better" data resulting from the first questions asked in the survey. Because there was only one version of the survey, and therefore questions were not counterbalanced in any way, the questions asked towards the end of the survey, including the EDI questions and the EI dietary restraint subscale, are likely to have been answered with questionable veracity. In future studies, this problem could be mitigated by providing several versions of the survey with counterbalanced questions.

A further study limitation affects one of the primary assumptions of this study: The supposition that individuals in Active Duty and Army Reserve environments are exposed to very different military environments. Because none of the survey questions asked participants about their current or past Active Duty status, or experiences being "activated" while in the Reserves, it is not known whether or not a substantial proportion of Reserve participants had recent or current experiences that would be similar to that of an Active Duty soldier. It was assumed that Reservist study participants are truly

"weekend warriors," and are only infrequently exposed to a military environment. In fact, Reservists may be "activated" to carry out missions with, or in place of, Active Duty soldiers. In the mid- to late-1990s when the study data was collected, Reservists were activated to carry out missions in the Sinai peninsula, the Balkans, and the Middle East (Jensen, 2002). Furthermore, the survey did not include a question about how long the individual had been in the military, so it is also not known how long participants have been exposed to a military environment. Although military rank could be considered an imperfect measure of length of time in the military (with higher ranks indicating more time-in-service), very few participants answered the survey question about military rank. Ultimately, the structure of the survey makes it difficult to determine how extensively individual participants have been exposed to the military environment, which challenges the supposition that Active Duty and Army Reserve soldiers in the sample truly had different experiences. Nonetheless, it could be pointed out that this study found statistically significant differences in perceptions of weight and fitness standards, unhealthy weight loss behaviors, and disordered eating cognitions between Active Duty and Reserve soldiers, indicating some differences between the two groups.

A similar concern to the one discussed above, and another limitation of this study is differences in types of military jobs between Active Duty and Army Reserve. Although Active Duty and Army Reserve samples had similar ethnicity and gender proportions, and were similar in age and BMI, there are more health care and supply and service personnel than expected in the Active Duty sample, and more combat personnel than expected in the Army Reserve sample. Although it might be argued that these differences in military job contributed to differences in military environments, this is not

necessarily the case. Individuals whose primary job is health care related may be assigned to combat units. Similarly, individuals whose primary job is combat-related may be assigned to recruiting or teaching positions. Unfortunately, there is no way to determine the types of military environments each participant was exposed to during the course of his or her career. Future studies may further elucidate the impact of the military environment by asking more detailed questions about deployment history, current and past unit assignments, and history of working in various combat environments.

Finally, the sample of participants was not representative of Army demographics when the data was collected, which challenges the generalizability of this study. The current sample over-represents women, African-Americans, Hispanics, and individuals of "other" ethnicity. In addition, the sample was also more educated than the general Army population. Finally, there was a proportionally greater number of Reservists in the study sample than were in the Army in Fiscal Year 1999 (U.S. Department of the Army, 2000). One must be careful when attempting to draw conclusions about a population using a sample that is not entirely representative of the population. It is also difficult to use this study to draw conclusions about the Army in 2009 because the Army has undergone significant cultural and demographic changes since the late-1990s.

Future Directions

In the decade since this study data was collected, the Army has undergone large and small changes that may affect the military environment and pressure to meet weight standards. Perhaps one of the most notable changes that has occurred in the past decade of military history is the commencement of the Global War on Terror (GWOT). Although

the Army was involved in various global operations in the 1990s, the military had not been involved in a large scale conflict since the Persian Gulf War in 1990 and 1991. Currently, the military is involved in large-scale combat and combat-support operations in Iraq and Afghanistan, among other locations. As of February 2008, about 60% of Active Duty soldiers had deployed to Iraq, Afghanistan, or Kuwait (Cavallaro, 2008). In Fiscal Year 2003, 46.3% of Active Duty soldiers and 23.9% of Reservists were deployed, although not necessarily to Iraq or Afghanistan (Rumsfeld, 2004).

The increased deployment tempo and the focus on combat operations have changed the culture of the Army from that of a "peacetime" force to a combat-focused organization. The current combat-focused military environment may be much more demanding and may contribute to increased stress, leading to changes in behaviors, including health behaviors (Dolan, Adler, Thomas, & Castro, 2005; Jones, O'Connor, Conner, McMillan, & Ferguson, 2007; Larzelere & Jones, 2008; McEwen, 2006; Melamed, Shirom, Toker, Berliner, & Shapira, 2006) and eating patterns (Payne, Jones, & Harris, 2005). Stress may be even associated with disordered eating behaviors such as bingeing in some individuals (Cattanach, Malley, & Rodin, 1988). At this time, no studies are available that assess the impact of the deployed environment, and an increasingly combat-focused culture, on disordered eating behaviors in the military. Possible future studies may explore eating behaviors in combat environments, and the impact of increased environmental stress on disordered eating behaviors.

Another significant change that has occurred since the data for this study were collected is a change in the weight standards for female soldiers. In September 2006 a new edition of Army Regulation 600-9: The Army Weight Control Program was

published. The new regulation listed significantly less stringent screening-weight standards for female soldiers. If, as this study suggests, fear of failing weight standards is related to propensity to engage in unhealthy weight loss behaviors, than less stringent standards should contribute to a decreased prevalence of unhealthy weight loss behaviors. Future studies could assess the current prevalence of unhealthy weight loss behaviors in an Army sample. If the above hypothesis is true, prevalence of unhealthy weight loss behaviors among females should decrease more than unhealthy weight loss behaviors among males, since male screening-weight standards did not change. This line of research could better elucidate the impact of weight standards on unhealthy weight loss behaviors among soldiers.

Conclusion

This study focused on the demographic and environmental and military factors associated with disordered eating and weight loss behaviors in a sample of Army soldiers. These individuals displayed many, though not all, of the predicted relationships between demographic factors and disordered eating. Perhaps more interestingly, this study demonstrated that there may be a relationship between disordered eating behaviors and perceived stress associated with military factors, such as military weight standards. The pressure to "make weight" by passing weight standards appears to incur significant risk for engaging in disordered eating behaviors among Army soldiers. Although these weight standards may be considered necessary to ensure a force that is "fit to fight," the standards appear to impose additional stress upon military personnel. Although doing away with these standards may not be in the best interest in the military, military leaders

can help ensure a supportive environment for those trying to lose weight. This slight measure would perhaps prevent some military personnel from engaging in extreme weight loss behaviors, and instead attempt to lose any additional weight in a healthy manner.

Future research should focus not only on current health behaviors among the U.S. military, but ways that military leaders can further facilitate healthy lifestyle choices despite often stressful environments. The findings of this and other studies which indicate that smoking is associated with diminished military readiness indicate that there is at least one possible focus of intervention. As military operations are at an increased level for the foreseeable future, it is important that the scientific and military communities work together to find ways to help service members cope and maintain their mental and physical health despite the increased stress often associated with a military lifestyle. With this consideration and assistance, military members may be better equipped to continue to do their duty defending the nation.

Table 1

Participant Characteristics (*N* = 871)

Characteristic		
Sex	*N*	Percent
Male	595	68.3
Female	269	30.9
No response	7	0.8
Race/Ethnicity		
Caucasian	387	44.4
African-American	335	38.5
Hispanic	64	7.3
Asian	35	4.0
Other	36	4.1
No response	14	1.6
Active Duty Status		
Army Active Duty	541	62.1
Army Reserve	330	37.9
Characteristic	Mean	Standard Deviation
Age	33.16	8.28
BMI[1]	25.58	3.32
EDI[2] Drive for Thinness subscale	3.60	4.48
EDI[2] Body Dissatisfaction subscale	6.46	6.05
EDI[2] Bulimia subscale	1.32	2.55
EI[3] Dietary Restraint Scale	7.09	4.69

[1]BMI: Body Mass Index

[2]EDI: Eating Disorder Inventory

[3]EI: Eating Inventory

Table 2

Prevalence (%) of Weight Control Behaviors Among Male and Female Soldiers

Behavior	Men	Women	$\chi 2(1)$	Odds Ratio (95% CI)†
Vomiting				
Long-Term	1.0%	4.5%	10.83**	4.58 (1.70 - 12.35)
Before APFT	1.5%	3.0%	2.05	2.00 (0.76 - 5.23)
Before Military Schools	0.5%	0.4%	0.07‡	0.74 (0.08 - 7.11)
Laxatives				
Long-Term	1.0%	1.9%	1.07	1.86 (0.56 - 6.15)
Before APFT	2.7%	7.1%	9.12**	2.75 (1.39 - 5.44)
Before Military Schools	0.5%	3.7%	12.91‡***	7.62 (2.08 - 27.91)
Diuretics				
Long-Term	1.5%	3.7%	4.19*	2.51 (1.01 - 6.26)
Before APFT	2.9%	6.3%	5.88*	2.29 (1.15 - 4.57)
Before Military Schools	1.2%	300.0%	3.51	2.58 (0.92 - 7.18)
Fasting				
Long-Term	8.1%	19.3%	22.96***	2.73 (1.79 - 4.17)
Before APFT	12.1%	20.1%	9.46**	1.82 (1.24 - 2.69)
Before Military Schools	5.2%	11.5%	11.09**	2.37 (1.41 - 3.99)
Meal Skipping				
Before APFT	21.2%	35.7%	20.43***	2.07 (1.50 - 2.84)
Before Military Schools	8.9%	14.9%	6.86**	1.79 (1.15 - 2.77)
Chewing & Spitting				
Long-Term	0.5%	0.4%	0.07‡	0.74 (0.08 - 7.11)
Before APFT	0.8%	1.1%	0.15‡	1.33 (0.32 - 5.61)
Before Military Schools	0.5%	0.4%	0.07‡	0.74 (0.08 - 7.11)
OTC Diet Pills				
Long-Term	3.5%	13.8%	30.93***	4.36 (2.50 - 7.61)
Before APFT	4.2%	12.6%	20.73***	3.30 (1.93 - 5.65)
Prescription Diet Pills				
Long-Term	1.3%	7.1%	20.01***	5.58 (2.41 - 12.91)

Before APFT	1.0%	5.9%	18.22***	6.21 (2.40 - 16.05)
Sauna				
Before APFT	9.7%	16.0%	6.98**	1.76 (1.15 - 2.69)
Rubber Suit				
Before APFT	5.5%	6.3%	0.2	1.15 (0.63 - 2.10)
Severe Calorie Restriction				
Long-Term	16.3%	28.6%	17.49***	2.06 (1.46 - 2.90)
Before APFT	12.3%	17.5%	4.19*	1.51 (1.02 - 2.26)
Tobacco	0.9%	2.9%	4.39*	3.23 (1.02 - 10.28)
Any Weight Loss Behaviors				
Long-Term	22.7%	42.4%	35.01***	2.51 (1.84 - 3.41)
Any Military Situation	29.7%	49.1%	30.11***	2.28 (1.69 - 3.06)
Before APFT	29.6%	48.0%	27.39***	2.19 (1.63 - 2.95)

*$p < .05$

**$p < .01$

***$p < .001$

†Male reference group

‡Some cells of *chi* square did not include 5 participants

Table 3

Prevalence (%) of Weight Control Behaviors Among Caucasian and African-American Female Soldiers

Behavior	Caucasian	African-American	$\chi 2(1)$	Odds Ratio (95% CI)†
Vomiting				
Long-Term	3.4%	4.8%	0.30‡	1.45 (0.38 - 5.56)
Before APFT	0.8%	3.8%	2.29‡	4.72 (0.52 - 42.92)
Before Military Schools	0.0%	0.0%	/	/
Laxatives				
Long-Term	0.8%	3.8%	2.29‡	4.72 (0.52 - 42.92)
Before APFT	8.4%	7.7%	0.04	0.91 (0.35 - 2.40)
Before Military Schools	4.2%	2.9%	0.28‡	0.68 (0.16 - 2.91)
Diuretics				
Long-Term	4.2%	3.8%	0.02‡	0.91 (0.24 - 3.49)
Before APFT	8.4%	5.8%	0.58	0.67 (0.23 - 1.90)
Before Military Schools	5.0%	1.9%	1.56‡	0.37 (0.07 - 1.87)
Fasting				
Long-Term	25.2%	15.4%	3.27	0.54 (0.28 - 1.06)
Before APFT	25.2%	15.4%	3.27	0.54 (0.28 - 1.06)
Before Military Schools	12.6%	8.7%	0.90	0.66 (0.28 - 1.57)
Meal Skipping				
Before APFT	40.3%	34.6%	0.77	0.78 (0.45 - 1.35)
Before Military Schools	14.3%	14.4%	0.00	1.01 (0.48 - 2.14)
Chewing & Spitting				
Long-Term	0.0%	1.0%	1.15‡	/
Before APFT	0.0%	1.9%	2.31‡	/
Before Military Schools	0.0%	0.0%	/	/
OTC Diet Pills				
Long-Term	13.4%	14.4%	0.04	1.09 (0.51 - 2.32)

Before APFT	12.6%	11.5%	0.06	0.90 (0.40 - 2.03)
Prescription Diet Pills				
Long-Term	6.7%	7.7%	0.08	1.16 (0.42 - 3.20)
Before APFT	5.0%	6.7%	0.29	1.36 (0.44 - 4.18)
Sauna				
Before APFT	5.9%	26.0%	17.32***	5.61 (2.33 - 13.53)
Rubber Suit				
Before APFT	3.4%	11.5%	5.57*‡	3.75 (1.17 - 12.01)
Severe Calorie Restriction				
Long-Term	32.8%	26.0%	1.24	0.72 (0.40 - 1.29)
Before APFT	15.1%	19.2%	0.66	1.34 (0.66 - 2.69)
Tobacco	5.9%	1.1%	3.35‡	0.17 (0.02 - 1.44)
Any Weight Loss Behaviors				
Long-Term	47.9%	39.4%	1.62	0.71 (0.42 - 1.21)
Any Military Situation	50.4%	50.0%	0.00	0.98 (0.58 - 1.66)
Before APFT	47.9%	50.0%	0.10	1.09 (0.64 - 1.84)

*$p < .05$

**$p < .01$

***$p < .001$

†Caucasian reference group

‡Some cells of *chi* square did not include 5 participants

Table 4

Prevalence (%) of Weight Control Behaviors Among Army Active Duty and Reserve Soldiers

Behavior	Active Duty	Army Reserve	$\chi 2(1)$	Odds Ratio
Vomiting				
Long-Term	2.4%	1.5%	0.80	0.63 (0.22 - 1.77)
Before APFT	2.0%	1.8%	0.05	0.89 (0.33 - 2.44)
Before Military Schools	0.4%	0.6%	0.25‡	1.64 (0.23 - 11.72)
Laxatives				
Long-Term	0.9%	1.8%	1.31	1.98 (0.60 - 6.56)
Before APFT	4.4%	3.6%	0.33	0.81 (0.40 - 1.65)
Before Military Schools	1.7%	1.5%	0.03	0.91 (0.30 - 2.74)
Diuretics				
Long-Term	2.2%	2.1%	0.01	0.96 (0.37 - 2.45)
Before APFT	3.9%	3.9%	0.00	1.02 (0.50 - 2.06)
Before Military Schools	1.5%	2.1%	0.50	1.44 (0.52 - 4.02)
Fasting				
Long-Term	13.7%	7.9%	6.78**	0.54 (0.34 - 0.86)
Before APFT	14.2%	14.8%	0.06	1.05 (0.71 - 1.55)
Before Military Schools	8.5%	4.8%	4.14*	0.55 (0.31 - 0.99)
Meal Skipping				
Before APFT	26.6%	23.9%	0.77	0.87 (0.63 - 1.19)
Before Military Schools	12.4%	7.9%	4.36*	0.61 (0.38 - 0.97)
Chewing & Spitting				
Long-Term	0.6%	0.3%	0.28‡	0.55 (0.06 - 5.26)
Before APFT	0.9%	0.9%	0.00‡	0.98 (0.23 - 4.14)
Before Military Schools	0.4%	0.6%	0.25‡	1.64 (0.23 - 11.72)
OTC Diet Pills				

Long-Term	7.6%	5.2%	1.94	0.66 (0.37 - 1.19)
Before APFT	8.1%	4.5%	4.18*	0.54 (0.29 - 0.98)
Prescription Diet Pills				
Long-Term	3.0%	3.3%	0.10	1.13 (0.52 - 2.47)
Before APFT	2.6%	2.4%	0.02	0.94 (0.39 - 2.25)
Sauna				
Before APFT	13.9%	8.2%	6.40*	0.55 (0.35 - 0.88)
Rubber Suit				
Before APFT	5.9%	5.8%	0.01	0.97 (0.54 - 1.74)
Severe Calorie Restriction				
Long-Term	21.3%	18.2%	1.21	0.82 (0.58 - 1.17)
Before APFT	14.8%	12.4%	0.96	0.82 (0.55 - 1.23)
Tobacco	0.8%	2.6%	3.92*‡	0.31 (0.09 - 1.05)
Any Weight Loss Behaviors				
Long-Term	30.9%	25.2%	3.27	0.75 (0.55 - 1.02)
Any Military Situation	37.0%	33.3%	1.18	0.85 (0.64 - 1.14)
Before APFT	36.4%	33.0%	1.03	0.86 (0.65 - 1.15)

*$p < .05$

**$p < .01$

***$p < .001$

†Army Reserve reference group

‡Some cells of *chi* square did not include 5 participants

Table 5

Summary of Logistic Regression Analysis Predicting Long-Term Disordered Eating Behaviors as a Function of Worry and Command Enforcement

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-0.74	0.08	84.76	
Sex	0.93	0.16	33.67***	
Male[+]				1.00
Female				2.53 (1.85 - 3.46)
Block 2‡				
Constant	-1.33	0.47	8.14**	
Sex	0.86	0.17	25.27***	
Male[+]				1.00
Female				2.36 (1.69 - 3.30)
Command Enforcement	-0.07	0.08	0.62	0.94 (0.80 - 1.10)
Worry	0.14	0.14	0.94	1.14 (0.87 - 1.51)
Interaction	0.04	0.02	2.19	1.04 (0.99 - 1.09)

†Cox & Snell *R* Square = 0.04; Nagelkerke R Square = 0.06

‡Cox & Snell *R* Square = 0.14; Nagelkerke *R* Square = 0.20

[+]Male reference group

**$p < .01$

***$p < .001$

Table 6
Summary of Logistic Regression Analysis Predicting Disordered Eating Behaviors in Military Situations as a Function of Worry and Command Enforcement

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI*)
Block 1†				
Constant	-0.42	0.08	29.24***	
Sex	0.82	0.15	28.17***	
Male[+]				1.00
Female				2.62 (1.67 - 3.06)
Block 2‡				
Constant	-0.95	0.43	4.76*	
Sex	0.75	0.17	19.34***	
Male[+]				1.00
Female				2.13 (1.52 - 2.98)
Command Enforcement	-0.12	0.08	2.52	0.88 (0.76 - 1.03)
Worry	0.23	0.14	2.67	1.26 (0.96 - 1.67)
Enforcement x Worry	0.04	0.03	2.32	1.04 (0.99 - 1.09)

†Cox & Snell *R Square* = 0.03; Nagelkerke R Square = 0.05

‡Cox & Snell *R* Square = 0.20; Nagelkerke *R* Square = 0.27

[+]Male reference group

*$p < .05$

**$p < .01$

***$p < .001$

Table 7

Summary of Logistic Regression Analysis Predicting Pre-Fitness Testing Disordered Eating Behaviors as a Function of Worry and Command Enforcement

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-0.44	0.08	33.15***	
Sex	0.78	0.15	25.56***	
Male[+]				1.00
Female				2.18 (1.61 - 2.95)
Block 2‡				
Constant	-0.93	0.43	4.56*	
Sex	0.71	0.17	17.00***	
Male[+]				1.00
Female				2.03 (1.45 - 2.84)
Command Enforcement	-0.13	0.08	2.93	0.88 (0.75 - 1.02)
Worry	0.23	0.14	2.69	1.26 (0.96 - 1.67)
Enforcement x Worry	0.04	0.03	2.31	1.04 (0.99 - 1.09)

†Cox & Snell *R* Square = 0.03; Nagelkerke R Square = 0.04

‡Cox & Snell *R* Square = 0.19; Nagelkerke *R* Square = 0.27

[+]Male reference group

*$p < .05$

**$p < .01$

***$p < .001$

Table 8

Summary of Logistic Regression Analysis Predicting Long-Term Disordered Eating Behaviors

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-0.78	0.08	87.53***	
Sex	0.89	0.17	28.97***	
Male[+]				1.00
Female				2.44 (1.77 - 3.38)
Block 2‡				
Constant	-2.97	0.24	157.22***	
Sex	0.24	0.21	1.34	
Male[+]				1.00
Female				1.27 (0.85 - 1.92)
Drive for Thinness	0.06	0.03	4.28*	1.06 (1.00 - 1.12)
Bulimia	0.03	0.04	0.63	1.03 (0.95 - 1.12)
Body Dissatisfaction	0.07	0.02	14.00***	1.07 (1.03 - 1.11)
Dietary Restraint	0.17	0.02	60.11***	1.19 (1.14 - 1.24)

†Cox & Snell *R Square* = 0.04; Nagelkerke R Square = 0.05

‡Cox & Snell *R* Square = 0.22; Nagelkerke *R* Square = 0.32

[+]Male reference group

*$p < .05$

**$p < .01$

***$p < .001$

Table 9

Summary of Logistic Regression Analysis Predicting Disordered Eating Behaviors in Military Situations

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-0.47	0.08	34.55***	
Sex	0.76	0.16	22.80***	
Male+				1.00
Female				2.14 (1.57 - 2.92)
Block 2‡				
Constant	-2.58	0.22	141.23***	
Sex	0.00	0.20	0.00	
Male+				1.00
Female				1.00 (0.68 - 1.49)
Drive for Thinness	0.07	0.03	6.12*	1.07 (1.01 - 1.13)
Bulimia	0.00	0.04	0.00	1.00 (0.92 - 1.08)
Body Dissatisfaction	0.09	0.02	26.98***	1.10 (1.06 - 1.14)
Dietary Restraint	0.15	0.02	50.65***	1.16 (1.11 - 1.21)

†Cox & Snell *R* Square = 0.03; Nagelkerke R Square = 0.04

‡Cox & Snell *R* Square = 0.23; Nagelkerke *R* Square = 0.31

+Male reference group

*$p < .05$

***$p < .001$

Table 10

Summary of Logistic Regression Analysis Predicting Disordered Eating Behaviors Prior to Fitness Testing and Weigh-In

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-0.50	0.08	38.80***	
Sex	0.72	0.16	20.48***	
Male+				1.00
Female				2.06 (1.51 - 2.81)
Block 2‡				
Constant	-2.52	0.22	137.71***	
Sex	-0.03	0.20	0.03	
Male+				1.00
Female				0.97 (0.65 - 1.43)
Drive for Thinness	0.08	0.03	7.63**	1.08 (1.02 - 1.14)
Bulimia	-0.02	0.04	0.13	0.99 (0.91 - 1.07)
Body Dissatisfaction	0.09	0.02	25.46***	1.10 (1.06 - 1.13)
Dietary Restraint	0.14	0.02	44.81***	1.15 (1.10 - 1.20)

†Cox & Snell *R* Square = 0.03; Nagelkerke R Square = 0.04

‡Cox & Snell *R* Square = 0.21; Nagelkerke *R* Square = 0.29

+Male reference group

*$p < .05$

**$p < .01$

***$p < .001$

Table11

Summary of Logistic Regression Analysis Predicting Disordered Eating Behaviors in Military Situations as a Function of Long-Term Disordered Eating and Cognitions

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-0.5	0.08	38.80***	
Sex	0.72	0.16	20.48	
Male[+]				1.00
Female				2.06 (1.51 - 2.81)
Block 2‡				
Constant	-0.77	0.10	57.33***	
Sex	-0.03	0.20	0.02	
Male[+]				1.00
Female				0.97 (0.65 - 1.44)
Dietary Restraint	0.11	0.03	16.59***	1.11 (1.06 - 1.17)
Dietary Restraint x LWLB[n]	0.09	0.05	3.66	1.09 (1.00 - 1.19)
Drive for Thinness	0.08	0.04	4.63*	1.09 (1.01 - 1.17)
Drive for Thinness x LWLB[n]	-0.03	0.06	0.24	0.97 (0.87 - 1.09)
Bulimia	-0.07	0.06	1.64	0.93 (0.84 - 1.04)
Bulimia x LWLB[n]	0.15	0.09	2.92	1.16 (0.98 - 1.38)
Body Dissatisfaction	0.10	0.02	18.01***	1.10 (1.05 - 1.15)
Body Dissatisfaction x LWLB[n]	-0.02	0.03	0.26	0.98 (0.92 - 1.05)

†Cox & Snell *R Square* = 0.03; Nagelkerke R Square = 0.04

‡Cox & Snell *R* Square = 0.22; Nagelkerke *R* Square = 0.30

[+]Male reference group

[n]Interaction of cognition and eating disordered behaviors utilized regularly

*$p < .05$

$^{**}p < .01$
$^{***}p < .001$

Table 12

Interaction of Cognitions and Worry About Failing Weight Standards as Predictors of Long-Term Disordered Eating Behaviors

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI*)
Block 1†				
Constant	-0.77	0.08	85.39***	
Sex	0.89	0.17	28.68***	
Male[+]				1.00
Female				2.44 (1.77 - 3.37)
Block 2‡				
Constant	-1.07	0.11	98.16***	
Sex	0.35	0.22	2.6	
Male[+]				1.00
Female				1.42 (0.93 - 2.16)
History of Failure	0.50	0.20	6.24*	1.65 (1.11 - 2.44)
Worry About Failing	0.14	0.05	7.26**	1.15 (1.04 - 1.28)
Dietary Restraint	0.16	0.02	50.05***	1.18 (1.13 - 1.23)
Dietary Restraint x Worry[n]	-0.01	0.01	0.20	1.00 (0.98 - 1.02)
Drive for Thinness	0.11	0.03	17.56***	1.12 (1.06 - 1.18)
Drive for Thinness Worry[n]	0.03	0.03	1.17	1.03 (0.97 - 1.10)
Bulimia	0.04	0.05	0.76	1.04 (0.95 - 1.14)
Bulimia x Worry[n]	-0.01	0.02	0.16	0.99 (0.96 - 1.03)
Body Dissatisfaction	0.04	0.02	4.43*	1.05 (1.00 - 1.09)
Body Dissatisfaction x Worry[n]	0.00	0.01	0.11	1.00 (0.98 - 1.01)

†Cox & Snell *R* Square = 0.04; Nagelkerke R Square = 0.05

‡Cox & Snell *R* Square = 0.25; Nagelkerke *R* Square = 0.35

[+]Male reference group

[++]History of people who have not failed weight standards as reference group

[n]Interaction of cognition and worry about failing weight standard

*$p < .05$

**$p < .01$

***$p < .001$

Table 13

Interaction of Cognitions and Worry About Failing Weight Standards as Predictors of Disordered Eating Behaviors Used in Military Situations

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-0.46	0.08	33.05***	
Sex	0.76	0.16	22.51***	
Male[+]				1.00
Female				2.13 (1.56 - 2.91)
Block 2‡				
Constant	-0.65	0.11	38.44***	
Sex	0.22	0.22	0.99	
Male[+]				1.00
Female				1.24 (0.81 - 1.89)
History of Failure[++]	1.18	0.19	37.51***	3.27 (2.24 - 4.77)
Worry About Failing	0.27	0.05	27.48***	1.30 (1.18 - 1.44)
Dietary Restraint	0.13	0.02	32.93***	1.14 (1.09 - 1.19)
Dietary Restraint x Worry[n]	0.00	0.01	0.02	1.00 (0.98 - 1.02)
Drive for Thinness	0.05	0.03	2.20	1.05 (0.99 - 1.11)
Drive for Thinness x Worry[n]	0.02	0.01	1.36	1.02 (0.99 - 1.04)
Bulimia	0.00	0.05	0.00	1.00 (0.92 - 1.10)
Bulimia x Worry[n]	0.00	0.02	0.04	1.00 (0.96 - 1.03)
Body Dissatisfaction	0.05	0.02	6.54*	1.05 (1.01 - 1.10)
Body Dissatisfaction x Worry[n]	-0.01	0.01	2.27	0.99 (0.97 - 1.00)

†Cox & Snell *R* Square = 0.03; Nagelkerke R Square = 0.04

‡Cox & Snell *R* Square = 0.32; Nagelkerke *R* Square = 0.43

[+]Male reference group

[++]History of people who have not failed weight standards as reference group

[n]Interaction of cognition and worry about failing weight standards

*$p < .05$

**$p < .01$

***$p < .001$

Table 14

Summary of Logistic Regression Analysis Predicting Missed Duty Time After Fitness Testing

Predictor	B	S.E.	Wald	Odds Ratio (95% *CI)*
Block 1†				
Constant	-3.37	0.75	20.06***	
Sex	0.51	0.35	2.12	
Male[+]				1.00
Female				1.67 (0.84 - 3.33)
Age	0.00	0.02	0.05	1.00 (0.97 - 1.05)
Ethnicity				
Caucasian[++]				1.00
African-American	-0.13	0.38	0.11	0.88 (0.42 - 1.85)
Hispanic	-18.15	5085.90	0.00	0.00 (0.00 - 0.00)
Asian	1.05	0.59	3.16	2.86 (0.90 - 9.09)
Other	-0.47	1.05	0.20	0.63 (0.08 - 4.87)
Block 2‡				
Constant	-5.39	1.55	12.15***	
Sex	0.49	0.38	1.64	
Male[+]				1.00
Female				1.63 (0.77 - 3.45)
Age	0.01	0.02	0.09	1.01 (0.96 - 1.05)
Ethnicity				
Caucasian[++]				1.00
African-American	-0.14	0.39	0.13	0.87 (0.40 - 1.87)
Hispanic	-18.12	4934.28	0.00	0.00 (0.00 - 0.00)
Asian	1.2	0.61	3.81[n]	3.231 (1.00 - 11.02)
Other	-0.64	1.05	0.37	0.53 (0.07 - 4.13)
BMI	0.05	0.06	0.77	1.05 (0.94 - 1.18)

Disordered Eating Behaviors Before APFT+++	0.62	0.45	1.96	1.87 (0.78 - 4.48)
Disordered Eating Behaviors Regularly+++	0.22	0.44	0.26	1.25 (0.53 - 2.94)
Smoking Status++++	1.21	0.39	9.80**	3.34 (1.57 - 7.11)

†Cox & Snell *R* Square = 0.02; Nagelkerke R Square = 0.05

‡Cox & Snell *R* Square = 0.03; Nagelkerke *R* Square = 0.10

+Male reference group

++Caucasian reference group

+++Individuals reporting engaging in the behavior as reference group

++++Non-smoking reference group

np = .051

*p< .05

**p < .01

***p<.001

Table 15

Support for Hypotheses

Hypothesis	Supported?
Aim One: Individual differences associated with disordered eating behaviors and cognitions	
Gender. Women will engage in more disordered eating behaviors than men, although the difference between genders will be smaller for situationally-based behaviors.	Partial
Ethnicity. African-American women will engage in fewer disordered eating behaviors and have lower average levels of disordered eating cognitions.	No
Duty status. Active Duty soldiers will display more disordered eating behaviors and cognitions than Reservists.	Partial
Duty status and perception of weight standards. Active Duty soldiers will be more supportive of weight standards than Reserve soldiers.	No
Aim Two: Military factors associated with unhealthy weight loss behaviors	
Body mass index. Individuals who engage in unhealthy weight loss behaviors will have a higher average BMI than those who do not engage in unhealthy weight loss behaviors.	Yes
History of failing weight standards. Individuals who have a history of failing weight standards will be more likely to engage in unhealthy weight loss behaviors, especially prior to fitness testing and weigh-in.	Yes
Concern about failing weight standards. Individuals who were worried about failing weight standards or who tried to lose weight before the last weigh-in will be more likely to engage in unhealthy weight loss behaviors, especially prior to fitness testing and weigh-in.	Yes

Command enforcement. Individuals who perceive that their commanders strictly enforce weight standards will be more likely to engage in unhealthy weight loss behaviors, especially prior to fitness testing and weigh-in, than those with less strict commanders.	No
Interaction of worry and command enforcement. Individuals who are concerned about failing weight standards will be likely to engage in unhealthy weight loss behaviors only if they reported a high level of command enforcement.	No
Aim Three: Interaction of cognitions and military factors	
Disordered eating cognitions and unhealthy weight loss behaviors. Disordered eating cognitions will be predictive of unhealthy weight loss behaviors, and will better predict long-term weight loss behaviors than situational weight loss behaviors.	Partial
Interaction of disordered eating cognitions and long-term disordered eating behaviors. Disordered eating cognitions will poorly predict situationally-based weight loss behaviors in the absence of long-term weight loss behaviors	No
Military factors and disordered eating cognitions. Worry about failing weight standards and history of failing weight standards would better predict situational disordered eating behaviors and disordered eating cognitions would better predict long-term disordered eating behaviors.	Partial
Aim Four: Predictors of missed duty time	
Unhealthy weight loss behaviors. Unhealthy weight loss behaviors, especially those used to prepare for military situations, will predict lost duty time after fitness testing.	Yes
Body mass index (BMI). Individuals who lose duty time after fitness testing will have a higher average BMI than those who have not lost duty time after fitness testing.	No
Smoking and unhealthy weight loss behaviors. Individuals who endorse smoking as a means of weight control will be more likely to engage in unhealthy weight loss behaviors than those who do not smoke to control weight.	Yes

Predictors of lost duty time after fitness testing. Smoking will be the best predictor of lost duty time after fitness testing.	Yes

APPENDIX A: LETTER OF EXEMPTION FROM USUHS IRB

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814-4712
www.usuhs.mil

May 22, 2008

MEMORANDUM FOR CPT LAUREL COPELL, BA, MEDICAL AND CLINICAL PSYCHOLOGY

SUBJECT: IRB Exemption of Study (DoD Assurance No. FWA00001 and FWA 00001628)

1. Your research protocol FD72KD entitled, "Weight Control Behaviors Used By Active Duty and Army Reserve Personnel," was reviewed and approved for execution on May 22, 2008 as an EXEMPT human use study under the provisions of 32 CFR 219.101(b)(4). This approval will be reported to the full Uniformed Services University IRB scheduled to meet on June 12, 2008.

2. An exempt study signifies that you will not be required to submit renewal applications for full Board review **as long as that portion of your project involving human subjects remains unchanged. If during the** course of your project, you intend to make changes which may significantly affect the human subjects involved, you should contact the IRB office for guidance prior to implementing these changes.

3. Any unanticipated problems related to your use of human subjects in this project must be promptly reported to the full Board through this office. This is required so that the IRB can institute or update protective measures for human subjects as necessary.

4. Exemption is granted with the understanding that no further changes or additions will be made to the procedures followed or investigators involved without the knowledge and approval of the IRB.

5. Your study and its documentation are subject to inspection at any time. You must maintain your records to facilitate such inspections. **You are to notify the USU IRB Office upon completion of the study.**

6. If you have questions regarding specific issues on your protocol, or questions of a more general nature concerning human subjects protection, please contact me at 301-295-3810/3534 or mpickerel@usuhs.mil.

Margaret Pickerel
Director, Human Research Protections Program
and Executive Secretary, IRB

cc: OSP
Chair, MPS
File

Learning to Care for Those in Harm's Way

APPENDIX B: LETTER FROM PRINCIPAL INVESTIGATOR GRANTING PERMISSION TO USE DATA SET

February 20, 2008

CPT Laurel Cofell
Uniformed Services University of the Health Sciences
Department of Medical and Clinical Psychology
4301 Jones Bridge Road
Bethesda, MD 20814

Dear Laurel:

This letter is to verify you have my permission to analyze my existing data set for your Master's thesis project at the Uniformed Services University of the Health Sciences (USUHS) under the supervision of Dr. Tracy Sbrocco. This data was collected under my supervision, and I was the Principal Investigator on the original project. Dr. Sbrocco served as co-investigator on the project. The original research project, entitled "The Prevalence of Disordered Eating Among Active Duty Military Personnel," protocol number R08154, involved the administration of an anonymous survey and was fully approved by the USUHS IRB. The data set you will receive has been fully de-identified, such that it is impossible to track individual subjects by any means. At no point will you have access to identifiers or the original data.

Dr. Tracy Sbrocco has my permission to grant you access to an electronic version of the data set upon approval from the USUHS IRB.

Sincerely,

Evelyn L. Lewis, M.D.

FEB 20 2008 3:44PM HP LASERJET FAX 301 295 0063 p.2

APPENDIX C: USUHS WEIGHT MANAGEMENT STRATEGY QUESTIONNAIRE

UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814-4799

Dear Service Member,

Thank you for agreeing to participate in the study entitled "Prevalence of Disordered Eating Among Active Duty Service Military Personnel." This research is being conducted to examine the existence of chronic and short term dieting among service personnel at the time of the Physical Readiness Test. You will be one of approximately 2100 active duty members of the Armed Forces to participate

Participation requires that you complete all portions of the following questionnaire. There are questions related to dieting, fasting, use of "water pills". The sauna, and vomiting to lose weight. You will also be asked questions regarding your age, rank, and ethnicity. Please read the directions and each question carefully, giving your most accurate answer to each one.

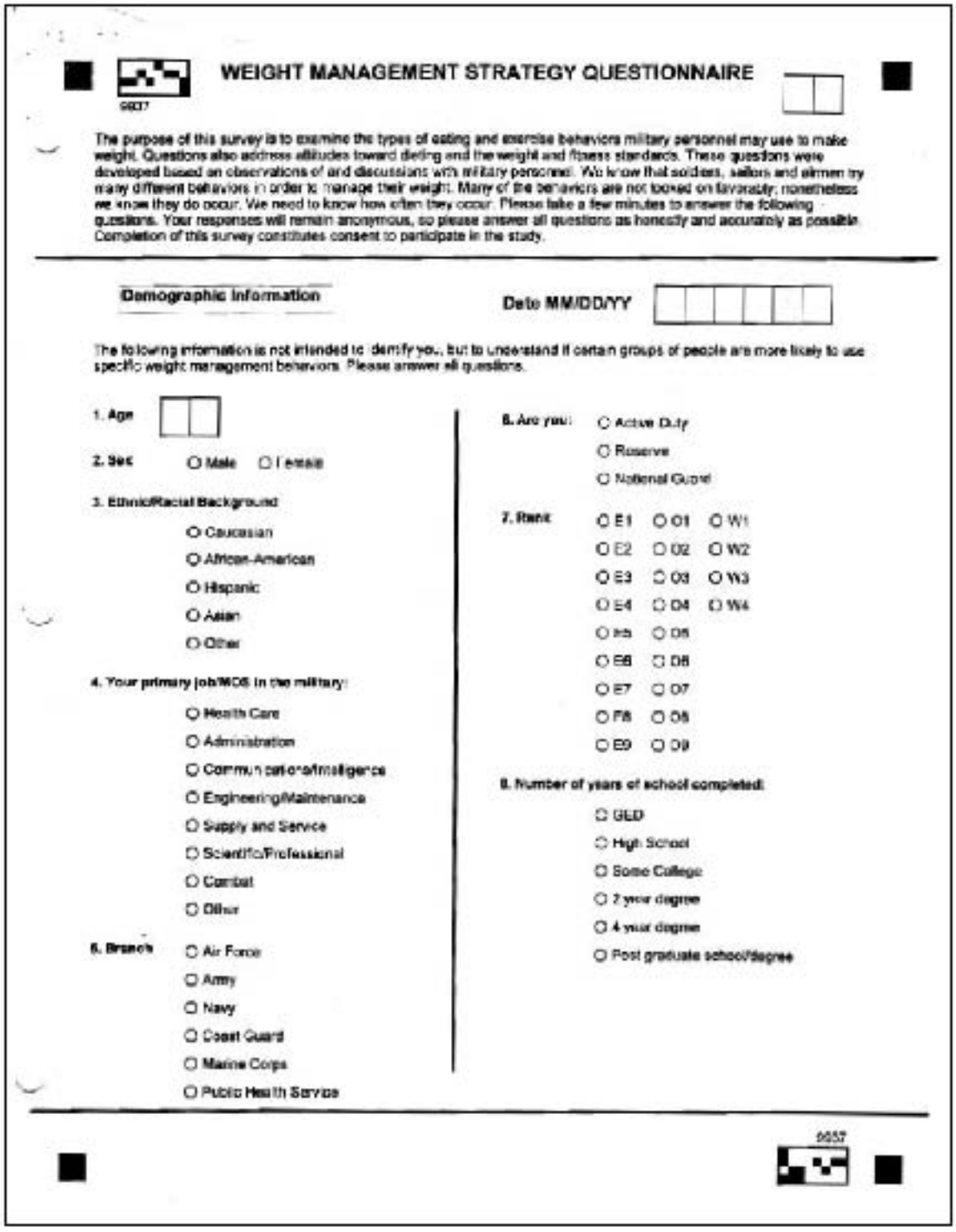
Your confidentiality (privacy) will be protected to the best extent of the law. Your name will not appear anywhere on the questionnaire. All data will be grouped prior to release. This is a voluntary survey. You may refuse or withdraw participation at any time with out penalty or loss of benefits.

Once you have received a questionnaire, please answer all questions and then return them to your Command Point of Contact (CPOC) upon leaving this room.

If you have any questions or concerns, you may contact Dr. E.L. Lewis in the Department of Family Medicine at 301-295-3632 (e-mail: elewis@mxa.usuhs.mil), Dr. T. Sbrocco in the Department of Medical & Clinical Psychology at 301-295-9674 (e-mail: tsbrocco@map.usuhs.mil), or the Office of Research Administration at 301-295-3303 at the Uniformed Services University of the Health Sciences.

Sincerely,

Evelyn L. Lewis, M.D., M.A.
CDR, MC, USN
Principal Investigator



WEIGHT MANAGEMENT STRATEGY QUESTIONNAIRE

The purpose of this survey is to examine the types of eating and exercise behaviors military personnel may use to make weight. Questions also address attitudes toward dieting and the weight and fitness standards. These questions were developed based on observations of and discussions with military personnel. We know that soldiers, sailors and airmen try many different behaviors in order to manage their weight. Many of the behaviors are not looked on favorably; nonetheless we know they do occur. We need to know how often they occur. Please take a few minutes to answer the following questions. Your responses will remain anonymous, so please answer all questions as honestly and accurately as possible. Completion of this survey constitutes consent to participate in the study.

Demographic Information

Date MM/DD/YY

The following information is not intended to identify you, but to understand if certain groups of people are more likely to use specific weight management behaviors. Please answer all questions.

1. Age

2. Sex ○ Male ○ Female

3. Ethnic/Racial Background
- ○ Caucasian
- ○ African-American
- ○ Hispanic
- ○ Asian
- ○ Other

4. Your primary job/MOS in the military:
- ○ Health Care
- ○ Administration
- ○ Communications/Intelligence
- ○ Engineering/Maintenance
- ○ Supply and Service
- ○ Scientific/Professional
- ○ Combat
- ○ Other

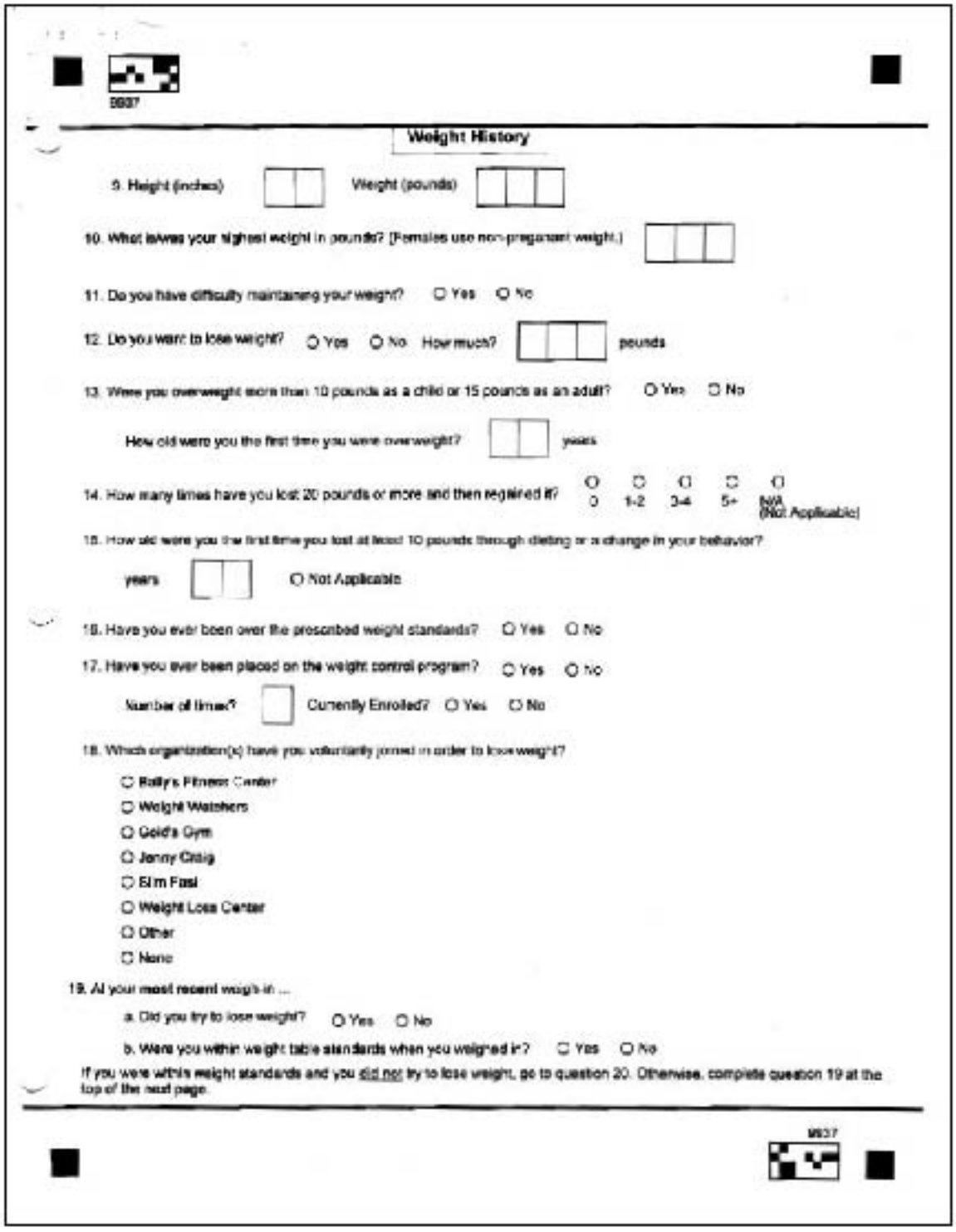
5. Branch
- ○ Air Force
- ○ Army
- ○ Navy
- ○ Coast Guard
- ○ Marine Corps
- ○ Public Health Service

6. Are you:
- ○ Active Duty
- ○ Reserve
- ○ National Guard

7. Rank
- ○ E1 ○ O1 ○ W1
- ○ E2 ○ O2 ○ W2
- ○ E3 ○ O3 ○ W3
- ○ E4 ○ O4 ○ W4
- ○ E5 ○ O5
- ○ E6 ○ O6
- ○ E7 ○ O7
- ○ E8 ○ O8
- ○ E9 ○ O9

8. Number of years of school completed:
- ○ GED
- ○ High School
- ○ Some College
- ○ 2 year degree
- ○ 4 year degree
- ○ Post graduate school/degree

9657



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Weight History

9. Height (inches) ☐☐ Weight (pounds) ☐☐☐

10. What is/was your highest weight in pounds? [Females use non-pregnant weight.] ☐☐☐

11. Do you have difficulty maintaining your weight? ○ Yes ○ No

12. Do you want to lose weight? ○ Yes ○ No How much? ☐☐☐ pounds

13. Were you overweight more than 10 pounds as a child or 15 pounds as an adult? ○ Yes ○ No

How old were you the first time you were overweight? ☐☐ years

14. How many times have you lost 20 pounds or more and then regained it?

○	○	○	○	○
0	1-2	3-4	5+	N/A (Not Applicable)

15. How old were you the first time you lost at least 10 pounds through dieting or a change in your behavior?

years ☐☐ ○ Not Applicable

16. Have you ever been over the prescribed weight standards? ○ Yes ○ No

17. Have you ever been placed on the weight control program? ○ Yes ○ No

Number of times? ☐ Currently Enrolled? ○ Yes ○ No

18. Which organization(s) have you voluntarily joined in order to lose weight?

- ○ Bally's Fitness Center
- ○ Weight Watchers
- ○ Gold's Gym
- ○ Jenny Craig
- ○ Slim Fast
- ○ Weight Loss Center
- ○ Other
- ○ None

19. At your most recent weigh-in ...

a. Did you try to lose weight? ○ Yes ○ No

b. Were you within weight table standards when you weighed in? ○ Yes ○ No

If you were within weight standards and you did not try to lose weight, go to question 20. Otherwise, complete question 19 at the top of the next page.

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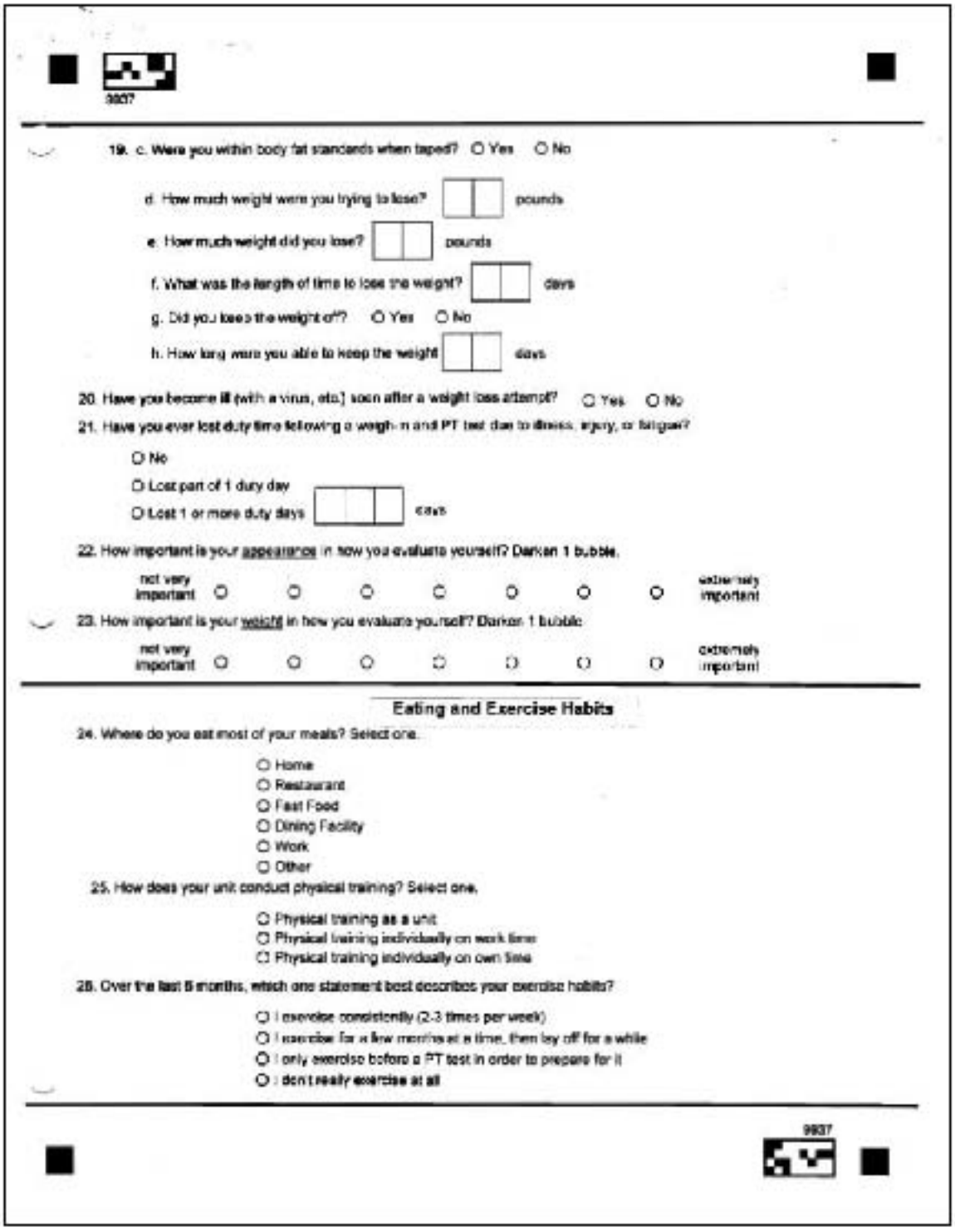


19. c. Were you within body fat standards when taped? ○ Yes ○ No

d. How much weight were you trying to lose? ☐☐ pounds

e. How much weight did you lose? ☐☐ pounds

f. What was the length of time to lose the weight? ☐☐ days

g. Did you keep the weight off? ○ Yes ○ No

h. How long were you able to keep the weight ☐☐ days

20. Have you become ill (with a virus, etc.) soon after a weight loss attempt? ○ Yes ○ No

21. Have you ever lost duty time following a weigh-in and PT test due to illness, injury, or fatigue?

○ No

○ Lost part of 1 duty day

○ Lost 1 or more duty days ☐☐☐ days

22. How important is your appearance in how you evaluate yourself? Darken 1 bubble.

not very important							extremely important
○	○	○	○	○	○	○	

23. How important is your weight in how you evaluate yourself? Darken 1 bubble.

not very important							extremely important
○	○	○	○	○	○	○	

Eating and Exercise Habits

24. Where do you eat most of your meals? Select one.

○ Home
○ Restaurant
○ Fast Food
○ Dining Facility
○ Work
○ Other

25. How does your unit conduct physical training? Select one.

○ Physical training as a unit
○ Physical training individually on work time
○ Physical training individually on own time

26. Over the last 6 months, which one statement best describes your exercise habits?

○ I exercise consistently (2-3 times per week)
○ I exercise for a few months at a time, then lay off for a while
○ I only exercise before a PT test in order to prepare for it
○ I don't really exercise at all

9937

The next series of questions refer to different weight loss methods. For questions 27 through 36, you will be told to skip parts A-F if you have not used this method of weight loss.

27. In order to lose weight, have you ever made yourself vomit?

○ No (Go to question 28)

○ Yes (Continue to answer questions A through F)

A. Has there ever been a period of time when you vomited regularly - at least twice a week for a period of 3 months or more?

○ Yes ○ No

B. Do you vomit to prepare for weigh-ins/PT tests?

○ Yes ○ No

C. If you vomited to prepare for weigh-ins/PT tests, for how long of a period of time did you do this?

○ Not Applicable
○ 1 Day
○ 2-5 Day
○ One Week
○ Two Weeks
○ Three Weeks
○ One Month
○ Two to Three Months
○ Four to Six Months
○ More than Six Months

D. How often during this preparation period do you vomit?

○ Not Applicable
○ More than once daily
○ Daily
○ 4-6 times a week
○ 2-3 times a week
○ Once a week
○ Less than once a week

E. Have you ever induced or caused vomiting before special events (weddings, sporting events, religious exercises) in order to lose weight?

○ Yes ○ No

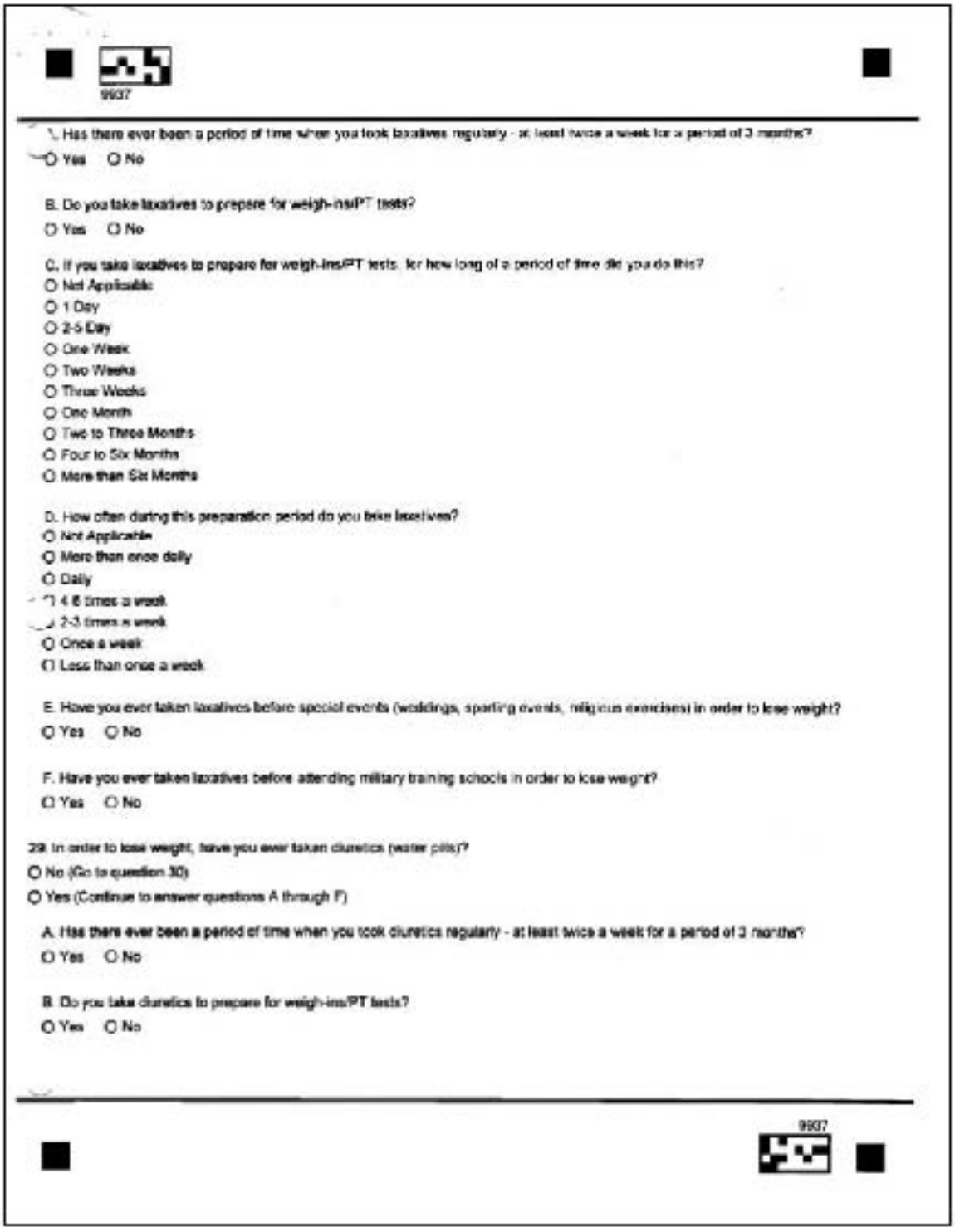
F. Have you ever induced or caused vomiting before attending military training schools in order to lose weight?

○ Yes ○ No

28. In order to lose weight, have you ever taken laxatives (Ex-Lax, Dulcolax, Correctol)?

○ No (Go to question 29)

○ Yes (Continue to answer questions A through F)



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A. Has there ever been a period of time when you took laxatives regularly - at least twice a week for a period of 3 months?
O Yes O No

B. Do you take laxatives to prepare for weigh-ins/PT tests?
O Yes O No

C. If you take laxatives to prepare for weigh-ins/PT tests, for how long of a period of time do you do this?
O Not Applicable
O 1 Day
O 2-5 Day
O One Week
O Two Weeks
O Three Weeks
O One Month
O Two to Three Months
O Four to Six Months
O More than Six Months

D. How often during this preparation period do you take laxatives?
O Not Applicable
O More than once daily
O Daily
O 4-6 times a week
O 2-3 times a week
O Once a week
O Less than once a week

E. Have you ever taken laxatives before special events (weddings, sporting events, religious exercises) in order to lose weight?
O Yes O No

F. Have you ever taken laxatives before attending military training schools in order to lose weight?
O Yes O No

29. In order to lose weight, have you ever taken diuretics (water pills)?
O No (Go to question 30)
O Yes (Continue to answer questions A through F)

A. Has there ever been a period of time when you took diuretics regularly - at least twice a week for a period of 3 months?
O Yes O No

B. Do you take diuretics to prepare for weigh-ins/PT tests?
O Yes O No

9937

9937

If you take diuretics to prepare for weigh-ins/PT tests, for how long of a period of time did you do this?

- Not Applicable
- 1 Day
- 2-5 Day
- One Week
- Two Weeks
- Three Weeks
- One Month
- Two to Three Months
- Four to Six Months
- More than Six Months

D. How often during this preparation period do you take diuretics?

- Not Applicable
- More than once daily
- Daily
- 4-6 times a week
- 2-3 times a week
- Once a week
- Less than once a week

E. Have you ever taken diuretics before special events (weddings, sporting events, religious ceremonies) in order to lose weight?

- Yes
- No

F. Have you ever taken diuretics before attending military training schools in order to lose weight?

- Yes
- No

Note: Question 30 asks about fasting. Fasting is defined as purposely skipping more than one meal per day for any period of time. On the other hand, skipping meals means that you missed no more than one meal per day for any period of time.

30. In order to lose weight, have you ever fasted (skipped more than one meal per day)?

- No (Go to question 31)
- Yes (Continue to answer questions A through F)

A. Has there ever been a period of time when you fasted regularly - at least twice a week for a period of 3 months?

- Yes
- No

B. Do you fast to prepare for weigh-ins/PT tests?

- Yes
- No

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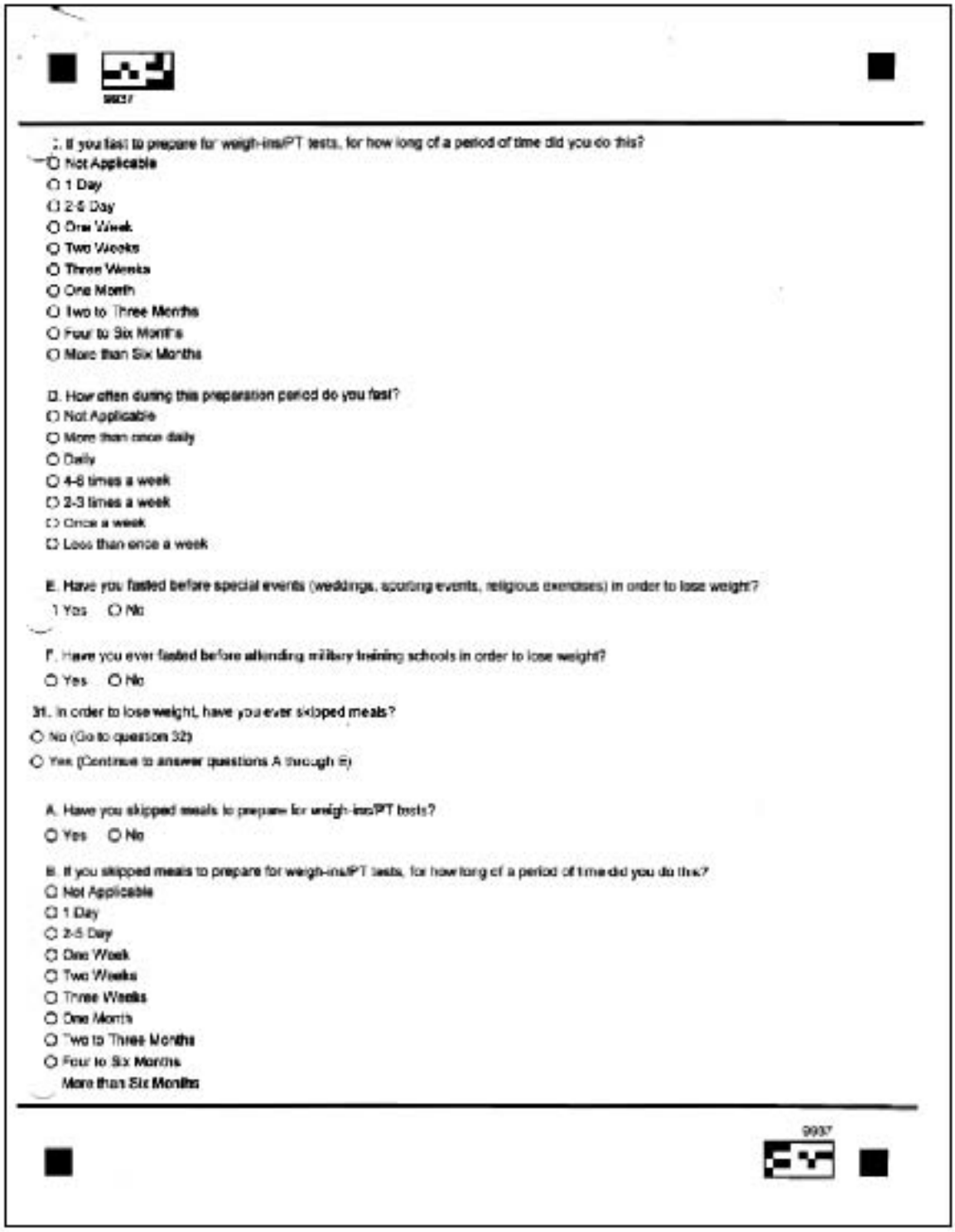

C. If you fast to prepare for weigh-ins/PT tests, for how long of a period of time did you do this?
- Not Applicable
- 1 Day
- 2-5 Day
- One Week
- Two Weeks
- Three Weeks
- One Month
- Two to Three Months
- Four to Six Months
- More than Six Months

D. How often during this preparation period do you fast?
- Not Applicable
- More than once daily
- Daily
- 4-6 times a week
- 2-3 times a week
- Once a week
- Less than once a week

E. Have you fasted before special events (weddings, scouting events, religious exercises) in order to lose weight?
- Yes
- No

F. Have you ever fasted before attending military training schools in order to lose weight?
- Yes
- No

31. In order to lose weight, have you ever skipped meals?
- No (Go to question 32)
- Yes (Continue to answer questions A through E)

A. Have you skipped meals to prepare for weigh-ins/PT tests?
- Yes
- No

B. If you skipped meals to prepare for weigh-ins/PT tests, for how long of a period of time did you do this?
- Not Applicable
- 1 Day
- 2-5 Day
- One Week
- Two Weeks
- Three Weeks
- One Month
- Two to Three Months
- Four to Six Months
- More than Six Months

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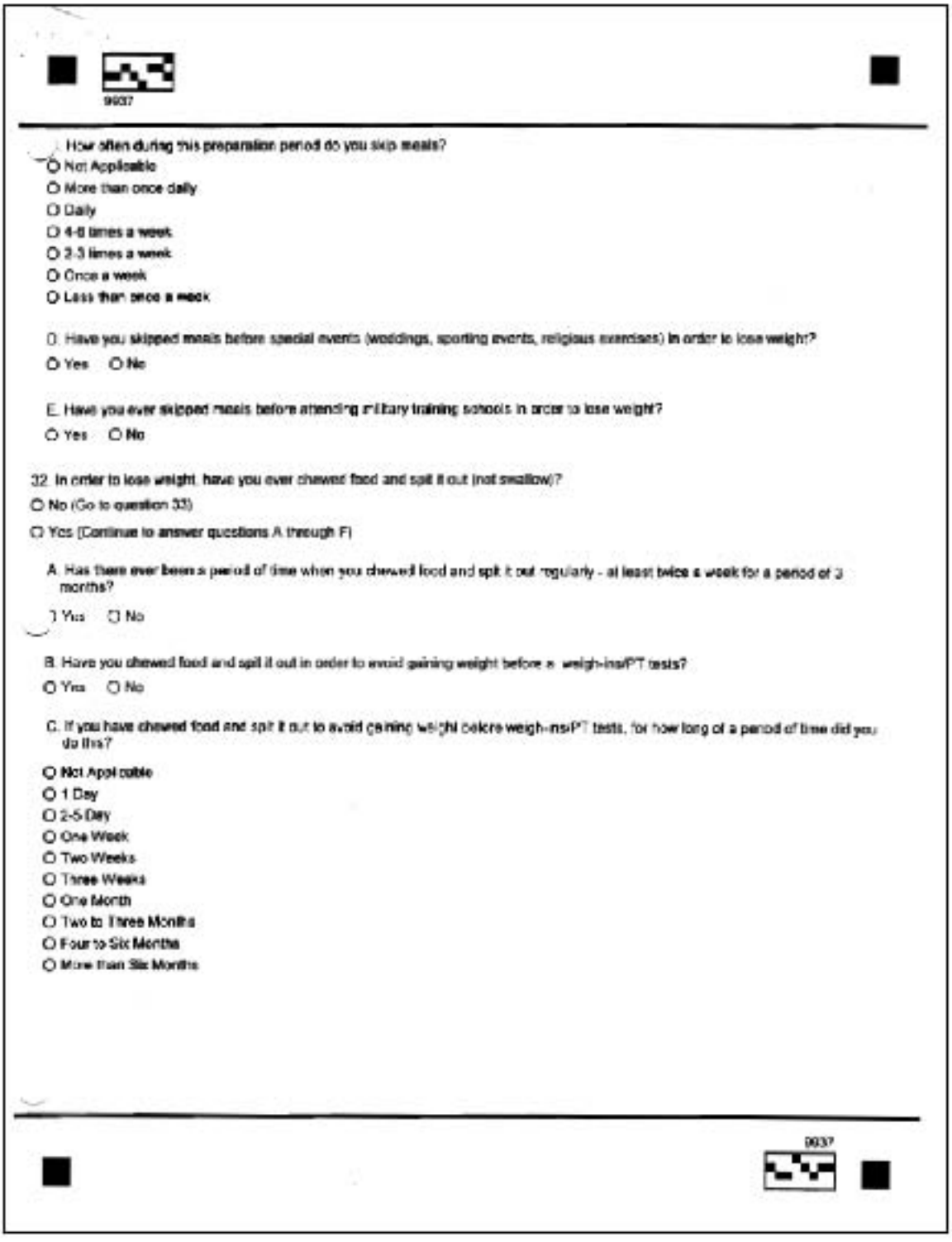

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How often during this preparation period do you skip meals?
- O Not Applicable
- O More than once daily
- O Daily
- O 4-6 times a week
- O 2-3 times a week
- O Once a week
- O Less than once a week

D. Have you skipped meals before special events (weddings, sporting events, religious exercises) in order to lose weight?

O Yes O No

E. Have you ever skipped meals before attending military training schools in order to lose weight?

O Yes O No

32. In order to lose weight, have you ever chewed food and spit it out (not swallow)?

O No (Go to question 33)

O Yes (Continue to answer questions A through F)

A. Has there ever been a period of time when you chewed food and spit it out regularly - at least twice a week for a period of 3 months?

O Yes O No

B. Have you chewed food and spit it out in order to avoid gaining weight before a weigh-in/PT tests?

O Yes O No

C. If you have chewed food and spit it out to avoid gaining weight before weigh-in/PT tests, for how long of a period of time did you do this?

- O Not Applicable
- O 1 Day
- O 2-5 Day
- O One Week
- O Two Weeks
- O Three Weeks
- O One Month
- O Two to Three Months
- O Four to Six Months
- O More than Six Months

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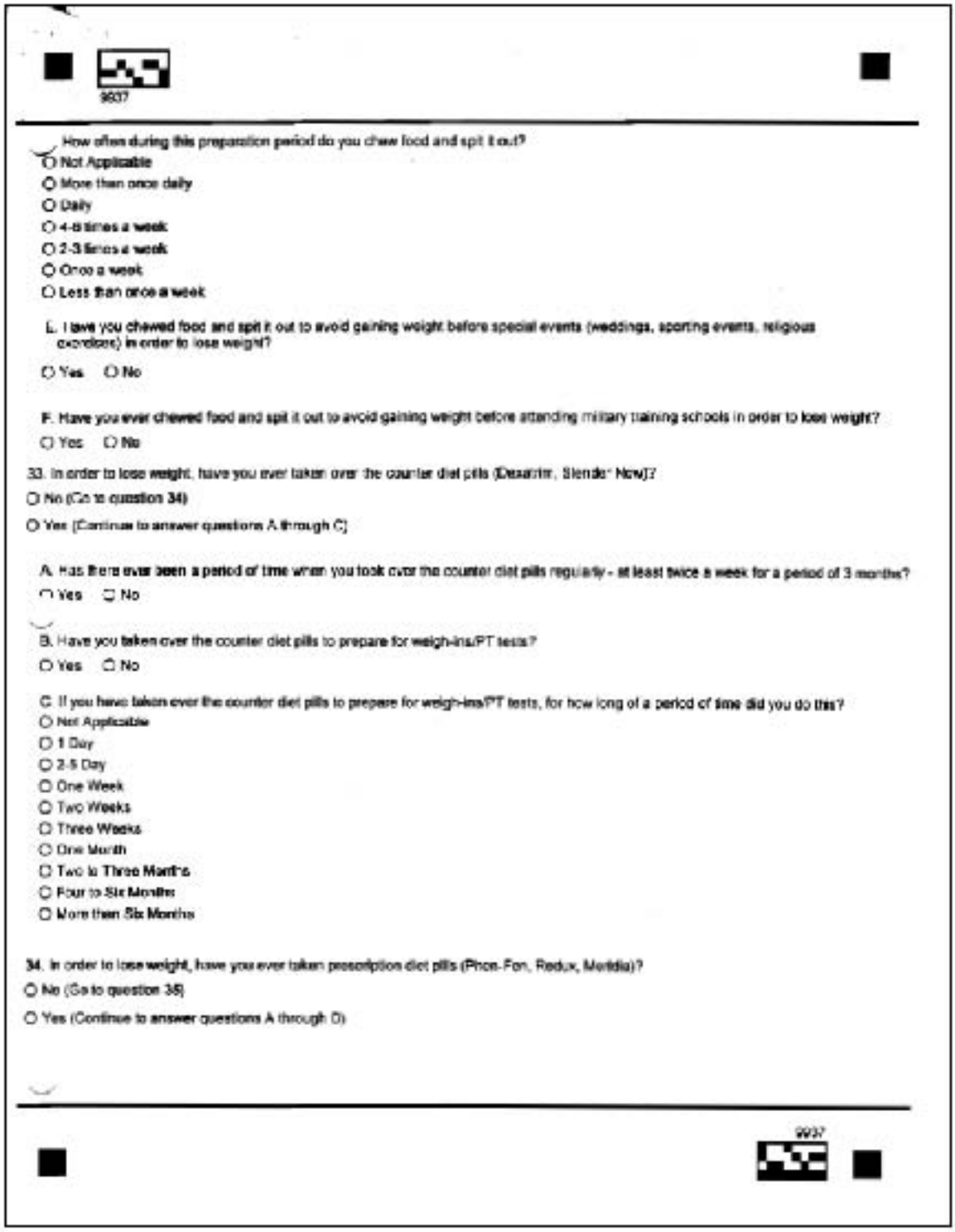

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How often during this preparation period do you chew food and spit it out?
- ○ Not Applicable
- ○ More than once daily
- ○ Daily
- ○ 4-6 times a week
- ○ 2-3 times a week
- ○ Once a week
- ○ Less than once a week

L. Have you chewed food and spit it out to avoid gaining weight before special events (weddings, sporting events, religious ceremonies) in order to lose weight?

○ Yes ○ No

F. Have you ever chewed food and spit it out to avoid gaining weight before attending military training schools in order to lose weight?

○ Yes ○ No

33. In order to lose weight, have you ever taken over the counter diet pills (Dexatrim, Slender Now)?

○ No (Go to question 34)

○ Yes (Continue to answer questions A through C)

A. Has there ever been a period of time when you took over the counter diet pills regularly - at least twice a week for a period of 3 months?

○ Yes ○ No

B. Have you taken over the counter diet pills to prepare for weigh-ins/PT tests?

○ Yes ○ No

C. If you have taken over the counter diet pills to prepare for weigh-ins/PT tests, for how long of a period of time did you do this?
- ○ Not Applicable
- ○ 1 Day
- ○ 2-5 Day
- ○ One Week
- ○ Two Weeks
- ○ Three Weeks
- ○ One Month
- ○ Two to Three Months
- ○ Four to Six Months
- ○ More than Six Months

34. In order to lose weight, have you ever taken prescription diet pills (Phen-Fen, Redux, Meridia)?

○ No (Go to question 35)

○ Yes (Continue to answer questions A through D)

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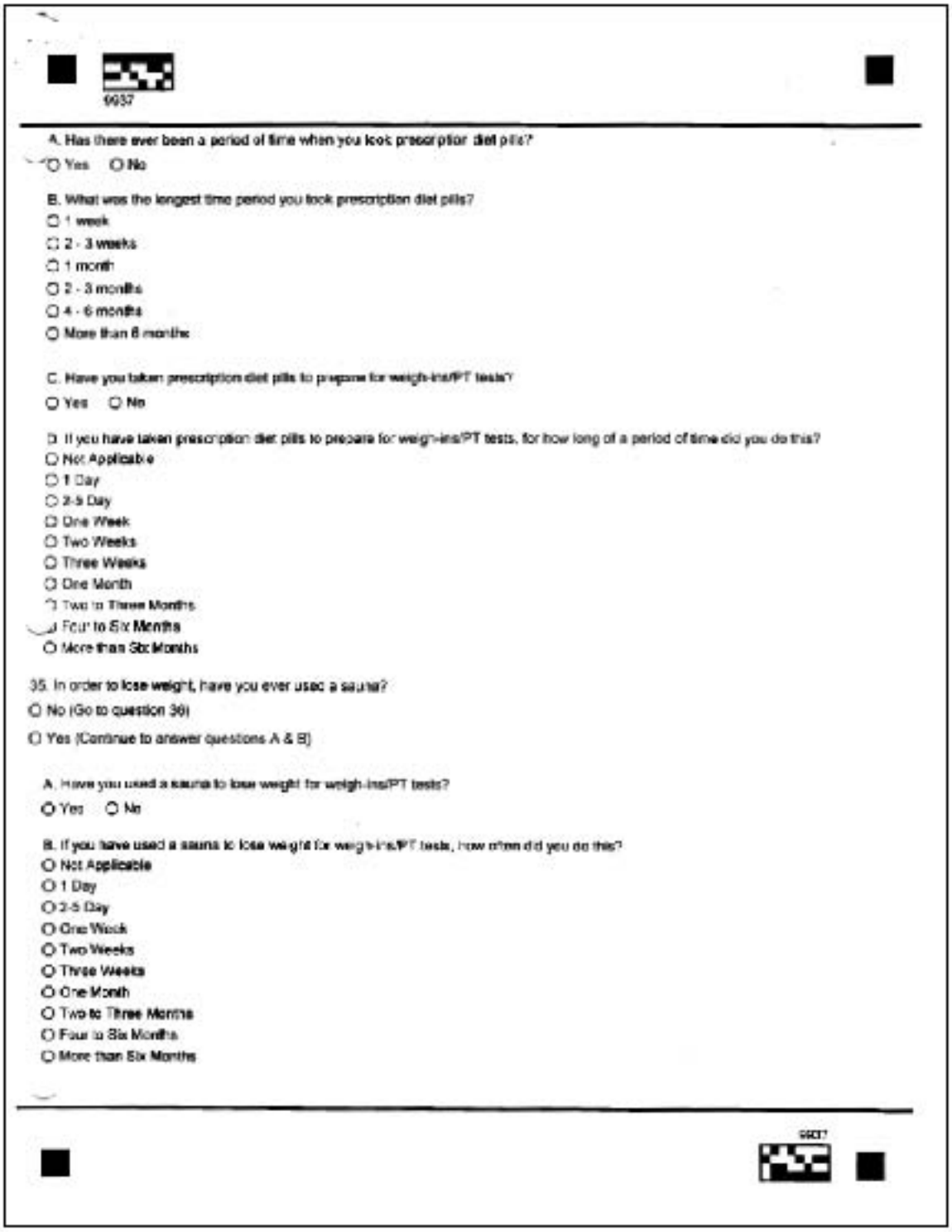


A. Has there ever been a period of time when you took prescription diet pills?

○ Yes ○ No

B. What was the longest time period you took prescription diet pills?

○ 1 week
○ 2 - 3 weeks
○ 1 month
○ 2 - 3 months
○ 4 - 6 months
○ More than 6 months

C. Have you taken prescription diet pills to prepare for weigh-ins/PT tests?

○ Yes ○ No

D. If you have taken prescription diet pills to prepare for weigh-ins/PT tests, for how long of a period of time did you do this?

○ Not Applicable
○ 1 Day
○ 2-5 Day
○ One Week
○ Two Weeks
○ Three Weeks
○ One Month
○ Two to Three Months
○ Four to Six Months
○ More than Six Months

35. In order to lose weight, have you ever used a sauna?

○ No (Go to question 36)

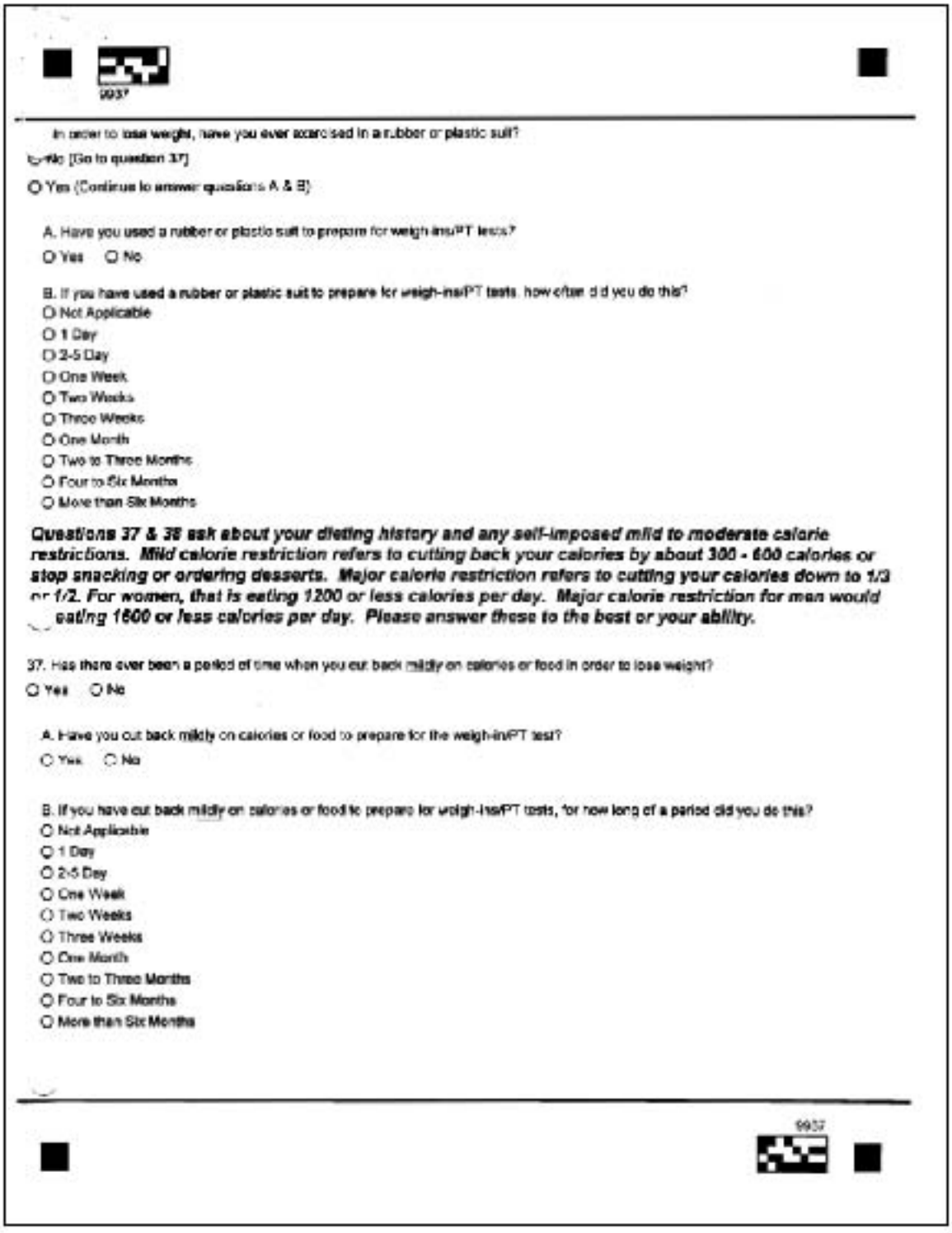
○ Yes (Continue to answer questions A & B)

A. Have you used a sauna to lose weight for weigh-ins/PT tests?

○ Yes ○ No

B. If you have used a sauna to lose weight for weigh-ins/PT tests, how often did you do this?

○ Not Applicable
○ 1 Day
○ 2-5 Day
○ One Week
○ Two Weeks
○ Three Weeks
○ One Month
○ Two to Three Months
○ Four to Six Months
○ More than Six Months



In order to **lose weight**, have you **ever** exercised in a rubber or plastic suit?

○ No [Go to question 37]

○ Yes [Continue to answer questions A & B]

A. Have you used a rubber or plastic suit to prepare for weigh-ins/PT tests?

○ Yes ○ No

B. If you have used a rubber or plastic suit to prepare for weigh-ins/PT tests, how often did you do this?

○ Not Applicable
○ 1 Day
○ 2-5 Day
○ One Week
○ Two Weeks
○ Three Weeks
○ One Month
○ Two to Three Months
○ Four to Six Months
○ More than Six Months

Questions 37 & 38 ask about your dieting history and any self-imposed mild to moderate calorie restrictions. Mild calorie restriction refers to cutting back your calories by about 300 - 600 calories or stop snacking or ordering desserts. Major calorie restriction refers to cutting your calories down to 1/3 or 1/2. For women, that is eating 1200 or less calories per day. Major calorie restriction for men would eating 1600 or less calories per day. Please answer these to the best or your ability.

37. Has there ever been a period of time when you cut back mildly on calories or food in order to lose weight?

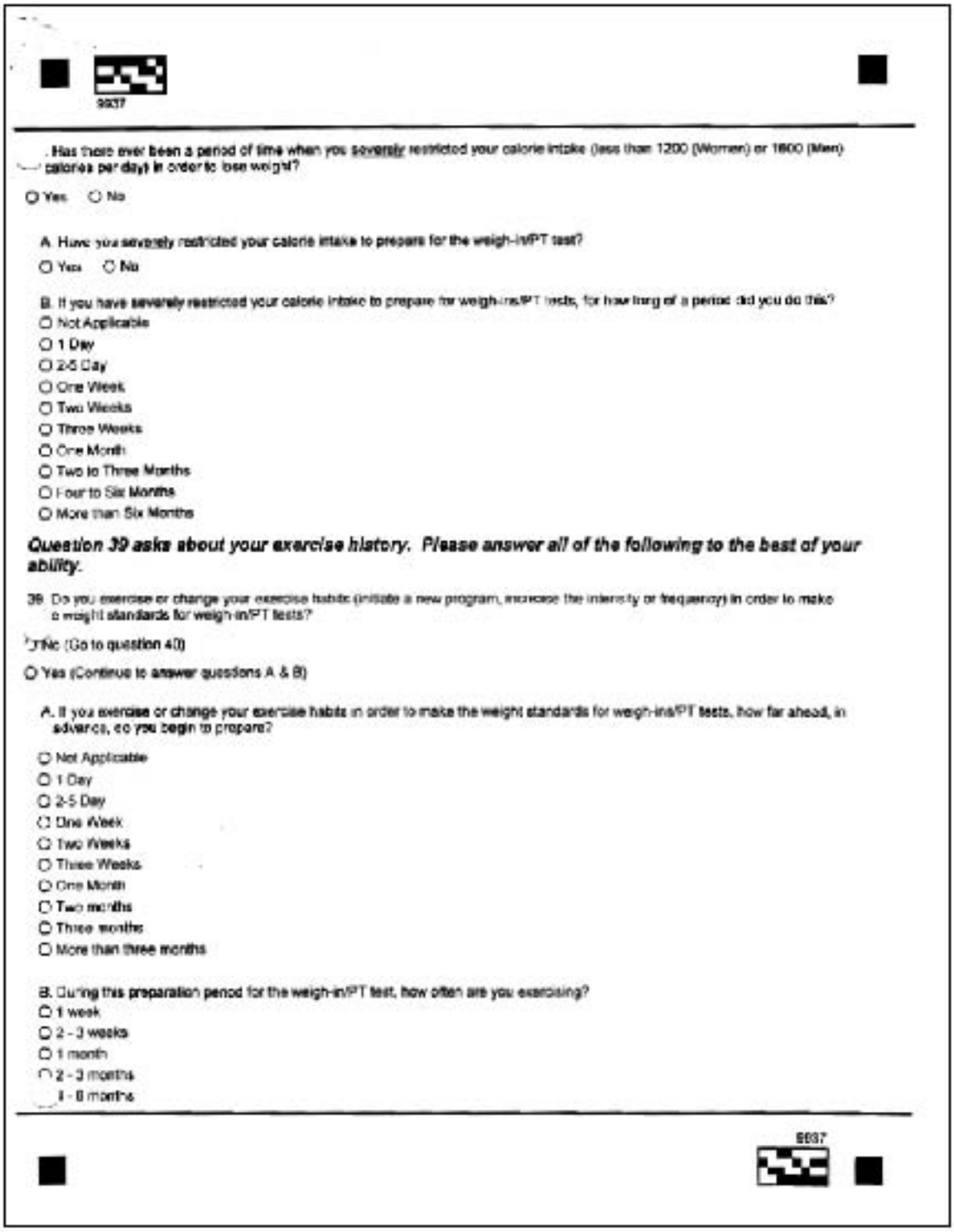
○ Yes ○ No

A. Have you cut back mildly on calories or food to prepare for the weigh-in/PT test?

○ Yes ○ No

B. If you have cut back mildly on calories or food to prepare for weigh-ins/PT tests, for how long of a period did you do this?

○ Not Applicable
○ 1 Day
○ 2-5 Day
○ One Week
○ Two Weeks
○ Three Weeks
○ One Month
○ Two to Three Months
○ Four to Six Months
○ More than Six Months



. Has there ever been a period of time when you severely restricted your calorie intake (less than 1200 (Women) or 1800 (Men) calories per day) in order to lose weight?

○ Yes ○ No

A. Have you severely restricted your calorie intake to prepare for the weigh-in/PT test?

○ Yes ○ No

B. If you have severely restricted your calorie intake to prepare for weigh-ins/PT tests, for how long of a period did you do this?

○ Not Applicable
○ 1 Day
○ 2-5 Day
○ One Week
○ Two Weeks
○ Three Weeks
○ One Month
○ Two to Three Months
○ Four to Six Months
○ More than Six Months

Question 39 asks about your exercise history. Please answer all of the following to the best of your ability.

39. Do you exercise or change your exercise habits (initiate a new program, increase the intensity or frequency) in order to make a weight standards for weigh-in/PT tests?

○ No (Go to question 40)

○ Yes (Continue to answer questions A & B)

A. If you exercise or change your exercise habits in order to make the weight standards for weigh-ins/PT tests, how far ahead, in advance, do you begin to prepare?

○ Not Applicable
○ 1 Day
○ 2-5 Day
○ One Week
○ Two Weeks
○ Three Weeks
○ One Month
○ Two months
○ Three months
○ More than three months

B. During this preparation period for the weigh-in/PT test, how often are you exercising?

○ 1 week
○ 2 - 3 weeks
○ 1 month
○ 2 - 3 months
○ 4 - 6 months

9937

40. What techniques are you likely to use in the future to attempt to control your weight? Mark all that apply.

- O Change eating habits/eat well balanced meals
- O Diet/calorie reduction
- O Not eat the day before a weigh-in/PT test
- O Skip meals
- O Chew food and spit it out (not swallow)
- O Not drink liquids
- O Exercise more than one hour the day before a weigh-in/PT test
- O Perform exercises targeting specific body areas (i.e. waist, thighs, buttocks) to decrease bodyfat
- O Use a sauna/steam room
- O Wear rubber/plastic suit
- O Take laxatives (i.e. Ex-Lax)
- O Take diuretics (water pills)
- O Take prescription diet pills
- O Take over the counter diet pills
- O Self-induced vomiting
- O Other

Attitude Towards Military Weight and Fitness Standards

41. Do you think the military weight and fitness standards are fair? Darken 1 bubble.

extremely unfair	O	O	O	O	O	O	O	extremely fair

42. Does your command support the military weight and fitness standards? Darken 1 bubble.

extremely unsupportive	O	O	O	O	O	O	O	extremely supportive

43. How strongly does your command enforce the military weight and fitness standards? Darken 1 bubble.

very loose enforcement	O	O	O	O	O	O	O	very strict enforcement

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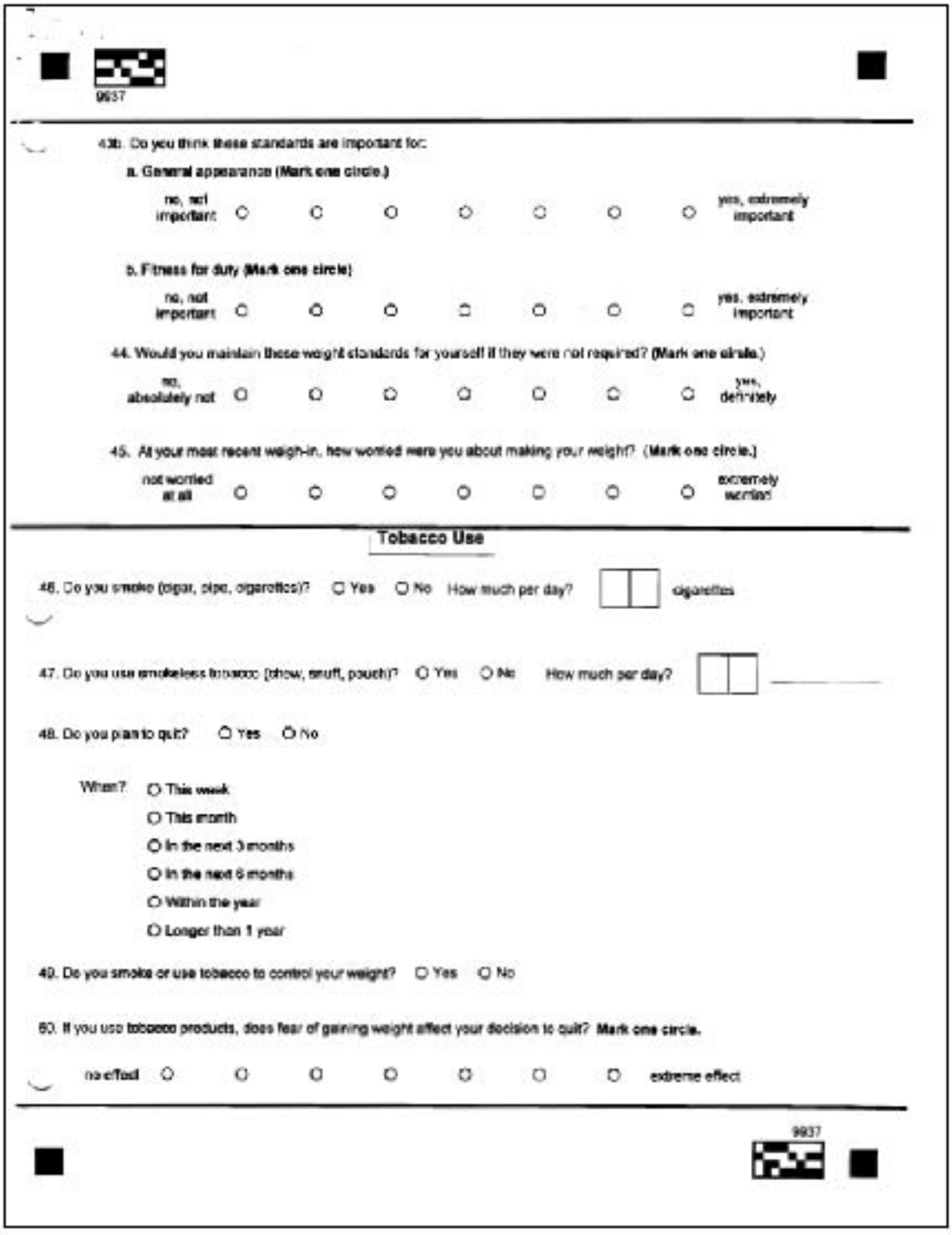

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43b. Do you think these standards are important for:

a. General appearance (Mark one circle.)

no, not important	○	○	○	○	○	○	○	yes, extremely important

b. Fitness for duty (Mark one circle)

no, not important	○	○	○	○	○	○	○	yes, extremely important

44. Would you maintain these weight standards for yourself if they were not required? (Mark one circle.)

no, absolutely not	○	○	○	○	○	○	○	yes, definitely

45. At your most recent weigh-in, how worried were you about making your weight? (Mark one circle.)

not worried at all	○	○	○	○	○	○	○	extremely worried

Tobacco Use

46. Do you smoke (cigar, pipe, cigarettes)? ○ Yes ○ No How much per day? ☐☐ cigarettes

47. Do you use smokeless tobacco (chew, snuff, pouch)? ○ Yes ○ No How much per day? ☐☐ _____

48. Do you plan to quit? ○ Yes ○ No

When? ○ This week
○ This month
○ In the next 3 months
○ In the next 6 months
○ Within the year
○ Longer than 1 year

49. Do you smoke or use tobacco to control your weight? ○ Yes ○ No

50. If you use tobacco products, does fear of gaining weight affect your decision to quit? Mark one circle.

no effect	○	○	○	○	○	○	○	extreme effect

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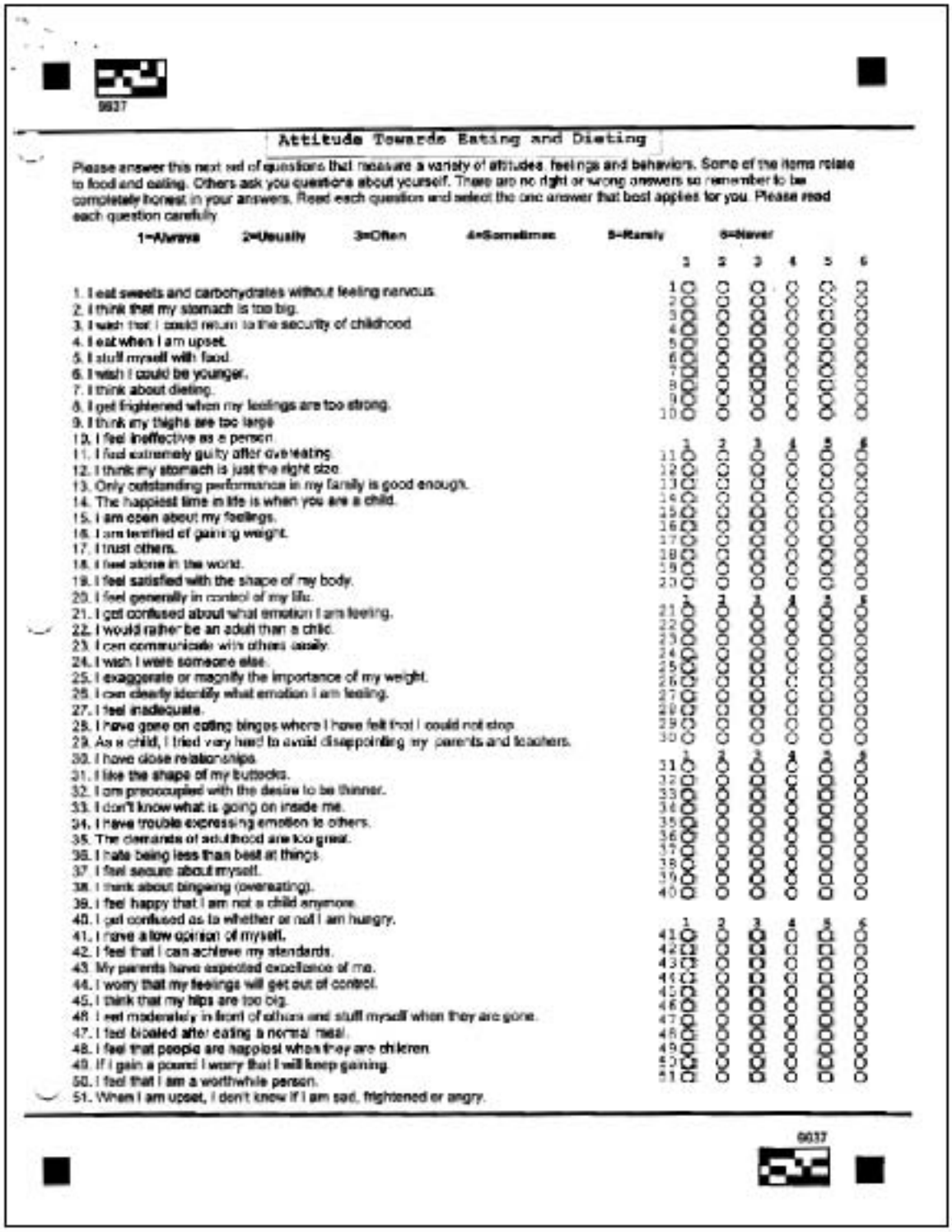


9837

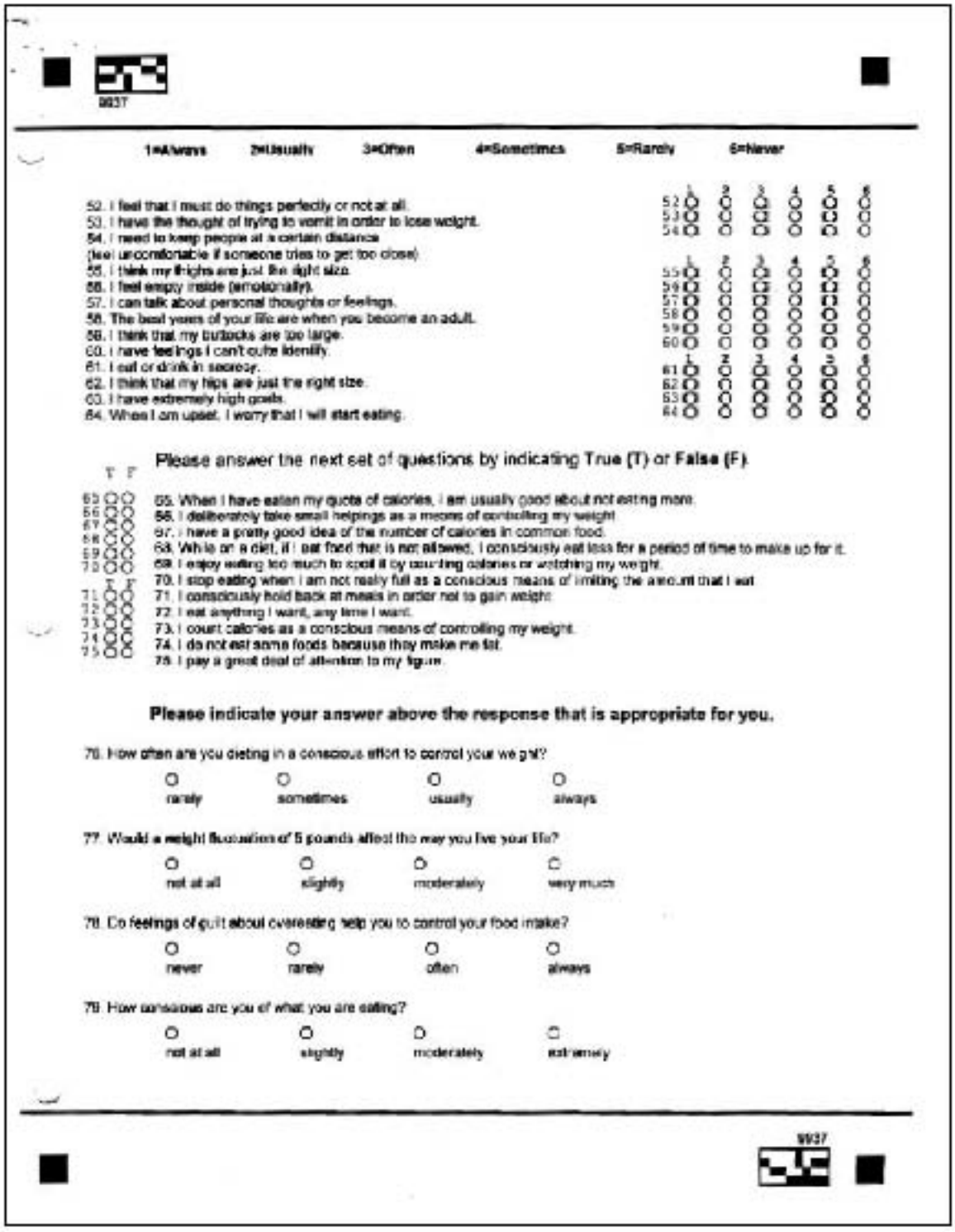
Attitude Towards Eating and Dieting

Please answer this next set of questions that measure a variety of attitudes, feelings and behaviors. Some of the items relate to food and eating. Others ask you questions about yourself. There are no right or wrong answers so remember to be completely honest in your answers. Read each question and select the one answer that best applies for you. Please read each question carefully.

1=Always 2=Usually 3=Often 4=Sometimes 5=Rarely 6=Never

	1	2	3	4	5	6
1. I eat sweets and carbohydrates without feeling nervous.						
2. I think that my stomach is too big.						
3. I wish that I could return to the security of childhood.						
4. I eat when I am upset.						
5. I stuff myself with food.						
6. I wish I could be younger.						
7. I think about dieting.						
8. I get frightened when my feelings are too strong.						
9. I think my thighs are too large.						
10. I feel ineffective as a person.						
11. I feel extremely guilty after overeating.						
12. I think my stomach is just the right size.						
13. Only outstanding performance in my family is good enough.						
14. The happiest time in life is when you are a child.						
15. I am open about my feelings.						
16. I am terrified of gaining weight.						
17. I trust others.						
18. I feel alone in the world.						
19. I feel satisfied with the shape of my body.						
20. I feel generally in control of my life.						
21. I get confused about what emotion I am feeling.						
22. I would rather be an adult than a child.						
23. I can communicate with others easily.						
24. I wish I were someone else.						
25. I exaggerate or magnify the importance of my weight.						
26. I can clearly identify what emotion I am feeling.						
27. I feel inadequate.						
28. I have gone on eating binges where I have felt that I could not stop.						
29. As a child, I tried very hard to avoid disappointing my parents and teachers.						
30. I have close relationships.						
31. I like the shape of my buttocks.						
32. I am preoccupied with the desire to be thinner.						
33. I don't know what is going on inside me.						
34. I have trouble expressing emotion to others.						
35. The demands of adulthood are too great.						
36. I hate being less than best at things.						
37. I feel secure about myself.						
38. I think about bingeing (overeating).						
39. I feel happy that I am not a child anymore.						
40. I get confused as to whether or not I am hungry.						
41. I have a low opinion of myself.						
42. I feel that I can achieve my standards.						
43. My parents have expected excellence of me.						
44. I worry that my feelings will get out of control.						
45. I think that my hips are too big.						
46. I eat moderately in front of others and stuff myself when they are gone.						
47. I feel bloated after eating a normal meal.						
48. I feel that people are happiest when they are children.						
49. If I gain a pound I worry that I will keep gaining.						
50. I feel that I am a worthwhile person.						
51. When I am upset, I don't know if I am sad, frightened or angry.						

9837



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1=Always 2=Usually 3=Often 4=Sometimes 5=Rarely 6=Never

	1	2	3	4	5	6
52. I feel that I must do things perfectly or not at all.	○	○	○	○	○	○
53. I have the thought of trying to vomit in order to lose weight.	○	○	○	○	○	○
54. I need to keep people at a certain distance (feel uncomfortable if someone tries to get too close)	○	○	○	○	○	○
55. I think my thighs are just the right size.	○	○	○	○	○	○
56. I feel empty inside (emotionally).	○	○	○	○	○	○
57. I can talk about personal thoughts or feelings.	○	○	○	○	○	○
58. The best years of your life are when you become an adult.	○	○	○	○	○	○
59. I think that my buttocks are too large.	○	○	○	○	○	○
60. I have feelings I can't quite identify.	○	○	○	○	○	○
61. I eat or drink in secrecy.	○	○	○	○	○	○
62. I think that my hips are just the right size.	○	○	○	○	○	○
63. I have extremely high goals.	○	○	○	○	○	○
64. When I am upset, I worry that I will start eating.	○	○	○	○	○	○

Please answer the next set of questions by indicating **True (T)** or **False (F)**.

	T	F	
65. When I have eaten my quota of calories, I am usually good about not eating more.	○	○	65
66. I deliberately take small helpings as a means of controlling my weight.	○	○	66
67. I have a pretty good idea of the number of calories in common food.	○	○	67
68. While on a diet, if I eat food that is not allowed, I consciously eat less for a period of time to make up for it.	○	○	68
69. I enjoy eating too much to spoil it by counting calories or watching my weight.	○	○	69
70. I stop eating when I am not really full as a conscious means of limiting the amount that I eat.	○	○	70
71. I consciously hold back at meals in order not to gain weight.	○	○	71
72. I eat anything I want, any time I want.	○	○	72
73. I count calories as a conscious means of controlling my weight.	○	○	73
74. I do not eat some foods because they make me fat.	○	○	74
75. I pay a great deal of attention to my figure.	○	○	75

Please indicate your answer above the response that is appropriate for you.

76. How often are you dieting in a conscious effort to control your weight?

○ rarely ○ sometimes ○ usually ○ always

77. Would a weight fluctuation of 5 pounds affect the way you live your life?

○ not at all ○ slightly ○ moderately ○ very much

78. Do feelings of guilt about overeating help you to control your food intake?

○ never ○ rarely ○ often ○ always

79. How conscious are you of what you are eating?

○ not at all ○ slightly ○ moderately ○ extremely

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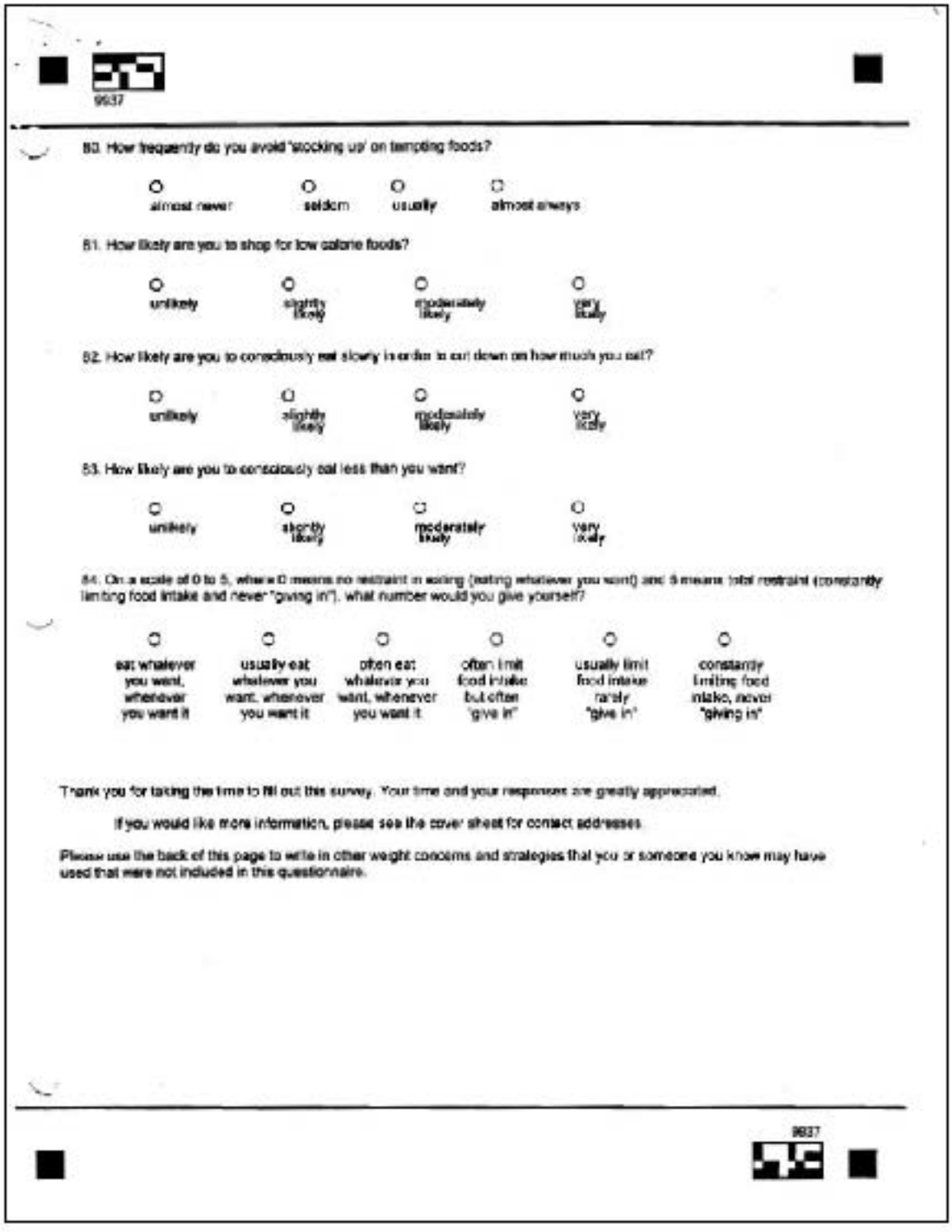

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80. How frequently do you avoid "stocking up" on tempting foods?

almost never	seldom	usually	almost always
○	○	○	○

81. How likely are you to shop for low calorie foods?

unlikely	slightly likely	moderately likely	very likely
○	○	○	○

82. How likely are you to consciously eat slowly in order to cut down on how much you eat?

unlikely	slightly likely	moderately likely	very likely
○	○	○	○

83. How likely are you to consciously eat less than you want?

unlikely	slightly likely	moderately likely	very likely
○	○	○	○

84. On a scale of 0 to 5, where 0 means no restraint in eating (eating whatever you want) and 5 means total restraint (constantly limiting food intake and never "giving in"), what number would you give yourself?

0	1	2	3	4	5
○	○	○	○	○	○
eat whatever you want, whenever you want it	usually eat whatever you want, whenever you want it	often eat whatever you want, whenever you want it	often limit food intake but often "give in"	usually limit food intake rarely "give in"	constantly limiting food intake, never "giving in"

Thank you for taking the time to fill out this survey. Your time and your responses are greatly appreciated.

If you would like more information, please see the cover sheet for contact addresses.

Please use the back of this page to write in other weight concerns and strategies that you or someone you know may have used that were not included in this questionnaire.

9837

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