

ABSTRACT

ROSARIO, WILMINA BEAUMONT. Estimating the Development of Risk Factors Associated with the Co-occurrence of Eating Disorders and Substance Abuse in Military Personnel. (Under the Direction of Stanley Baker.)

The purpose of this study was to understand eating-disorder risk factors and their relationship to substance abuse, and hence the co-occurrence of these two disorders, among military personnel. A secondary purpose was to examine the relationship between these two disorders within the context of social learning theory, specifically applying the concept of drinking refusal self-efficacy.

One hundred male military personnel referred for substance-abuse treatment at an outpatient military substance-abuse facility in an eastern state were administered three separate measures, which screened for symptoms of eating disorders, hazardous alcohol use, and the individual's perceived ability to refuse alcohol in specific situations. The measures administered were the Eating Disorders Inventory-3 (EDI-3), the Alcohol Use Disorders Identification Test (AUDIT), and the Drinking Refusal Self-Efficacy Questionnaire (DRSEQ).

When compared with civilian males of approximately the same age, male military personnel with substance abuse on average scored significantly higher on the Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, and Emotional Dysregulation psychological subscales of the EDI-3. These findings suggest that military male personnel with substance abuse may be at risk for eating disorders with respect to these particular subscales. However, no significant difference between the two groups was found on the three

primary EDI-3 subscales related to risk for developing eating disorders (Drive for Thinness, Bulimia, and Body Dissatisfaction).

Total AUDIT score was significantly inversely related to total DRSE score. Thus, hazardous alcohol use as measured by the AUDIT and used as a measure of substance abuse in this study predicted an individual's perceived ability to resist alcohol use (i.e., the level of drinking refusal self-efficacy).

When the relationship between drinking refusal self-efficacy and eating disorders was examined, the results showed a significant inverse relationship between the total DRSE score and the EDI-3 Interpersonal Alienation, Emotional Dysregulation, and Maturity Fears subscale scores. These results suggest that drinking refusal-self efficacy predicts psychological risk factors related to eating disorders on these particular subscales of the EDI-3.

The study's overall findings suggest that individuals with substance abuse experience psychological risk factors that are related to the development of eating disorders. In addition, the study's findings suggests that an individual's perceived ability to resist alcohol may also be associated with common psychological risk factors that are related to the development eating disorders and substance-abuse disorders. The results have implications for future research and practice toward considering screening for eating disorders in military personnel with substance-abuse disorders and using drinking refusal self-efficacy measures as part of the screening and assessment processes when the co-occurrence of these two disorders is likely.

Estimating the Development of Risk Factors Associated with the Co-occurrence of
Eating Disorders and Substance Abuse in Military Personnel

by
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DEDICATION

To my children Ramón and Roberto, who are the most wonderful children a mother could ever hope for, to my loving husband Ramón, who has traveled alongside with me on this journey, and to my mother Alfonsa Beaumont, whose love and support throughout my entire life have been my inspiration and guiding light.

BIOGRAPHY

Wilmina Beaumont Rosario was born in the Dominican Republic and immigrated with her mother and four of five siblings to New York City at the age of seven. She completed her undergraduate studies at Fordham University, where she received a Bachelor of Science degree in psychology in 1980. She completed her graduate studies at Teachers College, Columbia University, in 1986, where she received a Masters of Arts and a Masters of Education degree in psychological counseling. She pursued doctoral studies in counselor education with a minor in psychology at North Carolina State University.

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Her current interest and doctoral research is in the area of co-occurrence of eating disorders and substance abuse in the military population. Other interests include cross-cultural counseling, clinical supervision of helping professionals from diverse cultural backgrounds, and treating combat stress and post-traumatic stress disorder.

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CHAPTER 1: INTRODUCTION

Because military personnel are expected to maintain exceptional physical fitness, having an ideal body weight that reflects physical fitness is considered essential to maintaining and reflecting military readiness in all branches of the armed forces (Bray et al., 2002). Pope (2000) described the ideal body type stereotypically associated with masculinity as the muscular, mesomorphic type, and Kirkpatrick and Sanders (1978) described men with this ideal body type as being associated with possessing personality traits such as strong, happy, and brave. These characteristics are desirable and admired in military personnel; however, the emphasis on body weight as a reflection of physical fitness may result in the development of an unrealistic body image. Thus, this study's first hypothesis was that emphasis on body weight, which may lead to unrealistic body image, may place military personnel at risk for developing eating disorders.

Another risk factor that has been associated with eating disorders is substance abuse, and military personnel have been reported to show significantly higher rates of alcohol abuse than do civilians (Bray et al., 2002). Because numerous studies have identified substance abuse as a risk factor in the development of eating disorders (e.g., Dansky, Brewerton, & Kilpatrick, 2000; Holderness, Brooks-Gunn, & Warren, 1994), the study's second hypothesis was that military personnel who have substance-abuse disorders are at increased risk of developing eating disorders.

Because eating disorders and substance abuse share common risk factors, it was determined that the application of a theory-based approach that takes into account

environmental, biological, and cognitive determinants would be useful for both research and clinical practice toward understanding the relationship between these two distinct disorders when they co-occur. The theoretical framework used to explain the relationship between substance abuse and risk of developing eating disorders, and hence co-occurrence of these two disorders, was Albert Bandura's social learning theory (1986), which assigns central importance to the concept of self-efficacy. *Self-efficacy* is defined by Oei, Fergusson, and Lee (1998) as "one's perceived ability to achieve a desired outcome in a particular situation" (p. 74). This definition has been extended in the substance-abuse literature to refer to a person's perceived ability to refuse alcohol (defined as *drinking refusal self-efficacy*). Thus, this study's third hypothesis was that military personnel with co-occurrence of substance abuse and eating-disorder risk factors have low levels of drinking refusal self-efficacy.

In this study, the term *co-occurrence* refers to the simultaneous occurrence of two disorders, whether they are independent, share a common etiology, or have a causal relationship. This definition is derived from Grilo, Sinha, and O'Malley (2002), who emphasized the importance of distinguishing between the terms *co-occurrence* and *comorbidity* (the latter term indicating that two disorders are not independent).

Purpose and Goals of the Study

This study's first goal was to address the gap in the literature with respect to understanding the risk factors associated with the development of eating disorders in general, particularly as these factors manifest themselves in males. Increased understanding of how eating-disorder-related risk factors may affect military personnel's overall health could have implications for prevention and treatment.

The study's second goal was to address the gap in the literature with respect to understanding the relationship between eating disorders and substance abuse and, hence, their co-occurrence. However, research on the co-occurrence of eating disorders and substance abuse has focused almost exclusively on women (Dansky et al., 2000; Holderness et al., 1994; Loxton & Dawe, 2000). Thus, the study's second goal encompassed addressing the even wider gap in the literature with respect to co-occurrence of eating disorders and substance abuse in military personnel, the majority of whom are males. Increased understanding of factors that may increase the risk of co-occurrence of eating disorders and substance abuse could also have implications for prevention and treatment.

The study's third goal was to add to the general knowledge and understanding of the co-occurrence of substance abuse and risk factors for eating disorders as it relates to drinking refusal self-efficacy.

Statement of the Problem

Occupations have been identified in which individuals experience increased pressure to maintain a specific body-weight-to-fat ratio and a specific body image as an integral aspect of fulfilling the role and image of that occupation. These occupations have been shown to have elevated rates of eating disorders. Examples of occupations identified as increasing the risk for developing eating disorders are ballerina, professional wrestler, and jockey. Because military personnel also experience a great deal of occupation-related emphasis on body image as a reflection of overall physical fitness, military personnel might be expected to be at increased risk for developing eating disorders.

Carlat, Camargo, and Herzog (1997) pointed out that although the first report of eating disorders in a male was published over 300 years ago, information on eating disorders in males remains sporadic and sparse. They noted that although males account for 10% to 15% of all bulimic patients and that 0.2% of all adolescents and young adult males meet stringent criteria for bulimia nervosa and anorexia nervosa, the need remains for practical information on males with eating disorders. Carlat et al. (1997) also maintained that this type of practical information would help guide diagnostic and treatment decisions and that the study of males with eating disorders would contribute useful information pertaining to the general question of the etiology of eating disorders.

Most of the research on eating disorders has focused solely on females (Tyrka et al., 2002; Ranson, Iacono, & McGue, 2002). The few studies that have included men have estimated the prevalence of bulimia nervosa and anorexia nervosa to be ten times greater in women than in men. However, in one study, males reported binge eating at least twice or more per week at the same prevalence as women (Garfinkel et al., as cited in Lewinsohn, Seeley, Moerk, & Strigel-Moore, 2002). According to Lewinsohn et al. (2002), treatment providers have reported an increase in males seeking treatment for eating disorders over the past two decades, and experts speculate that the increase may be due to increased awareness of eating disorders in men. However, the reasons for this increase remain unclear.

In addition, Lewinsohn et al. (2002) suggested that the reported low prevalence of eating disorders in males may be the result of the threshold in the *Diagnostic and Statistical Manual of Mental Disorders* (fourth edition, text revision [DSM-IV-TR]) (American Psychiatric Association [APA], 2002) for meeting diagnostic criteria for anorexia nervosa

and bulimia nervosa being too high. Prominent investigators have suggested that cases that partially meet the criteria for an eating-disorder diagnosis should be included in eating-disorder studies (e.g., King, as cited in Lewinsohn et al.). Furthermore, the *DSM-IV-TR* criteria for eating disorders were developed based on the clinical presentation of women (Striegel-Moore & Marcus, as cited in Lewinsohn et al.), and Lewinsohn et al. noted that although men with eating disorders may have the same clinical presentation as women, the presentation may often differ. One difference may be in the extent to which excessive exercise is a major problem for men with eating disorders. Although excessive exercise is one of the symptoms of anorexia nervosa, this aspect of the disorder has not been as extensively studied as those symptoms most consistently reported by females with eating disorders, which are linked to attitudes about body image, such as a desire to be thin and extreme fear of getting fat. It has been suggested that societal pressures for women to be thin may be at the root of these attitudes. However, these same societal pressures may be experienced by military males who are expected to have a muscular, lean body as a symbol of masculinity, fitness, and strength, which may place them at risk for developing eating disorders.

Virtually no previous research was found related to risk factors associated with eating disorders in military personnel. The Department of Defense's (DoD's) triennial *DoD Survey of Health Related Behaviors Among Military Personnel* (Bray et al., 2002) was the only study found that addressed eating-related patterns in military personnel in response to coping with stress and psychological distress. Bray et al. found that 41.8% of military personnel got something to eat as a coping strategy in response to stress, including 39% of males and 51%

of females. Eating as a means of coping with stress was listed as the fifth most frequently used of ten behaviors (e.g., talking to a friend, lighting up a cigarette, having a drink). However, the DoD survey data related to eating patterns were reported in the context of describing behaviors associated with stress, not in the context of examining risk factors associated with eating disorders. A gap in the literature was apparent with respect to research focusing specifically on risk factors associated with eating disorders in military personnel.

In contrast to the lack of data pertaining to eating-disorder-related behaviors among military personnel, extensive data on substance abuse have since 1980 been reported in the DoD triennial survey. In the most recent DoD survey (Bray et al., 2002), the rate of heavy alcohol use was 16.9% among military personnel versus 11.2% among civilians. Among men, 16.0% in the military were heavy drinkers, compared with 11.0% of civilians. Differences between military personnel and civilians varied by age group. Military personnel aged 18 to 25 showed significantly higher rates of heavy drinking than civilians (27.3% vs. 15.3%), whereas military personnel aged 26 to 55 showed rates of heavy drinking similar to those of their civilian counterparts (8.9% vs. 8.0%). These differences were greatest for young men aged 18 to 25, among whom the rate of heavy alcohol use (32.2%) was about twice the rate for civilians (17.8%). The individual services showed the same pattern as in the total DoD survey, with rates of heavy alcohol use among 18- to 25-year-olds being higher than those among civilians of the same age and rates of use among 26- to 55-year-olds being similar. Older Marines, however, also showed heavier alcohol use than did civilians.

Given the negative impact that substance abuse may have on the overall health and military readiness of military personnel, and considering that numerous studies suggest a

relationship between eating disorders and substance abuse (e.g., Dansky et al., 2000; Holderness et al., 1994), the need to understand the relationship between substance abuse and eating-disorder risk factors among military personnel became apparent.

In addition to substance abuse, other risk factors that have been associated with the development of eating disorders include depression, anxiety, social maladjustments, and impulse-control problems (Garner, 1991). Similarly, risk factors that have been associated with substance abuse include tension, anxiety, and social skills deficits (Bandura, 1969). Because both substance abuse and eating disorders have these common risk factors, it was determined that a theory-based approach taking into account environmental, biological, and cognitive determinants would be useful toward understanding the relationship between these disorders. As discussed by Oei et al. (1998), Bandura's (1986) social learning theory is consistent in offering possible explanations of how alcohol use expectancies are a fundamental aspect of social learning; this aspect of Bandura's theory could be applied in explaining the co-occurrence of substance abuse and eating-disorder risk factors and toward understanding co-occurrence as it relates to drinking refusal self-efficacy.

Significance and Scope

The detrimental effects of eating disorders on physical and emotional health have been well documented. This study attempted to promote a better understanding of the extent to which eating-disorder risk factors may be experienced by male military personnel with substance-abuse disorders. Additionally, because of the high rates of alcohol abuse in the military (Bray et al., 2002), the study examined the relationship between substance abuse and eating-disorder risk factors in order to determine whether military male personnel were at

higher risk than civilians for developing co-occurrence of these two disorders. This study also examined the relationship between drinking refusal self-efficacy and eating disorders. The findings could have implications for both research and practice, especially in the area of prevention and screening for eating-disorder risk factors at military substance-abuse facilities.

Hypotheses and Research Questions

Based on the hypotheses discussed above, four specific research hypotheses were identified:

- *Research Hypothesis 1a:* Male military personnel with substance abuse and females with eating disorders are equally likely to exhibit eating-disorder risk factors.
- *Research Hypothesis 1b:* Male military personnel with substance abuse are more likely to exhibit eating-disorder risk factors than are females without eating disorders.
- *Research Hypothesis 1c:* Male military personnel with substance abuse and males with eating disorders are equally likely to exhibit eating-disorder risk factors.
- *Research Hypothesis 1d:* Male military personnel with substance abuse are more likely to exhibit eating-disorder risk factors than are males without eating disorders.
- *Research Hypothesis 2:* Substance abuse will predict eating-disorder risk factors.
- *Research Hypothesis 3:* Substance abuse will predict drinking refusal self-efficacy.

- Research Hypothesis 4: Drinking refusal self-efficacy will predict eating-disorder risk factors.

In order to test these hypotheses, the following specific research questions were addressed through a study of a sample of male military personnel who had been referred for substance-abuse treatment:

1. What is the rate of being at risk for developing eating disorders in the sample?
2. How do eating-disorder risk factors in the sample compare with those in normative groups?
3. What is the rate of substance abuse in the sample?
4. What is the relationship between substance abuse and eating-disorder risk factors in the sample?
5. Does substance abuse predict eating-disorder risk factors?
6. What proportion of the sample is at risk for co-occurrence of substance abuse and eating disorders?
7. Are rates of co-occurrence of substance abuse and eating disorders in the sample consistent with those observed in other studies?
8. What is the mean level of drinking refusal self-efficacy in the sample?
9. What is the relationship between drinking refusal self-efficacy and substance abuse in the sample?
10. What is the relationship between drinking refusal self-efficacy and eating-disorder risk factors in the sample?

CHAPTER 2: LITERATURE REVIEW

Eating Disorders

The incidence of eating disorders is increasing at an alarming rate in the United States and around the world. Eating disorders are serious, potentially life-threatening conditions that affect a person's emotional and physical health. Although eating disorders may begin with preoccupations with food and weight, they are complex conditions that most often develop because of underlying longstanding behavioral, emotional, psychological, interpersonal, and social factors (NEDA, 2003).

Three major types of eating disorders are recognized, all three of which are associated with a preoccupation with not gaining weight (NEDA, 2003):

1. In *anorexia nervosa*, the individual has an intense fear of becoming fat and resorts to restricting food and overall caloric intake.
2. In *bulimia nervosa*, the individual engages in recurrent binge-and-purge cycles, eating large amounts of food within a short period, followed by purging behavior, such as self-induced vomiting, laxative or diuretic abuse, or extreme exercising.
3. In *binge eating disorder*, the individual goes through periods of eating substantial quantities of food within a short period, often followed by feelings of worthlessness and guilt.

As noted by Devlin, Goldfein, and Dobrow (2003), binge eating disorder was first described by Strunkard in 1959, and was more recently classified as a distinct psychiatric diagnosis among non-obese individuals. Binge eating is both a defining feature of bulimia

nervosa and the core defining characteristic of binge eating disorder (Devlin et al., 2003).

Because additional tests of validity and reliability are needed in order for binge eating disorder to be considered a distinct diagnostic category, it is considered a provisional diagnosis in the *DSM-IV-TR*.

The APA (2000) also defines eating disorders in terms of maladaptive behavioral patterns. It specifically defines *anorexia nervosa* as the individual's refusal to maintain body weight at or above a minimally normal weight for age and height, characterized by intense fear of gaining weight or becoming fat, disturbance in perception of one's body or shape, and the absence of menses in post-menarche females. The APA recognizes two specific types of *anorexia nervosa*: (a) the *restricting type* and (b) the *binging and purging type*.

In this study, data from the study sample were compared with data from individuals diagnosed with *bulimia nervosa*. The criteria for *bulimia nervosa* described in the *DSM-IV-TR* are as follows:

- A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
 - (1) eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat during similar period of time and under similar circumstances
 - (2) a sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)
- B. Recurrent inappropriate compensatory behavior in order to prevent weight gain, such as self induced vomiting; misuse of laxatives, diuretics, enemas, or other medications; fasting; or excessive exercise.

The binge eating and inappropriate compensatory behaviors both occur, on average, at least twice a week for 3 months.

Self-evaluation is unduly influenced by body shape and weight.

The disturbance does not occur exclusively during episodes of Anorexia Nervosa. (p. 264)

In addition, the *DSM-IV-TR* identifies two specific types of bulimia nervosa: (a) the *purging type* and (b) the *non-purging bingeing type*. The purging type is characterized by self-induced vomiting or the use of laxatives, diuretics, or enemas during the bulimia nervosa episode. The non-purging type is characterized by other compensatory behaviors, such as fasting or excessive exercise, but without regular self-induced vomiting or misuse of laxatives, diuretics, or enemas.

Health Risks Associated with Eating Disorders

Numerous medical conditions and health risks are associated with the three major types of eating disorders. Health risks associated with anorexia nervosa include osteoporosis (a reduction in bone density that results in brittle bones), muscle loss and overall weakness, and dehydration, which results from inadequate intake of nutrients and can result in kidney failure. Other health risks include fatigue, fainting, low blood pressure, abnormally slow heart rate, and heart failure. In bulimia nervosa, behaviors associated with binge and purge cycles affect the entire digestive system and can lead to electrolyte and chemical imbalances. Purging behaviors often result in dehydration and electrolyte imbalances caused by loss of potassium and sodium chloride. Medical conditions associated with frequent vomiting are inflammation and rupture of the esophagus, tooth decay and staining (from stomach acids), development of peptic ulcers, pancreatitis, and gastric rupture. Laxative abuse in bulimia nervosa can result in chronic irregular bowel movements and constipation. The health risks

associated with binge eating disorder include high cholesterol levels and heart disease due to elevated triglyceride levels, type II diabetes mellitus, and gallbladder disease (NEDA, 2003).

In addition to medical health risks, eating disorders are associated with emotional and psychological risks, including low self-esteem, feelings of inadequacy, lack of control of one's life, depression, anxiety, anger, loneliness, troubled family and personal relationships, and difficulty expressing emotions and feelings. Thus, eating disorders are associated with medical, emotional, and psychological problems that can have serious consequences for health, productivity, and interpersonal relationships, affecting individuals, their families, and society in general (NEDA, 2003).

Risk Factors Associated With Eating Disorders in Military Personnel

Anxiety and depression are among the mental-health-related risk factors associated with eating disorders (Duncan et al., 2005; Bushnell, Wells, McKenzie, Kaye, & Joyce, 1994). The DoD triennial survey (Bray et al., 2002) includes an assessment of the mental health issues experienced by military personnel. Among the issues listed were stress, depression, coping mechanisms, and symptoms of anxiety. Bray et al. noted that the prevalences of anxiety and depression experienced by military personnel were substantial (16.6% and 18.8%, respectively). Bray et al. found that 32% of military personnel described their military duty as more stressful than their family or personal lives. In addition, Bray et al. pointed out that in order to cope with stress, men were more likely to smoke cigarettes or have a drink, whereas women tended to talk to a friend or family member, pray, or get something to eat. Women were also more likely than men to experience anxiety and depressive symptoms. The data related to these risk factors provide information that may be

useful for examining the emotional and psychological problems that may be associated with the development of eating disorders in military personnel.

Substance Abuse

This study examined substance abuse specifically as it relates to alcohol, because alcohol is the substance most widely abused by military personnel, and because drugs vary greatly with regard to their use, effects, and addictive patterns. Furthermore, Holderness et al. (1993) suggested that studies exploring the co-occurrence of substance abuse and eating disorders compare similar types of substances. Focusing on alcohol avoids methodological problems associated with research on co-occurrence of eating disorders and abuse of more than one type of substance.

The *DSM-IV-TR* divides its Substance-Related Disorders classification into (a) Substance Use Disorders, which includes the Substance Dependence and Substance Abuse categories, and (b) Substance-Induced Disorders, which includes the Substance Intoxication and Substance Withdrawal categories. Morrison (2001) describes *substance intoxication* as an acute clinical condition that results from the recent overuse of a substance and *substance withdrawal* as “this collection of symptoms, specific to the class of substance that develops when the person who has frequently used the substance discontinues or markedly reduces the amount used” (p. 63). This study focused on individuals in the *DSM-IV-TR* Substance Use Disorders classification who met the criteria for diagnoses of Substance Dependence or Substance Abuse, as follows:

Substance Dependence

A maladaptive pattern of substance use, leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring at any time in the same 12-month period:

- (1) tolerance, as defined by either of the following:
 - (a) need for markedly increased amounts of the substance to achieve intoxication or desired effect
 - (b) markedly diminished effect with the continued use of the same amount of the substance
- (2) withdrawal, as manifested by either of the following:
 - (a) the characteristic withdrawal syndrome for the substance (refer to Criteria A and B of the criteria sets for the Withdrawal from the specific substances)
 - (b) the same (or a closely related) substance is taken to relieve or avoid withdrawal symptoms
- (3) the substance is often taken in larger amounts or over a longer period than was intended
- (4) there is a persistent desire or unsuccessful efforts to cut down or control substance use
- (5) a great deal of time is spent in activities necessary to obtain the substance (e.g., visiting multiple doctors or driving long distances), use the substance (e.g., chain-smoking), or recover from its effects
- (6) important social, occupational, or recreational activities are given up or reduced because of substance use
- (7) the substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by the substance (e.g., current cocaine use despite recognition of cocaine-induced depression, or continued drinking despite recognition that an ulcer was made worse by alcohol consumption” (p. 197)

Substance Abuse

- A. A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one (or more) of the following, occurring within a 12-month period:
 - (1) recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household)
 - (2) recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use)
 - (3) recurrent substance-related legal problems (e.g., arrests for substance-related disorderly conduct)
 - (4) recurrent substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights)
- B. The symptoms have never met the criteria for Substance Dependence for this class of substance. (p. 199)

Alcohol Abuse

The most commonly abused substance in the United States and around the world is alcohol. Alcohol abuse is associated with alcoholic liver disease, coronary heart disease, breast and bone cancer, increased blood pressure, and immune disorders (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2000). Alcohol abuse also has a detrimental financial impact on society. The United States spends billions of dollars each year on hospitalization and institutionalization, motor vehicle crashes, and crime associated with alcohol abuse. The costs associated with alcohol abuse amounted to \$70.3 billion in 1998 and continue to rise (NIAAA, 1991). They include costs associated with rehabilitation, reduced

or lost productivity, and expenses of law enforcement. As with eating disorders, substance abuse has significant detrimental effects on individuals, families, and society.

Risk Factors Associated With Substance Abuse in Military Personnel

The DoD has been monitoring and evaluating trends in alcohol abuse since 1980 via the *DoD Survey of Health Related Behaviors Among Military Personnel*. However, as discussed above, studies that address substance use and abuse by military personnel are sparse. In addition to monitoring alcohol abuse and its effects on military readiness, the DoD in 1998 added to the survey other issues considered important in preventing chronic diseases among military personnel, including body weight and its relationship to fitness, military readiness, and overall health, which are included in the most recent DoD survey (Bray et al., 2002). However, no studies to date were found that focused on risk factors associated with eating disorders in military personnel.

Substantial negative consequences of alcohol use for the work performance, health, and societal relationships of military personnel have been a continuing concern assessed in the DoD surveys. Among the negative consequences assessed by Bray et al. (2002) were serious consequences related to alcohol use, productivity loss, and dependence symptoms. Bray et al. pointed out that although alcohol-related negative consequences declined from 1980 to 1998 (from 17.3% to 6.7%), they increased significantly from 1998 to 2002 (to 9.6%). Although negative consequences associated with alcohol use have generally declined since 1980, the most recent increase is of concern to DoD. Productivity loss because of alcohol use also decreased between 1980 and 2002 (from 26%.7 to 17.3%), but increased significantly from 1998 to 2002 (from 13.6% to 17.3%).

In addition to the negative consequences associated with alcohol use in military personnel, risk factors associated with heavy alcohol also identified by Bray et al. (2002) were stress and depression. Heavy alcohol users had more problems with stress at work than did abstainers (40.1% vs. 29.6%) and experienced more stress in their families (22.3% vs. 16.1%). Heavy alcohol users were also more likely to experience anxiety symptoms (21.3% vs. 16.6%) and depressive symptoms (26.4% vs. 18.0%) and reported more limitations due to poor mental health (5.9% vs. 3.1%) than did abstainers. Bray et al. noted that about a quarter of military personnel used alcohol to cope with stress and depression and further noted that these findings suggest a comorbid relationship between heavy alcohol use and mental-health-related problems.

Co-occurrence of Eating Disorders and Substance Abuse

There is evidence that individuals affected by one of these disorders are at risk for developing the other. Holderness et al. (1994) reviewed and synthesized the results of 53 studies that investigated and analyzed the relationship between eating disorders and substance abuse, conducted from 1977 to 1991. The results are summarized below, followed by summaries of the results of other, more recent studies on the co-occurrence of eating disorders and substance abuse.

Summary of Studies on Co-occurrence by Holderness et al.

Holderness et al. (1994) considered four categories of studies: (a) studies of substance use in eating-disordered individuals, (b) studies of substance abuse in eating-disordered individuals, (c) studies of patterns of eating disorders among substance abusers, and

(d) studies of family history of substance use, substance abuse, or eating disorders among eating-disordered individuals. They also considered the psychological, biological, and environmental mechanisms that may mediate the link between eating disorders and substance abuse.

Studies of substance use in eating disordered individuals. In 13 of the studies reviewed by Holderness et al. (1994), the percentage of individuals with bulimia who reported alcohol use but whose consumption did not merit the term *abuse* ranged from 10.7% to 88.9%, with a median of 23.2%. In 12 studies, the percentages of individuals with bulimia who reported a current or past history of drug use ranged from 8% to 33.3%, with a median of 21.4%.

In one study that compared current or past history of drug use between individuals with and without bulimia, 60% of individuals with bulimia reported cocaine use, compared with 14% of individuals without the disorder, and 60% reported amphetamine use, compared with 20% of individuals without the disorder. Another study, which classified individuals as *bulimics*, *purgers*, and *normal controls*, found that 25.0% of the bulimics, 21.4% of the purgers, and 17.5% of the controls reported getting drunk at least once per month and that 10.7% of the bulimics, 23.3% of the purgers, and 7.7% of the normal controls reported getting drunk at least several times per month. A study that categorized eating-disordered individuals as *restrictors* and *bulimic anorexics* found that 80% of the bulimic anorexics and none of the restrictors reported having become involved with drugs before the onset of the eating disorder.

Studies of substance abuse in eating-disordered individuals. In 25 studies of individuals with bulimia, the percentage who reported alcohol abuse or dependence or having received treatment for either of these conditions ranged from 2.9% to 48.6%, with a median of 22.9%. In addition, the percentage of individuals with bulimia who reported a current or past history of drug, substance, or alcohol abuse and/or dependence or treatment for any of these conditions ranged from 0% to 55.0%, with a median of 17.0%.

Studies of patterns of eating disorder among substance abusers. In eight studies, the percentage of drug abusers who reported a current or past history of bulimia or bulimic behaviors ranged from 8% to 40.7%, with a median of 20%. The reviewers noted that these results complemented those of studies of eating-disordered individuals, supporting the conclusions that eating disorders and substance abuse co-occur, and that the co-occurrence is more common among individuals with bulimia than among individuals with anorexia.

Studies of family history of substance use, substance abuse, or eating disorders among eating-disordered individuals. In 21 studies of individuals with bulimia, the rates of family history of alcoholism ranged from 13.1% to 81.0%, with a median of 39.2%. The rates of drug abuse among families of individuals with bulimia ranged from 5.7% to 76.5%, with a median of 19.0%. Several studies suggest that substance abuse occurs more frequently in individuals with a family history of alcoholism or a family history of eating disorders. These results suggest the possibility of a genetic predisposition to both disorders. Other studies suggest that eating disorders occur more frequently in individuals with a family history of eating disorders. The reviewers noted that the results from studies of families of eating-disordered individuals suggest that dysfunctional family interaction patterns are a major

factor in the development of eating disorders. They also noted that similar dysfunctional interaction patterns had been observed in families of individuals with alcoholism.

Studies on psychological, biological, and environmental mechanisms. One of the proposed reasons for the co-occurrence of eating disorders and substance abuse is the existence of an *addictive personality*, which predisposes individuals to become addicted to almost anything they find pleasurable, including consumption of alcohol, drugs, or food. Other studies have attributed the co-occurrence of substance abuse and eating disorders to their use as coping mechanisms to relieve stress. In this view, both eating disorders and substance abuse function as stress-reducing coping mechanisms, and an individual who uses one of these coping mechanisms is therefore at risk of developing the other. Another study proposed a self-medication theory to explain the co-occurrence of eating disorders and substance abuse, suggesting that eating-disordered individuals may abuse substances as a means of relieving worries related to their eating disorders; for example, individuals may use alcohol to relieve anxious feelings related to their weight.

One study speculated that addiction to one type of substance results in psychological and behavioral patterns that leave individuals vulnerable to addictions to other substances. According to this theory, individuals with eating disorders are essentially addicted to food and as a result are more likely subsequently to become addicted to alcohol or drugs. Other studies focused on the addiction process itself, comparing the behavioral and psychological factors associated with the process of becoming addicted to substances with the factors associated with developing an eating disorder. These studies concluded that behavioral and

psychological factors are associated with both disorders, and that substance abuse and eating disorders are psycho-addictive processes.

Another body of research suggests that the association between substance abuse and eating disorders results from physiological factors related to brain chemistry and brain function.

Conclusions of the studies reviewed by Holderness et al. (1994) on co-occurrence.

Holderness et al. (1994) found the evidence in support of the addictive personality theory to be inconclusive, as studies have had little or no success in isolating and associating psychological characteristics common to drug abuse and eating disorders in women. They noted that most of the research supporting the addictive personality theory has focused on individuals with bulimia, rather than individuals with anorexia. They commented that the stress-reducing coping mechanism theory is supported by anecdotal evidence. The reviewers also noted that the theory that addiction to food increases vulnerability to other addictions is supported by findings that individuals who are addicted to drugs or alcohol are more likely later to develop eating disorders. Holderness et al. concluded that the one common factor that appears to be present in both eating disorders and substance abuse is impulsivity.

Recent Studies on Co-occurrence of Eating Disorders and Substance Abuse

The observation by Holderness et al. (1994) that impulsivity is common to eating disorders and substance abuse is supported by research by Loxton and Dawe (2001) on alcohol abuse and disordered eating in college-aged women and on the relation of these disorders to impulsive behaviors. These researchers asked the subjects questions about their sensitivity to reward and punishment and their susceptibility toward behaving impulsively.

They concluded that impulsivity reflects an individual's sensitivity to cues in the environment that come to be associated, via conditioning, with potential reward or punishment. Specifically, they concluded that the manner in which an individual responds to these environmental cues depends on an inherent predisposition to be influenced by one of two independent biologically based systems that regulate motivation, the behavioral approach system (BAS), which regulates response to rewarding stimuli, and the behavioral inhibition system (BIS), which regulates responses to conditioned cues of punishment. Thus, individuals with greater BAS sensitivity would be more prone to impulsive behaviors, and individuals with greater BIS sensitivity would experience increased behavioral inhibition and negative affect (such as anxiety) in situations cued for potential punishment. In summary, Loxton and Dawe suggested that young women who abuse alcohol are predisposed to BAS sensitivity and that eating-disordered young women are predisposed to BIS sensitivity. They suggested that by differentiating between the two types of behavioral reward sensitivity systems, clinicians and researchers would be able to understand better the co-occurrence of eating disorders and substance abuse.

Other recent studies of the co-occurrence of eating disorders and substance abuse have focused mainly on examining whether a relationship between these disorders exists, estimating the rate of co-occurrence, or comparing groups affected by one or both of these disorders. Past studies have also considered various social factors, such as family history of substance abuse or eating disorders, and their association with the development of these disorders (e.g., Bulik & Sullivan, 1993; Dansky et al., 2000; Dunn, Larimer, & Neighbors, 2002; Grilo et al., 2002; Mintz, Kashubeck, & Tracy, 1995).

Bulik and Sullivan (1993) examined the clinical characteristics and perceptions of the family of origin among 16 women who were bulimic with comorbid alcohol use, abuse, or dependence, 17 women with bulimia alone, and 30 normal controls. The results showed that while there were no differences across groups in global family environment items, there were in fact differences in specific parental characteristics. Fathers of bulimic women without alcohol dependence were perceived as being more seductive than fathers of normal controls, and mothers were perceived as more neurotic and to have enjoyed their maternal role less than those of normal controls.

Grilo et al. (2002) noted that early research suggested that individuals with eating disorders were in fact more likely to have family histories of substance abuse; however, they also pointed out that recent studies have found that eating disorders and substance abuse do not have the same genetic, environmental, and familial risk factors. In addition, they noted that other studies reported weak evidence of an association between family history of substance abuse and eating disorders.

Mintz et al. (1995) found considerable variation in reported symptoms associated with eating disorders in a group of college women. Women who reported higher-than-average dissatisfaction with body image had scores that indicated problems associated with drinking; however, of the 195 women in the study, only 18% reported coming from homes where there was parental alcoholism.

Dunn et al. (2002) found that females who met criteria for binge eating disorders and bulimia nervosa did not drink more frequently or in greater quantity than non-eating-disordered females, but had higher negative consequences because of alcohol use. Russell (as

cited in Garner, 2004) found an association between the features of bulimia nervosa and those of alcohol abuse. Garner (2004) noted that Russell's study had been confirmed by more recent studies (e.g., a study by Kozyk, Touyz & Beaumont). In addition, Carlat et al. (1997) found that that men accounted for 10% to 15% of all bulimic patients.

Wolfe and Maisto's (2001) more recent synthesis of studies confirms that the co-occurrence of eating disorders and substance abuse has been well documented (e.g., in studies by Bushnell, Wells, Hornblow, Oakely, Brown, & Joyce; Mitchell, Hatsukami, Eckert, & Pyle; and Newman & Gold; all as cited in Wolfe & Maisto). High rates of alcohol use have been found in individuals being treated for eating disorders, and equally high rates of eating disorders have been found in females being treated for substance abuse, especially among individuals with bulimia or binge and purging anorexia, as opposed to restricting anorexia.

Ranson, Iacono, and McGue (2001) noted that individuals with eating disorders exhibit higher rates of alcohol and drug problems than normal controls or than population base rates. They stated that particularly strong associations were found in individuals who engage in binge-eating and purging behaviors and that substance abuse or dependence has been reported in up to 55% in patients with bulimia nervosa and in patients with anorexia nervosa (Eckert, Goldberg, Halmi, Casper, & Davies, as cited in Ranson et al., 2001; Holderness et al., 1994); alcohol and stimulants were the substances most commonly used.

Risk Factors Associated with Co-occurrence of Eating Disorders and Substance Abuse in Military Personnel

As noted above, mental health issues (i.e., anxiety and depression) have been found to be risk factors associated with the development of both eating disorders and substance-abuse disorders, and both of these risk factors are substantially experienced by military personnel. In addition, because there is evidence which suggests that individuals affected by one of these disorders are at risk for developing the other, it was hypothesized that military personnel are at increased risk of developing co-occurrence of these two disorders. Furthermore, because of the reported association between features of bulimia nervosa and alcohol abuse, it was determined that this research would specifically compare the study sample with a clinical group identified as having bulimia nervosa.

Theoretical Framework for Interpreting the Results of the Study

Various psychological mechanisms have been suggested as being associated with the development of eating disorders and substance abuse and their co-occurrence. As a framework for interpreting the results of this study, Albert Bandura's social learning theory (1963), which later evolved into social cognitive theory (1977), was used, because the theory has been extensively investigated with respect to explaining behavior in terms of environmental, biological, and cognitive determinants. As a result, social learning theory set the stage for the development of a more comprehensive cognitive-social learning theory of alcoholism (Abrams & Niaura, 1987) and subsequently the development of social and behavioral theories of addiction that focus on cognitive mechanisms (McCusker, 2001).

Abrams and Niaura (1987) described alcohol use in terms of social learning theory as a social behavior that is acquired and maintained by modeling, social reinforcement, and anticipation of its effects and from the direct experiences of its rewarding or negative effects. In addition, Abrams and Niaura stated that “social learning theory posits that personal factors, environment, and behavior are interlocking determinants of each other” (p. 132).

Another reason for selecting social learning as a theoretical framework for this study was that the underlying principles of social learning theory have been applied toward the understanding of eating disorders. Weiner (1998) described binge eating patterns as self-reinforcing, in that a cycle of negative thoughts leads to eating, to numbness and then guilt, and then to eating again. Weiner further stated that this pattern was similar to patterns seen in other states of psychological dependence and addiction. Other studies also have applied social learning theory’s principles toward explaining eating disorders (e.g., Klump, Wonderlich, Lehoux, Lilenfeld, & Bulik, 2002; Tyrka et al., 2002; Lewinsohn et al., 2002).

Because addiction research and the vast majority of eating-disorder research has been based on social learning theory principles that focus on environmental factors, individual coping strategies, and biological differences, it was determined that social learning theory would also be applicable to examining the co-occurrence of substance abuse and risk factors for development of eating disorders.

Bandura’s Social Learning Theory

Social learning theory emphasizes that social and environmental factors play a major role in human development (Bandura, 1963). Bandura’s emphasis on mental processes as they relate to development derives from the theoretical framework of cognitive psychology.

Cognitive psychology has as its underlying premise that human development and behavior are much more complex than the stimulus-and-response model espoused by behavioral psychology. Cognitive psychology theory maintains that the mind constantly examines the information that the sense organs bring to the individual about the environment, and weighs and sorts out information rapidly coming at it, which in effect describes the process of learning. Bandura's theory thus emphasizes the importance of the social environment as central to the individual's learning.

Social Modeling

According to Bandura's theory (1963), imitative behavior is often reinforced or rewarded by the model when the model exhibits socially desirable behavior. Thus, Bandura acknowledges the role of reinforcement schedules as an important aspect of learning; however, he points out that the most rapid manner for social behavior patterns to be acquired is through a combination of differential reinforcement with the influence of social models. Another important aspect of social learning is the concept of generalization, in which learned patterns of responses are generalized to other situations, as espoused by behavioral theory. Generalization explains the process of how individuals might be influenced by reinforcers that are present in their environment.

One can apply Bandura's theory to explain the effects of the media on influencing the behavior and attitudes of adolescent girls by drawing on what Bandura (1986) would refer to as *social models*. These social models are usually high-priced fashion models or celebrities who are often associated with high prestige, are portrayed as successful, and have a much thinner physique than the average person. Because success is associated with thinness,

success and thinness are portrayed as being inextricably intertwined. Thus, adolescent girls, in particular, become susceptible to imitating these unrealistic social models. As a result, when the adolescent girl starts to notice physical changes that occur during puberty (e.g., beginning to accumulate more body fat at the onset of puberty), she is more susceptible to engaging in behavior (e.g., dieting) that would bring about social reinforcement. In addition, as noted by Conner, Johnson, and Grogan (2004), there has been a recent trend toward increased pressures for men to be slim in order to be considered attractive and successful. Carlat et al. (1997) found that many of the male subjects in their study reported that their sexuality played an important role in the development of their eating disorders, and five homosexual men explicitly stated that their eating disorders began in response to pressures toward thinness in the gay subculture.

Self-Efficacy

In addition to emphasizing the role of social models in understanding the development of eating disorders, Bandura's social learning theory evolved into a social cognitive theory wherein the importance of the effects of cognitive variables on behavior also is emphasized. One of these cognitive variables is self-efficacy. *Self-efficacy* is defined as an individual's perception of his or her ability to successfully complete a particular task. The more confident an individual is toward completing the task, the higher the level of self-efficacy and likelihood of success (Bandura, 1977, 1986).

Young et al. (1991) pointed out that numerous studies have confirmed the importance of self-efficacy as it relates to various psychological problems, such as phobias (Bandura & Adams, as cited in Young et al.), anxiety disorders (Bandura, Adams, Hardy, & Howels, as

cited in Young et al.) and depression (Bandura & Cevone, as cited in Young et al.). Young et al. further noted that Bandura's social learning theory and the concept of self-efficacy have also been used as a framework with which to interpret both the development and the treatment of addictive behavior (e.g., by Lawrence & Rubinson and by Miller, Ross, Emmerson, & Todt, as cited in Young et al.). However, Young et al. made the important distinction that unlike self-efficacy in other areas, self-efficacy in relation to addictive behavior refers to one's ability to resist engaging in a certain behavior rather than one's ability to perform a certain task (Baer & Lichtenstein, as cited in Young et al.). Thus, *self-efficacy* in this study refers to the individual's ability to resist alcohol use (*drinking refusal self-efficacy*).

Because social learning theory's principles have been used to explain self-efficacy as it relates to risk factors associated with eating disorders (i.e., anxiety and depression) and has been used to explain self-efficacy as it relates to alcohol abuse, the theory's principles will also serve as the framework for examining this study's hypothesis that military personnel with co-occurrence of substance abuse and eating-disorder risk factors have low levels of drinking refusal self-efficacy.

CHAPTER 3: METHODS

Study Overview and Research Design

Study participants were 100 male military personnel who had been referred for substance-abuse treatment. Participants were enrolled and data collected over an eight-month period. Data were collected to characterize the study sample's (a) risk for development of eating disorders, assessed with the Eating Disorders Inventory-3 (Garner, 2004), (b) substance-abuse levels, assessed with the World Health Organization's Alcohol Use Disorders Identification Test (AUDIT) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), and (c) levels of drinking refusal self-efficacy, assessed with the Drinking Refusal Self-Efficacy Questionnaire (DRSEQ) (Young et al., 1991). These data were analyzed in order to address the study hypotheses and research questions.

The first phase of data analysis was descriptive: the study sample was described statistically with respect to the three measures of interest. Next, the EDI-3 subscale scores for the sample were compared statistically (by means of one-way analysis of variance [ANOVA]) with the EDI-3 subscale scores for the following four groups, as reported by Garner (2004):

1. The EDI-3 U.S. adult normative sample for bulimia nervosa (all female).
2. A group of U.S. adult females without eating disorders.
3. A group of U.S. adult males with eating disorders.
4. A group of U.S. adult males without eating disorders.

Selection of the female normative sample for bulimia nervosa for these comparisons was based on the high rates of alcohol use found in individuals with bulimia nervosa, the high rates of alcohol use found in military male personnel, and the study's sample being comprised of individuals referred for alcohol-related problems. It was expected that if associations between substance abuse and eating disorders were found in this study, they would more likely be found with respect to risk for developing bulimia nervosa than risk for other types of eating disorders. The male clinical group included males with all types of eating disorders; scores for males with bulimia nervosa were not reported separately (Garner, 2004).

The second phase of data analysis involved using statistical measures of association to describe the relationships between substance abuse and eating-disorder risk factors, between substance abuse and drinking refusal self-efficacy, and between eating-disorder risk factors and drinking refusal self-efficacy. The relationship between eating-disorder risk factors and substance abuse was examined through the use of simple linear regressions, with total AUDIT score as the dependent variable and EDI-3 subscale scores as the independent variables. Simple linear regression also was used to examine the relationship between (a) drinking refusal self-efficacy (DRSE) score and total AUDIT score and (b) DRSE score and EDI-3 subscale scores.

In addition, eating-disorder risk factors and substance abuse were analyzed as categorical variables. EDI-3 subscale scores were categorized as *low*, *typical*, or *elevated*, and individuals with scores in the *typical* or *elevated* range were considered to be at risk of developing eating disorders. Individuals with total AUDIT scores of 8 or higher were

considered to have substance-abuse disorders. For each EDI-3 subscale, a chi-square test was used to test the association between substance abuse and the risk of developing eating disorders.

Inferential methods were used in studying the variables of interest to make predictions in relation to the co-occurrence of eating disorders and substance abuse.

Participants and Setting

The participants were recruited from among male active-duty military personnel primarily serving in the U.S. Marine Corps and the U.S. Navy, who were referred for substance-abuse treatment to an outpatient military facility in the eastern United States. All participants had previously been screened for substance abuse by the facility's staff in accordance with the facility's standardized procedure. Participants had been diagnosed with substance dependence or substance abuse or, despite not meeting *DSM-IV-TR* diagnostic criteria for substance dependence or substance abuse, had experienced problems and consequences associated with substance use that warranted substance-abuse treatment.

Participants were recruited for the study immediately following their initial facility orientation session, designed to provide participants with information about the program before beginning their recommended substance-abuse treatment, also in accordance with the facility's standardized procedure. After individuals were informed by the facility's counselor that they had completed their orientation session and were free to leave, the researcher entered the classroom. At this time, individuals were asked whether they were interested in volunteering for a research study. They were informed that participation was voluntary and that refusal to participate would not adversely affect them in any manner. They were also

informed that the benefits of engaging in the research were the opportunity to assess their substance abuse and their risks for developing an eating disorder, as well as the opportunity to participate in research that aimed to understand these phenomena and ultimately help prevent these disorders.

Overview of Facility's Referral, Screening, Admission, and Orientation Processes

Individuals are referred to the facility from military units, military commands, or social service agencies, or by themselves, for substance-abuse-related services. Individuals referred are scheduled by the Admissions Coordinator at the facility for a substance-abuse screening and are notified of the date and time of their screening via mail. As part of the substance-abuse screening process, the facility's counselors use the AUDIT and arrive at a diagnosis based on the *DSM-IV-TR* criteria. The results of the AUDIT are maintained by the facility as part of the individual's confidential case record.

Following the substance abuse screening process, the facility's counselor recommends that the individual engage in a level of care that is determined by the individual's diagnosis and the specific level of care that best meets the individual's needs. The intensity and frequency of counseling and other related services vary depending on the extent of the individuals' substance abuse and their particular situations. The levels of care offered at the facility are based on guidelines developed by the American Society of Addiction Medicine Patient Placement Criteria (ASAM, 2001). These levels of care range from substance-abuse education to intensive outpatient treatment. The results of the substance-abuse screening and the counselor's recommendations are reviewed by the facility's Admissions Coordinator, who forwards them to the facility's psychiatrist for review

of the individual's diagnosis and final approval. These results are maintained by the facility as part of the individual's confidential case record. The individual is then notified via mail of the level of care recommended and scheduled by the facility's personnel to participate in an orientation session as a part of the admission process prior to beginning their recommended care.

As part of the facility's admission process, the individual is also administered the DRSEQ, which may be used by the counselor as part of the assessment and counseling processes. The results of the DRSEQ also are maintained by the facility as part of the individual's confidential case records.

The orientation session presented by the facility's counselor is designed to provide the individual with extensive information about the facility and its related services in a group setting prior to engaging in substance abuse treatment. These orientation sessions are held on the Fridays before the start of treatment on the following Monday.

During the orientation session, the facility's counselor provides information about substance-abuse treatment at the facility, which includes a detailed explanation of the individual's rights while engaging in substance-abuse treatment. This explanation includes the individual's right to decline to engage in any type of research activity without experiencing any type of adverse consequences, including adverse effects on their careers. Upon completion of the orientation session, the individuals are free to leave.

Demographic Information

Out of 171 individuals who attended 11 orientation sessions over a 10-month period, 100 chose to participate in the study. Of the 100 participants, 76% were White, 11 were

Black, 11% were Hispanic or Latino, 1 was Native American, and 1 reported his race as *other*. All 100 participants completed all three study instruments.

Measures

Eating Disorders

The initial intent was to use the Eating Disorder Inventory-2 (EDI-2) (Garner, 1991) to assess eating-disorder risk factors in this study. The first 20 participants were administered the EDI-2. During the course of the study, the EDI-2 was revised to the EDI-3, and the remaining 80 participants were administered the EDI-3.

The EDI-2 (Garner, 1991) is a questionnaire that measures self-reported symptoms associated with anorexia nervosa and bulimia nervosa. The EDI-2 was designed to aid clinicians and researchers in understanding and treating these disorders; however, the developers emphasized that diagnosis of eating disorder should not be based solely on this measure.

The EDI-2 consists of 91 items, grouped into eleven subscales. The original EDI (Garner, 1983) included 64 items in eight subscales (Drive for Thinness, Bulimia, Body Dissatisfaction, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Maturity Fears). The EDI-2 added three provisional subscales (Asceticism, Impulse Regulation, and Social Insecurity). The package also included the EDI-2 Symptom Checklist (EDI-SC), a separate form for self-reporting of current and past eating patterns and menstrual history, to be completed by females. The EDI-2 can be completed in about 20 minutes and is scored by the investigator.

Although the norms were established with college-aged females, the EDI-2 has been used with different populations in a wide range of settings, and separate norms are provided based on gender, age, and diagnostic status. The EDI-2 is recommended for both clinical and research purposes. Most of the research reported in the EDI-2 manual was based on the original EDI instrument (Garner & Olmsted, 1984, 1986; Garner, Olmsted, & Polivy, 1983).

Internal consistency reliability coefficients of the EDI-2 subscales have been reported to range from .84 to .92, with lower reliabilities for the Perfectionism (.76) and Interpersonal Distrust (.74) subscales (Norrington, 1989; Norrington & Sohlberg, 1988). Coefficients of test-retest reliability for the EDI-2 administered one week apart to 70 student and staff nurses were .79 to .95 for all subscales except Interoceptive Awareness (.67). Test-retest reliability coefficients for the EDI administered three weeks apart to 70 non-patient university undergraduates were above .80 for all subscales except Maturity Fears (0.65). Test-retest reliability for the EDI-2 administered one year apart ranged from .41 to .75 (Welch, 1988). Validation studies with the original 8 EDI scales and subsequent research in a wide range of settings have demonstrated appropriate content, convergent, criterion, and discriminate validity (Garner & Olmsted, 1984, 1986; Garner et al., 1983). Scores on the EDI subscales have been found to be positively correlated with scores on many other personality instruments, indicating that the personality characteristics measured are not unique to eating disorders.

Garner (1991) described the process for scoring and interpreting the EDI-2 scores. Scores are derived from the individuals' ratings of whether each statement applies *always*, *usually*, *often*, *sometimes*, *rarely*, or *never*. Responses are weighted from 0 to 3; a score of 3

is assigned to the response closest to the symptomatic direction, a score of 2 for the immediately adjacent response, a score of 1 for the next adjacent response, and a score of 0 to the next three responses (farthest from the symptomatic direction). The score for each item contributes to only one subscale, and the subscale score is the sum of all item scores for that subscale.

In the EDI-3 (Garner, 2004), the original 91 items of the EDI-2 remain unchanged, thereby allowing clinicians and researchers to compare data previously collected using the EDI-2 with data collected using the EDI-3. In the EDI-3, the 91 items from the EDI-2 have been organized into twelve primary subscales: three eating-disorder-specific subscales (Drive for Thinness, Bulimia, and Body Dissatisfaction) and nine general psychological subscales (Low Self Esteem, Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, Interoceptive Deficits, Emotional Dysregulation, Perfectionism, Asceticism, and Maturity Fears), which, according to Garner, are relevant to eating disorders but not specific to these disorders. Because the questions on the EDI-2 and EDI-3 are the same, the EDI-2 questionnaires collected in this study were scored according to the twelve subscales of the EDI-3.

Each of the EDI-3 subscales provides a continuous score; the higher the score, the greater the manifestation of the particular trait, and thus the higher the risk for developing an eating disorder (Garner, 2004). Sample items from the EDI-3 are provided in Appendix A.

In summarizing the main features of the EDI-3, Garner (2004) stated that that it assesses psychological domains that have conceptual relevance in understanding eating disorders, that it is designed for both clinicians and researchers, and that a large U.S clinical

multi-site standardization sample was used to create updated norms. The EDI-3's norms were derived from groups in the United States (Indiana, Maryland, Michigan, Ohio, and Wisconsin) and in other countries (Australia, Canada, Italy, and the Netherlands). All normative samples consisted of females undergoing treatment for eating disorders in a variety of clinical settings. Four clinical samples were derived from these normative samples: Anorexia Nervosa Restrictive type, Anorexia Nervosa Binge-Eating/Purging type, Bulimia Nervosa, and Eating Disorders Not Otherwise Specified.

Garner (2004) further noted that the EDI-3 followed the tradition of the EDI-1 and the EDI-2, which always took into account the importance of relying on separate norms, since “it is well documented that individuals with eating disorders differ from comparison groups of non-patient individuals” (p. 117). Clinical and non-clinical samples were used in the development of the EDI-3, and the norms were derived from two separate age groups. According to Garner, “Age effects in the EDI-1 and EDI-2 can be quite substantial on some of the subscales, especially between younger adolescents and adults” (p. 117). The development of the U.S. norms for the EDI-3 was based on both adults (983 aged 18 years or older) and adolescents (335 aged 11 to 17).

Substance Abuse

The AUDIT is a 10-item screening questionnaire that assesses alcohol use pattern, which was developed by the World Health Organization in 1989 for use as part of a screening procedure to identify persons whose alcohol consumption is hazardous or harmful to their health (Babor et al., 2001). The AUDIT is recommended for use in conjunction with other measures examining alcohol use patterns, rather than as a single measure on which to

base diagnosis of alcohol abuse or dependency. The AUDIT includes three questions about the amount and frequency of alcohol use, three about alcohol dependence, and four about problems caused by alcohol abuse. The questions are associated with the *DSM-IV-TR* criteria for alcohol abuse and dependence. For each question, there is a set of responses to choose from, and each response is scored on a scale of 0 to 4.

A score of 8 is recommended as an indication of alcohol abuse and possibly alcohol dependence; the higher the total score, the greater the likelihood of hazardous and harmful drinking. The instrument may be self-administered and takes about two minutes to complete.

The norms for the AUDIT were established with heavy drinkers and alcoholics in adult populations. The AUDIT is recommended for use with patient populations, individuals convicted of driving while intoxicated, incarcerated individuals, military personnel, workers in Employee Assistance programs, and workers in industrial settings (Babor et al., 2001). Reliability studies on the AUDIT have examined test-retest reliability and internal consistency, including content, criterion, and construct validity (Fleming, Barry, & MacDonald; Hays, Merz, & Nicholas; Sinclair, McRee, & Babor; all as cited in Babor et al.).

The AUDIT has been used in a variety of research and epidemiological studies in addition to its use as a screening instrument. The results of these studies, which have been conducted on various subpopulations, indicated that it provides good discriminant validity (Volk, Steinbauer, Cantor, & Holzer; Rigmaiden, Pistorello, Johnson, Mar, & Veatch; Piccinelli et al.; all as cited in Babor et al., 2001). In one study that compared the AUDIT with the Michigan Alcohol Screening Test (Selzer, 1971), a widely used alcohol screening instrument, a strong correlation between the instruments ($r = .88$) was found for both males

and females (Bohn, Babor, & Krannzler, as cited in Babor et al.) A high correlation coefficient (.78) was also found when the AUDIT was compared with another widely used alcohol-screening instrument, the CAGE (Ewing, 1984), which is a mnemonic that refers to the questions related to the individual's ability to Cut back on their drinking, Annoyance with others who criticize their drinking, Guilt related to their drinking, and using alcohol as an Eye-opener (Hays, Merz, & Nicholas, as cited in Babor et al.).

Two other studies examined the relationship between AUDIT scores and future alcohol-related problems. One of these studies found that the likelihood of remaining unemployed over a two-year period was 1.6 times as high for individuals with AUDIT scores of 8 or higher as for individuals with lower scores (Claussen & Aasland, as cited in Babor et al., 2001). The other study predicted future occurrence of physical disorders among ambulatory care patients, as well as future social problems related to drinking (Conigrave, Saunders, & Reznik, as cited in Babor et al.). In a test-retest reliability study, the AUDIT showed high reliability (.86). A copy of the AUDIT is provided in Appendix B.

Drinking Refusal Self-Efficacy

The Drinking Expectancy Profile (DEP) has two separate measures: the Drinking Expectancy Questionnaire (DEQ) and the Drinking Refusal Self-Efficacy Questionnaire (DRSEQ) (Young et al., 1991; Young, Connor, Ricciardelli, & Saunders, 2005). The study participants had already completed the DRSEQ before being recruited for this study. Only the DRSEQ was used in the study, for two reasons: (a) social learning theory is the underlying theory for the concept of drinking refusal self-efficacy, and (b) having

participants also complete the DEQ would have been time consuming, cumbersome, and not essential to the study.

The DRSEQ is a pencil-and-paper self-administered instrument, which takes approximately 10 minutes to complete. The DRSEQ was normed on adult clinical patients, adult drinkers, and university students. Test-retest reliabilities have been completed (Alcohol & Drug Institute, 2004).

Young et al. (1991) originally developed the Drinking Self-Efficacy Questionnaire (DSEQ) to complement an existing measure, the DEQ (Young & Knight, 1989). The pilot version of the DSEQ contained 35 situations for which participants were asked to rate the likelihood that they would drink, using a scale of 1 to 6, ranging from *I am very sure I would drink* (1) to *I am very sure I would not drink* (6). Following the initial analysis, the final version contained 31 items and a three-factor solution, which Young et al. summarized as assessing “self-efficacy in situations of social pressure (Factor I), self-efficacy in situations of opportunistic drinking (Factor II), and self-efficacy in situations characterized by a need for emotional relief (Factor III)” (p. 6). High total scores on the questions that correspond to each of the three factors are indicative of low drinking refusal self-efficacy, and low scores indicate high levels of self-efficacy. Young et al. (1991) noted that “the DSEQ has adequate reliability and validity, and all three factors demonstrated good utility both in predicting consumption and in discriminating between problem and non-problem drinkers” (p. 10). The psychometric properties of the DSEQ as a measure of drinking self-efficacy were subsequently applied to an individual’s perceived ability to *refuse* alcohol, hence the name

Drinking Refusal Self-Efficacy Questionnaire. Instructions for completing the DRSEQ and sample items are provided in Appendix C.

Procedures

Data Collection

Once the potential volunteers had been identified, the researcher provided further information about the study and described in detail what the data collection procedure would entail. The researcher explained to the volunteers that the research was aimed at examining the link between substance abuse and eating disorders. (The recruitment script is provided in Appendix D). The researcher again explained that participation in the research was strictly voluntary and reiterated that declining to participate in the study would in no way adversely affect them. The researcher explained that those who chose to volunteer to participate in the study could remain in the classroom; the others were free to leave.

The researcher provided participants with the informed consent form, which contained a written explanation of the purpose of the study and written consent for the researcher to make copies of the AUDIT and DRSEQ previously completed by the participants. After reviewing the contents of the informed consent form with the participants, the researcher collected the signed consent forms.

The EDI-2 or EDI-3 was then distributed to the participants. The researcher explained to the participants that if during the course of completing the EDI-2 or EDI-3, their responses to some of the questions elicited emotional discomfort or if they experienced emotional discomfort while engaging in any aspect of the research at any time, they could choose not to complete the questionnaires or to discontinue participation in the research.

The participants were advised that their individual information would remain confidential and that results would be reported with no individual identifying information, in accordance with the *DoD Health Information Privacy Regulation* (U.S. DoD, 2003). Participants were also informed that information on resources (e.g., referral to mental health professionals for treatment of eating disorders) was available, should they wish to explore issues that could arise from their participation in the research.

As part of the facility's existing protocol, individuals who wish to address other mental-health-related issues that may have surfaced during substance-abuse treatment and that are beyond the scope of the facility are routinely referred to other military mental-health facilities. Mental-health-related issues that may arise are addressed concurrently while individuals are engaged in substance-abuse treatment at the facility or immediately following their completion of substance-abuse treatment. Thus, referral to other mental-health resources for participants wishing to explore eating-disorder issues as a result of participating in the study did not interfere with the facility's primary objective of assuring that individuals received substance-abuse treatment.

Participants who had additional questions about the study were provided with a standard statement that included a brief description of the study (provided in Appendix E). The researcher did not provide participants with any feedback regarding their individual scores. The participants were exposed to no physical risks and to minimal emotional risks. Participants received contact information for the researcher and were invited to contact the researcher should they have any questions about the research.

After gathering the completed consent forms and completed EDI-3, the researcher made copies of the participants' AUDITs and DRSEQs, which were maintained at the facility in a secured location. All patient identifying information obtained from the EDI-3, AUDIT, and DRSEQ was entered into a separate data collection form, and each participant was assigned a unique identifier number, which was used to match the completed EDI-3 to the corresponding AUDIT and DRSEQ. Once unique identifiers had been assigned, all patient identifying information on the copies of the instruments was marked over with a black permanent marker. The copies of the AUDIT and DRSEQ, the completed EDI-2 or EDI-3, and the data collection forms were kept in a locked cabinet at the facility to which only the researcher had access. Individual information remained confidential, and results were reported with no individual identifying information. This list of assigned identifiers was shredded after data collection was completed.

Data Analyses

To determine the rates of eating-disorder risk factors in the study sample, the twelve EDI-3 subscale scores were computed for each participant and transferred to the EDI-3 Summary Sheet. The scores were then converted to T-scores using Garner's (2004) Table A-1, *Raw Score to T-Score Conversion: EDI-3 Eating Disorder Risk Scales Scores for the U.S. Adult Clinical Sample — Bulimia Nervosa*. The same procedure was followed in converting the raw score to percentiles.

Interpretation of EDI-3 subscale scores. The scores of the EDI-3 were interpreted according to the score interpretation guidelines and tables established by Garner (2004). The T-scores and percentile scores for each EDI-3 subscale were plotted on the Profile Sheet,

allowing visual comparison of each individual's scores with those of the normative group. The participants' raw scores, T-scores, and percentile scores were entered into a mathematical formula based on Garner's (2004) predetermined ranges, which categorized the scores into *elevated*, *typical*, or *low* clinical ranges. JMP statistical software (SAS) was used to make the calculations and for all other data analysis. If the individuals' EDI-3 raw scores or T-scores did not fall into one of the conditions of the formula, the statistical software assigned it as a missing value.

The means for the twelve EDI-3 subscale scores for the study sample were then compared with the scores for the four comparison groups (based on data reported by Garner, 2004); twelve separate one-way ANOVAs were used to determine whether the means for the study sample and each comparison group differed significantly.

It should be noted that Garner (2004) cautioned against concluding that an individual is at risk for developing an eating disorder based solely on elevated subscale scores; the EDI-3 is intended to be used in combination with other measures (such as clinical interviews) for assessing for eating disorders. Nonetheless, analysis of subscale scores is a useful research tool for exploring the roles of specific risk factors in the development of eating disorders.

Categorical analyses. For the purpose of categorical data analysis, participants whose EDI-3 subscale scores fell in the *typical* or *elevated* ranges on any of the twelve subscales were considered to be at risk for an eating disorder, based on that particular subscale. These participants were assigned a code of 1. Participants whose subscale scores were in the *low* category were considered not to be at risk for an eating disorder, based on that subscale, and were assigned a code of 0. For the purpose of categorical analyses, participants with total

AUDIT scores of 8 or higher were classified as having substance abuse and assigned a code of 1. Participants who scored less than 8 were considered not to have substance abuse and assigned a code of 0. For each EDI-3 subscale, a chi-square test was conducted to determine whether being at risk for eating disorders (based on that subscale) was associated with substance abuse (based on the AUDIT score cutoff).

Regression analyses. Simple linear regression was used to determine whether the extent of substance abuse predicted the risk of developing eating disorders. Each of the twelve EDI-3 subscale scores (the independent variable) was regressed on total AUDIT score (the dependent variable).

Analyses of drinking refusal self-efficacy. The average rate of drinking refusal self-efficacy in the sample was determined by computing the mean total DRSE score. In order to determine whether levels of drinking refusal self-efficacy in the sample were similar to the level of drinking refusal self-efficacy in comparable samples of non-military males with substance abuse, the average DRSE factor scores were compared with the results reported by Oei et al. (1998) and by Connor, Young, Williams, and Ricciardelli (2000). Simple linear regression was used to determine the relationship between the extent of substance abuse and the level of drinking self-efficacy; total DRSE score (dependent variable) was regressed on total AUDIT score (independent variable). The three DRSE factor scores (Social Pressure, Emotional Relief, and Opportunistic Drinking) also were regressed on total AUDIT score. To determine the relationship between drinking refusal self-efficacy and eating-disorder risk factors, the EDI-3 subscale scores were regressed on the total DRSE score.

Inferential methods were used to address the ten research questions and test the four research hypotheses introduced in Chapter 1.

CHAPTER 4: RESULTS

This presentation of results is organized according to the four research hypotheses and ten research questions introduced in Chapter 1.

Demographics

Table 1 compares the sample sizes and ages of the study sample and the four comparison groups (Garner, 2004) used in the analyses of EDI-3 scores. All individuals in the U.S. normative group for bulimia nervosa were female. No information on race was provided for the comparison groups, and the mean age was not reported for either of the comparison groups without eating disorders. The clinical group of males with eating disorders included all types of eating disorders. Separate means and standard deviations for males with bulimia nervosa were not available, so the analyses were conducted with data for the entire group of 102 males. Garner stated that 35% of the males with eating disorders had bulimia nervosa (estimated to be 36 out of 102). It is interesting to note that the mean ages of the study sample and the normative group for bulimia nervosa were approximately equal.

Table 1. Sample Sizes and Mean Ages of the Study Sample and the Comparison Groups

	N	Mean age	SD
Study sample	100	23.0	4.10
Normative sample of females with bulimia nervosa (Garner, 2004)	429	23.9	6.74
Females without eating disorders (Garner, 2004)	679	–	–
Males with eating disorders (Garner, 2004)	102	26.8	8.9
Males without eating disorders (Garner, 2004)	43	–	–

SD = standard deviation.

Risk of Developing Eating Disorders

Research Question 1: What is the rate of being at risk for developing eating disorders in the sample?

Table 2 shows the distribution of the study sample among the *elevated*, *typical*, and *low* ranges for all twelve EDI-3 subscales. Participants whose subscale scores were in the *elevated* or *typical* range for any of the twelve subscales were considered to be at risk for developing eating disorders, based on that particular subscale. Most individuals scored in the *low* clinical range for the three subscales directly associated with eating-disorder-related behaviors. A total of only 4 individuals scored in the *elevated* range on these three subscales. However, on the general psychological subscales, the proportion of the study sample considered to be at risk of eating disorders ranged from 16% to 73%, and was over 50% for five subscales: Interpersonal Insecurity, Interpersonal Alienation, Emotional Dysregulation, Perfectionism, and Maturity Fears.

Table 2. Distribution of Study Participants by EDI-3 Clinical Range

	N	EDI-3 clinical ranges			
		Elevated	Typical	Low	Elevated + Typical
Eating-disorder subscales					
Drive for Thinness	99	1 (0.01%)	5 (0.05%)	93 (9%)	6%
Bulimia	98	2 (0.02)	27 (27%)	68 (68%)	29%
Body Dissatisfaction	96	1 (0.01%)	6 (0.06%)	89 (92%)	7%
Psychological Subscales					
Low Self Esteem	99	2 (0.02%)	14 (14%)	83 (83%)	16%
Personal Alienation	100	8 (0.08%)	27 (27%)	65 (65%)	35%
Interpersonal Insecurity	97	21 (21%)	42 (43%)	34 (35%)	63%
Interpersonal Alienation	97	27 (27%)	33 (34%)	37 (38%)	60%
Interoceptive Deficits	98	5 (0.05%)	22 (22%)	71 (72%)	27%
Emotional Dysregulation	93	43 (46%)	30 (32%)	20 (21%)	73%
Perfectionism	93	14 (15%)	37 (39%)	42 (45%)	51%
Asceticism	98	6 (0.06%)	17 (17%)	75 (76%)	23%
Maturity Fears	93	26 (26%)	35 (35%)	37 (37%)	61%

Research Question 2: How do eating-disorder risk factors in the sample compare with those in normative groups?

In order to test whether the study sample’s EDI-3 subscale scores differed significantly from those of the four comparison groups, twelve separate ANOVAs were run for each comparison group.

Research Hypothesis 1a: Male military personnel with substance abuse and females with eating disorders are equally likely to exhibit eating-disorder risk factors. Thus, it was

hypothesized that the EDI-3 subscale scores of the study sample would not differ significantly from those of the normative group of females with bulimia nervosa.

Table 3 summarizes the results of *t*-tests comparing the mean EDI-3 subscale scores between the study sample and the normative group of females with bulimia nervosa. The means differed significantly for all twelve of the EDI-3 subscales. For eleven of the subscales, the study sample's means were significantly lower. However, the study sample's mean score on the Emotional Dysregulation subscale was significantly higher than that of the normative group (10.39 ± 7.56 , compared with 8.16 ± 5.70 ; $p = .004$).

Table 3. Comparison of EDI-3 Subscale Scores Between the Study Sample and Females With Bulimia Nervosa

	Study sample		Females with BN (N = 429)		SE	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Eating-disorder subscales							
Drive for Thinness	4.88	6.12	21.49	5.68	.611	-27.160	.0001*
Bulimia	4.14	4.91	20.40	7.27	.490	-33.148	.0001*
Body Dissatisfaction	8.48	8.58	29.92	9.10	.858	-24.990	.0001*
Psychological Subscales							
Low Self Esteem	4.12	5.33	13.05	5.33	.533	-16.760	.0001*
Personal Alienation	7.70	6.25	13.60	6.28	.625	-9.4402	.0001*
Interpersonal Insecurity	9.45	6.66	11.59	6.16	.666	-3.2156	.0018*
Interpersonal Alienation	8.52	6.10	10.30	5.36	.610	-13.805	.0001*
Interoceptive Deficits	6.79	6.98	16.94	8.14	.698	-14.546	.0001*
Emotional Dysregulation	10.39	7.56	8.16	5.70	.756	2.9504	.0040*
Perfectionism	10.68	5.25	13.80	5.89	.525	-5.9373	.0001*
Asceticism	6.15	4.93	12.73	5.72	.493	-13.340	.0001*
Maturity Fears	9.01	7.10	10.82	6.91	.710	-2.5477	.0124*

BN = bulimia nervosa; SD = standard deviation; SE = standard error of the mean.

**p* < .05 in two-tailed *t*-test.

Research Hypothesis 1b: Male military personnel with substance abuse are more likely to exhibit eating-disorder risk factors than are females without eating disorders. Thus, it was hypothesized that the EDI-3 subscale scores of the study sample would be significantly higher than those of females without eating disorders.

Table 4 summarizes the results of *t*-tests comparing the mean EDI-3 subscale scores between the study sample and females without eating disorders. The study sample's EDI-3

subscale means were significantly higher than those for the females without eating disorders on the Personal Alienation, Interpersonal Alienation, Interpersonal Insecurity, and Emotional Dysregulation subscales. The study sample's means were significantly lower on the Drive for Thinness and Body Dissatisfaction subscales. The two groups did not differ significantly on the remaining subscales.

Table 4. Comparison of EDI-3 Subscale Scores Between the Study Sample and Females Without Eating Disorders

	Study sample		Females without eating disorders (N = 679)		SE	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Eating-disorder subscales							
Drive for Thinness	4.88	6.12	9.94	7.82	0.612	8.2740	.0001*
Bulimia	4.14	4.91	4.65	5.42	0.491	-1.0397	.3010
Body Dissatisfaction	8.48	8.58	19.95	11.27	0.858	-13.369	.0001*
Psychological Subscales							
Low Self Esteem	4.12	5.33	4.76	4.87	0.539	-1.2012	.2326
Personal Alienation	7.7	6.25	6.29	5.47	0.625	2.2561	.0263*
Interpersonal Insecurity	9.45	6.66	7.34	3.98	0.666	3.1705	.0020*
Interpersonal Alienation	8.52	6.10	6.19	4.81	0.610	3.8201	.0002*
Interoceptive Deficits	6.79	6.98	7.34	6.57	0.698	-0.7882	.4325
Emotional Dysregulation	10.39	7.56	5.14	4.81	0.756	6.9459	.0001*
Perfectionism	10.68	5.25	10.87	5.19	0.525	-0.3616	.7184
Asceticism	6.15	4.93	6.16	4.35	0.493	-0.0203	.9839
Maturity Fears	9.01	7.10	8.65	5.66	0.710	0.5067	.6135

SD = standard deviation; SE = standard error of the mean. **p* < .05 in two-tailed *t*-test.

Research Hypothesis 1c: Male military personnel with substance abuse and males with eating disorders are equally likely to exhibit eating-disorder risk factors. Thus, it was hypothesized that the EDI-3 subscale scores of the study sample would not differ significantly from those of males with eating disorders.

Table 5 summarizes the results of *t*-tests comparing the mean EDI-3 subscale scores between the study sample and males with eating disorders. On eight subscales, the study sample's means were significantly lower than those for the clinical group of males with eating disorders. The study sample's mean was significantly higher than that for the males with eating disorders on the Emotional Dysregulation subscale and did not differ significantly on the Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, and Maturity Fears subscales. On the Emotional Dysregulation subscale, the difference between the study sample's mean (10.39 ± 7.56) and the mean for males with eating disorders (6.75 ± 5.69) was even greater than the difference from the mean for females with bulimia nervosa (8.16 ± 5.70).

Table 5. Comparison of EDI-3 Subscale Scores Between the Study Sample and Males With Eating Disorders

	Study sample		Males with eating disorders (N = 102)		SE	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Eating-disorder subscales							
Drive for Thinness	4.88	6.12	15.10	8.52	0.612	-16.712	.0001*
Bulimia	4.14	4.91	12.61	9.63	0.491	-17.267	.0001*
Body Dissatisfaction	8.48	8.58	22.05	11.81	0.859	-15.8717	.0001*
Psychological Subscales							
Low Self Esteem	4.12	5.33	9.99	6.73	0.533	-11.017	.0001*
Personal Alienation	7.7	6.25	10.97	7.21	0.625	-5.2321	.0001*
Interpersonal Insecurity	9.45	6.66	9.68	5.22	0.666	-0.3456	.7304
Interpersonal Alienation	8.52	6.10	9.04	6.00	0.610	-0.8526	.3960
Interoceptive Deficits	6.79	6.98	12.98	8.38	0.698	-8.8707	.0001*
Emotional Dysregulation	10.39	7.56	6.75	5.69	0.756	4.8158	.0001*
Perfectionism	10.68	5.25	12.08	5.60	0.525	-2.6642	.0090*
Asceticism	6.15	4.93	10.34	5.97	0.493	-8.4945	.0001*
Maturity Fears	9.01	7.10	10.10	6.87	0.710	-1.5342	.1282

SD = standard deviation; SE = standard error of the mean. * $p < .05$ in two-tailed *t*-test.

Research Hypothesis 1d: Male military personnel with substance abuse are more likely to exhibit eating-disorder risk factors than are males without eating disorders. Thus, it was hypothesized that the EDI-3 subscale scores of the study sample would be significantly higher than those of males without eating disorders.

Table 6 summarizes the results of *t*-tests comparing the mean EDI-3 subscale scores between the study sample and males without eating disorders. The study sample's mean

scores were significantly higher than those of the males without eating disorders on the Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, and Emotional Dysregulation subscales. The study sample and the males without eating disorders did not differ significantly on the remaining eight subscales.

Table 6. Comparison of EDI-3 Subscale Scores Between the Study Sample and Males Without Eating Disorders

	Study sample		Males without eating disorders (N = 43)		SE	<i>t</i>	<i>p</i>
	Mean	SD	Mean	SD			
Eating-disorder subscales							
Drive for Thinness	4.88	6.12	5.63	6.41	0.612	-1.2264	.2230
Bulimia	4.14	4.91	4.05	5.11	0.491	0.1835	.8548
Body Dissatisfaction	8.48	8.58	9.65	8.47	0.858	-1.3637	.1757
Psychological Subscales							
Low Self Esteem	4.12	5.33	3.95	5.16	0.533	0.3191	.7504
Personal Alienation	7.7	6.25	6.00	5.21	0.625	2.7201	.0077*
Interpersonal Insecurity	9.45	6.66	7.77	5.32	0.666	2.5244	.0132*
Interpersonal Alienation	8.52	6.10	7.00	5.61	0.610	2.4921	.0144*
Interoceptive Deficits	6.79	6.98	6.35	7.11	0.698	0.6306	.5298
Emotional Dysregulation	10.39	7.56	7.26	7.40	0.756	4.1411	.0001*
Perfectionism	10.68	5.25	11.23	4.92	0.525	-1.0466	.2978
Asceticism	6.15	4.93	6.53	4.43	0.493	0.7704	.4429
Maturity Fears	9.01	7.10	8.42	5.82	0.710	0.8305	.4083

SD = standard deviation; SE = standard error of the mean. * $p < .05$ in two-tailed *t*-test.

Substance Abuse and Its Relationship with Eating-Disorder Risk Factors

Research Question 3: What is the rate of substance abuse the sample?

Participants with a total AUDIT score of 8 or higher were considered to have substance abuse. As shown in Table 7, 79 participants were considered to have substance abuse, with a mean AUDIT score of approximately 17, and 21 participants were considered not to have substance abuse, with a mean AUDIT score of approximately 4.

Table 7. The Rate of Substance Abuse in the Study Sample, Based on Total AUDIT Score

	N	Mean AUDIT score	SD
Participants with substance abuse	79	16.64	8.04
Participants without substance abuse	21	4.14	2.26

SD = standard deviation.

Research Question 4: What is the relationship between eating-disorder risk factors and substance abuse in the sample?

Research Question 5: Does substance abuse predict eating-disorder risk factors?

Research Hypothesis 2: Substance abuse will predict eating-disorder risk factors.

The relationship between eating-disorder risk factors and substance abuse was examined through simple linear regression of each of the twelve EDI-3 subscale scores (dependent variables) on total AUDIT score (independent variable), in order to estimate the direction and strength of the association of eating-disorder risk factors and substance abuse. This analysis was based on the assumption that the relationship between eating EDI-3 scores and total AUDIT score was linear. A two-tailed *t*-test was used to test the significance of the associations. The results of the regression analysis are shown in Table 8.

All of the correlations were positive; as AUDIT score increased, the EDI-3 subscale scores increased. The regressions were statistically significant for six of the EDI-3 subscales: Bulimia, Interpersonal Insecurity, Interpersonal Alienation, Interoceptive Deficits, Emotional Deregulation, and Maturity Fears. The correlations between the EDI-3 subscale scores and the total AUDIT score for these six subscales ranged from .21 to .33, and the coefficients of determination ranged from .042 (Interpersonal Insecurity) to .108 (Emotional Dysregulation), indicating that substance abuse explained from 4.2% to 10.8% of the variability in these six eating-disorder risk factors. These results suggest that the association between eating-disorder risk factors and substance abuse, while positive, was generally weak.

Table 8. Regression of EDI-3 Subscale Scores on Total AUDIT Score for the Study Sample

	<i>r</i>	<i>r</i> ²	<i>t</i>	<i>p</i>
Eating-disorder subscales				
Drive for Thinness	.14	.019	1.39	.1689
Bulimia	.26	.067	2.66	.0090*
Body Dissatisfaction	.18	.032	1.81	.0731
Psychological Subscales				
Low Self Esteem	.17	.030	1.74	.0845
Personal Alienation	.19	.035	1.90	.0608
Interpersonal Insecurity	.21	.042	2.09	.0391*
Interpersonal Alienation	.21	.043	2.11	.0378*
Interoceptive Deficits	.23	.052	2.39	.0189*
Emotional Dysregulation	.33	.108	3.49	.0007*
Perfectionism	.01	.0001	0.11	.9117
Asceticism	.16	.025	1.66	.0998
Maturity Fears	.21	.044	2.19	.0312*

**p* < .05 in two-tailed *t*-test.

Research Question 6. What proportion of the sample is at risk for co-occurrence of substance abuse and eating disorders?

Contingency analyses were conducted in which substance abuse and eating-disorder risk factors were treated as a categorical variables, based on total AUDIT score of 8 or higher as signifying substance abuse and EDI-3 subscale score in the *elevated or typical* clinical range signifying risk for eating disorders. Table 9 shows the proportions of individuals considered to have substance abuse and also to be at risk for eating disorders, and who thus were considered to be at risk for co-occurrence of these disorders. The highest percentages of

individuals with co-occurrence were found for the following EDI-3 subscales: Interpersonal Insecurity (55%), Interpersonal Alienation (53%), Emotional Dysregulation (60%), and Maturity Fears (56%). However, chi-square tests for association of eating disorder risk with substance abuse found a significant association for only one EDI-3 subscale (Asceticism).

The results of the chi-square tests also are shown in Table 9

Table 9. Proportion of the Study Sample at Risk for Co-Occurrence^a and Results of Chi-square Test of Association Between Substance Abuse and Eating-Disorder Risk

	% at risk	Chi square	<i>p</i>
Eating-disorder subscales			
Drive for Thinness	6%	1.141	.8878
Bulimia	26%	2.048	.7270
Body Dissatisfaction	7%	1.398	.8445
Psychological Subscales			
Low Self Esteem	14%	1.330	.8562
Personal Alienation	32%	2.627	.5872
Interpersonal Insecurity	55%	5.566	.2339
Interpersonal Alienation	53%	8.316	.0807
Interoceptive Deficits	22%	2.294	.6819
Emotional Dysregulation	60%	4.881	.2997
Perfectionism	42%	2.764	.5961
Asceticism	19%	10.771	.0293*
Maturity Fears	56%	9.224	.0557

^aBased on *typical* or *elevated* EDI-3 subscale scores and total AUDIT score ≥ 8 .

* $p < .05$ in chi-square test.

Research Question 7. Are rates of co-occurrence of substance abuse and eating disorders in the sample consistent with those observed in other studies?

The proportion of individuals in this study considered to be at risk for co-occurrence of substance abuse and eating disorders varied according to the EDI-3 subscales, ranging from 7% (based on the Drive for Thinness subscale) to 60% (based on the Emotional Dysregulation subscale). The proportion was over 50% for four of the EDI-3 subscales; these levels were consistent with the findings of several studies reviewed by Dansky et al. (2000). The rate of bulimia nervosa among inpatient women diagnosed with alcohol-use disorders was as high as 44 % (Braun, Sunday, & Halmi, as cited in Dansky et al.). In other studies of outpatient women who met criteria for alcohol dependence, the rate of co-occurrence of bulimia nervosa was as high as 47% (Bulik, Sullivan, Carter, & Joyce, as cited in Dansky et al.).

Drinking Refusal Self-Efficacy

Research Question 8. What is the mean level of drinking refusal self-efficacy in the sample?

The DRSE scores for the study sample are summarized in Table 10. These results were consistent with the results reported by Oei et al. (1998) and Connor et al. (2000) for non-military samples of males with substance abuse. Table 10 also shows the DRSE scores reported by Connor et al. (data from Oei et al. are not included, because they were presented graphically).

Table 10. Mean DRSE Scores for the Study Sample and as Reported by Connor et al. for Non-military Males With Substance Abuse

	Study sample		Connor et al. (2000)	
	Mean	SD	Mean	SD
Total DRSE score	125.7	36.54	–	–
Social Pressure Self-Efficacy	44.25	14.00	41.22	11.43
Emotional Relief Self-Efficacy	44.34	16.56	50.50	11.45
Opportunistic Self-Efficacy	37.17	9.33	38.86	6.74

SD = standard deviation.

Research Question 9. What is the relationship between drinking refusal self-efficacy and substance abuse in the sample?

Research Hypothesis 3: Substance abuse will predict drinking refusal self-efficacy.

To determine whether substance abuse predicted drinking refusal self-efficacy score, the total DRSE score (dependent variable) was regressed on the total AUDIT score (independent variable). The results of the regression analyses for the total DSRE score and for the scores on the three DSRE subscales are shown in Table 11. The relationship between the two variables was inverse and statistically significant in all four analyses; as the AUDIT score increased, the DRSE score decreased. These results were as expected, as the lower the DRSE score, the more likely an individual is to perceive that he or she can refuse alcohol. Thus, total AUDIT score predicted total DRSE score and the scores on all three DRSE subscales.

Table 11. Regression of DSRE Scores on Total AUDIT Score for the Study Sample

	<i>r</i>	<i>r</i> ²	<i>t</i>	<i>p</i>
Total DRSE score	-.50	.25	-5.68	.0001*
Social Pressure Self-Efficacy	-.40	.16	-0.428	.0001*
Emotional Relief Self-Efficacy	-.48	.23	-5.40	.0001*
Opportunistic Self-Efficacy	-.47	.22	-5.31	.0001*

**p* < .05 in two-tailed *t*-test.

Research Question 10. What is the relationship between drinking refusal self-efficacy and eating-disorder risk factors in the sample?

Research Hypothesis 4: Drinking refusal self-efficacy will predict eating-disorder risk factors.

Each of the twelve EDI-3 subscale scores was regressed on total DRSE score. A significant inverse relationship was found between DRSE score and the scores on three EDI-3 subscales: Interpersonal Alienation, Emotional Dysregulation, and Maturity Fears. The results are summarized in Table 12. Although the amounts of variance in the EDI-3 subscale scores accounted for by drinking refusal self-efficacy were small (6% to 7% for the three subscales with significant regressions), the direction of the relationship also was inverse for all but one of the remaining nine subscales. Thus, it appears that drinking refusal self-efficacy had a weak but real inverse relationship with these three EDI-3 subscales. In other words, an individual's perception that he or she would not drink in a wide range of situations predicted low risk for developing eating disorders as assessed by certain EDI-3 subscales.

Table 12. Regression of EDI-3 Subscale Scores on Total DRSE Score for the Study Sample

	<i>r</i>	<i>r</i> ²	<i>t</i>	<i>p</i>
Eating-disorder subscales				
Drive for Thinness	-.12	.01	-1.16	.2501
Bulimia	-.18	.03	-1.77	.0799
Body Dissatisfaction	-.19	.03	-1.90	.0600
Psychological Subscales				
Low Self Esteem	-.12	.02	1.19	.2364
Personal Alienation	-.19	.04	1.97	.0511
Interpersonal Insecurity	-.12	.01	-1.21	.2308
Interpersonal Alienation	-.24	.06	-2.24	.0156*
Interoceptive Deficits	-.15	.02	-1.56	.01231
Emotional Dysregulation	-.27	.07	-2.80	.0061*
Perfectionism	.06	.00	.56	.5743
Asceticism	-.19	.04	-1.96	.0529
Maturity Fears	-.24	.06	-2.49	.0144*

**p* < .05 in two-tailed *t*-test.

CHAPTER 5: DISCUSSION

This chapter discusses the implications of this study with respect to the risk of co-occurrence of eating disorders and substance abuse by addressing the ten research questions posed in Chapter 1.

Rates of Eating Disorders in the Study's Sample

The first two research questions addressed were, What is the rate of being at risk for developing eating disorders in the sample? and How do eating-disorder risk factors in the sample compare with those in normative groups?

As discussed in Chapter 2, high rates of substance abuse have been found in individuals with eating disorders, particularly those with bulimia nervosa (e.g., Weideman & Pryor, as cited in Ranson et al., 2001). For this reason, the EDI-3's U.S. adult normative group for bulimia nervosa (Garner, 2004) was selected for comparison with the study sample of male military personnel who had been referred for substance-abuse treatment, despite the fact that the normative group consisted entirely of females. In comparisons of EDI-3 subscale scores, the study sample scored significantly lower than the females with bulimia nervosa on all of the subscales except Emotional Dysregulation. Although these results did not support the hypothesis that the two groups would have similar scores, they were not surprising, as it was not expected that military males with substance abuse would score higher on the EDI-3 than females diagnosed with having an eating disorder. However, it was surprising that the study sample scored significantly higher on the Emotional Dysregulation subscale than did the females with bulimia nervosa. Since the study sample consisted of individuals with

substance-abuse-related problems, the results support Garner's (2004) findings that suggest that elevated scores on the Emotional Dysregulation subscale are uncommon in non-clinical samples and may be indicative of a high level of psychopathology. Garner noted that an elevated score on this subscale is an "indicator of mood instability, recklessness, anger and self-destructiveness which may be associated with substance abuse related problems involving alcohol, drugs or both" (p. 70).

When compared with the females without eating disorders, the study sample scored significantly higher not only on the Emotional Dysregulation subscale, but also on the Personal Alienation, Interpersonal Insecurity, and Interpersonal Alienation subscales. According to Garner (2004), the Personal Alienation subscale "measures feelings of emptiness and aloneness and a poor sense of self understanding" (p. 62); the Interpersonal Insecurity subscale "assesses discomfort, apprehension and reticence in social situations" (p. 64) and "assesses the person's ability to express thoughts and feelings to others" (p. 64); and the Interpersonal Alienation subscale "assesses disappointment, distance, estrangement, and lack of trust in relationships" (p. 65). The elevated scores on these subscales are consistent with theories of personality used to explain the relationship between eating disorders and substance abuse, as reviewed by Wolfe and Maisto (2000). Personality disorders with emotional and erratic qualities have been found to be more prevalent among bulimics than among individuals with other types of eating disorders (Rossiter, Agras, Telch, & Schneider, as cited in Wolfe and Maisto), and other researchers who have used the role of personality in explaining co-occurrence have found equally high prevalences of substance

abuse among personalities that have anxious mood and fearful qualities. These qualities seem to be similar to the qualities measured by the above EDI-3 subscales.

When the study sample was compared with the clinical sample of males diagnosed with eating disorders, the study sample again scored significantly higher on the Emotional Dysregulation subscale. Although the study sample's scores were significantly lower than those of the males with eating disorders on nine of the twelve EDI-3 subscales, they did not differ significantly on the Interpersonal Insecurity, Interpersonal Alienation, or Maturity Fears subscales. This finding that the study sample either scored higher than or did not differ from the clinical sample of eating-disordered males on these particular subscales again supports the personality hypothesis that suggests that eating disorders and substance-abuse disorders share common psychological characteristics. It is also interesting to note that with respect to EDI-3 scores, the study sample resembled males with eating disorders more closely than females with bulimia nervosa.

When compared with males without eating disorders, the study sample scored significantly higher on the Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, and Emotional Dysregulation subscales, suggesting that males with substance abuse are at elevated risk for eating disorders based on these psychological risk factors. Again, these findings seem to support Garner's (2004) assertions that elevated scores on these psychological factors may be indicative of other types of psychopathology, particularly with respect to the Emotional Dysregulation subscale, which, as noted above, has been found to be elevated in individuals with substance abuse. Furthermore, because this analysis compared a sample of military males referred for substance-abuse treatment with a non-

clinical group of civilian males, it is possible that the higher scores of the study sample on these subscales were related to their military status; this could support the hypothesis that military males are at higher risk for developing eating disorders than are civilian males.

Although the study sample scored on average consistently higher than the comparison groups on the Emotional Dysregulation subscale and on certain other psychological subscales, the sample scored consistently lower on the primary eating-disorder-related subscales (Drive for Thinness, Bulimia, and Body Dissatisfaction). Interestingly, women without eating disorders scored higher on the Drive for Thinness and Body Dissatisfaction subscales than did military males with substance abuse. These results support the many studies which suggest that, in general, women have greater concerns than men do with respect to maintaining a desired body image. This finding is consistent with results of Lewinsohn et al.'s (2002) study of co-occurrence, which investigated the utility of the Eating Disorders Symptoms Questionnaire (EDSQ) as a measure that would be suitable for assessing eating disorders in both men and women. Lewinsohn et al. found that the scores on the Body Dissatisfaction and Drive for Thinness subscales of the EDSQ were significantly lower for men than for women. The researchers suggested that "future studies need to add questions pertaining to feeling fat that are less weighted toward female bearing fat-bearing body parts" (p. 236). These results suggest that body-image-related issues are not expressed in the same manner by males with substance abuse as by females either with or without eating disorders; thus, future research needs to focus on understanding body-image-related concerns as they are manifested in males.

Substance Abuse

Research questions related to substance abuse were, What is the rate of substance abuse in the sample? What is the relationship between eating-disorder risk factors and substance abuse in the sample? and Does substance abuse predict eating-disorder risk factors? The severity of substance abuse was measured by total AUDIT score. Based on an AUDIT score of 8 or higher, 79% of the sample was considered to have alcohol abuse. Given that the individuals recruited for the study had been referred as a result of problems related to substance abuse, primarily alcohol abuse, the rate of substance abuse in the sample was as expected.

The relationship between eating-disorder risk and substance abuse was addressed by examining the relationship between the total AUDIT score and the scores on the EDI-3 subscales. Although the correlation between eating-disorder risk factors and substance abuse was generally weak, total AUDIT score predicted the score on the Bulimia subscale, which is one of the three primary eating-disorder risk factors. Total AUDIT score also predicted scores on the Interpersonal Insecurity, Interpersonal Alienation, Emotional Dysregulation, and Maturity Fears subscales.

When substance abuse and eating-disorder risk factors were analyzed as categorical variables, the associations between them generally were not statistically significant. It is important to note, however, that individuals in the sample were referred for substance-related problems and thus could be considered a clinical sample with respect to substance abuse. Therefore, those considered to have substance abuse by virtue of having a total AUDIT score of 8 or higher were in effect a subset of the larger group of individuals who had already been

identified as having substance-abuse-related problems. Generally, substance abuse did not seem to be a strong predictor of eating disorders; however, it appeared to have a strong association with certain psychological risk factors associated with eating disorders.

Co-occurrence of Eating Disorders and Substance Abuse

The next questions addressed were, What proportion of the sample is at risk for co-occurrence of eating disorders and substance abuse? and Are rates of co-occurrence in the sample consistent with those observed in other studies?

The portion of the study sample considered to be at particular risk for co-occurrence was the subset of individuals with AUDIT scores of 8 or higher and also EDI-3 subscale scores in the *typical* and *elevated* ranges. For this subset, the percentage of scores in the *typical* or *elevated* range was over 50% for four of the subscales: Interpersonal Insecurity, Interpersonal Alienation, Emotional Dysregulation, and Maturity Fears. These results, suggesting co-occurrence based on certain psychological measures, were consistent with studies that found rates of eating-disorder risk of up to 47% among individuals with substance-abuse disorders (Bulik et al., 1997).

The results of this study suggest that military personnel with substance abuse do not appear to be at higher risk for developing eating disorders than females without eating disorders. However, when compared with males without eating disorders, the sample scored significantly higher on the EDI-3 subscales for Personal Alienation, Interpersonal Insecurity, Interpersonal Alienation, and Emotional Dysregulation. The most striking difference between the study sample and the comparison groups was on the Emotional Dysregulation scale.

However, as noted above, Garner (2004) emphasized that the elevated scores on EDI-3 subscales must be interpreted with caution, and that eating-disorder risk cannot be determined solely from EDI-3 subscale scores. Garner cautioned further that most individuals with eating disorders do not report problems with substance abuse; he cited Kozyk et al. as noting that elevated levels of psychological risk factors associated with eating disorders in individuals with substance abuse “may be an artifact of the relationship between personality disorders and hazardous alcohol use” (p. 71).

The results of this study suggest that before one can conclude that elevated scores on certain EDI-3 psychological subscales are sufficient indicators for the risk of co-occurrence of substance abuse and eating disorders, further research is needed that incorporates the use of a combination of standardized eating-disorder screening tools and clinical interviews. With respect to the EDI-3’s primary eating-disorder-related subscales, the study sample did not differ significantly from the males without eating disorders. Had these groups differed significantly on these primary eating-disorder-related subscales, and if a high degree of correlation between eating-disorder risk factors and substance abuse in general had been observed, this would have been better indication that substance abuse predicted co-occurrence of eating-disorder risk factors.

Drinking Refusal Self-Efficacy

The final three research questions were, What is the mean level of drinking refusal self-efficacy in the sample? What is the relationship between drinking refusal self-efficacy and substance abuse in the sample? and What is relationship between drinking refusal self-efficacy and eating-disorder risk factors in the sample?

To determine whether the DRSE scores for the study sample were typical of individuals with substance abuse, the results were compared with those of other studies of comparable non-military samples (Oei et al., 1998; Connor et al., 2000). The results were similar, suggesting that the military males with substance abuse sampled in this study and the non-military males with substance abuse sampled in the other studies were similar with respect to drinking refusal self-efficacy.

Regression analysis showed that total AUDIT score and DRSE scores had a significant inverse relationship. Thus, total AUDIT score significantly predicted drinking refusal self-efficacy, which supports previous studies related to correlation of the DSREQ with other similar measures of alcohol consumption, such as the Michigan Alcoholism Screening Test (Young et al., 1991). In other words, individuals who had high AUDIT scores reported feeling less able to resist alcohol use in various situations, as would be expected.

To determine the relationship between drinking refusal self-efficacy and eating-disorder risk factors, scores on the twelve EDI-3 subscales were regressed on total DRSE score. The results indicated a significant negative relationship between the DRSE score and the Interpersonal Alienation, Emotional Dysregulation, and Maturity Fears subscale scores, for which the total AUDIT score also was predictive.

Social Learning Theory

It was important to examine the relationship between eating disorders within a theoretical framework that has been used to understand the manifestation of risk factors common to both disorders. Albert Bandura's (1977) social learning theory was selected as the theoretical framework because it has been extensively researched and applied toward

understanding the psychological and emotional factors, such as anxiety and depression, that are common risk factors for both eating disorders and substance abuse. One of the central tenets of Bandura's theory, which has been extensively researched, is the concept of self-efficacy as it relates to substance abuse. The concept of self-efficacy specifically as it relates to drinking refusal was applied toward explaining the relationship between eating disorders and substance abuse and ultimately toward understanding the risk for co-occurrence of these disorders.

As discussed above, this study found a significant inverse relationship between the three factors of the DRSEQ and the EDI-3 Interpersonal Alienation, Emotional Dysregulation, and Maturity Fears subscales. In addition, AUDIT scores significantly predicted the scores for the three factors of the DRSE, again in an inverse relationship.

These results suggest that drinking refusal self-efficacy may be a mediating factor in the development of co-occurrence of substance abuse and eating disorders. The relationship between drinking refusal self-efficacy and eating disorders and the relationship between drinking refusal self-efficacy and substance-abuse disorders appear to share common psychological risk factors. For example, total AUDIT score had a significant positive relationship with the EDI-3 Emotional Dysregulation subscale ($r = 0.33$) and a significant inverse relationship ($r = -.48$) with the DRSEQ Emotional Relief Self-Efficacy factor score. Furthermore, total DRSE score had a significant inverse relationship with the EDI-3 Emotional Dysregulation subscale ($r = -0.27$). These results suggest that an individual's ability to regulate emotions, a risk factor for eating disorders that has been found to be elevated in individuals with substance abuse (Garner, 2004), may be a mediating factor

related to an individual's perceived ability to refuse alcohol, particularly for those whose alcohol use is related to emotional relief. In addition, the EDI-3 Interpersonal Insecurity subscale was positively related to total AUDIT score and inversely related to the DRSEQ Opportunistic Drinking Refusal Self-Efficacy factor, suggesting a similar relationship between the ability to express thoughts and emotions and the perceived ability to refuse alcohol.

The study's results, in which military personnel with substance abuse scored on average significantly higher than the four comparison groups on particular psychological measures, highlight the importance of including assessment tools that assess psychological factors, particularly those associated with emotional regulation. The results may have implications for screening and assessment of co-occurrence by substance-abuse facilities, particularly in facilities that treat military personnel.

Limitations

The research design had several limitations. One of the limitations was that selection of all participants from a pool of individuals who had been referred to the facility as result of substance-abuse-related behaviors resulted in a homogeneous sample; consequently, the results might not necessarily generalize to the entire military population. Another possible limitation is that the term *substance abuse* was used both to refer to the entire sample (i.e., when comparing the sample's means with those of the comparison groups) and to refer specifically to the extent of substance abuse as measured by individuals' total AUDIT scores (i.e., in using a total AUDIT score of 8 or higher as a cutoff for the categorical analyses).

Using the term interchangeably thus may have somewhat obscured understanding of the relationship between substance abuse and eating-disorder risk factors.

In addition, demographic variables, such as race and ethnicity, were not controlled for; therefore, this study did not address the possible effects of an individual's race or cultural background (environment) on the understanding of co-occurrence of substance abuse and eating disorders among males of various ethnic backgrounds.

Another limitation of the study was that the use of simple linear regression methods provided limited statistical information with respect to the interactions among the variables of interest. Multiple regression analysis could have provided additional information about interactions among the variables of interest and their overall effects on risk for co-occurrence of substance abuse and eating disorders.

In addition, reliance on an instrument, the EDI-3, for which the normative groups consisted entirely of females could have limited the study's ability to assess attitudes and behaviors commonly expressed by males at risk for eating disorders that may not have been reflected in the EDI-3 scores. Garner (2004) emphasized that the EDI-3 should be used in combination with other measures for the assessment of eating disorders. This study did not utilize other measures for determining eating-disorder risk factors in combination with the EDI-3. Use of a clinical interview would have allowed further clarification of participants' responses and provided the opportunity to explore participants' patterns of responses.

Recommendations for Practice

The first recommendation for future practice is for practitioners to assess the extent to which an individual's substance abuse has implications for practice, as it appears that the

severity of substance abuse would be an important factor to consider when examining the relationship between substance abuse and eating disorders. Elevated scores in measures that assess substance abuse could be the first step toward making clinical decisions with respect to further screening for risk of eating disorders. For both practice and research, is important to make a clear distinction between alcohol abuse and alcohol dependence (as defined by the *DSM-IV-TR*). It appears that the extent to which severity of substance abuse predicts eating disorders is an important factor in determining the appropriateness of screening for eating disorders in individuals experiencing substance-abuse-related problems. Determining the severity of the individual's substance abuse has implications for making clinical decisions with respect to the screening and assessment of eating disorders in individuals with substance-abuse-related problems. For example, the practitioner could use total AUDIT cutoff scores as an indicator for determining whether the individual needs to be screened for eating disorders or whether the individual may benefit from education with respect to eating-disorder prevention. In addition, high total AUDIT scores could serve as an indicator for further probing regarding attitudes and behaviors to assess eating-disorder risk factors and determine whether further eating-disorder assessment is recommended.

The second recommendation is for practitioners to consider the use of the DRSEQ as part of the assessment process for individuals with substance abuse, and that the results of the DRSEQ be examined in combination with tools that screen for eating disorders, which would be the first step in screening for the risk of co-occurrence of substance abuse and eating disorders.

The final recommendation is for practitioners to use standardized screening methods that incorporate questions that assess eating-disorder-related attitudes and behaviors commonly expressed by males (e.g., excessive exercise), such as the Eating Disorders Symptoms Questionnaire (Lewinsohn et al., 2002), which may be used in the assessment of eating disorders in both males and females.

Recommendations for Further Research

Further research is needed to determine whether military personnel with substance-abuse disorders are at greater risk for developing eating disorders than their civilian counterparts. In addition to research that examines whether severity of substance abuse is a factor in determining co-occurrence of these disorders, another possible question for further study is whether the sequence in which the disorders develop plays a role in their development. For example, research could address the question of whether administering the AUDIT to individuals with eating disorders would yield correlations between EDI-3 and total AUDIT scores similar to those observed in this study.

Another potential area of research might be the application of theories of addiction toward examining the relationship between substance abuse and eating disorders. The application of addiction theories that focus on the physiological effects of alcohol to explain the etiology of substance abuse might be useful toward exploring shared factors that could explain the etiology of co-occurrence of alcohol abuse and eating disorders.

Additional research also is needed to examine the extent to which issues related to emotional regulation and other psychological risk factors might be mediating factors in both in eating disorders and substance-abuse disorders. Further study in this area would also be

recommended in order to examine the relationship between these psychological risk factors and levels of drinking refusal self-efficacy. For example, research is needed to examine whether personality traits that are assessed by EDI-3 subscales are correlated with the personality traits that underlie the DRSE factor scores.

It appears that an individual's level of drinking refusal self-efficacy as it relates to emotional regulation is a psychological factor shared by individuals at risk for eating disorders and individuals with substance-abuse disorders. Further research is recommended to examine whether the association of the individual's ability to regulate emotions with drinking refusal self-efficacy is also a common factor in the co-occurrence of the two disorders (i.e., does drinking refusal self-efficacy predict co-occurrence?).

Conclusions

This study made an effort toward examining the relationship between eating disorders and substance abuse and the risk of their co-occurrence in order to determine whether there is a need to address eating-disorder risk factors in individuals affected by substance abuse.

One interesting finding was that the study sample's mean scores were higher on several EDI-3 subscales than were those of a sample of civilian males without eating disorders. These findings suggest that military male personnel with substance abuse may be at risk for eating disorders with respect to these particular subscales. However, no significant difference between the two groups was found on the three primary EDI-3 subscales related to risk for developing eating disorders. The most striking difference between the study sample and all four comparison groups was on the EDI-3 Emotional Dysregulation subscale; the

study sample's score was consistently higher, suggesting that emotional dysregulation may be a mediating factor in both substance abuse and eating disorders.

The study's overall findings suggest that individuals with substance abuse experience psychological risk factors that are related to the development of eating disorders. In addition, the study's findings suggests that an individual's perceived ability to resist alcohol may also be associated with common psychological risk factors that are related to the development eating disorders and substance-abuse disorders. The results have implications for future research and practice toward considering screening for eating disorders in military personnel with substance-abuse disorders and using drinking refusal self-efficacy measures as part of the screening and assessment processes when the co-occurrence of these two disorders is likely.

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APPENDICES

Appendix A: Sample EDI-3 Items

1. I eat sweets and carbohydrates without feeling nervous.

21. I get confused about what emotion I am feeling.

49. If I gain a pound I worry that I will keep gaining.

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Appendix B: The AUDIT Questionnaire

Questions	0	1	2	3	4	
Box 10						
The Alcohol Use Disorders Identification Test: Self-Report Version						
<p>PATIENT: Because alcohol use can affect your health and can interfere with certain medications and treatments, it is important that we ask some questions about your use of alcohol. Your answers will remain confidential so please be honest.</p> <p>Place an X in one box that best describes your answer to each question.</p>						
1. How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week	
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more	
3. How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
4. How often during the last year have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
5. How often during the last year have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
8. How often during the last year have you been unable to remember what happened the night before because of your drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily	
9. Have you or someone else been injured because of your drinking?	No		Yes, but not in the last year		Yes, during the last year	
10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?	No		Yes, but not in the last year		Yes, during the last year	
					Total	

Appendix C: DRSEQ Instructions and Sample Items

Instructions for Completing the DRSEQ

The following items ask you to describe your ability to handle drinking situations. Your answers will be completely confidential, so please try to answer as honestly as you can.

The following pages contain a list of situations in which people find themselves drinking alcohol. Most people find it easier to resist drinking in some of these situations than others. Please circle the number beside each statement which best describes how much you could resist drinking in each case.

1	2	3	4	5	6
I am very sure I would drink	I most likely would drink	I probably would drink	I probably would NOT drink	I most likely would NOT drink	I am very sure I would NOT drink

Example:

HOW SURE ARE YOU THAT YOU COULD RESIST DRINKING ALCOHOL?

When your spouse or best friend is drinking..... 1 2 3 4 5 6

If you think that you would most likely drink too, then circle the number 2, or the number (1 though 6) of the best answer for you.

Sample Items

How sure are you that you would resist drinking alcohol?

1. When you are out with friends
2. When you are out playing pool with friends
3. When you are watching TV
4. When you see others drinking
5. When you are uptight
6. When you are angry

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Appendix D: Recruitment Script

Script to be followed by Researcher when recruiting volunteers at the FACILITY orientation.

Hello Everyone,

My name is Wilmina Rosario, and I am doctoral student at North Carolina University. I am conducting a research for my doctoral dissertation that aims to study the risk factors that are associated with eating disorders and substance abuse in the military population.

I hope that the study will help us in understanding the risks of developing eating disorders in individuals with substance abuse.

I am here to ask for volunteers who would like to participate in this study. The study entails comparing your AUDIT score, which you completed at the time of your screening, and your DRSEQ scores, which you just completed at this orientation session, with your score on the EDI-2 [EDI-3], which I will ask you to complete.

The EDI-2 [EDI-3] is a 91-item questionnaire, self-report measure that measures symptoms associated with anorexia nervosa and bulimia nervosa and will take you approximately 20 minutes to complete.

I will be available to answer any questions you may have about the study this morning, this afternoon, tomorrow morning prior to beginning your day at FACILITY, or you may schedule a time with me that is more convenient for you. During this time you can also ask me any other questions that you may have about the study.

Your data will remain confidential, as the data will not be able to be tracked back to you.

Participation in this study is strictly voluntary, and your participation or lack of participation has no bearing on your participation in treatment status at the FACILITY program.

If you are interested in volunteering for the study, you may remain in the classroom. I will be going over with you in detail an Informed Consent Form for Research. For those of you who are not interested in participating in the study, you are free to leave.

Thank you all for your attention.

Appendix E: Researcher's Standard Statement and Description of Study

Researcher's Standard Statement

“For participants who express an interest in obtaining more information about the study such as yourself, the following is additional information and a brief description of the study are provided for your information. The researcher will not discuss your particular EDI-2 [EDI-3] scores with you since the study does not encompass interpretation of scores or employ procedures which may be considered diagnostic in nature. However, the following is brief background and description of the study's purpose designed to answer some of the questions which participants may have.”

Description of Study.

- I. The study's first purpose is to add to society's understanding with respect to the occurrence of eating disorders.
- II. In addition, because there is very little research related to risk factors associated with eating disorders in military personnel this research aims to expand our knowledge of eating disorders particularly in males
- III. The third purpose of the study to add to the understanding of risk factors associated with eating disorders in individuals with substance abuse.

We hope that this research can lead to future research that can help prevent and treat individuals with both substance abuse and eating disorders.

If you have any further questions about the research or information, please see contact information in your Informed Consent Form for Research form.

Thank you again for volunteering to participate in this research.

Sincerely yours,

Wilmina B. Rosario