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A Comparison of Eating Attitudes and Behavior and General Psychological Characteristics in
Bulimics and Bodybuilders

Gary S. Goldfield, M. A.

A thesis submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of
Doctor of Philosophy

Department of Psychology
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submitted by

Gary S. Goldfield

in Partial fulfillment of the requirements for
the degree of Doctor of Philosophy

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Abstract

Although not conclusive, research has shown that sports and activities that emphasize leanness for enhanced performance or appearance are associated with an increased risk of developing body dissatisfaction, eating disturbances and frank eating disorders. Bodybuilders, who strive to obtain a lean and mesomorphic ideal, have reported significantly more body dissatisfaction, weight and shape preoccupation, and eating disturbances compared to athletic groups and non-athletic controls (Goldfield et al., in press). Few studies have examined gender differences in eating psychopathology and associated characteristics in bodybuilders. No study to date has employed a concurrent sample of eating disorder subjects in examining eating-related pathology in bodybuilders, making comparisons between these groups problematic.

The goal of the present study was to extend the literature by directly comparing male and female bulimics, competitive bodybuilders and recreational bodybuilders on eating disorder attitudes and behavior and associated psychological characteristics. The volunteer sample of 145 participants was comprised of 48 bulimics (23 males, 25 females), 47 competitive bodybuilders (27 males, 20 females), and 50 recreational bodybuilders (25 males, 25 females). Standardized measures of eating and general psychopathology were administered in a manner that encouraged honest responding.

Results indicate that compared to bulimics, competitive and recreational bodybuilders reported significantly less body dissatisfaction, eating-related disturbances and general psychopathology. No significant differences on these dimensions emerged between competitive and recreational bodybuilders. Bulimic females reported significantly more eating-related pathology than male bulimics, but no significant gender differences emerged in bodybuilders on

eating disorder symptoms or on general (non-eating related) psychological factors. Hierarchical regression analyses indicated that dysfunctional attitudes relating to over valuing body weight and shape significantly predicted eating disturbances in bodybuilders and bulimics.

Steroid use was significantly more prevalent in competitive bodybuilders compared to recreational bodybuilders. In addition, hierarchical regression analyses indicated that frequency of binge eating emerged as the best predictor of steroid use in competitive bodybuilders, followed by general dysfunctional attitudes and feelings of ineffectiveness. This suggests that competitive bodybuilders who use steroids may be at risk for developing serious binge eating problems that may lead to Binge Eating Disorder.

Male bodybuilders reported significantly more weight and shape preoccupation and body dissatisfaction compared to a normative sample of males; whereas female bodybuilders reported significantly less bulimic tendencies and less body dissatisfaction compared to a normative female sample. These findings suggest that as a group, male bodybuilders in the present study may be at increased risk of developing an eating disorder and female bodybuilders may be at lower risk. Importantly, a sub-group of male and female bodybuilders, which tend to be defined by competitive status, reported elevated rates of regular binge eating, weight and shape preoccupation, and unhealthy weight control and physique enhancement practices. In pursuit of the lean and mesomorphic ideal, this sub-group of bodybuilders show considerable vulnerability for developing Binge Eating Disorder and/or Bulimia Nervosa (BN).

Clinical and health implications of these findings, as well as five recommendations for preventing potentially harmful eating and body modification practices associated with bodybuilding, and ideas for future research are provided.

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Introduction

Bulimia nervosa (BN) is a psychiatric disorder characterized by episodes of binge eating and purging and over valuing body weight and shape (Diagnostic and Statistical Manual for Mental Disorders (DSM-IV), American Psychiatric Association (APA, 1994; shown in Appendix A). BN has been reported to be associated with considerable medical consequences including an increased risk of premature mortality (Kaplan & Woodside, 1987; Pope & Hudson, 1989). The incidence of this disorder is highest among adolescent and young adult women (1-5%), with the disorder reported to afflict 0.2% of adolescent boys and young adult men (Carlat & Camargo, 1991; Fairburn & Beglin, 1990; Pemberton, Vernon, & Lee, 1996).

One influential approach to understanding and treating eating disorders stems from cognitive theory. According to cognitive theory, various psychopathological conditions such as anxiety disorders, depressive disorders, personality disorders, as well as eating disorders result from a systematic bias in the individual's cognitions (e.g., beliefs, attitudes, assumptions, and perceptions) and/or processing of information (Beck & Weishaar, 1989; Meichenbaum, 1977). Individuals with eating disorders have been described as holding the central belief that self-worth and social acceptability are determined by weight and shape (Beck & Weishaar, 1989; Garner, 1986; Fairburn Cooper & Cooper, 1986). The centrality of this belief is a defining characteristic of BN (e.g., see DSM-IV criteria in Appendix A). Those with BN are said to hold the dysfunctional belief that, "to be fat is to be a failure, unattractive, and unhappy" (Fairburn, et al., 1986), which according to cognitive theory, fosters a morbid fear of being fat and precipitates strict dieting and abnormal eating and weight control practices

(Beck & Weishaar, 1989; Fairburn, et al., 1986). Following from the conceptualization of emotional disorders as resulting from faulty information processing and misguided beliefs, cognitive therapy attempts to identify and replace dysfunctional cognitions with more adaptive cognitive styles.

The media's portrayal and glorification of thinness as the standard of beauty for females has long been suggested as playing a precipitating role in body image disturbances and eating disorders among women (Garner, Garfinkel, Schwartz, & Thompson, 1980). More recently, in addition to thinness, the media are emphasizing a physically fit standard of beauty for women, characterized by a lean and toned body (Brownell, 1991).

It was previously believed that compared to women, men were relatively unaffected by sociocultural pressures to possess a specific body type (Fallon & Rozin, 1985). Recent research, however, indicates that young men may be increasingly susceptible to media messages that portray the extreme mesomorph (i.e., lean and muscular body) as the culturally sanctioned ideal male body shape (Butler & Ryckman, 1994; Cash, Winstead & Janda, 1986; Lamb, Jackson, Cassidy, & Priest, 1993). Body shape and size have been purported to play a central role in the development of young men's self-esteem, and the various pressures for men to conform to an aesthetic ideal (mesomorphy) have been hypothesized to intensify and produce body image disturbances and other negative psychological effects in men in similar ways that it has in women (Mishkind, Rodin, Silberstein, & Striegel-Moore, 1986). Research during the last twelve years supports these authors' hypotheses, as males have reported body dissatisfaction typically indicating a perception of being thinner than ideal (Drewnowski & Yee, 1987;

Mintz & Betz, 1986). This dissatisfaction, in turn, is associated with proneness to depression and problems with self-esteem (Davis, Brewer, & Weinstein, 1993; Harnatz, Gronendyke, & Thomas, 1985; McCaulay, Mintz, & Glenn, 1988).

With a cultural milieu endorsing mesomorphy as the standard of attractiveness for males, and a lean, toned, and physically fit body representing the current female ideal, it is not surprising that bodybuilding has recently become a popular activity for men and women. Bodybuilding has been broadly defined as the systematic use of progressive weight training in order to increase one's muscle size, and enhance muscle shape and tone (International Federation of Bodybuilders; IFBB, 1995). The dramatic rise in the popularity of bodybuilding is reflected by a proliferation of popular magazines promoting new regimens for adding lean muscle mass, reducing body fat, and enhancing body size and shape for men and women (Klein, 1986). However, the increase in popularity of bodybuilding has not been accompanied by a concomitant increase in scientific inquiry concerning the possible psychological effects of bodybuilding. The majority of initial research has shown that male bodybuilders exhibit a psychological profile similar to that seen among individuals with BN. For example, male bodybuilders reported more severe body dissatisfaction, preoccupation with weight and shape, and/or significantly more pathological eating and weight control practices such as binge eating, dieting, fasting, excessive exercise, and use of diuretics and laxatives in comparison to athletic comparison groups (Blouin & Goldfield, 1995; Franco, Tamburino, Carroll, & Bernal, 1988; Loosemore & Moriarty, 1990) and non-athletic controls (Loosemore & Moriarty, 1990). Several other studies that did not incorporate comparison groups also revealed high rates of disordered eating, unhealthy weight control practices and weight and shape

preoccupation in male bodybuilders (Anderson, Barlett, Morgan & Brownell, 1995; Pope, Katz, & Hudson, 1993; Sandoval, Heyward & Lyons, 1989). It is important to note that these disordered eating attitudes and behaviors and body dissatisfaction reported in male bodybuilders were particularly prominent in those who used anabolic steroids to enhance muscle size and shape. The studies that investigated eating-related characteristics among female bodybuilders, however, yielded inconsistent findings (Guthrie, Ferguson, & Grimmer, 1994; Lamar-Hildebrand, Saldanha, & Endres, 1989; Pasma & Thompson, 1988; Walberg & Johnston, 1991). Although eating-related disturbances have been found to be more prominent among competitive bodybuilders than among recreational bodybuilders (Lamar-Hildebrand et al. 1989; Walberg & Johnston, 1991), they have also been reported among recreational bodybuilders who did not intend to compete (Blouin & Goldfield, 1995; Loosemore & Moriarty, 1990; Pope et al., 1993).

Although suggestive of eating disordered attitudes and behavior, it is important to note that conclusions regarding the similarity of psychological and behavioral profiles between bodybuilders and people with BN must remain tentative due to several methodological limitations in the research. For example, no published study to date has employed a concurrent sample of eating disorder subjects in the investigation of eating disorder behavior in bodybuilders. In addition, several studies used either non-standardized inventories (Andersen et al., 1995; Freeman, 1987; Lamar-Hildebrand et al., 1989; Loosemore & Moriarty, 1991) or unconventional (ethnographic) procedures (Klein, 1987). Moreover, the majority of studies focused on eating-related pathology to the exclusion of more general (non-eating related) psychological characteristics, thereby yielding a limited psychological profile of bodybuilders.

Another limitation in the research concerning eating disorder symptoms among bodybuilders is the absence of a prominent theoretical orientation guiding the studies. Although symptom-based investigations are typical of most developing lines of research, it has been noted that utilizing a theoretical paradigm may provide a better understanding of complex relationships between variables, therefore facilitating the development of effective interventions (e.g., Bandura, 1986; Fairburn, 1995).

The purpose of the present study is to advance the study of eating disordered attitudes and behavior and related psychological factors in bodybuilders by using improved methodology and deriving guiding questions not only from previously reported empirical data, but also from a well grounded theoretical perspective. The investigation of possible gender effects is important as very few studies have comparatively examined eating-related disturbances and psychological profiles of male and female bodybuilders, and it is therefore not clear that the profiles are comparable. The proposed study is also designed to use a theoretical framework to guide research concerning bodybuilders' possible maladaptive attitudes and core beliefs. Evaluation of maladaptive attitudes and core beliefs associated with body size, shape and weight represents an important aspect in this study as research has identified these characteristics to predict severity of bulimic symptoms and treatment outcome among individuals with BN (Fairburn et al., 1991; Schulman et al., 1986; Thompson, Berg, & Shatford, 1987). Identifying bodybuilders' underlying cognitions (e.g., beliefs and attitudes) may be an important step in the development of programs designed to prevent and/or treat eating-related disturbances and dangerous physique enhancement practices which may accompany bodybuilding.

The literature review that follows will begin by providing prevalence statistics of BN and describing what is known or suspected of the origins and phenomenology of this eating disorder. The question of gender differences will also be examined. Following this, the cognitive model will be presented as it applies to BN because it represents the theoretical framework in which this study is grounded. The cognitive model was selected because it is considered to be the most commonly cited, parsimonious, and heuristically useful model to explain the etiology and maintenance of BN (e.g., Fairburn, 1995; Fairburn, Marcus & Wilson, 1993). Applying the cognitive model in this study allows a conceptualization of body image disturbances and eating-related pathology among bodybuilders that is consistent with the approach used by many clinicians. Following a discussion of the cognitive model applied to BN, sociocultural factors thought to influence the development of body image disturbance and eating disorders will be presented. This section will also attempt to explain how cultural pressures may help to shape a dysfunctional cognitive set. Then, the prevalence of body image disturbance and psychological sequelae among men and women will be reviewed. The literature review will conclude by examining eating disorder attitudes and behavior in a variety of sports and activities with a specific focus on weight training and bodybuilding.

Overview of Bulimia Nervosa

Definition and Prevalence

The description of a syndrome of bulimia, including those of average and above average weight, was first explicitly reported by Russell (1979). This clinician described 30 patients who suffered from an eating disorder characterized by an irresistible urge to overeat followed by vomiting and a morbid fear of becoming fat. Although Russell (1979) noted that it would be premature to think of the disorder as constituting a distinct syndrome, the clinical picture presented is consistent with that of BN as currently defined in the DSM-IV (APA, 1994). One year after Russell's report, this binge-purge syndrome was categorized as a distinct disorder with the label "bulimia" in the DSM-III (APA, 1980). "Bulimia" was officially changed to "bulimia nervosa" in the subsequent edition; the DSM-III- Revised (APA, 1987). The addition of the term "nervosa" refers primarily to the psychological characteristics of bulimia which were previously absent, namely, the over concern and preoccupation with body shape and weight.

Eating disorders are one of a few psychiatric illnesses that may result in death if untreated. Although anorexia nervosa (AN) and BN are eating disorders that are characterized by body dissatisfaction and an intense fear of becoming fat, differences between the disorders exist. AN is characterized by a disturbance in perception of body size and weight whereby the individual claims to "feel fat" even when appearing emaciated. This distorted body image perception may be present in someone with BN but is not necessary for a diagnosis. In addition, a weight criterion is present for a diagnosis of AN in which people must weigh at least 15% below normal weight for age and height. No such weight criterion is required for a diagnosis of BN. Moreover,

people with AN typically try to lose weight by restricting their caloric intake, whereas people with BN typically use inappropriate methods of weight control such as self-induced vomiting, laxatives or diuretics. It is important to note, however, that bulimic symptoms have often been reported to occur in anorexics, and some bulimics engage in starvation or excessive dieting as primary methods of preventing weight gain that are characteristic of AN. These overlapping symptoms has led to the classification of AN and BN into sub-types in the DSM-IV (APA, 1994; see Appendix A).

Individuals with AN who primarily use starvation and/or excessive exercise to prevent weight gain are referred to as “restricting type” in the DSM-IV (APA, 1994). However, when anorexics regularly engage in binge eating or purging (or both) by means of self-induced vomiting, or use of laxatives or diuretics, they are classified in the DSM-IV as “binge-eating/purging type” (APA, 1994).

Individuals with BN who regularly engage in self-induced vomiting or the misuse of laxatives, diuretics, or enemas during the current episode are classified as “purging type” in the DSM-IV (APA, 1994). Individuals diagnosed with BN who use other inappropriate compensatory methods such as fasting or excessive exercise, but not self-induced vomiting, diuretics, or laxatives, are classified as “non-purging type”.

Serious medical problems have been reported to be associated with BN. These include electrolyte imbalances, gastrointestinal disturbances, kidney and liver dysfunction and cardiovascular problems (Kaplan & Woodside, 1987; Mitchell, Hatzukami, Pyle, & Eckert, 1986). Moreover, the risk of death among BN patients is believed to be to be several times greater than that of a normal, age and sex matched population (Pope &

Hudson, 1989). The substantial morbidity and mortality risk associated with BN emphasizes the importance of developing effective interventions.

Research suggests that the incidence of BN is highest among female adolescents and young adult women (1-5%), with the disorder occurring in only 0.2% of adolescent boys and young adult men (Carlat and Camargo, 1991; Fairburn & Beglin, 1990). These prevalence rates are considerably lower than those from studies in the 1980's, which reported incidence figures for BN that ranged from 2% for non student female populations to as high as 15% for student female populations (Pope & Hudson, 1989). The differences in prevalence rates reported in these studies may be due to various factors; however, the different diagnostic criteria used in bulimia research studies may be the most likely explanation. The DSM-III-R, developed in 1987, has more stringent criteria therefore prevalence rates tend to be lower than when DSM-III (1980) criteria are used, which are less strict. Other factors which may be responsible for the variation of prevalence rates reported in the eating disorder literature include differences in assessment methods (questionnaires versus interviews) and differences in the populations sampled. Taking these methodological differences into account, studies suggest that about 10-15% of bulimics in the community are male; however, only about 5% of clinical samples are males (Carlat & Camargo, 1991; Pope & Hudson, 1989). This discrepancy suggests that males may be less likely to seek treatment (or even recognize the problem) for what is considered a "feminine" disorder.

It has been noted that eating disorders are more prevalent in the upper socioeconomic classes than among lower income groups (Bruch, 1974). However, a

more recent review of the literature showed this popular belief to be unfounded (Pope & Hudson, 1989).

Psychological and Behavioral Profile

The binge-purge syndrome represents the most defining characteristics of BN. However, individuals with BN typically exhibit several other psychological characteristics that are less well known, but are considered to be important aspects of the disorder. This section is intended to provide a comprehensive psychological profile of people with BN that incorporates, but extends beyond an explanation of binge eating and purging.

Binging and Purging

Binge eating and purging are defining features of BN. Binge eating is defined as eating a large amount of food (more than normal under similar circumstances) in a discrete period of time with an accompanying sense of having lost control (APA, 1994). In a descriptive study of 275 patients who met the DSM-III criteria for bulimia, Mitchell et al. (1986) found that 82% binged and 72% purged at least once daily. Binge episodes are often pre-planned, solitary events usually occurring at home in the evening (Pyle, Mitchell, Eckert, & Halvorson, 1981). On the basis of self report measures, investigators have uncovered several precipitating factors of binge eating. These include psychological tension or stress, being alone, thinking about food, craving specific foods, feeling sad or depressed, feeling hungry due to dietary restraint, and eating something sweet (Pyle et al., 1981; Polivy & Herman, 1985). Studies suggest that a typical binge may last about an hour, with an average intake of approximately 1000-2000 calories typically coming from sweet, high calorie foods like ice cream or cake (Pyle et al., 1981; Fairburn et al., 1986).

However, it is important to note that the rate and quantity of food consumed in what is labeled a binge is variable. The criteria do not clearly stipulate the minimum number of calories consumed, or length of episode, thus the term, "binge eating", still remains somewhat vague. Although characteristics associated with binge eating may vary, many researchers have reported that bulimics often avoid situations in which they will likely be exposed to food or find it difficult to exert rigid control over eating, such as going out to dinner with friends (Beaumont, 1995; Fairburn et al., 1986; Mitchell et al., 1986). This avoidance of social behavior is believed to exacerbate other problems that bulimics have with social relations and may help establish a vicious cycle of binge eating, purging and social withdrawal (Beaumont, 1995).

The purging aspect of BN, which typically involves self-induced vomiting, or use of diuretics or laxatives, occurs most frequently after a binge episode in order to prevent weight gain. By these means, the person with BN is often able to maintain a normal weight despite over eating (Beaumont, 1995). Although the purging behaviors typically alleviate the anxiety associated with binge eating, they often become the focus of intense feelings of guilt and shame (Beaumont, 1995).

Body Image Disturbance

Body image disturbance is usually measured by a combination of two related but distinct constructs, body image distortion and body dissatisfaction (Cash, 1990). Body image distortion involves perceiving one's body to be either smaller or larger than it is in reality. Body dissatisfaction refers to negative beliefs, attitudes, and feelings concerning body size, shape and weight, specific body parts, or overall physical appearance (Cash, 1990; Thompson, Penner, & Altabe, 1990).

Body dissatisfaction has been reported to play an important role in the development and maintenance of eating disorders (Cash, 1990; Fairburn et al., 1986; Rosen, 1990; 1995). In fact, of all psychological factors that are believed to cause eating disorders, body image dissatisfaction is often thought to be the most relevant (e.g., Cash, 1990; Rosen, 1995). Extreme and unhealthy weight control practices that characterize BN are considered to be the individuals' remedy for the perceived defect in their appearance and are secondary to the body image problem (Rosen, 1995). There is evidence that negative body image, defined and measured as body dissatisfaction, predicts severity of eating and dieting pathology (fasting, binge eating, purging) better than other psychological variables such as self-esteem, depression, and social anxiety combined (Gross & Rosen, 1988). In fact, Brown, Cash and Lewis (1989) found that body image parameters continued to differentiate binge-purgers from controls even after psycho-social adjustment was statistically controlled.

Body size distortion reflecting the perception of being overweight when actually well below average weight for height has long been considered to be a defining characteristic of people with AN (Russell, 1979). Although body size distortion is not a criterion for the diagnosis of BN, overestimation of body size is a common phenomenon among individuals with BN. In fact, after reviewing the literature, Cash and Brown (1987) concluded that the frequency and magnitude of body size distortion among individuals with BN is equal or greater than that reported among anorexics. Nevertheless, body size distortion remains a relatively neglected issue in the literature describing treatment of body image disturbance for individuals with BN.

Affective Disorders

Research has shown that depression and anxiety are prevalent among people with BN. Hudson, Pope, and Jonas (1984) investigated the incidence of clinical depression in 74 bulimic patients using a structured interview (the National Institute of Mental Health Diagnostic Interview Schedule (NIMH-DIS) that has demonstrated reliability and validity for DSM-III diagnoses. Results showed that major affective disorder (depression) was found in 89% of the sample. Similarly, Garfinkel and Garner (1987) noted that next to the preoccupations directly concerned with eating and weight, depressive symptoms were the most prominent feature of patients' mental state. In addition to depression, several studies have found a high prevalence of anxiety disorders among bulimics (Fairburn et al., 1986, Pope & Hudson, 1989).

The frequent occurrence of affective disorders has been reported to be negatively associated with treatment outcome among BN patients (Fairburn, 1995). That is, BN patients that exhibit more severe depression and anxiety tend to take longer to recover from bulimia than those with milder affective disturbances. The strong association between affective disorders and BN reported in the literature has raised questions concerning whether affective disturbances are causes or effects of eating disorders. Although conclusive findings have not been reported, affective disturbances have been reported to be both antecedents (Pyle et al., 1981) and consequences of binge eating and purging (Beaumont, 1995).

Self-Esteem and Perfectionism

According to Bruch, a pioneer in the field of eating disorders, those with anorexia nervosa have typically been "ideal" children, who strove for perfection and approval from

others, prior to the onset of the eating disorder (Bruch, 1974). This idyllic facade is thought to serve the purpose of hiding underlying deficits in self-concept (Bruch, 1974, 1982). Bruch (1985) believed that, "long before the disease becomes manifest, these girls have felt helpless and ineffective in conducting their own lives, and ... completely powerless" (p. 10). In speculating on the etiology of eating disorders, Bruch emphasized the role of the family. She purported that parents may fail to transmit an appropriate sense of competence and self-value, resulting in the child's unrealistic conception of her personal significance and her striving for perfection. For the individual with anorexia, the relentless pursuit of thinness is a concrete way of achieving this sought after perfection (Bruch, 1974). Similar themes, noting the role of perceived ineffectiveness and perfectionistic pursuit of thinness in order to establish self-worth, have been applied to bulimia (Casper, 1982).

Self-esteem, a construct widely believed to be a predictor of psycho-social adjustment or well-being (Rosenberg, 1979), has been widely investigated in the eating disorder literature and is associated with body image concerns and eating dysfunction. Several studies have shown that people with anorexia and bulimia have low-self-esteem, feelings of being a bad person, and a fear of rejection or abandonment (Garfinkel & Garner, 1982; Johnson & Connors, 1987). Among bulimics, body image distortion and dissatisfaction have been reported to be more severe among those who have the most negative self-esteem (Cooper & Taylor, 1986; Garfinkel & Garner, 1982). In addition, feelings of ineffectiveness among individuals with eating disorders has been widely reported to be positively associated with weight and shape preoccupation and eating disturbances (Garner, Olmsted, & Polivy, 1983).

Gender Differences in Bulimia Nervosa

While the predominant interest in BN research has concerned females, there have been recent increases in reports of this disorder in males (Andersen, 1990; Carlat & Camargo, 1991; Fichter & Daser, 1987; Olivardia, Pope, Mangweth, & Hudson, 1995). Because of the disproportionate incidence of BN among females, it is important to determine if there are characteristics that distinguish male bulimics from their female counterparts. The identification of such characteristics may improve diagnosis and treatment of bulimia in males.

“Premorbid weight” has been a consistently reported variable that discriminates male and female bulimics. Herzog, Norman, Gordon & Pepose (1984) found that a history of obesity was significantly more prevalent among their male bulimic subjects (9 of 14, 64%) than among their female bulimic subjects (34 of 92, 37%). Schneider and Agras (1987) compared 15 male and 15 female bulimic subjects and found that the male subjects had been relatively heavier than female subjects before developing bulimia (129% of ideal (textbook) body weight versus 111%, respectively), and were also relatively heavier at the time of diagnosis (110% of ideal weight versus 95%). Similarly, Andersen (1990) studied 12 normal-weight male bulimic subjects and found that the average maximum premorbid weight was 155% of their ideal body weight, which was significantly higher ($p < .005$) than the 121% of ideal reported by 13 age matched female bulimic subjects. Although these studies suggest that male bulimics have a higher premorbid weight than female bulimics, the small sample sizes used in these studies limits the generalizability of the findings. Age of onset appears to be another factor

that may differentiate males and females with bulimia. Studies have indicated that the average age of onset of bulimia is between 15 and 18 in females and 18-26 in males (e.g., Hall & Beresford, 1989; Johnson & Connors, 1987). However, these studies did not directly compare the age of onset of male and female bulimics. Several additional studies report the later developmental onset of bulimia in males when directly compared with female bulimics (Cullberg & Engstrom, 1988; Herzog et al., 1984; Schneider & Agras, 1987; Woodside et al., 1990), but only one study reported a statistically significant difference (Pope & Hudson, 1986). With regards to the remaining studies, the results of statistical analyses were either not reported (Cullberg & Engstrom, 1988; Woodside, Garner, Rockert, & Garfinkel, 1990) or the subject groups were so small that only extremely large age differences could have reached statistical significance (Herzog et al., 1984; Schneider & Agras, 1987).

There is no evidence that male and female bulimics differ with respect to symptoms such as the frequency of binge eating or purging (Edwin & Andersen, 1990; Mitchell & Goff, 1984; Robinson & Holden, 1986) or frequency or severity of electrolyte or other resultant medical disturbances (Johnson & Connors, 1987; Mitchell, Pyle, & Eckert, 1983). Eating-related pathology appears more similar than different in men and women. There is, however, some evidence that male bulimic subjects are less troubled by their binge eating and are less concerned with strict weight control than female bulimics. Schneider and Agras (1987) reported that compared to age matched female bulimic subjects, 15 male bulimics consumed more food during a binge, were more likely to eat in public and reported less guilt after binge eating in public. These gender differences related to binge eating are consistent with those from studies using "normal"

male and female high school and college students who binge (Kagan & Squires, 1983; Leon et al., 1985; Whitaker, Davies, & Shaffer, 1989).

The results are inconsistent concerning gender differences on body image parameters. Schneider and Agras (1987) found that the mean desired body weight of male bulimic subjects (95% of ideal) was moderately but significantly higher than that of female subjects (85%), suggesting that as a group the male bulimic subjects may be more realistic about their ideal body weight. Edwin and Andersen (1990) reported that male bulimics had significantly less body dissatisfaction, general discontent and had more vigor than bulimic women. However, Woodside et al. (1990) failed to find gender-dependent differences on body image as indicated by the Berscheid Body Questionnaire (BSQ). It is important to note that this scale measures attitudes towards a wide range of body parts (e.g., nose, ears, etc.), most of which are not a specific concern among people with eating disorders. The BSQ has been shown to correlate only .29 to the Drive for Thinness and .55 to the Body Dissatisfaction subscales of the Eating Disorder Inventory (EDI). Thus, the inconsistent findings regarding body dissatisfaction between male and female bulimics may be due, at least in part, to the divergent measurements employed.

A series of case reports of males with bulimia suggests the occurrence of considerable psychiatric comorbidity, including affective disorders (Mitchell & Goff, 1984; Pope & Hudson, 1986; Robinson & Holden, 1986), and personality disorders (particularly "Borderline"). The frequency and severity of co-morbidity demonstrated in these samples is similar to that typically observed among female bulimics (Andersen, 1990). However, a precise determination of gender differences among bulimics with co-

morbid psychiatric conditions remains unknown because few studies employed a comparative female sample of bulimics. In the only direct comparison of male and female bulimic subjects along this dimension, Pope, Hudson and Jonas (1986) found that 67% (10 of 15) of their male bulimic subjects had either current or past major affective disorder, which was a rate that did not significantly differ from that of a comparison of female bulimics (60%, 9 of 15).

Alcohol and drug abuse are conditions co-morbid with bulimia that have received considerable attention in the literature. Studies have reported higher than expected prevalence rates of drug and alcohol abuse among male and female bulimic patients (Mitchell & Goff, 1984; Robinson & Holden, 1986; Schneider & Agras, 1987). There is preliminary evidence that, unlike their female counterparts, cocaine-abusing males are particularly likely to be bulimic. In a study of 259 cocaine abusers, Jones et al. (1987) found that 21% of the men met the DSM-III criteria for bulimia, compared with 23% of the women. The similar rates of prevalence of bulimia between genders among cocaine abusers is contrasted by findings indicating the prevalence of bulimia among males in the general population, which is approximately one-tenth the prevalence among females. These findings, because they are correlational, preclude a determination of whether cocaine abuse increases the risk of bulimia among males or having bulimia disproportionately increases males' risk of abusing cocaine, or whether both are manifestations of a more general underlying psychopathology.

Studies investigating gender differences in the relationship between alcohol use and bulimic symptomatology have produced conflicting results. Among college students, one study showed a stronger association between alcohol use and bulimic

behaviors in males (Claydon, 1987), while another study found a stronger relationship between alcohol use and bulimic behavior among females than among males (Pyle et al., 1983). However, other large prevalence studies have failed to find gender differences in the relationship between alcohol abuse and bulimic behavior (Higuchi et al., 1993; Suzuki et al., 1995).

Summary of Bulimia Nervosa Overview

Studies indicate that the typical individual with BN is most likely to be a young female who regularly binges and purges, has a morbid fear of being fat, and perceives herself to be heavier than ideal. In addition, a person with BN may have poor self-esteem, feels depressed and/or anxious, abuses alcohol or drugs and exhibits perfectionistic personality characteristics and maturity fears. The increased risk of serious medical conditions and premature death associated with BN underscores the importance of developing effective interventions.

Research suggests that there are more similarities than differences in the clinical features of male and female bulimics. It appears, however, that male bulimics may be less bothered by binge eating and less concerned with dieting and weight control in comparison to female bulimics, but this issue requires further inquiry. Compared to female counterparts, male bulimics may have a later age of onset and higher prevalence of premorbid obesity. Importantly, the strength of these conclusions is limited because definitive comparisons between studies are difficult to achieve due to the various methodological issues, including selection biases of respondents, differences in case detection and measurement of bulimia (changing criteria of bulimia delineated in several versions of the DSM), and small sample sizes of male bulimics. In addition to addressing

these methodological concerns, future research would benefit from investigating gender-related differences in personality measures (e.g., perfectionism, self-esteem, and dichotomous -black/white thinking styles) as these factors have been previously identified to be important targets in facilitating treatment success and preventing relapse (Blouin et al., 1994; Fairburn, Marcus & Wilson, 1993).

Cognitive Model Applied to Bulimia Nervosa

Although numerous psychological and biologically-based paradigms have been used to help conceptualize the development of BN, the cognitive model proposed by Beck and associates is considered by many experts to be the most useful (Fairburn et al., 1986; Garner, 1986). According to cognitive theory, emotional and behavioral disturbances result from faulty or dysfunctional cognitions (e.g., beliefs, attitudes, assumptions, and perceptions, collectively known as schemas), or biased information processing (Beck & Weishaar, 1989; Meichenbaum, 1977). It is believed that the type of thoughts, or systematic biases in information processing, that intercede events and emotional responses are idiosyncratic to particular emotional disorders (Beck et al., 1979). For example, an individual whose thinking selectively synthesizes themes of loss or defeat is likely to be depressed (Beck et al., 1979). Similarly, people with phobias or anxiety disorders are said to be characterized by a cognitive bias that leads to the inappropriate anticipation of physical or psychological harm in circumscribed situations (Beck & Weishaar, 1989). Individuals with eating disorders have been reported to hold the central belief that weight and shape determine one's self-worth and social acceptability (Beck & Weishaar, 1989; Garner, 1986; Fairburn et al., 1986). In other words, those with BN are purported to hold the belief that, "to be fat is to be a failure,

unattractive, and unhappy" (Fairburn, et al., 1986), which in turn fosters a morbid fear of being fat and precipitates strict dieting and abnormal eating and weight control practices.

This type of maladaptive underlying belief system, or core schema, is reflected in several types of erroneous thoughts, known as "cognitive distortions", such as dichotomous (all-or-none) thinking, jumping to conclusions, and discounting the positive (Beck & Weishaar, 1989). All or nothing thinking is reported to be a particularly common cognitive distortion among people with BN (Fairburn et al., 1986; Fairburn, 1995). For example, "I binged, therefore I will never have control over my eating" is a typical cognitive error that would likely result in emotional distress.

Following from the conceptualization of emotional disorders as resulting from faulty information processing, cognitive therapy attempts to teach individuals to identify their maladaptive cognitions (core beliefs, attitudes, assumptions, and perceptions) and replace them with more adaptive cognitive styles (Beck, 1976; Beck & Weishaar, 1989; Ellis, 1989). This is contrasted by the behavioral paradigm, which asserts that cognitive processes are not required to procure behavioral change. Simply, the traditional behavioral paradigm asserts that behavior can be changed by manipulating environmental antecedents and consequences of behavior (Wilson, 1989). The widespread coupling of cognitive and behavioral paradigms gave birth to cognitive-behavioral therapy, a treatment approach that assumes that cognitive factors such as attribution, perception, attitudes, values and beliefs play a critical role in influencing current behavior, and are influenced by past behavior (Lazarus, 1989). CBT, which emphasizes modification of maladaptive cognitions and behaviors, has been successfully applied in several

psychological disorders such as depression (Beck, 1979), anxiety (Barlow, 1995) and eating disorders (Blouin et al., 1994; Fairburn et al., 1993).

Several studies investigating the etiology and maintenance of the binge-purge cycle in BN have emphasized the importance of cognitive variables, including preoccupation with food and eating (e.g., Hawkins & Clement, 1984; Orleans & Barnett, 1984), cognitive distortions regarding body image and weight (Fairburn, 1985; Hawkins & Clement, 1984; Russell, 1979), and a dichotomous thinking style (Polivy & Herman, 1985). Additional research found that bulimics exhibited irrational beliefs, and a relationship has been reported between the severity of cognitive distortions and severity of bulimic symptomatology (Schulman et al., 1986; Thompson et al., 1987). These studies support the cognitive model's tenets that maladaptive core beliefs pertaining to over valuing weight and shape (e.g., "if I am fat, then I will be unattractive, unlovable, and unhappy") are predictive of the pathogenic eating behavior and weight control practices that characterize BN. Because few of these studies reviewed utilized experimental or prospective designs, causal inferences regarding the extent to which dysfunctional cognitive styles precipitate and perpetuate BN are limited. However, the high level of efficacy of cognitive therapy demonstrated by several outcome studies (Fairburn et al., 1991; Fairburn et al., 1993) is consistent with the tenets of the cognitive paradigm applied to BN.

Sociocultural Factors in Bulimia Nervosa: A Shaper of a Maladaptive Cognitive Set

Society's portrayal of thinness as the aesthetic ideal for females has long been purported as an etiological factor in eating disorders (Fallon & Rozin, 1985; Garner et al., 1980; Wilfley & Rodin, 1995). In fact, many researchers have postulated that eating

disorders are a culture bound syndrome that cannot be understood apart from its specific cultural context. Garner et al. (1980) reported that cultural standards for women became progressively thinner over the past few decades. These findings were based on examining twenty years (1960-1980) of Playboy centerfolds and Miss America Pageant contestants, which illustrate contemporary ideals of body size and shape in women. The corresponding increase in prevalence of eating disorders reported in epidemiologic studies during the progressive emphasis on thinness over the past thirty years tends to support the cultural hypothesis. In addition, the lower incidence of eating disorders reported in third world countries, which do not perceive thinness as the aesthetic ideal (Wilfley & Rodin, 1995), tends to corroborate the belief that eating disorders are culture specific.

Comparatively few studies have examined the extent to which men are affected by cultural pressures to possess a particular body type. Perhaps this is because throughout history females have been primarily evaluated on their beauty whereas males were judged on their career status and ability to "provide" for their families. It is important to note, however, that recent research indicates that men may also feel a cultural pressure to conform to an ideal body shape, one that is characterized by pronounced muscle mass combined with low levels of body fat (Butler & Ryckman, 1994; Cash, Winstead & Janda, 1986; Lamb et al., 1993). Just as cultural standards of the ideal body for women have become progressively thinner over the years, fitness and fashion magazines have been increasingly promoting the concept of the extremely muscular or "hypermesomorphic" body as the standard of attractiveness for males (Loosemore & Moriarty, 1990; Cash & Pruzinsky, 1990; Mishkind et al., 1986). A more recent study

found that popular men's magazines primarily focused on advertisements and articles pertaining to altering body shape (becoming more muscular), whereas women's magazines primarily emphasized weight loss in the advertisements (Andersen & DiDomenicio, 1992). Mishkind et al. (1986) purport that body shape and size play a central role in the development of men's self-esteem, and the various pressures for men to conform to an aesthetic ideal (mesomorphy) will continue to intensify and produce negative psychological and physical effects on men in the same manner as the drive for thinness has on women. Goldman (1989) and others claim that the socialization of men to achieve a muscular somatype begins in early childhood, whereby boys learn that the ideal man possesses a physique similar to that of a Mr. Universe, or to huge, abnormally muscled beings on cartoons and other children's programming.

Although it is widely accepted that sociocultural factors likely play a role in the development of eating disorders, the precise mechanism of influence is a more controversial issue. Using a cognitive theoretical framework, the following discussion is intended to explore in more detail how sociocultural factors, especially the media, may influence the development of body image disturbances and abnormal eating practices that sometimes lead to BN.

According to the cognitive model, it is the cultural meaning of achieving the current beauty ideal, rather than exposure to the ideal itself, that encourages the development of body image disturbance and eating disorders. That is, it is what being lean, toned and physically fit symbolizes in our culture that is the driving force in the development and maintenance of body image disturbances and eating disorders. In Western Culture, achieving a lean and toned body, for both men and women is not only

sought for expected health benefits, but also for what it has come to symbolize; competence, success, control, acceptance, and sexual attractiveness (Brownell, 1991; Mishkind et al., 1986; Wilfley & Rodin, 1995). Conversely, obesity may be seen as representing laziness, self-indulgence, and lack of willpower (Brownell, 1991; Wilfley & Rodin, 1995). Many researchers purport that the primary vehicle responsible for communicating these messages and influencing our concept of the ideal body has been the mass media, including movies, television, magazines, and clothing advertisements (Brownell, 1991; Freedman, 1986). Capitalizing on individuals' search for the perfect body, there has been a proliferation of information, programs, medicines, potions, home exercise equipment and other devices that promise to make us slimmer, fitter, and thus more aesthetically appealing.

Brownell (1991) and others claim that the search for the perfect body is driven by two beliefs. First, that the body is infinitely malleable, whereby the right combination of diet, exercise, and personal effort will enable an individual to achieve the aesthetic ideal. Second, once the ideal is achieved, there will be considerable rewards, such as respect and admiration, personal happiness, sexual desirability, and career advancement.

With regards to the first belief, very little, if any, evidence exists to support the contention that the body is completely malleable, which is the explicit and erroneous message communicated in magazines, home equipment advertising campaigns, and information-commercials. Data obtained from a series of studies conducted by Stunkard and colleagues indicate that biological factors play a substantial role in limiting one's ability to change body shape and weight (Stunkard, Foch, Hrubec, 1986; Stunkard, Harris, Pederson, & MacClearn, 1990; Keeseey, 1986). Moreover, there is now evidence

that body fat distribution and percent body fat have a strong genetic component (Bouchard & Johnston, 1988; Bouchard et al., 1990). It is important to note that these studies indicate that biological and genetic factors are instrumental in determining one's body weight, shape and composition. However, they do not indicate that body weight and shape are determined exclusively by these factors. Environmental factors (e.g., a healthy diet and regular exercise) have been shown to have some effect on shape and weight (Brownell, 1995; Stunkard et al., 1986).

It is important to note that attempting to achieve current beauty ideals is an unrealistic goal for most people. It has been estimated that most female fashion models and actresses have 10-15% body fat, which is the approximate body fat levels of elite distance runners (Brownell, 1991). However, normal body fat for a healthy woman is 22-26% (Katch & McArdle, 1988; Wilmore & Costill, 1988). A similar magnitude of discrepancy of body fat between the mesomorphic aesthetic male body type displayed in the media (5-8% body fat) and the average healthy male (15% body fat), has been reported (Cash, Winstead, & Janda, 1986; Mishkind et al., 1986). It is believed that most people will not be able to achieve these unrealistic standards for men and women because of the genetic and biological limitations in the malleability of body weight and shape previously mentioned.

The second belief, which Brownell (1991) also claims precipitates and maintains the rigorous pursuit of the aesthetic ideal, is based on the assumption that achieving the ideal will bring substantial personal rewards. From a cognitive theory viewpoint, individuals internalize messages conveyed in the media that achieving the aesthetic ideal will yield rewards such as respect, admiration, success, and sexual desirability. The

salience of these messages may increase the risk of eating disorders by communicating messages that one's weight, shape, and physical attractiveness are a reflection of one's character and value as a person. These messages are believed to foster the dysfunctional core schemas and cognitive distortions previously discussed (Brownell, 1991), such as "to be fat is to be worthless, unattractive and unhappy" or "If I am thin, I will be happy, respected, and admired".

Studies only partially support the basis of the second assumption, that individuals who achieve the aesthetic ideal will be rewarded with success, happiness, and a fuller life (Barsky, 1988; Glassner, 1988). Investigating the extent to which attractiveness creates success and happiness using a national (U.S.) sample, Glassner (1988) reported that the average income of attractive men and women was 11% higher than for average looking people, and 19% greater than for plain or unattractive people. However, Glassner (1988) noted some negative sequelae of being attractive. Attractive children score lower on college admission and IQ tests. There is also evidence that attractive people have more difficulty sustaining close relationships, especially among those of the same gender. In addition, women who were attractive in college reported being more dissatisfied with their lives in middle age, when attractiveness has diminished. Attractive women, whose partners seek them out for physical reasons, risk failing relationships when beauty fades (Glassner, 1988). Moreover, research has shown that individuals who meet society's standards of beauty may have considerably different and more negative self-perceptions concerning body-image and self-concept than the perceptions of others (Berscheid & Walster, 1974; Butters & Cash, 1987). These findings suggest that being physically attractive may be beneficial in some areas (occupationally), but may be detrimental in

others (some social aspects), and does not necessarily yield great happiness or feelings of self-worth. Further research using prospective studies is required in order to determine how becoming more or less attractive over time affects one's happiness, level of success, relationships, and other areas of life.

In summary, consistent with the cognitive model, Brownell (1991) posits that people engage in vigorous exercise and dieting in attempt to achieve the perfect (lean and toned) body portrayed in the media because they believe it will not only provide health benefits, but also yield considerable personal rewards, such as success, acceptance, sexual desirability, and personal happiness. Due to the biological and genetic limitations in the malleability of the body, however, most people will not be able to achieve the current aesthetic ideals for men and women. The negative consequences of falling short of their personal weight and shape goals have been purported to result in body dissatisfaction, frustration, and loss of self-esteem (Brownell, 1991). The negative psychological effects, especially body dissatisfaction, combined with the fallacious beliefs (e.g., the body is totally malleable and achieving perfect body will bring vast rewards), have been reported to precipitate a more rigorous regimen of dieting, exercising, and dangerous physique enhancing practices, thus creating a vicious circle (Brownell, 1991; Rosen, 1995). The findings reviewed also suggest that cognitive-based interventions, which focus on educating people about the genetic limitations of body size and debunking the myth that achieving the aesthetic ideal will automatically bring unconditional happiness, may be useful in preventing or limiting anorexic or bulimic behavior.

Body Image and Self-Esteem Among Men and Women

Based on cognitive theory, the previous section illustrated how cultural pressures to possess a specific body type can have a deleterious effect on body image and self-esteem. Identifying the prevalence and severity of body dissatisfaction among men and women is clinically relevant for several reasons. Specifically, body image disturbance has been reported to be a precipitating and perpetuating factor in obsessive exercise, unhealthy weight loss methods as well as full blown eating disorders (Cash, 1990; Fairburn et al., 1986; Rosen, 1995). In addition, body dissatisfaction, as previously discussed, has been associated with poor self-esteem and depression among men and women in both clinical (Hudson & Pope, 1987; Pyle, Mitchell, & Eckert, 1981) and non clinical samples such as college (McCaulay et al., 1988; Mintz & Betz, 1986) and high school students (Whitaker et al., 1989). The aim of this section is to examine body image and self-esteem among males and females as they relate to the sociocultural standards of attractiveness for each gender.

Fallon (1990) has noted that of all the ways people think of themselves, none is so essentially immediate and central as the image of their own bodies. In fact, many researchers purport that the body is experienced as a reflection of the self (Fallon, 1990; Cash, 1990). Historically, body dissatisfaction was an issue that affected young women, but was not seen as an important concern among young men. Fallon and Rozin (1985) found that women generally reported that they felt heavier than they would consider either ideal, or attractive to males. Males, however, were more likely to report that they considered their physique to be close to ideal and close to that which women would find attractive. Further studies indicated that males do report body dissatisfaction. However,

with the exception of one study that did not find gender differences (Silberstein, Striegel-Moore, Timko & Rodin, 1988), body dissatisfaction was less severe among men than among women (Butler & Ryckman, 1994; McCaulay, Mintz & Glenn, 1988; Mintz & Betz, 1986). Consistent with the cultural standards of beauty for men and women, females generally considered themselves to be overweight, whereas males generally reported feeling underweight and thinner than ideal. As expected, these studies also revealed gender differences with respect to dissatisfaction of body parts, with men reporting a desire for larger chests, shoulders and arms, whereas women reported desiring slimmer thighs, buttocks, and legs. In addition, these studies indicate that men are usually equally concerned with shape as with weight, whereas women are predominantly concerned with weight.

Similar to the findings regarding body dissatisfaction, males and females also differed with respect to the magnitude and direction of body size distortion (Drewnowski & Yee, 1987; Miller, Coffman, & Linke, 1980; Mintz & Betz, 1986). These studies indicated that males perceived their size with less distortion than females. Males generally reported body size distortion with the perception of being smaller and lighter than their actual size and weight, whereas women overestimated their body size and weight. Importantly, all body image studies reviewed above were conducted with college students, therefore these findings may not necessarily be representative of men and women in the general population. However, research with elementary school children, junior and senior high school students support the findings obtained from college students as males were more satisfied with their bodies than females and perceived their bodies with

less distortion (Halmi, Goldberg & Cunningham, 1977; Kaplan, Busner & Pollack, 1988).

Body image has long been postulated to be of considerable importance in the development of self-esteem. Having a positive self-esteem is important as clinicians and theorists within the psycho-social domain have long cited it as the key component of favorable life adjustment (Rosenberg, 1979; Wylie, 1974). Secord and Jourard (1953) found significant positive correlations between evaluations of body and self. Low satisfaction with the body was found to be associated with anxiety, insecurity and feeling of ineffectiveness. In an extension of Secord and Jourard's work, Rosen and Gross (1968) reported that correlations between self-esteem and body image were found to be higher if the body part or aspect of the self were judged to be important. Similarly, Berscheid, Walster and Bohrnstedt (1973) surveyed over 2,000 people via mailed questionnaires and found that body image and self-esteem are indeed highly correlated. More recent studies support earlier findings as body image was found to be significantly positively correlated with self-esteem among male and female college students (Lerner, Orlos, & Knapp, 1976; Powers & Erickson, 1986) and adolescents (Lerner et al., 1976; Koff, Rierdan & Stubbs, 1990). Research has shown that the relationship between body image and self-esteem is stronger in children and adolescents than in adults, perhaps because physical appearance is more important during the developmental years (Keelan, Dion & Dion, 1992).

The data from research investigating gender differences in the relationship between body image and self-esteem are inconsistent. Many studies found that the severity of body dissatisfaction and its relationship to self-esteem to be more prominent among women than among men (Fallon & Rozin, 1985; Lerner, Karabenick & Stuart,

1973; Mintz & Betz, 1986; McCaulay et al., 1988). However, a study by Harmatz, Gronendyke and Thomas (1985) identified a subgroup of men who reported the most severe problems with body image and self-esteem. Men who were underweight reported just as much body dissatisfaction as overweight females, who typically report the most severe body dissatisfaction. Underweight men however viewed themselves as being less handsome, good natured, and having less sex appeal when compared with either normal, or overweight males, or overweight, normal or underweight females. Moreover, the impact of a disturbed body image on self-esteem and social adjustment in the underweight male was greater than among any other group including overweight females. Previous studies either did not adequately separate overweight and underweight subgroups in their sample (Fallon & Rozin, 1985; Lerner et al., 1973) or had insufficient numbers to adequately address the issue (Mintz & Betz, 1986; McCaulay et al., 1988). The findings reported by Harmatz et al. (1985) underscore the importance of assessing body weight when examining body dissatisfaction and its psychological correlates.

Appearance anxiety, a concept related to body dissatisfaction, is described as an apprehension about aspects of one's physical appearance and how it is evaluated (Davis, Brewer and Weinstein, 1993). Although research in this area has focused primarily on female populations, more recent research provides evidence that young men are becoming more concerned about aspects of physical appearance and how others evaluate them in this dimension (Mishkind et al., 1986). In an attempt to further understand this concept in men, Davis et al. (1993) investigated the issue of appearance anxiety among a group (n=71) of college-aged males. Results from a regression analyses indicated that 42% of the variance in appearance anxiety was explained by the Upper Body Strength

Scale of the Body Esteem Scale. That is, men who had low esteem concerning aspects of their upper body were more highly anxious about having their bodies evaluated by others. Importantly, anthropometric measurement revealed a strong positive relationship between body fat and appearance anxiety, indicating that higher than ideal levels of body fat reflective of poor muscle tone is perceived by males to be socially undesirable.

Taken together, the studies reviewed provide evidence that men may be becoming more concerned with physical appearance and are reporting a greater degree of negative body image than previously. In addition, these studies also indicate that body dissatisfaction is associated with depression, self-esteem, and appearance anxiety among college men; however, the strength of these relationships appear to be stronger in college women. Males who are underweight or exhibit higher than average levels of body fat on their upper bodies appear to be at higher risk for experiencing body image disturbance and psychological distress. The perception among men that thinness is equated with a negative self-image has been discussed by Mishkind et al. (1986), who suggest that men perceive a highly developed body as the most masculine physique. Mishkind et al. (1986) purport that this perception leads young men to pursue rigorous weight training and bodybuilding in order to attain the exaggerated "hypermesomorphic" ideal portrayed in the media. Although the current feminine ideal displays considerably less muscle mass than the male ideal, the feminine ideal nevertheless is characterized by lean and toned muscles that is indicative of a physically fit body (Brownell, 1991). It is not surprising, therefore, that weight training and bodybuilding have recently become popular forms of exercise among females, as well as males. Before the weight training and bodybuilding literature is reviewed, however, it is important to first examine the

broader issue of eating disorder behavior among sports and fitness activities. This information is intended to provide a more thorough understanding of how sports affect eating practices, and also provides a framework of knowledge which can be compared to the bodybuilding literature.

Eating Disorder Symptoms in Athletes and Fitness Enthusiasts

Eating disturbances, weight preoccupation, abnormal weight control behavior, and full blown eating disorders among athletes and physical fitness enthusiasts are becoming recognized as important issues. This is reflected by the increasing numbers of publications on these topics in the scientific literature, magazines, newspapers, and by the development in the United States of a national educational program on eating disorders by the National Collegiate Athletic Association (NCAA) (Brownell, Rodin & Wilmore, 1992).

"Anorexia athletica" is a term coined to describe eating disorders among athletes (Fairbanks, 1987). It is characterized by a preoccupation with low body weight, a drive for thinness, body dissatisfaction and eating patterns that are harmful to the growth and development of the body. Starving, bingeing and purging are characteristic practices. Physical signs include a reduction in body weight, decline in optimal performance, fatigue, dizziness, dehydration and amenorrhea. Fairbanks (1987) believes that these athletes do not have full blown clinical psychiatric disorders but are entering a realm of eating disorders that may lead to poor development, depression and altered moods.

Much of the increased scientific inquiry in disordered eating in sports and fitness was sparked by the findings of Yates, Leehey and Shisslak (1983). These authors reported that three-fourths of female runners and two-thirds of male runners surveyed

were heavily focused on dieting with weight preoccupation and body dissatisfaction.

They also noted that certain groups of male runners and anorexic females exhibited many similarities, including high self-expectations, high tolerance for physical discomfort, drive for thinness, tendency to deny debility, and the prevalence of depression.

Furthermore, Yates et al. (1983) suggested that running is an analog of anorexia nervosa and therefore attracts persons with an anorexic (obsessive) personality. Similarly, Brownell, Rodin, and Wilmore (1988) reported that shared characteristics between eating disordered individuals and long distance runners include a preoccupation with calories and body fat, food faddism, ritualistic eating behaviors, binge-purge activities, perfectionism, introversion, and ascetic personality traits (Brownell et. al., 1988).

Surveys among women runners also confirmed a high incidence of episodic binge-purge eating patterns motivated by fear of fatness and quest for continued progressive weight loss (Rosen, McKeag, Hough, & Curley 1986). In a group of 93 elite-level women runners, 13% reported a history of anorexia nervosa; 25% binge eating; 9% bingeing and purging; and 34% atypical (undefined) eating practices (Clark, Nelson, & Evans, 1988). Importantly, studies have also found that male and female marathon runners did not exhibit an eating disorder profile (Siegal, Stewart & Barone, 1990; Weight & Noakes , 1986). In fact, Weight and Noakes (1986) concluded that the prevalence of body image disturbance, abnormal eating attitudes and the incidence of anorexia nervosa was not more common among competitive runners than among the general population. However, Weight and Noakes (1986) reported that some runners had serious problems with eating and weight concerns, but without the concomitant abnormally low body weight necessary for a diagnosis of anorexia nervosa. Some women, with a psychological predisposition

towards anorexia, may use running as a substitute method of reducing body weight or size and are sufficiently satisfied by it not to present the full blown clinical picture of the disorder (Weight & Noakes, 1986).

Using a sample of 182 female collegiate athletes, Rosen et al. (1986) found that 32% practiced at least one cardinal bulimic behavior. However, it was found that this population did not engage in bulimic behavior to enhance physical attractiveness but attempted to lower their body weight to achieve the highest possible performance (Rosen et al., 1986). Muni-Brander and Lachenmeyer (1986) found that from a population of male high school athletes, 25% reported vomiting to control weight, 12% reported bingeing and vomiting, 2.7% abused laxatives, 1.3% abused diuretics, and 9.5% used diet pills to achieve weight loss. Similarly, in a study using a sample size of 695 male and female college athletes, Burckes-Miller and Black (1986) found that many athletes reported both bulimic attitudes and behaviors. Twenty-four percent of athletes reported having recurrent binge episodes at least once every 1-8 days, 11.9% reported a loss or fear of losing control when eating and 5.3% ate until they were physically ill. Purging techniques to prevent weight gain were also used by some athletes, 5.6% were engaged in self induced vomiting, 3.7% abused laxatives, 11.9% fasted for at least twenty-four hours and 1.4% used enemas. Although these studies did not utilize non-athletic controls, the prevalence rates of eating disorder symptoms reported among these athletes are higher than those typically reported in the general population.

Burckes-Miller and Black (1988) conducted a study (n=695), 382 females and 313 males) to determine the prevalence of anorexia nervosa and bulimia in male and female college athletes. Women's sports included volleyball, basketball, softball, cross country

indicated that athletes had lower scores than controls on all eating disorder measures; however, statistical analyses were not performed. Wilkins, Boland and Albinson (1990) investigated the prevalence of eating disorder symptomatology in male and female university athletes (intercollegiate or higher) and non-athletes. Results showed that the athletic sample exhibited significantly lower levels of pathological eating attitudes and behavior. These athletes were less likely to perceive themselves as overweight, relied less on dieting, and exhibited higher self esteem and more positive body image in comparison to nonathletes drawn from the same university population. However, female athletes exhibited significantly higher scores than male athletes on eating disorder indices, a finding that is consistent with the literature indicating that eating-related pathology is more prevalent among women. Although causal direction is impossible to establish with this kind of research, Wilkins et al.'s (1990) findings suggest that not only are athletes not at risk for developing eating disorders, but they are generally healthier psychologically as indicated by their higher self-esteem and more positive body image. More recent investigations using standardized inventories are consistent with those of Wilkins et al. (1990) in that female athletes reported more favorable body image (Hallinan, Pierce, Evans, & Degrenier, 1991) and significantly less severe eating disorder attitudes and behavior compared to non-athletic female comparison groups (Tobias, 1995). In a sample of high school male athletes and nonathletes, Asci, Gokmen, Tiryaki, and Asci, (1997) found males athletes reported more positive body image and self-esteem compared to their non-athletic peers.

Several studies, however, have also found no overall differences between athletes and non-athletic controls on eating disorder attitudes and behavior using standardized

measures (Ashley, Smith, Robinson, & Richardson, 1996; Warren, Stanton & Blessing, 1990). Moreover, other studies that used standardized measures of eating-related pathology show more frequent eating disturbances among athletes compared to nonathletes (Davis, 1992; Mallick, Whipple & Huerta, 1987). Perhaps the most compelling evidence of more disturbed eating and pathogenic weight control practices in female athletes is provided by Sundgot-Borgen in a series of studies utilizing large samples (over 900 subjects) and standardized inventories. The data from these studies indicate significantly more frequent eating disturbances and bulimic weight control methods among female athletes compared to non-athletic controls (1990; 1993, 1994). Furthermore, Sundgot-Borgen reported a significantly higher rate of frank eating disorders in elite female Norwegian athletes compared to athletic controls (18% vs 5%) based on clinical interviews done on a randomly selected sample of participants using DSM-III-R criteria.

Eating Disorder Symptoms in Sports/Activities Emphasizing Leanness

The incidence of eating disorders and subclinical levels of eating disturbances appears to be much higher among people who participate in sports, physical activities or occupations which emphasize thinness or low body fat. For example, Borgen and Corbin (1987) reported more prevalent and severe eating disorder symptomatology among college women who participated in dance, aerobics, cheerleading, gymnastics, figure skating, and distance running compared to those college women who participated in activities with minimal emphasis on thinness (e.g., volleyball, swimming). Moreover, as many as 20% of females who participated in these "high risk" sports exhibited eating disorder behavior compared to 10% of all athletes surveyed and 6% of nonathletes.

Interestingly, when asked the reasons for engaging in dieting, 86 percent of athletes reported enhanced performance (including pressure from coaches, parents) with only 14% citing cosmetic reasons, while 95% of non-athletes reported improving physical appearance (cosmetic) as the main reason for dieting. Similarly, Davis and Cowles (1986) found female athletes in thin-build sports had greater diet and weight concerns, body dissatisfaction, and more emotional lability than athletes in normal-build sports, even though they were actually thinner. The most convincing findings are reported by Sundgot-Borgen (1993) who administered standardized inventories to a large sample of female athletes (n=522) and controls (n=448). Six categories were utilized for sports groups: technical (long jump, high jump, sailing and golf); endurance (middle and long distance running, rowing, swimming and speed skating); aesthetics (dance, gymnastics, figure skating and diving), weight dependent, (wrestling judo and karate); ball games (basketball, volleyball, tennis); and power (powerlifting, shot put and tennis). Results indicated that a significantly higher number of athletes compared to controls (32% vs 20%) were dieting, and used pathologic weight control methods (34% vs 25%). Moreover, athletes reported a significantly higher rate of eating disorders than controls (18% vs 5%) determined by clinical interview. These discrepancies become more pronounced when sport groups were compared. The highest rate of frank eating disorders were reported by athletes who participated in endurance (20%) , aesthetic (34%) and weight dependent sports (27%); all of which emphasize leanness. The prevalence of eating disorders in athletes participating in sports in which leanness or a specific weight are considered important (25%) was significantly higher than athletes participating in other sports (12%) and controls (5%). No significant differences in rates of eating

disorders emerged between controls and athletes who participated in sports in which leanness was not considered important (i.e. technical, ball games, and power sports).

Many of the studies investigating disordered eating in sports have focused on female athletes. Wrestling is a sport, predominantly practiced by males, that has received considerable attention in the eating disorder literature. Enns, Drewnoski, and Grinker (1987) investigated the prevalence of eating disorders and body image perception among male wrestlers, male swimmers, and a non-athletic control group. Results indicate that male wrestlers reported more disturbed perceptions of body image and more pathogenic eating and weight loss practices (fasting, exercising in saunas) than swimmers or control subjects. These findings in wrestlers are supported by several other papers (Brownell, Steen & Wilmore, 1987; Steen & Brownell, 1990; Steen & McKinney, 1986). Results from these studies also indicated a considerable amount of the weight loss reported in attempt to "make weight" was regained during the off season when nutritional habits returned to normal. These findings suggest that the severe eating disturbances and extreme weight loss practices associated with wrestling may be a response to the high demands involved in the sport and may not reflect a psychiatric condition characteristic of people with eating disorders. Nevertheless, extreme dieting practices and repeated weight loss and regain observed among wrestlers have been reported to have deleterious effects on physiology, including renal function (Rowell, 1974), electrolyte imbalance (Zambraski, Foster, Gross, & Tipton, 1976), metabolic dysfunction (Brownell & Rodin, 1994) and a number of psychological factors, such as concentration, anxiety, and depression (Brownell & Rodin, 1994).

Eating Disorder Symptoms in Weight-Sensitive Occupations

Findings from the sport literature appear to be consistent with those investigating eating-related disturbances in occupations which emphasize low body weight or physical appearance. Several studies have shown elevated occurrences of pathological eating attitudes and weight control behavior among aerobics instructors (Ford, 1990), cheerleaders and majorettes (Humphries and Gruber, 198), fashion models (Garner & Garfinkel, 1980) and ballet dancers (Garner, Garfinkel, Rockert & Olmstead, 1987). Importantly, the studies showed that on measures of eating pathology assessed by the standardized Eating Attitudes Test (EAT), models and ballet dancers scored in the range of patients being treated for anorexia nervosa. One study reported alarming rates of anorexia nervosa (15%) and bulimia (19%) among a sample of 55 white ballet dancers, while none of the black (n=11) dancers met the criteria for an eating disorder (Hamilton, Brooks-Gunn & Warren, 1985). Moreover, ballet dancers studying in more competitive settings (with associated higher performance expectations) were found to be at greater risk for the development of eating disorders due to the occurrence of more prevalent eating disturbances. Similarly, King and Meezey (1987) found that male jockeys showed a variety of abnormal eating and weight control behavior. These authors also found that jockeys reported abnormal weight control behavior during the race season that they did not show in the off-season.

Gender Differences in Eating Disorder Symptoms in Athletes

Few large scale studies incorporating various sporting activities have systematically examined gender differences in eating disorder attitudes and behavior.

Black and Burckes-Miller (1988) found few gender differences among university athletes participating in eight sports, but a trend emerged suggesting that some males may use exercise to lose weight while women may prefer dieting. This study was previously noted to have methodological limitations, namely, neither a standardized eating disorder inventory was used nor a concurrent sample of nonathletes employed. Acknowledging these limitations, Boland and associates found that female athletes reported significantly more severe eating pathology (i.e., higher scores) than male athletes, a finding that was consistent with the non-athletic control groups (Boland & Lake, 1988; Wilkins, Boland, & Albinson, 1990). The findings of greater eating pathology in female athletes compared to their male counterparts have also been reported to occur among several sports, including swimming (Drummer et al., 1987), running (Kiernan et al., 1993), ice skating (Rucinski, 1989) and rowing (Sykora, Grilo, Wilfley & Brownell, 1993). The findings from Rucinski (1989) are especially noteworthy as 48% of (11 of 23) female ice skaters, but no males, reported scores on eating pathology in the anorexic range. This high prevalence of disordered eating among female skaters was also associated with severe disturbances in body image.

Summary of Eating Disorder Symptoms in Athletes and Fitness Enthusiasts

Definitive estimates regarding the prevalence of eating disorders in athletes remain unknown due to the absence of large scale studies, a lack of standardized inventories and non-athletic control groups. While some studies have reported more frequent and severe eating disturbances among athletes, others have found no differences between groups, while others reported less severe eating disturbances in athletes. Differences in methodology, characteristics of the sample, DSM criteria and other

divergent factors may account for these inconsistent findings. However, there appears to be a consistent pattern of findings indicating more eating disorder behavior among people who participate in sports or activities in which leanness (wrestling), low body weight (e.g., ballet, gymnastics) , endurance (middle and long distance running) or an aesthetically pleasing body (e.g., modeling, figure skating) are considered to be important for success. There is also some evidence that participating in these sports or activities at higher competitive levels may potentiate the risk of disordered eating. It is uncertain whether these sports and activities elicit or promote disordered eating or whether the eating disturbances predate participation in these activities. However, initial findings suggest that the disordered eating occurs more frequently during times of competition than non-competition. These findings, combined with retrospective self-reports, suggest that athletes may be engaging in extreme eating and weight control practices in attempt to improve performance rather than an effort to improve appearance for purposes of self-esteem or self-evaluation, which is typical of people with eating disorders. Further inquiry regarding athletes' underlying motivation to modify their body shape and weight is needed. The more prevalent pathologic eating and weight control practices observed among women compared to men is consistent with the athletic literature as female athletes generally reported significantly more disordered eating than male athletes. Future studies should extend beyond eating-related pathology and attempt to identify a broader range of psychological, biological and demographic factors that may, collectively or independently, predispose athletes to develop eating disturbances and unhealthy weight control behavior.

Body Image and Psychological Factors in Weight Trainers

Weight training and its more rigorous counterpart, bodybuilding, have rapidly become widely practiced forms of physical activity. Several researchers have suggested that the increase in participation observed in weight training, bodybuilding and other forms of resistance exercise is a response to the fitness movement and sociocultural norms that portray the mesomorphic build as the aesthetic male ideal, and a physically fit (lean and toned) body as the current standard of attractiveness for women (Brownell, 1991; Butler & Ryckman, 1993; Lamb et al., 1993; Mishkind et al., 1986; Cash, Winstead & Janda, 1990). The acceptance of weight training can be measured by the remarkable growth in the past two decades. Although no formal epidemiological studies on weight lifting or bodybuilding have been done, trade publications estimate that over 85 million North Americans engage in some form of weight training (Klein, 1986; International Federation of Bodybuilders, IFBB). More conservative prevalence estimates ranging between 5-10 million have recently been proposed (Pope et al., 1997). While only a tiny fraction of weight trainers will ever develop enough to compete in the sport of bodybuilding, almost all expect to see some alterations in their physiques. In that sense they may be considered body builders, body shapers or body sculpters.

The physical benefits of weight training are widely documented by research and include increased strength, lean muscle mass and increased bone density (Gettman & Pollock, 1981; Tucker, 1983; Tucker & Mortell, 1993). The increased strength and muscle mass that accompany regular weight training are particularly important for many athletes who are trying to enhance their athletic performance. This effect combined with increased bone density has been shown to improve functional mobility in senior citizens

as well as delay the onset of osteoporosis, which is common among women from middle-age and older (Shephard, 1990). Moreover, recent research has also shown that weight training increases the basal metabolic rate (BMR) by increasing the proportion of muscle mass in relation to body fat (Katch & McArdle, 1988). This increased proportion of lean body mass (fat free mass) results in burning more calories when an individual is at rest, and this results in a leaner body. Increases in lean body mass which results in ideal levels of body fat have clinical relevance considering several studies have shown a relationship between high levels of body fat and several life threatening diseases such as high blood pressure, heart disease, and colon and breast cancer (Brownell & Fairburn, 1995).

Although many physical benefits have been reported from regular weight-training, the psychological sequelae of this activity are less understood. Tucker and associates were among the first to examine the effects of weight training on participants' psychological well-being. Tucker (1982) explored the relationship between weight training and psychological well-being among 113 university males utilizing a cross-sectional design. The primary hypothesis of Tucker's research was that weight training would result in enhanced psychological well being due to the positive (personal and social) feedback participants would receive generated by the overt consequences of regular lifting (e.g., increased muscle mass, strength and tone). Analyses showed number of months of weight training was positively and significantly related to global self-concept, body cathexis, and extroversion.

Acknowledging the limitations inherent in a retrospective approach, Tucker (1982, 1983) conducted follow-up studies employing prospective designs that would

provide a better understanding of the psychological effects of a 16-week weight-training program on college males. Self-concept was assessed by the Tennessee Self-Concept scale and a modified version of Secourd and Jourard's (1953) Body Cathexis Scale was used to assess body image. Subjects were randomly selected by a cluster-sampling strategy but assignment to experimental and control groups was determined by self-selection rather than random assignment. The weight training program required two intense 50-minute total body workouts. In both studies, the experimental group showed significant improvement from pre-to post-test on several of the self-concept indices, yet control subjects displayed no significant changes on any of the dimensions. The dimensions of self-concept that benefitted most from the weight-training were Physical Self, Behavior, Identity, and Global self-concept and Personal Self. In addition, weight trainers reported significantly higher body cathexis scores indicating greater satisfaction with body parts. The possibility of a ceiling effect among the control subjects is unlikely because analyses showed no significant differences between groups on dependent measures at pre-test.

Tucker's findings indicating psychological benefits associated with a weight training regimen among college males are supported by findings from a more recent study by Melnick and Mookerjee (1991) who utilized a similar design and methodology. These authors reported improvements in self-esteem and body image among weight training participants. Weight trainers also exhibited significant reductions in body fat and increases in strength. These improvements in body composition, which were associated with enhanced perceptions of the physical self, accompanied the improvements in

self-esteem, indicating that improving one's body image may be a way to enhance self-esteem.

More recent prospective studies support Tucker's initial findings and extend them to a sample of college females (Trujillo, 1983, Brazell-Roberts & Thomas, 1990). Weight trainers reported significantly greater pre-post differences in self-concept relative to controls. Consistent with previous findings (Tucker, 1983) that employed male samples, the group of women who exhibited the largest gain in self-esteem was the group which had the largest gains in body strength and exhibited significant losses in size of certain body parts (e.g., legs, hips). Although correlational in nature, these data suggest that improvements in self-esteem associated with weight-training may be moderated by enhanced body image perceptions and strength gains.

Although the prospective studies reviewed above represent an improvement in methodological rigor relative to cross-sectional designs, none of the studies employed an athletic comparison group to control for the "feel good" and other non-specific effects of an exercise program. Thus, it cannot be determined from these studies whether weight training is more effective than other forms of exercise in producing psychological benefits.

Citing this limitation, Stein and Motta (1992) compared the effects of weight-training and aerobic exercise on depression and self-concept using a prospective experimental design. The results indicated that both aerobic and non-aerobic groups were equally effective in significantly reducing self-reported depression in comparison to controls. However, the weight training (non-aerobic) condition was superior to the swimming (aerobic) group for enhancing overall self-concept as measured by the widely

reliance on college students, which may not be representative of beginning weight trainers in general. Moreover, future inquiry should assess the effect of frequency, duration and intensity of workouts on psychological health in an attempt to identify the most effective weight-training prescription. Furthermore, long term prospective investigations are required to determine if any psychological benefits of weight training are maintained over time. Finally, it would be of considerable value for future studies to employ more comprehensive investigations of the effects of weight-training that extend beyond self-esteem and body image. Psychological variables that have been associated with poor health and premature mortality, such as abnormal eating attitudes and practices, depression, anxiety, and Type-A personality variables (e.g., anger, hostility), may be a logical starting place.

Eating Disorder Symptoms and Psychological Factors in Bodybuilders

The term "bodybuilding" covers a wide spectrum of activities, ranging from individual workouts using weights to the professional sponsored competitions by national and international bodybuilding associations (Dutton & Laura, 1988). Bodybuilding has been broadly defined as the systematic use of progressive weight training in order to increase one's muscle size, and enhance muscle shape and tone (International Federation of Bodybuilders; IFBB, 1995). The goal of serious or competitive bodybuilders is to develop a large amount of lean muscle mass with pronounced muscularity and vascularity so that the body is symmetrical in proportion to one's height and frame (Bednarek, 1987; Committee on Sports Medicine, 1990). This is distinct from sports such as Olympic weight lifting where the aim is to achieve maximum strength. It is also distinct from the use of weights to improve athletic performance or rehabilitate injuries. As such,

bodybuilding differs from other activities that involve weight training by its primary aim, which is to change the appearance and composition of the body for cosmetic purposes and to a lesser extent expected health benefits. Although this differentiation can be achieved conceptually, it is more difficult to achieve in practice because many weight trainers are reluctant to label their activity as "bodybuilding", and because people engage in weight training for several simultaneous reasons (e.g., cosmetic, health, athletic performance enhancement, stress reduction). The inconsistent and vague operational definitions reported in the literature represents a methodological shortcoming that limits the differentiation between weight training and recreational bodybuilding.

Although bodybuilding and weight training both involve the use of progressive resistance training, the differences in scope, frequency, intensity, and motivation for engaging in these activities may have significantly different psychological effects, and may attract different types of participants. A great deal of research exists indicating that people who participate in sports and/or physical activities (running, ballet, gymnastics, etc.) in which leanness, body shape or weight are important factors for enhanced performance are at higher risk of engaging in abnormal eating and weight control practices that are characteristic of eating disorders (Black, 1991; Brownell, Rodin & Wilmore, 1992; Moriarty & Moriarty, 1991; Sundgot-Borgen, 1990;1993). The goal of bodybuilding is to possess a body that contains a substantial amount of body mass, which typically is reflected in weight gain. However, this added bulk has to be in the form of lean muscle mass with extremely low levels of body fat. The goal of possessing a large amount of muscle with extremely low percentages of body fat is a physiological paradox, and can only be achieved naturally by a very small proportion of the population who

possess the necessary genetic potential. Despite these largely unrealistic body size and shape standards associated with bodybuilding, few studies have examined eating-related attitudes and behavioral practices designed to modify body shape and size, and associated psychological characteristics among bodybuilders.

Early studies by Henry (1941), Thune, (1949), and Harlow (1951) all reported personality characteristics of bodybuilders that were consistent with common prejudices of the times: feelings of inferiority, lack of masculinity, and narcissistic and homosexual tendencies. Subsequent research reported that the personality profiles of competitive bodybuilders and weightlifters did not significantly differ from those in the average population (Darden, 1972; Franck, 1984). In accordance with the growing popularity of bodybuilding, research has also indicated results more consistent with current values. For example, muscular males have been reported to be perceived by others as more athletically inclined and possessing more favorable skills and personality traits than non-muscular males (Berscheid & Walster, 1974; Dion, Berscheid, & Walster, 1982). Interestingly, research indicates that people perceive female bodybuilders in a socially undesirable manner characterized by unattractiveness, being more likely to perform masculine role behaviors and less likely to be employed in feminine occupations (Freeman, 1987).

Eating Disorder Symptoms and Psychological Factors in Male Bodybuilders

Klein (1987) conducted a 6-year ethnographic study and reported that male competitive bodybuilders had poor body images and low self-concepts. In addition, Klein (1987) noted that participation in bodybuilding appeared to be the primary vehicle in which these athletes attempted to compensate for their self-perceived inadequacies.

Klein reported there was an inverse relationship between body image, self-esteem and the frequency and intensity in which these males participated in bodybuilding. The greater the dissatisfaction with their bodies and general self-image, the more rigorously they engaged in bodybuilding.

Using the Eating Attitudes Test (EAT), Franco, Tamburrino, Carroll and Bernal (1988) conducted an investigation of eating attitudes in a sample of 240 college males. Although this study was not designed to examine eating pathology among bodybuilders, results indicated that elevated EAT scores, indicating pathogenic eating attitudes and behavior, correlated significantly with males who participated in bodybuilding. More specifically, bodybuilders reported greater preoccupation with dieting and more body dissatisfaction than males who participated in other sports and non-athletic males.

Pasman and Thompson (1988) examined body image and eating disturbances in 15 habitual runners, 15 habitual weightlifters and 15 sedentary controls. Results indicated that male weightlifters reported higher scores on the Drive for Thinness (reflecting weight and shape preoccupation) and Body Dissatisfaction subscales of the EDI in comparison to male sedentary controls only. However, no significant differences emerged between male runners and male weightlifters on these measures. Interestingly, weightlifters were significantly more accurate in estimating body size (3% overestimation) than runners (17% overestimation) and controls (12% overestimation), although the latter two groups did not significantly differ from each other.

Perhaps the most intriguing findings from this study is the lack of body size distortion exhibited by the weightlifters, which was predicted to be underestimated due to the fact that they typically desire a larger body. The absence of size distortion reported

by Pasman and Thompson (1988) appears to be a valid finding as body size estimation was assessed using an objective measure consisting of an adjustable light beam apparatus. This procedure requires participants to self-adjust a beam of light against a wall to match their own perception of specific body parts (cheeks, waist, hips, and thighs). This was compared with measurements of those body parts obtained by an anthropometer. The authors offer a few explanations as to the reason for the accurate estimation of body size exhibited by the weightlifters in relation to the other groups. First, since most weight-rooms (where subjects were selected from) are lined with wall to wall mirrors, it is probable that these individuals observe themselves, and specific body parts, to a greater degree than runners and controls. On the other hand, the authors cite Festinger's (1954) social comparison theory. According to this view, subjects may be evaluating their size in relation to others more frequently than runners and controls, thereby enhancing the accuracy with which their bodies are perceived. Despite the accurate estimation of body size, this subgroup of male weightlifters reported more body dissatisfaction and preoccupation with weight and shape (Drive for Thinness) characteristic of anorexics and bulimics compared to sedentary controls.

Loosemore and Moriarty (1990) examined body dissatisfaction and body size distortion among three groups of undergraduate males; bodybuilders (n=25), hockey players (n=18), and controls (n=25). Bodybuilders were defined as those lifting weights for the primary reason of enhancing their appearance by developing their muscles and physiques. The hockey players selected played at the intercollegiate level, while the comparison group consisted of introductory psychology students.

Results indicated that bodybuilders reported significantly higher body dissatisfaction, with the perception of being thinner than ideal, than hockey players and psychology students, who did not differ significantly from each other. Body dissatisfaction was assessed by the widely used and validated Eating Disorder Inventory (EDI). In addition, bodybuilders exhibited significantly greater body size distortion than the two comparison groups ($p < .001$), who did not differ significantly from each other. Interestingly, bodybuilders were much heavier for their height than were hockey players and control subjects, yet they perceived themselves to be the most underweight. Moreover, although bodybuilders reported a high prevalence of anabolic steroid use (72%), neither control group reported using steroids. Bodybuilders participated more frequently in their sport and also rated their physical appearance as more important than the other groups and this perception was positively related to the reported body image disturbance. It is important to note that even though the inventory used in the above study to assess body size distortion, the Body Image Distortion Questionnaire (BIDQ; Mable, Balance & Galgan, 1986), has been reported to possess strong reliability, its construct validity has been questioned. Research has indicated that the most valid measures of body size distortion compare the difference between subjects' perception of their body size with their actual body size (Cash, 1990). Perhaps the most valid measures of body size distortion have been reported using a distorting camera/video technique described by Cash and Brown (1987) or an adjustable light beam apparatus (Thompson, Penner, & Altabe, 1990). It is highly unlikely, if not impossible, to obtain a quantitative measure of body size distortion using paper and pencil questionnaires, and the BIDQ used in this study is no exception. For example, subjects are asked to indicate a point which

they believe best represented their body size on a line ranging from 50% underweight to 50% overweight, with the mid-point representing "just right". Questions concerning height, weight, and body frame size were used to determine the conformity of the self-reported weights to the Metropolitan Life Insurance height-weight norm midpoint charts. The percentage of body image distortion was then measured by the following formula: $[(\text{perceived weight deviation} / \text{deviation of reported weight}) - 1] \times 100 = \% \text{ body image distortion}$. Importantly, this formula, reflecting a discrepancy between self-perceptions and ideal body size, is more representative of body dissatisfaction rather than body size distortion. Nevertheless, this study reports important results as it suggests that the body image disturbance and high prevalence of steroid use found in bodybuilders was not found among the hockey players, even though considerable strength and size are beneficial characteristics to the sport of hockey.

The effects of participation in selected physical activities on scores of body-image parameters and global self-concept in a sample of college males was examined by Ford, Puckett, and Reeve (1991). Seventy-eight students, enrolled in university physical education classes, participated 3 hours per week for 8-weeks in one of three activities: strength development, bodybuilding, or jogging or fitness. A comparison group was utilized, which consisted of 35 students who were not enrolled in physical education service programs. This study represents the first investigation to comparatively examine the psychological effects of lifting weights for the purpose of enhancing strength (e.g., strength development group) with that done for the purpose of changing the shape and size of the body (e.g., bodybuilding).

Significant improvements were found using Body Cathexis Scale (Secourd & Jourard, 1953) in favor of the bodybuilding and jogging groups compared to the strength development and control groups. Although no significant differences existed at pretest, joggers reported higher body cathexis scores than bodybuilders indicating they were more satisfied with the appearance of their body. With regards to self-esteem, assessed by the Rosenberg Self-Esteem Scale, bodybuilding and jogging groups exhibited a non-significant increase from pretest to post-test, whereas the strength development and control groups showed little change. These results suggests that participating three times per week for 8-weeks in a bodybuilding class can have positive effects on body image; however, follow-up assessments are required to determine the long-term effects, if any, of a bodybuilding regimen.

In their investigation of the psychiatric effects of steroids, Pope et al. (1993) administered the Structured Clinical Interview for DSM-III-R (SCID) to 55 male bodybuilders who used steroids and 53 non-using male bodybuilders. Three (2.8%) of the subjects reported a history of anorexia nervosa, a rate considerably higher than the .02% typically reported in North American men. In addition to anorexia nervosa, Pope et al. (1993) also identified a disturbance in body image among a sub-group of bodybuilders (n=9) described as "reverse anorexia", a syndrome characterized by the fear and belief that one is small and weak even though the individual appears large and muscular. Pope et al. (1993) found that bodybuilders who met the criteria of "reverse anorexia" reported an insatiable drive to put on weight in the form of lean muscle mass in a manner that is similar but in the opposite direction of an anorexics' intense desire to lose weight. In addition, this reported disturbance in body image had not only a deleterious effect on

their emotional well-being but also hindered their daily functioning. For example, reported behavioral indicators of body image disturbance among male bodybuilders diagnosed with "reverse anorexia" included avoiding social invitations, refusing to be seen at the beach, or wearing baggy clothes even in the heat of summer to cover up their "perceived smallness". Importantly, all nine "reverse anorexia" cases occurred among steroid users, with four subjects reporting that their reverse anorexic symptoms played a role in their decision to begin taking steroids. Four subjects reported that they did not develop reverse anorexic symptoms until after they began using steroids. The remaining individual who met the author's criteria of "reverse anorexia" developed symptoms exclusively during steroid withdrawal. It is also notable that five of the "reverse anorexic" subjects displayed psychiatric morbidity in the form of mania or hypomania in association with steroid use. This represents a rate significantly higher than that of the other steroid-using bodybuilders.

Importantly, the phenomenon among bodybuilders initially described by Pope et al. (1993) as "reverse anorexia" has been renamed "muscle dysmorphia" by these investigators. Pope et al. (1997) postulate that "muscle dysmorphia" is a sub-type of Body Dysmorphic Disorder described in the DSM-IV (APA, 1994). Muscle dysmorphia is reported to be under recognized, occurring in approximately 10% (n=156) of male bodybuilders and 84% (32 of 38) of competitive female bodybuilders interviewed (Pope et al., 1997). Muscle dysmorphia may have important clinical and health implications as it has been found to be associated with occupational and social maladjustment, comorbid psychiatric disorders, (e.g., eating disorders, obsessive compulsive disorder), psychological distress, and anabolic steroid use (Pope et al., 1997).

participation) and for possible attraction to a sport perceived to enhance personal feelings of masculine effectiveness (martial arts).

Bodybuilders reported significantly greater body dissatisfaction, abnormal eating attitudes (e.g., preoccupation with weight and shape, fat anxiety, etc.) and abnormal weight control practices (most notably anorexic and bulimic behavior and steroid use) compared to either of the athletic comparison groups. With regards to steroid use, 44% of bodybuilders (n=43) reported using steroids, a rate significantly higher than runners (2.1%, n=48) and martial artists (0 out of 48). In addition, bodybuilders reported significantly higher scores on standardized measures of perfectionism, ineffectiveness, maturity fears, as well as lower self-esteem in relation to controls. Moreover, this negative psychological profile was more prominent among steroid-using bodybuilders than non-users, with body dissatisfaction (feeling too thin and wanting to “bulk up”) and bulimic tendencies representing the strongest predictors of anabolic steroid use. Few significant differences were found between competitive and recreational runners and martial artists. However, competitive and recreational bodybuilders significantly differed on a few indices, but fewer than expected. Competitive bodybuilders reported more severe body dissatisfaction (perception of being smaller than ideal) and higher rates of steroid use (78% vs 20%) than recreational bodybuilders. The lack of differentiation between competitive and recreational bodybuilders suggests that much of the variability in pathogenic eating attitudes, behavior and weight control practices that discriminated bodybuilders from athletic controls is unlikely to be solely a function of unrealistically high standards in competitive bodybuilding. Acknowledging that this subgroup of bodybuilders may not be representative of all bodybuilders, Blouin and Goldfield (1995)

concluded that this group engaged in high risk behavioral practices (notably steroid use, anorexic and bulimic behavior) with the apparent purpose of modifying their body in order to meet personal and/or societal expectations.

In contrast to many of the previously reviewed studies, Schwerin et al. (1996) reported more positive psychological characteristics in male bodybuilders. Schwerin et al. (1996) found no significant differences on measures of social anxiety or body dissatisfaction between male bodybuilders who self-reported using steroids ($n = 35$), non-using male bodybuilders ($n=50$), athletically active male exercisers ($n = 50$) and sedentary males ($n = 50$). Results indicated that steroid-using bodybuilders reported more positive body image ratings (less social physique anxiety and greater upper body strength ratings) than non-user groups including bodybuilders. These findings suggest that the muscle enhancing effects of steroids may have a positive effect on body image. This finding is inconsistent with the majority of research which indicates that a negative body image is reported to be a significant predictor of anabolic steroid use among male bodybuilders (Blouin & Goldfield, 1995; Brower, Blow, Young & Hill, 1991; Loosemore & Moriarty, 1991; Pope et al., 1993). Perhaps these inconsistent findings regarding the association between body image and steroid use in bodybuilders are due, at least in part, to differences in body image measurement. Schwerin et al. (1996) employed the Upper Body Strength Scale and Social Physique Anxiety Scale, whereas investigators who found a negative relationship between body image and steroid use employed the Body Dissatisfaction scale of the Eating Disorder Inventory (Blouin & Goldfield, 1995; Brower et al., 1991; Loosemore & Moriarty, 1990).

Taken together, in 4 of 6 studies, male bodybuilders reported significantly more severe body dissatisfaction and/or pathogenic eating attitudes and behavior in comparison to athletic (Blouin & Goldfield, 1995; Franco et al., 1988; Loosemore & Moriarty, 1990) and non-athletic control groups (Franco et al., 1988; Loosemore & Moriarty, 1990; Pasman & Thompson, 1988). In addition, several other studies that did not include comparison groups also reported disturbances in body image (Klein, 1987; Pope et al., 1993), self-esteem (Klein, 1987), and prevalence of strict dieting (Sandoval, Heyward, & Lyons, 1989), binge eating, pathogenic methods of weight control (laxatives, dehydration techniques), weight cycling (substantial weight loss and regain), and psychological distress manifested in anger, anxiety, and short temper (Andersen et al., 1995).

Eating Disorder Symptoms and Psychological Factors in Female Bodybuilders

Very little research has examined eating behavior among female bodybuilders, despite reports that bodybuilding is becoming increasingly popular among women (International Federation of Bodybuilding; IFBB, 1995). The initial investigations have produced conflicting findings. In a prospective study with a small sample of competitive female bodybuilders, Lamar-Hildebrand et al. (1989) found severe dieting and weight cycling among female bodybuilders preparing for a contest, as well as vitamin and mineral intake below the recommended daily levels.

Walberg and Johnston (1991) compared 96 weightlifters (84 recreational weight-trainers, and 12 competitive bodybuilders) with a group (n=92) of women enrolled in introductory university classes served as a comparison group. Results indicated that weightlifters scored significantly higher than comparison group members on the Drive for Thinness subscale of Eating Disorder Inventory (EDI), but no

significantly higher for the subset of 12 weightlifters who had competed in at least one bodybuilding competition than recreational weightlifters (86% vs 34%). These findings are consistent with other studies suggesting that menstrual dysfunction is more commonly observed in athletes who participate in activities in which low body fat or weight are thought to enhance performance, such as running, gymnastics, and ballet (Dale, Gerlach, & White. 1979; Sanborn, Martin, & Wagner, 1982). Taken together, these data suggest that women who report a history of anorexia nervosa, with excessive concern with their weight and food consumption, and who are experiencing menstrual dysfunction, are disproportionately represented in groups of women who participate in weight lifting for general conditioning, and even more so for those who have a history of competing in bodybuilding.

More recently, Andersen et al. (Personal Communication, October, 1997) found that strict dieting, weight cycling, body dissatisfaction, and preoccupation with food were prevalent among a sample of 26 competitive female bodybuilders participating in a drug-free competition. However, this study did not employ a comparison group.

In contrast to these negative findings, more positive results have been reported in studies investigating eating disturbances and associated psychological characteristics in female bodybuilders. Pasman and Thompson (1988) found that female recreational weightlifters reported less body dissatisfaction and body size distortion (less overestimation) than female runners and sedentary female controls. Guthrie et al. (1994) examined the nutritional practices and body images of 13 competitive female bodybuilders using structured interviews and survey methods. Findings indicate positive body images as measured by the Multidimensional Body Self-Relations Questionnaire

(MBSRQ) This instrument assesses three psychological dispositions toward one's body (affective, cognitive, and behavioral) across three somatic domains: physical aesthetics (appearance), physical competence (fitness), and biological integrity (health). The self-report data indicate that the bodybuilders were motivated to participate in bodybuilding for appearance reasons, as well as fitness and health. Despite this narcissistic motivation, bodybuilders reported less pathological attitudes toward shape and weight (weight preoccupation, fat anxiety, body satisfaction) compared to a sample of women that were used in the validation study of the MBSRQ (Cash et al., 1986). In addition, no bodybuilder met the criteria (DSM-III-R) for anorexia nervosa or bulimia nervosa at the time of testing, and most did not report regular use of abnormal weight control techniques such as vomiting, laxatives, diuretics, enemas, or diet pills. However, this group of bodybuilders did score high on a dieting scale and 32% reported a history of BN.

Perhaps the most important data in this study were obtained from the interviews. All bodybuilders retrospectively reported enhanced body image and self-concept after initiating training. Personal accounts underscore the phenomenon that this sample of female bodybuilders perceived a psychological empowerment resulting from a transformation in body composition from bodybuilding. However, all bodybuilders reported that the standards in competitive bodybuilding were too high. As a result, the most serious competitors resorted to steroid use (4 out of 12), cosmetic surgery (4 out of 12), and almost all used unhealthy dehydration methods a few weeks prior to the competition in effort to achieve the perfect "championship " body. The majority of the remaining sample reported seriously contemplating these extreme methods of physique

enhancement. Although these findings cannot be generalized to the population of female bodybuilders due to a small sample of self-selected volunteers ($n=13$), they provide tentative evidence that participating in competitive bodybuilding may offer nutritional and somatic benefits for some women, but may pose serious health threats to some who are serious competitors.

Gender Differences in Eating Disorder Symptoms in Bodybuilders

Few studies have specifically examined gender differences in eating-related pathology and general psychological characteristics in bodybuilders. Sandoval, Heyward and Lyons (1989) reported few differences in dietary practices between male and female competitive bodybuilders assessed three days prior to competition. Similarly, Pasman and Thompson (1988) reported few gender differences in eating disturbances in bodybuilders; however, female bodybuilders reported significantly more body size overestimation than males. Findings from both studies, however, should be interpreted with caution as sample sizes were very small (less than 15 for each gender), thus requiring extremely large differences to achieve statistical significance. Further inquiry with larger samples is required to determine if there are reliable sex differences between bodybuilders on measures of eating-related pathology. Extrapolating from the literature examining eating disorders in athletes, which generally indicates that female athletes exhibit more frequent and severe body dissatisfaction and eating disturbances than their male counterparts (Boland & Lake, 1988; Kieman et al., 1993; Sykora et al., 1993; Wilkins et al., 1990), female bodybuilders may be at greater risk of disordered eating than males.

Summary of Eating Disorder Symptoms and Psychological Factors in Bodybuilders

The reported psychological sequelae of bodybuilding stand in contrast to those of weight training. Moderate weight training is often associated with improved psychological functioning in the form of enhanced body image and self-esteem in both males and females. Although not conclusive, serious recreational (noncompetitive) and competitive bodybuilding, especially in males, is generally associated with body dissatisfaction, anabolic steroid use, eating disturbances and pathological weight control practices, as well as feelings of ineffectiveness and low self-esteem. Due to the correlational nature of the data, it cannot be determined whether this divergent pattern of psychological and behavioral sequelae is due to a selection phenomenon (differences in subjects before lifting weights), or whether the activities of weight training and bodybuilding produce vastly different psychological effects. With regards to the negative psychological profile exhibited by serious bodybuilders, there appears to be evidence to support two possibilities. First, that people with eating disorder symptoms pursue bodybuilding (e.g., selection phenomenon). Second, the activity of bodybuilding, with its emphasis on enhancing body size, shape and weight, precipitates eating disorder symptomatology. Consistent with the first postulation, research has shown a substantial history of anorexia nervosa among male bodybuilders (2.8%, Pope et al., 1993) and competitive female bodybuilders (42%, Walberg & Johnston, 1991). In addition, Guthrie et al. (1994) found that 32% of competitive female bodybuilders reported having bulimia nervosa before they began bodybuilding. These rates of previous eating disorders are considerably higher than would be expected by chance given the rates in the population.

Moreover, self-reports from many male bodybuilders indicated they engaged in rigorous bodybuilding, strict dieting, excessive aerobic activity and steroid use to enhance the appearance of their bodies and self-esteem for cosmetic rather than competitive reasons (Blouin & Goldfield, 1995; Loosemore & Moriarty, 1990). However, consistent with the second contention, that activities which emphasize a lean body may foster pathological eating and weight control practices, retrospective data from a subgroup of bodybuilders indicated that body image disturbance, eating-related pathology, and steroid use began well after a program of bodybuilding was initiated (Pope et al., 1993). In addition, retrospective reports from bodybuilders suggest that preoccupation with weight and shape, dieting and unhealthy body modification practices, were more extreme during months of competition in comparison to the "off season" (Andersen et al., 1995; Guthrie et al., 1994). It is possible that people who are dissatisfied with their body shape and weight and have unhealthy eating practices or tendencies may gravitate toward bodybuilding, and the high standards associated with serious or competitive bodybuilding may potentiate the risk of eating disordered behavior. Future inquiry utilizing prospective designs is required to properly address this issue.

Few studies to date have included females and males in the same sample of bodybuilders in their investigations. Future inquiry is needed to comparatively examine male and female bodybuilders in order to determine if there are basic differences between the sexes with regards to eating disorder symptoms or general psychological characteristics.

The high prevalence of steroid use reported among recreational and especially competitive bodybuilders as a method of physique enhancement has important health

implications due to the reported physiological and psychological morbidity associated with anabolic steroids. Several studies document a relationship between steroid use and serious physical/medical problems in males including atrophy of the testes and decreases in sperm production, actual sterility, increased risk of liver and kidney cancer, cardiovascular disease via hypertension and increased cholesterol levels, increased mortality and even sudden death (Canadian Centre for Drug-free Sport, 1995; Friedl, 1990; Kusserow, 1991; Pope & Katz, 1994). The psychological effects that have been reported in association with steroid use include increased aggressiveness and explosive hostility and anger (e.g., “roid rage”), frequent and severe mood swings, sleep disturbances, cross-addiction, depression when withdrawing from use, as well as mania, delusions, hallucinations and paranoia (Moss, Panzak & Tarter, 1992; Pope & Katz, 1988, 1994; Smart, Adlaf, & Porterfield, 1990). In comparison to non-users, additional research found steroid users reported significantly more anxiety, depression, and hostility (Perry, Yates, & Andersen, 1990), as well as more prevalent pathogenic personality characteristics in the form of antisocial behavior (Yates, Perry, & Andersen, 1990), narcissism and less empathy (Porcerelli & Sandler, 1995). These findings underscore the importance of developing effective interventions designed to prevent steroid use which is a common method of modifying body size and shape among bodybuilders.

An important limitation in the extant investigations is a focus on identifying symptoms and psychological characteristics of bodybuilders without attempting to identify the underlying issues that are driving individuals to pursue rigorous bodybuilding and unhealthy eating and physique enhancement practices. For example, in women with eating disorders, there is considerable evidence that an enduring fear of being fat is a

powerful motivator in AN and BN and manifests itself in unhealthy eating and compensatory behaviors (Fairburn et al., 1986; Garner & Garfinkel, 1982). Consistent with cognitive theory, research has also shown that the morbid fear of fat displayed by individuals with BN may originate from the maladaptive core beliefs associated with the importance of weight and shape. For example, a common core belief in a bulimic individual may be, "if I am fat, I will be unlovable, unattractive, and a miserable failure" (Fairburn et al., 1986). Future inquiry aimed at identifying bodybuilders' motivation and underlying beliefs is essential to develop programs designed to prevent and treat the negative psychological characteristics and high risk behavioral practices associated with serious bodybuilding.

Rationale for the Present Study

Society's portrayal of thinness as the beauty ideal for females has long been reported as a precipitating factor in the development of body image disturbances and eating disorders (Garner et al., 1980). More recent research illustrates that the beauty standards for women not only emphasize thinness, but also a body that appears physically fit with considerable muscle tone (Andersen & DiDomenico, 1992; Brownell, 1991). Although it was previously believed that men were not adversely influenced by media images, more recent research has shown that young males may also be susceptible (McCaulay et al., 1988; Mishkind et al., 1986). Several studies have reported a relationship between the hypermesomorphic body, which has been heavily promoted as the aesthetic ideal for males, and a growing incidence of reported body dissatisfaction among young men, many of whom tend to perceive themselves to be thinner than ideal (Drewnowski & Yee, 1987; Mishkind et al., 1986; Butler & Ryckman, 1994). In light of

the expected health benefits, as well as the sociocultural pressures for men to possess a hypermesomorphic build and women to achieve the lean and toned female ideal, bodybuilding has become a popular form of physical activity for both sexes.

The majority of the findings indicate that serious or competitive male bodybuilders exhibit a psychological profile that is similar in some ways to that typically seen among people with BN. This profile is characterized by body dissatisfaction, preoccupation with weight and shape, abnormal eating attitudes, behavior and weight modification practices (e.g., drive for thinness, binge eating, strict dieting, fasting, abuse of laxatives and diuretics), and feelings of ineffectiveness. Moreover, this negative profile of male bodybuilders was reported to be more prominent among bodybuilders who used steroids than non-users. However, an absence of a concurrent eating disorder group, differences in measurement inventories, characteristics of the samples, and other divergent factors make comparisons between bodybuilders and bulimics problematic. Valid conclusions regarding the degree of concordance of eating and psychological profiles between bodybuilders and people with BN requires that these groups be directly compared. Although bodybuilders appear to be physically fit and healthy, which may attract people to the sport, they may not be healthier (psychologically) than an identified psychiatric sample. Identifying the extent to which bodybuilders resemble people with BN may have important implications for health promotion programs, and may lead to further research investigating the psychological risks and benefits of bodybuilding.

The primary aim of the present study was to build on past research by comparatively examining eating-related pathology and general psychological characteristics of male and female bodybuilders with male and female bulimics. The

psychological comparison of male and female bodybuilders represents an important component in the present study because gender differences among bodybuilders have not been adequately investigated, and expression of psychopathology related to body modification seems to be different in males and females. The bodybuilding sample was stratified by competition history (competitive vs recreational) in an attempt to provide further evidence for the widely held belief that competitive bodybuilders are at greater risk for body dissatisfaction, eating pathology and steroid use than recreational bodybuilders (Goldfield et al., in press).

An important theoretical limitation in the bodybuilding research is the absence of a theoretical orientation. The selection of a coherent and well developed theoretical framework, as opposed to variables selected from different theories or factors that are not affiliated with a theory, has the advantage of predicting potential relationships among the variables. Specifying relationships among variables may facilitate a more integrated and systemic understanding of complex behavior, which is critical to the development of effective interventions (Bandura, 1986; Beck, 1976). Cognitive theory posits that emotional and behavioral disturbances result from maladaptive attitudes, beliefs and perceptions (Beck & Weishaar, 1989). Since cognitive-behavioral theory is the most widely used paradigm in research investigating the etiology, maintenance, and treatment of eating disorders (Fairburn, 1995; Fairburn et al., 1993), it seems to be the most useful theoretical framework to be applied to the study of eating disorder behavior among bodybuilders.

An ancillary purpose of this study is to extend the investigation beyond examining symptomatology between bodybuilders and bulimics by utilizing a cognitive model in

attempt to identify maladaptive beliefs that may be driving individuals to pursue rigorous bodybuilding, unhealthy eating practices and dangerous methods of physique enhancement. The assessment of maladaptive attitudes and beliefs associated with over valuing body weight and shape is important as research has shown these aspects to be associated with severity of bulimic symptoms and treatment outcome (Garner, 1986; Fairburn et al., 1986; Fairburn et al., 1993). The present study, though not a test of the cognitive explanation of eating disorders, represents the first investigation designed to begin to identify bodybuilders' underlying beliefs that may serve as motivation to achieve the mesomorphic ideal. In turn, understanding individuals' motivation to engage in unhealthy and high risk behavioral practices in pursuit of the aesthetic ideal has been noted to be critical to the development and implementation of effective interventions (Brownell, 1991).

Guiding Research Questions

Primary Research Questions

The primary research questions most pertinent to this study are as follows:

1. Do bulimics, competitive, and recreational bodybuilders differ with respect to eating disorder attitudes and behavior?
2. Are there gender differences on eating disorder attitudes and behavior?
3. Are there gender or group differences on general psychological characteristics?
4. Is there a difference in the direction of body dissatisfaction between groups, with bulimics desiring a slimmer body and bodybuilders desiring a larger body?
5. Are there group or gender differences in the severity of body dissatisfaction with certain body parts (e.g., upper body parts versus lower body parts)?

Secondary Research Questions

1. Is there a relationship between dysfunctional beliefs and eating-related pathology?
2. Which maladaptive beliefs, if any, are most predictive of eating-related psychopathology?

Exploratory Research Questions

Steroid use represents another extreme and harmful strategy to modify body shape and size and may be related to eating-based strategies of physique alteration. The present study presents an opportunity to investigate in a preliminary way how steroid use and eating and weight control practices are related.

1. What is the prevalence of steroid use among male and female bodybuilders in both competitive and recreational conditions?

2. Do steroid-using bodybuilders report more negative body image, disordered eating and less positive psychological characteristics than non-steroid using bodybuilders?
3. In building a multivariate model for predicting steroid use, which demographic, eating-related and psychological variables best discriminate steroid-users from non-users, and how much variance in steroid use is explained by the model?

Method

Subjects

The sample in the present study was comprised of 48 bulimics (23 males, 25 females), 47 competitive bodybuilders (27 males, 20 females), and 50 recreational (noncompetitive) bodybuilders (25 males, 25 females).

Inclusion criteria for the competitive bodybuilding group required a person to be either actively training for or planning to enter a competition within the next year or who had participated in a bodybuilding competition within the past twelve months.

Recreational bodybuilders were defined as those people who lifted weights a minimum average of twice per week for at least seven months, and who had never competed in a bodybuilding competition and did not plan to in the next twelve months. Individuals who lifted weights primarily to recover from an injury were excluded from participating as these people are not representative of recreational bodybuilders. This exclusion criterion (e.g., lifting weights to recover from injury) was assessed by a brief screening interview conducted by the principal investigator and his assistants.

The eating disorder (clinical) sample consisted of volunteers recruited from an Eating Disorder Clinic located in Ottawa at Carleton University, as well as in Toronto at the Toronto Hospital. Table 1 (on p.73) displays that subjects recruited from Ottawa and Toronto did not significantly differ on demographic variables, eating-related pathology, or general psychological characteristics and were therefore combined. Of the 23 male eating disorder subjects, 22 met the DSM-III-R lifetime criteria for BN, while the remaining subject reported a history of Anorexia Nervosa. Twenty-three of the 25

Table 1

Descriptive Characteristics and Outcome Measures of Male and Female Bulimics

Variable	Ottawa Sample Mean (SD) (n=28)	Toronto Sample Mean (SD) (n=20)
% Female	60.0	40.0
Age	30.3 _a (9.9)	31.3 _a (8.0)
Education	4.7 _a (1.5)	4.5 _a (1.5)
Height (inches)	67.2 _a (3.5)	67.8 _a (3.5)
Weight (pounds)	164.7 _a (67.6)	148.8 _a (33.7)
Self-Esteem	28.4 _a (11.3)	27.3 _a (13.4)
Depression	20.0 _a (12.0)	21.9 _a (10.1)
Drive for Thinness	12.1 _a (6.4)	11.9 _a (6.0)
Bulimia	7.2 _a (6.8)	7.8 _a (5.5)
Body Dissatisfaction	16.5 _a (7.6)	12.4 _a (8.0)
Ineffectiveness	9.6 _a (8.0)	9.7 _a (8.2)
Perfectionism	6.4 _a (5.0)	6.6 _a (5.4)
Interpersonal Distrust	6.2 _a (5.4)	6.5 _a (4.5)
Interoceptive Awareness	10.3 _a (9.0)	9.3 _a (7.6)
Maturity Fears	6.1 _a (6.3)	5.7 _a (6.2)
Ave. # of binges per wk.	3.6 _a (4.7)	3.1 _a (5.4)

Note. Means in the same row that do not share subscripts differ at $p < .05$ in the Least Significant Differences Tests.

females met the DSM-III-R criteria for BN (Appendix B). The remaining two subjects met criteria for Eating Disorder - Not Otherwise Specified according to the DSM-III-R (APA, 1987; Appendix B). Despite the fact that six percent of the subjects in the eating disorder group did not meet criteria for BN, this group will be referred to as bulimic for the sake of simplicity. Information for diagnoses was derived from responses to the BN section of the computerized version (C-DISR; Blouin, Perez, & Blouin, 1988) of the National Institute of Mental Health Diagnostic Interview Schedule (DIS, Robins, Helzer, Clouston, & Ratcliffe, 1981). Sixty-five percent of males and 100% of females in the bulimic group, respectively, were symptomatic at the time of testing. Symptomatic was defined as currently engaging in binge eating, being persistently over concerned with body shape or weight, and using at least one method of weight control (e.g., purging) within the past two weeks. Patients diagnosed with BN were selected to represent the clinical sample as they comprise the majority of eating disorder population and because initial research indicated elevations in bulimic attitudes and symptomatology among male bodybuilders. No bulimic subjects were pregnant, lactating or suffering from a serious physical illness, thus, none were excluded. Taken together, the sample obtained in the present study may be considered to represent a convenience sample rather than randomly selected group of participants.

Materials

Anabolic Steroid Questionnaire (ASQ)

This 29-item self-report inventory represents a modification of a prominent steroid questionnaire (Chang & Moore, 1990), which is reported to have good internal consistency (coefficient alpha = .88). The ASQ assesses the extent, frequency, duration

adjustment or other disorders (Beck et al., 1987). The BDI has also shown to differentiate between people with serious depressive disorders from those with less severe depression (Beck et al., 1987).

Bodybuilding/Weight Training Questionnaire.

This questionnaire, which was developed for previous studies investigating psychological factors among male bodybuilders (Blouin & Goldfield, 1995), systematically assesses the criteria required to classify subjects into competitive and recreational groups. In addition, this questionnaire assesses the frequency and duration of training sessions. Research using this instrument provides preliminary evidence of discriminant validity among bodybuilders, runners and martial artists (Blouin & Goldfield, 1995).

Demographics Questionnaire.

This 9-item inventory was developed by the investigator in order to obtain personal and demographic information of subjects. Preliminary testing revealed it has excellent item test-retest reliability $r > .99$). It was designed to be used for this study and is not intended to be marketed as a demographics questionnaire.

Modified Dysfunctional Attitude Scale (MDAS).

The DAS is a 40 item inventory that has been reported to have strong psychometric properties, including good test-retest reliability $r = .84$) (Weissman, 1979). In addition, research has shown a significant relationship between the severity of dysfunctional attitudes assessed by the DAS and the intensity of depression among a large sample (Weissman, 1979). The original DAS has been modified to a 20-item inventory for the present study in order to assess bodybuilders' dysfunctional core beliefs

that may reflect their motivation to achieve the mesomorphic ideal. In addition to assessing dysfunctional beliefs associated with body size, shape and weight, this modified inventory assesses general dysfunctional attitudes that are not specific to body shape or weight. Preliminary testing revealed that the modified version of this instrument has moderate to good test-retest reliability ($.52 < r < .79$) (Goldfield & Blouin, in preparation).

Eating Disorder Inventory (EDI)

The 64-item EDI is a widely used self-report measure designed to assess the psychological and behavioral characteristics common in anorexia nervosa and BN. The EDI has been reported to have good reliability and validity (Garner et al., 1983). Based on a large sample of anorexics, the EDI has demonstrated good internal consistency, with Cronbach's alpha above .80 for each subscale. Criterion-related validity for all subscales was established based on the significant correlations reported ($r = .44$ to $.68$, $p < .001$) between anorexics' self-report scores and therapists' ratings of anorexics on all EDI dimensions. Moreover, these authors report considerable evidence of the EDI's discriminant validity as this inventory significantly differentiated anorexics self-report scores from those of colleges students and recovered anorexics. In addition, "restrictor" anorexics reported significantly lower scores than "bulimic" anorexics on the Bulimia subscale. An addendum to the EDI was developed by the investigator of this study for previous research (Blouin & Goldfield, 1995). Part of the addendum consists of reversing the direction of the items of the Body Dissatisfaction scale in order to comprise a scale labeled "Drive for Bulk". This adaption (changing "too big" to "too small") was intended to make the scale more appropriate for males. In addition to the Drive for Bulk,

the addendum includes a drive for muscle definition and questions assessing subjects' desired body size, shape and weight. The addendum was sensitive in previous research, significantly discriminating bodybuilders from both runners and martial artists (Blouin & Goldfield, 1995).

National Institutes of Mental Health-Diagnostic Interview Schedule- (NIMH-DIS).

The NIMH-DIS is a widely used structured paper and pencil interview which provides Axis I DSM-III-R diagnoses (Helzer & Robins, 1988; Robins, Helzer, Crougton, & Ratcliffe, 1981). The eating disorders section of the NIMH-DIS was the only segment employed in this study. Research indicates good reliability and validity of this instrument (Robins et al., 1981). Robins et al. (1981) reported a high degree of concordance when the interview was administered by a lay interviewer using the DIS computer diagnosis and when the interview was given independently and blindly to the same respondents by a psychiatrist. These high instrument-clinician concordance levels (mean Kappa values ranged from .58 to .70) have been reported to be stable across age and gender categories, in or out-patients status, and disorders of long and short duration. Subsequent research has reported good test-retest reliability ($.70 < r < .91$) of the DIS based on DSM-III-R (1987) criteria (Burke, 1986). The computerized version of this instrument, which has been shown to have psychometric data that are comparable to the original instrument (Blouin et al., 1988), was transcribed into a paper and pencil questionnaire.

Physical Trait / Sexual Attractiveness Questionnaire (PTSA).

This inventory was modified from Feinman and Gill (1978) and assesses the preferences of physical traits and whole body types among men and women seeking a

separating their names from their questionnaires. This procedure was implemented to ensure complete anonymity in attempt to provide an environment that facilitated honest responding. Bodybuilders were instructed to complete the questionnaires, which took approximately 45-60 minutes, on their own time in a quiet environment of their choice. Bodybuilders were either given pre-stamped envelopes which they simply mailed back to the investigator upon completion or had the option of leaving the questionnaires in a sealed envelope at their athletic centre in order to be collected. The vast majority (87%) of bodybuilders returned their questionnaires to their respective fitness clubs rather than by mail. Subjects were given a choice to receive a debriefing form (attached in Appendix G) in the mail or at their respective athletic centres unless they specifically requested to be debriefed in person. Although all were given the opportunity, only one bodybuilder called the investigator to receive debriefing in person. Most bodybuilders (74%) opted to pick up a debriefing form at their athletic centres.

Eating Disorder Sample

Patients presenting for treatment at the Eating Disorder Clinic at Carleton university were randomly approached to participate in the study between June, 1996 and February, 1998. During the patients' initial assessment at the Eating Disorders Clinic in Ottawa, a clinical interview was conducted in order to assess exclusion criteria for the present study. In addition, the investigator called some subjects at home to conduct a brief telephone screening to assess exclusion criteria when face-to-face contact was not feasible. Patients appearing appropriate for the study, on the basis of the telephone screening or personal interview, were invited to participate in the study. Each subject was administered the same assessment instruments as those administered to the

bodybuilders. Over the course of one year, approximately 10 male bulimic patients were typically seen at the Eating Disorder Clinic when it was located at the Ottawa Civic Hospital. Not all potential participants were expected to volunteer so a number of male patients previously assessed at the clinic were contacted throughout 1996 by telephone and invited to participate, provided they met the inclusion criteria. This recruitment strategy proved less effective than expected as there was a decline in the number of men who sought treatment at the Ottawa clinic over the last two years and contacting former patients was ineffective as many prospective subjects had moved away. As a result, males with a history of BN were recruited to complete the required sample despite being asymptomatic at the time of testing. It is important to note, however, the proportion of male bulimics included in the study who were asymptomatic was significantly less than those who exhibited bulimic symptoms at the time of testing (35% vs 65%, $p < .05$). All subjects in the clinical sample recruited in Ottawa were given written debriefing forms.

Due to a recent decline in the number of people seeking help at the Eating Disorder Clinic in Ottawa, the staff at the Eating Disorder Unit at the Toronto Hospital were asked to recruit the remaining number of male and female eating disorder patients. Unlike the clinic in Ottawa which recruited bulimics seeking treatment, the Toronto clinic recruited bulimics in the community by placing an advertisement inviting individuals to participate in a variety of research projects involving eating problems, including the present investigation. The Toronto staff employed a brief telephone interview with prospective subjects who responded to the advertisement in order to ensure they met the inclusion criteria of the present study. This interview was also used to explain the purpose of the present study to participants and the conditions of subjects' participation.

This screening interview was very similar to the one used by the Ottawa clinic described in Appendix E. Approximately 73% of individuals who responded to the advertisement participated in the study. Subjects who met the inclusion criteria and were willing to participate were then mailed the questionnaires in a pre-stamped envelope and were asked to sign the informed consent and questionnaires, seal the envelope, and return it by mail to the Toronto investigators. In addition, subjects in the clinical sample recruited in Toronto (only) were given a small honorarium (\$15) for their participation in the study. This financial remuneration was mailed to subjects in a package that also included written debriefing forms shown in Appendix G. Similar to the Ottawa clinic, the Toronto clinic was unable to recruit the required number of male bulimics who were currently symptomatic, therefore they contacted former patients to complete the required sample using the same procedures as the Ottawa clinic described earlier. Descriptive characteristics of the eating disorder sample recruited from the Ottawa and Toronto clinics are presented in Table 1 (see page 73). Despite employing slightly divergent methodology, no significant differences emerged between the samples recruited in Ottawa and Toronto.

Design

The present study employed a 3 x 2 between subjects factorial design whereby the first independent variable, "group", is comprised of competitive bodybuilders, recreational bodybuilders and bulimic subjects. The second independent variable is gender. Primary dependent variables were separated into three categories: 1) bulimic attitudes and behaviors; 2) general psychological characteristics; 3) body image variables.

Each dependent variable grouping is comprised of more than one variable. Bulimic

attitudes and behavior were assessed by an aggregate Eating Disorder variable comprised of summing the standardized scores on the Drive for Thinness, Bulimia and Body Dissatisfaction subscales of the EDI, and the average number of binge episodes per week in the last three months. General psychological characteristics were measured by seven variables: Self-Esteem (RSI), Depression (BDI), and the five remaining subscales of the EDI, which included Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Maturity Fears. Body image variables were measured by the Body Dissatisfaction subscale of the EDI, as well as the Drive for Bulk and Drive for Tone scales.

Hypotheses

Primary Hypotheses

It was hypothesized that bulimics and competitive bodybuilders would not differ significantly on the “eating disorder” composite variable (see next section for calculation), but both groups would report significantly more eating-related pathology than recreational bodybuilders. In addition, it was anticipated that there would be a significant main effect for gender, with females reporting significantly more severe eating-related pathology than males. It was further hypothesized that bodybuilders' (both males and females) body dissatisfaction would be qualitatively different from that exhibited by bulimics. Specifically, it was predicted that in comparison to bulimics, competitive and recreational bodybuilders (both male and female) would exhibit significantly higher scores on the Drive for Bulk and Tone measures, and significantly lower scores on the Body Dissatisfaction subscale of the EDI. In regards to dissatisfaction with body parts, it was anticipated that males would be more dissatisfied with upper body parts (e.g., Drive for Bulk items such as arms, shoulders, and chest would be judged smaller than ideal) while females would be more dissatisfied with lower body parts (e.g., Body Dissatisfaction items such as hips, buttocks and thighs would be larger than ideal).

With regards to general psychological factors, it was predicted that bulimics would exhibit a significantly more negative psychological profile than competitive and recreational bodybuilders.

Secondary Hypotheses

Consistent with cognitive theory, it was predicted that there would be a significant relationship between severity of dysfunctional beliefs reflecting over valuing weight and shape assessed by the modified DAS and bulimic symptomatology.

It was also hypothesized that male bodybuilders would report a significantly higher prevalence rate of steroid use than female bodybuilders, and recreational bodybuilders would report a significantly lower prevalence rate in comparison to competitive bodybuilders. Moreover, it was anticipated that steroid-users would report significantly more severe body dissatisfaction, drive for bulk, eating-related pathology and psychological disturbance compared to non-users.

Statistical Analyses

Data Screening Procedures

Procedures for screening grouped data described by Tabachnick and Fidell (1989) were employed prior to analyzing the data . There was a small amount of missing data that appeared to be randomly distributed throughout the data set, thus missing data were deleted by the default option of Statistical Package for the Social Sciences (SPSS) program.

Identification of outliers was accomplished by examination of raw scores in frequency distributions to identify univariate outliers, and calculating mahalanobis distance and examining the obtained value against the criterion of $p < .001$ in order to identify multivariate outliers. Four univariate outliers, defined as values greater than 3.67 standard deviations from the mean, were identified. No multivariate outliers were found. Rather than eliminate subjects with outliers, which would reduce the power of subsequent

statistical analyses, the scores for these data points were changed to scores one unit larger than the next most extreme score in the distribution as recommended by Tabachnick and Fidell (1989). Appendix H displays the correlations between variables for each group of dependent variables. All bivariate correlations were below .9, indicating no problem with multicollinearity (Tabachnick & Fidell, 1989).

Distributional properties of the data for each group and each dependent variable were not re-examined after adjusting the effects of extreme scores because the presence of skewed distributions will not necessarily have an adverse effect on analyses (Tabachnick & Fidell, 1989). The central limit theorem states that, with large sample sizes, sampling distributions of means approach normality regardless of the shapes of the variable distributions (Tabachnick & Fidell, 1989). For example, if there are at least 20 degrees of freedom for error in a univariate ANOVA, the F test is said to be robust to violations of normality of variables provided there are no outliers. Although the degree to which robustness extends to multivariate analysis is not clear, Tabachnick and Fidell (1989) state that the larger the sample size the less effect non-normality of variables is likely to have on your conclusions. Moreover, with grouped data and large samples, transformations of variables is purported to be less important (Tabachnick & Fidell, 1989).

Analytical Strategy

Statistical analyses were chosen to answer questions posed in the section entitled: “Guiding Research Questions” (p.74).

Primary Analyses

Analysis of variance (ANOVA) was used as a method of testing for group differences on eating-related attitudes and behavior. A factor analysis using the whole sample was conducted as a data reduction technique in an attempt to reduce the number of ANOVA's required to answer this question, thereby decreasing the probability of making a Type I error. A MANOVA was not used because it is not considered to be as statistically powerful as ANOVA, therefore, there is an increased chance of retaining the null hypothesis when MANOVA is used (Tabachnick & Fidell, 1989, pp. 372-373). If the null hypothesis was not rejected, it would have been unclear whether there are no real differences between groups or if there was not enough statistical power to detect a significant difference (Type II error).

A principal components analysis using Varimax rotation of six eating-related variables presented in Appendix I was conducted in order to summarize patterns of inter-correlation among variables and reduce the data. Using Tabachnick and Fidell's (1989) suggestion of retaining factors that have eigenvalues greater than 1, two factors emerged and accounted for a total of 74.2 percent of the variance. The first factor that emerged was labeled as an "Eating Disorder" factor as it consisted of the EDI's Drive for Thinness, Bulimia, and Body Dissatisfaction subscales, and the average number of times subjects binged in the last three months. This pattern of inter-correlation among the triad of EDI variables has been previously reported in research using factor analysis as a means of data reduction (Davis, Claridge & Cerullo, 1997). The second factor that emerged was labeled "Drive for Bulk and Tone" as it consisted of the newly developed body image variables "Drive for Bulk" and "Drive for Tone".

compared to bodybuilders (reflected by a higher score on body Dissatisfaction), while bodybuilders would perceive themselves as smaller and less toned than ideal (e.g., higher Drive for Bulk and Tone) compared to bulimics. These variables were also used to test the hypothesis that females would report more dissatisfaction with lower body parts (e.g., hips, legs and buttocks) compared to males, but less dissatisfaction with body shape and size of their upper bodies.

With regards to analyses of three grouping variables, eating pathology, psychological factors, and body image variables, statistically significant effects ($p < .05$, 2-tailed) were followed by univariate tests of simple main effects and *post hoc* comparisons using the Least Significant Difference tests.

Secondary Analyses

Stepwise multiple regression was used to determine if a measure of dysfunctional beliefs regarding body size, weight and shape predicts bulimic symptomatology as measured by the “Eating Disorder” composite variable. Summing the scores from items in the modified DAS to arrive at a total score was not believed to be meaningful as endorsing extreme attitudes, either in a positive or negative direction, can be considered dysfunctional. In order to select which of the 20 items should be entered in a regression analysis, factor analysis was conducted using the whole sample. Four factors emerged from the factor analysis accounting for a total of 55% of the variance. Instead of calculating aggregate scores using the method previously described, items that loaded on to a factor at .50 or higher were entered in the regression analysis as recommended by Cohen (1990). For this particular analysis, this method is preferred to the approach of

calculating composite scores as it can identify which items provide the best independent prediction of eating disordered attitudes and behavior.

Chi-square analyses were used to test differences in rates of steroid-use among male and female bodybuilders in both competitive and recreational conditions. In addition, univariate analyses (independent t-tests, $p < .05$, two-tailed) comparing steroid-using bodybuilders to non-using bodybuilders on demographic measures, dysfunctional attitudes, eating-related pathology, psychological variables, and behavioral factors related to bodybuilding (e.g., frequency, duration, past success) were conducted. Variables that were found to significantly differentiate users and non-users were entered as predictors in a logistic regression in order to construct a multivariate profile of steroid-using bodybuilders.

Results

Primary Results

Table 2 shows the descriptive characteristics of the sample across groups. In addition to describing the sample, these variables have been found to be associated with eating disorder symptoms. Appendix J reveals the correlations between these demographic variables and eating -related disturbances and psychological characteristics.

Eating Disorder Attitudes and Behavior

To examine group and gender effects on eating-related pathology, a 3 x 2 between subjects ANOVA was conducted on the “Eating Disorder” aggregate variable. The ANOVA revealed statistically significant main effects for group ($F(2,139) = 56.81, p < .001$), gender ($F(1, 139) = 14.92, p < .001$) and a group by gender interaction ($F(2,139) = 3.17, p < .001$).

Post hoc comparisons using Least Significance Difference tests revealed that the bulimic group reported significantly higher eating disorder attitudes and behavior than competitive bodybuilders ($p < .001$) and recreational bodybuilders ($p < .001$), who did not differ significantly from each other (Figure 1).

The results indicate significantly more eating pathology among females than males ($p < .001$, Figure 2). In addition, bulimic females exhibited significantly greater eating pathology than bulimic males ($t(46) = -3.16, p < .005$, Figure 3). However, there were no gender differences among competitive or recreational bodybuilders on this aggregate measure of eating pathology.

Table 2

Demographic and Descriptive Characteristics of Sample

Variable	M (Sd)	Bulimics		Competitive BB's		Recreational BB's	
		Male (n=23)	Female (n=25)	Male (n=27)	Female (n=20)	Male (n=25)	Female (n=25)
Age ^{A, B, D, E, H, I}	M (sd)	33.6 (8.8)	30.0 (8.6)	26.9 (5.0)	26.3 (3.6)	24.9 (5.0)	27.3 (5.7)
Education ^{B, D, E, G, H, I}	M (sd)	3.91 (1.5)	5.2 (1.2)	4.9 (1.5)	5.3 (1.0)	5.1 (1.1)	5.7 (1.0)
Height (in) ^{D, E, F, G, H}	M (sd)	70.2 (2.2)	64.8 (2.1)	68.1 (3.0)	64.5 (2.2)	69.4 (2.4)	63.6 (2.4)
Weight (lbs) ^{C, D, E, F, G}	M (sd)	178.8 (66.2)	139.4 (37.1)	205.9 (35.5)	135.5 (14.8)	182.1 (40.4)	127.7 (18.1)
Marital Status							
% single ^{A, B, C, H, I}		56.5	66.7	74.1	95.0	88.0	80.0
% married		26.1	12.5	18.5	5.0	8.0	12.0
% separated		0.0	12.5	3.7	0.0	0.0	4.0
% divorced		17.4	8.3	3.7	0.0	4.0	4.0

A BN vs Comp BB vs Rec BB, $p < .05$ B BN vs Comp BB, $p < .05$ C BN vs Rec BB, $p < .05$ D Males vs Females, $p < .05$ E Male BN vs Female BN, $p < .05$ F Male Comp. BB's vs Female Comp BB's, $p < .05$ G Rec Male BB's vs Rec Female BB's, $p < .05$ H Male BN vs Male Comp. BB, $p < .05$ I Male BN vs Male Rec. BB, $p < .05$ J Female BN vs Female Comp BB, $p < .05$

Figure 1. Standardized Mean Scores on Eating Disorder Composite Variable for Bulimics and Bodybuilders

Figure 2. Standardized Mean Scores on Eating Disorder Composite Variable for Males and Females

Figure 3. Standardized Mean Scores on Eating Disorder Composite Variable for Male and Female Bulimics and Bodybuilders

Psychological Variables

A 3 x 2 between subjects MANOVA was used to test the hypothesis that individuals with eating disorders would report significantly more psychopathology than bodybuilders, and recreational bodybuilders would report a more positive psychological profile than competitive bodybuilders. The dependent variables that comprised the psychopathology grouping included Self-Esteem, Depression, and five subscales of the EDI: Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, and Maturity Fears.

The multivariate main effect for group on variables reflecting psychopathology was significant using the Wilks' Lambda criterion ($F(14,264) = 9.48, p < .001$). The significant univariate F tests examining between group differences are as follows: Self-Esteem ($F(2,139) = 56.1, p < .001$); Depression ($F(2,139) = 62.6, p < .001$); Ineffectiveness

($F(2,139) = 34.4, p < .001$); Interpersonal Distrust ($F(2,139) = 9.1, p < .001$); Interoceptive Awareness ($F(2,139) = 30.6, p < .001$); and Maturity Fears ($F(2,139) = 9.4, p < .001$).

There were no significant group differences on Perfectionism ($F(2,139) = .14, p = .87$).

Post hoc comparisons using Least Significant Difference tests revealed significantly greater scores on all measures of psychopathology (except on the measure of Perfectionism) among the bulimic group in comparison to the two bodybuilder groups (see Figures 4 to 6). Unexpectedly, competitive and recreational bodybuilders did not differ significantly on any of the variables reflecting psychopathology.

Figure 4. Mean Scores on Self-Esteem and Depression for Bulimics and Bodybuilders

Figure 5. Mean Scores on Ineffectiveness and Interpersonal Distrust for Bulimics and Bodybuilders

Figure 6. Mean Scores on Interoceptive Awareness and Maturity Fears for Bulimics and Bodybuilders

Using the Wilks' lambda criterion, gender did not achieve statistical significance ($F(7,131) = 1.7, p = .11$), thus overall males did not differ significantly from females on psychological variables.

The group by gender interaction on psychological measures was statistically significant using the Wilks' Lambda criterion ($F(14,262) = 1.75, p < .05$). However, no univariate interactions achieved statistical significance.

Body Image Variables

ANOVAs were used to test the hypothesis that the bulimic group would report Body Dissatisfaction in the opposite direction of bodybuilders. That is, it was hypothesized that the bulimic group would report feeling larger than ideal compared to bodybuilders, whereas the bodybuilder groups, despite already being large and muscular, would report a stronger Drive for Bulk and Tone reflecting a perception of being smaller and less toned than ideal compared to bulimic subjects.

On the EDI's Body Dissatisfaction subscale that measures overall Body Dissatisfaction and also the extent to which one feels their hips, buttock and thighs are too large, significant results were achieved for group ($F(2,139) = 31.1, p < .01$) and gender ($F(1,139) = 21.6, p < .001$). The group by gender interaction was not statistically significant ($F(2,139) = 2.14, p = .12$).

As hypothesized, *post hoc* comparisons revealed that bulimics reported significantly higher scores ($p < .05$) than Competitive and Recreational bodybuilders on the Body Dissatisfaction subscale (see Figure 7). However, there were no significant

differences between the two bodybuilder groups. As predicted, females scored significantly higher than males on Body Dissatisfaction ($p < .01$; see Figure 8).

Figure 7. Mean Scores on Body Dissatisfaction, Drive for Bulk and Drive for Tone for Bulimics and Bodybuilders

ANOVA on the Drive for Bulk scale revealed significant main effects for group ($F(2,144) = 20.50, p < .001$) and gender ($F(1,139) = 67.51, p < .001$, see Figure 8), but not the group by gender interaction ($F(2,144) = 2.56, p = .08$). *Post hoc* comparisons indicated that competitive bodybuilders exhibited a significantly stronger Drive for Bulk in comparison to bulimics ($p < .01$) and recreational bodybuilders ($p < .05$). The bulimic group had a significantly lower Drive for Bulk than recreational bodybuilders ($p < .05$, see Figure 7). With regards to the significant main effects of gender, males scored higher than females on the Drive for Bulk, as predicted.

Figure 8. Mean Scores on Body Dissatisfaction, Drive for Bulk and Drive for Tone for Males and Females

Significant results emerged for the effects of group ($F(2,139) = 10.27, p < .001$, see Figure 7) and gender ($F(1,139) = 10.60, p < .001$, see Figure 8) on Drive for Tone, but the group by gender interaction was not significant ($F(2,139) = 2.27, p = .10$). *Post hoc* comparisons revealed that the bulimics exhibited significantly lower scores on Drive for Tone than competitive bodybuilders ($p < .05$) and recreational bodybuilders ($p < .05$). Critical comparisons between subjects in the bodybuilding groups did not achieve statistical significance. Regarding the significant main effect of gender, males scored significantly higher than females on Drive for Tone.

Due to the high inter-correlations between demographic characteristics and eating-related outcome measures, all principal analyses (either ANOVA or MANOVA) were conducted with and without covariates for age, weight and education with identical

patterns of results emerging on all variables except for Drive for Tone. Interestingly, when weight was used as a covariate in an ANCOVA, gender differences on Drive for Tone were no longer statistically significant ($F(1,139) = 3.01, p = .08$), indicating that the highly significant gender differences on Drive for Tone may be due in part to differences in weight between the sexes rather than representing a basic difference in the desire for toned muscles.

Secondary Results

Prediction of Eating-Related Pathology from Dysfunctional Attitudes

Stepwise multiple regression analyses were employed to test the association between eating-related pathology (dependent variable) and dysfunctional attitudes, and to identify which dysfunctional attitudes on the MDAS provided the best independent prediction of eating-related pathology. In order to reduce the number of potential predictors in the regression equation, a factor analysis was performed on MDAS items (see Appendix K). Four factors emerged from the analysis, and every item with a factor loading of .50 or higher on one of these factors was selected for use in the regression analyses.

Although the MDAS was developed by the investigator primarily to identify dysfunctional attitudes that may be motivating bodybuilders to achieve the aesthetic (mesomorphic) ideal, it was believed that several items may also be strongly endorsed by individuals with bulimia. As such, it was hypothesized that MDAS items would provide useful prediction of eating disorder symptoms among the overall sample, but individual predictor variables (on the MDAS) may vary as a function of group membership. Thus, four regression analyses were conducted, one using the overall sample, with the

remaining three analyses representing each group (Bulimics, Competitive Bodybuilders, and Recreational Bodybuilders).

Results from the stepwise multiple regression analysis employing the appropriate items from the MDAS as predictors indicated that 50% of the variance in eating pathology (as measured by the standardized composite “Eating Disorder” index) was explained by significant independent contributions from five items ($F(5,137) = 27.35, p < .0001$). The first and most important predictor of eating pathology was item 9, “I feel good about myself as a person even on the days when I do not look good,” which accounted for 31% of variance. The remaining four items that contributed significantly to the variance in eating pathology in order of importance are as follows: Item 11, “If I let myself go and gain weight (in fat), my friends and family will think less of me,” added 8% of the variance accounted for; item 20 “I feel that people will look up to me more if I have large muscles that are well defined rather than small, underdeveloped muscles” added 4.5% of variance; item 18, “If a person asks for help, it is a sign of weakness” added 3.5% of variance; and item 13, “I only feel good about myself as a person when I feel that my body fat is low”, added 3% of the variance. All of the above predictor variables on the MDAS were positively associated with eating disorder symptoms except for item item 9, “I feel good about myself as a person even on the days when I do not look good,” and item 20, “People will look up to me more if I have large muscles that are well defined rather than small, underdeveloped muscles”, which were both negatively correlated with eating disorder symptoms.

Prediction of Eating-Related Pathology in Groups from Dysfunctional Attitudes

Among the bulimic group, two MDAS items accounted for a total of 29.7% of the variance in bulimic symptoms. Item 13, “I only feel good about myself as a person when I feel that my body fat is low” was the most important predictor, accounting for 21.4% of the variance in the eating disorder group. The second best predictor of bulimic symptoms in the eating disorder group was item 18, “If a person asks for help, it is a sign of weakness,” accounting for an additional 8.3% of variance. Both variables were positively correlated with the criterion (aggregate) measure of “Eating Disorder” symptoms. No other item on the MDAS provided a significant independent contribution in variance to the “Eating Disorder” aggregate variable (i.e., eating disorder attitudes and behavior) in the bulimic group.

A total of 28.6% of variance in eating disorder symptoms was accounted for among competitive bodybuilders. The only variable to make a significant contribution was item 13, “I only feel good about myself as a person when I feel that my body fat is low”. This MDAS item was positively correlated with eating disorder symptoms.

Among recreational bodybuilders, three MDAS items accounted for 40% of the variance in eating disorder symptoms. Item 9, “I feel good about myself as a person even on the days when I do not look good,” contributed most as it accounted for 26% of the variance. The second predictor was item 11, “If I let myself go and gain weight in fat, my friends and family will think less of me,” accounted for 8.4% of variance; the third and final variable that provided a significant independent contribution was MDAS item 1, “I have to be considered good looking or attractive in order to be happy and content with myself,” which accounted for 5.4% of the variance in eating disorder symptoms in

recreational bodybuilders. The main predictor, item 9 on the MDAS, was negatively correlated with eating disorder symptoms while the remaining two significant predictors (i.e., items 11 and 1) were positively correlated.

Exploratory Results

Although not hypothesized, several interesting results from analyses on eating behavior and associated psychological characteristics in bodybuilders emerged. As such, these results are reported here as they are believed to add detail to our knowledge of bodybuilders' eating and weight control practices, and how these behaviors are related to psychological factors.

BN, Binge Eating, Purging, and Psychological Factors in Bodybuilders

Although many eating disorder symptoms exhibited by bodybuilders were significantly less frequent and severe in comparison to individuals with BN, eating disturbances were not uncommon among bodybuilders. Table 3 shows the prevalence of BN, as well as symptoms of BN among male and female competitive and recreational bodybuilders.

Binge Eating and Psychological Factors in Bodybuilders

Binge eating has been reported to be positively associated with psychological dysfunction in non-athletic and athletic samples, but few studies have examined this relationship in bodybuilders (Andersen et al., 1995). As such, independent t-tests ($p < .05$,

two-tailed) were conducted to determine if binge-eating bodybuilders reported more psychopathology than bodybuilders who have not had binge-eating episodes. In comparison to non-binge eating bodybuilders, bodybuilders who reported binge-eating had significantly higher scores on measures of Depression ($t(93) = 3.59, p < .01$), Ineffectiveness ($t(94) = 2.65, p < .01$), Interoceptive Awareness ($t(94) = 2.11, p < .05$), and significantly lower scores on Self-Esteem ($t(94) = 2.10, p < .05$).

No significant differences between binge-eating and non-binge eating bodybuilders were found on measures of Perfectionism, Interpersonal Distrust, Maturity Fears, or demographic variables (age, education, weight) using independent t-tests. Moreover, neither gender nor group (competitive vs recreational bodybuilders) significantly differentiated binge-eating bodybuilders from their non-binge eating counterparts using Chi-Square tests.

A logistic regression analysis based on the dichotomous outcome variable of “binge eaters” ($n = 35$) versus “non-binge eaters” ($n = 62$) was conducted to determine which of the psychological variables found to be significant on univariate tests would provide the most significant independent prediction of binge eating among bodybuilders.

Results revealed that Depression was the only variable that emerged as a significant predictor of binge eating, accounting for a total of 67.37% of the variance. Note that this model was more effective in predicting bodybuilders who have not binged (88.3% accuracy) than identifying those bodybuilders who have binged (31.43% accuracy).

Weight Cycling and Psychological Factors in Bodybuilders

Table 4 outlines the prevalence and magnitude of weight loss and weight gain among competitive and recreational bodybuilders, both males and females. Independent t-tests ($p < .05$, two-tailed) were conducted to test differences between bodybuilders who cycled weight with those who did not on psychological factors and demographic variables. Regarding weight loss, results indicate that bodybuilders who lost 15 pounds or more were more likely to be competitive bodybuilders than recreational bodybuilders ($\chi^2 (1) = 6.42, p < .01$), reported significantly higher body weight ($t (94) = 2.24, p < .05$), and more Depression ($t (93) = 2.18, p < .05$). In a logistic regression analysis based on this weight loss grouping among bodybuilders, Depression was the only significant predictor, accounting for a total of 60% of the variance. Note that this model was more effective in identifying bodybuilders ($n=57$) who lost at least 15 pounds (76.8% accuracy) compared to bodybuilders ($n=40$) who did not exhibit substantial weight loss (35.9%).

Bodybuilders who gained ten pounds or more at least once from a period of binge eating ($n=18$) were more likely to be competitive male bodybuilders ($\chi^2 (1) = 4.7, p < .05$), had significantly less education ($t(33) = 2.45, p < .05$), felt more Depressed ($t (33) = 2.15, p < .05$), Ineffective ($t(27) = 2.45, p < .05$), and reported higher Interoceptive Awareness ($t(33) = 2.40, p < .05$) than bodybuilders ($n=17$) who have never gained ten pounds from a period of binge eating.

Table 4

Prevalence of Weight Loss and Weight Gain in Male and Female Bodybuilders

Characteristic	Competitive BB's		Recreational BB's	
	M (n=27) n (%)	F (n=20) n (%)	M (n=25) n (%)	F (n=25) n (%)
Lost 15 pounds or more ^A	21 (77.8)	13 (65.0)	13 (52.0)	10 (40.0)
Gained weight from a binge	12 (44.4)	5 (25.0)	4 (16.0)	5 (20.0)
Gained 10 lbs at least once ^B	9 (33.3)	2 (10.0)	2 (8.0)	5(20.0)

^A Competitive BB's vs. Recreational BB's, $p < .05$

^B Competitive Male BB's vs Competitive Female BB's, $p < .05$

Logistic Regression analysis using variables that were significant on univariate analyses as predictors accounted for a total of 68.57% of the variance in ten pound weight gains from bingeing in bodybuilders. Ineffectiveness was the only significant predictor of weight gain. The model revealed similar results in prediction of bodybuilders who gained ten pounds from a period of bingeing (66.67% accuracy) compared to those who did not (70.59% accuracy).

Relationship Between Steroid Use and Disordered Eating in Bodybuilders

The prevalence of admitted steroid use among the total sample of bodybuilders was 31% (30 of 97). Competitive bodybuilders reported a significantly higher prevalence of steroid-use than recreational bodybuilders (51% vs 12%; $\chi^2 (1) = 17.51, p < .0001$). Male bodybuilders reported a significantly higher rate of steroid use than female bodybuilders (44% vs 18%; $\chi^2 (1) = 7.54, p < .01$). These gender differences were also observed in recreational bodybuilders as 24% of males and none of the females reported they have used steroids ($\chi^2 (1) = 6.86, p < .01$). However, the rate of steroid-use among

competitive male and competitive female bodybuilders did not differ significantly (59% vs 40%; $\chi^2 = 1.71, p = .19$). As expected, competitive male bodybuilders reported a significantly higher rate of steroid-use than recreational male bodybuilders (59% vs 24%; $\chi^2 (1) = 6.1, p < .05$). Similarly, competitive female bodybuilders reported a higher prevalence of steroid-use compared to recreational female bodybuilders (40% vs 0%; $\chi^2 (1) = 11.73, p < .001$).

In an attempt at building a multivariate profile of steroid users, univariate analyses using independent t-tests for continuously distributed data and chi-square analyses for discrete data were conducted to compare bodybuilders who have used steroids (“users”) with those who have not (“non-users”). Steroid-users ($n = 30$) and non-users ($n=67$) were compared on demographic variables, dysfunctional attitudes, eating-related pathology, psychological variables, and behavioral factors relating to weight training regimens (e.g., frequency, duration, years of participation). Results indicated that in comparison to “non-users”, “users” reported significantly higher weight ($t (93) = 3.63, p < .001$), Interpersonal Distrust ($t (93) = 2.07, p < .05$), Drive for Bulk ($t (93) = 3.67, p < .05$), average number of binge episodes in the three months that preceded testing ($t (45) = 2.84, p < .05$), frequency of purging through diuretics ($\chi^2 (1) = 8.6, p < .05$), and frequency of lifting weights ($t (93) = 3.04, p < .01$). In addition, “users” reported significantly more agreement than “non-users” on the following attitudes on the MDAS: Item 19, “I feel very unhappy with myself when I think of myself as thin”, ($t (92) = 2.34, p < .05$); and item 20, “I feel that people will look up to me more if I have large muscles that are well defined rather than underdeveloped, small muscles ($t (92) = 2.53, p < .05$). As mentioned previously, users were also more likely to be competitive bodybuilders than recreational

bodybuilders ($\chi^2 (1) = 17.51, p < .0001$), and male rather than female ($\chi^2 (1) = 7.54, p < .01$).

These 11 variables that differentiated “users” from “non-users” were employed in a logistic regression in an attempt to construct a profile of steroid-using bodybuilders. Results indicated a best overall solution of 76.6% correct prediction of steroid use among bodybuilders based on three predictor variables. In order of importance of contribution to the best model, these variables were: (1) Group membership (i.e., being a competitive bodybuilder); (2) Drive for Bulk; and (3) Prevalence of binge eating episodes in the three months that preceded testing. Preliminary iterations showed that Group membership alone could predict steroid-use with 71.28% accuracy, with Drive for Bulk adding 3.19% and binge eating adding 2.13% predictive utility to the model. Both Drive for Bulk and Prevalence of binge eating were positively associated with steroid use. This model was more effective in predicting non-using bodybuilders (84.38% accuracy) than bodybuilders who self-reported steroid use (60% accuracy).

Because steroid use was more prevalent among competitive bodybuilders compared to recreational bodybuilders, a second logistic regression analysis was conducted to construct a multivariate profile of a steroid-using competitive bodybuilder using the same procedures described previously. In comparison to non-using competitive bodybuilders ($n = 23$), steroid-using competitive bodybuilders ($n = 24$) reported significantly higher weight ($t (45) = 2.42, p < .05$), Ineffectiveness ($t (45) = 2.04, p < .05$), Interoceptive Awareness ($t (45) = 2.46, p < .05$), were more likely to binge twice per week for three months ($\chi^2 (1) = 4.5, p < .05$), gain ten pounds or more from binge eating ($\chi^2 (1) = 6.67, p < .05$), and meet criteria for Bulimia Nervosa ($\chi^2 (1) = 3.96,$

$p < .05$). In addition, steroid-using competitive bodybuilders reported significantly higher scores on MDAS item 17, “it is possible to gain another persons respect without being especially talented at anything compared to non-using bodybuilders ($t(44) = -2.69$, $p < .05$).

Results from the logistic regression yielded a solution of 76.09% overall correct “prediction” of steroid use in competitive bodybuilders based on three variables. In order of importance, these variables were: (1) binge eating twice per week for three months; (2) item 17 on the MDAS, “it is possible to gain another person’s respect without being especially talented at anything”; and (3) Ineffectiveness. Preliminary iterations showed that binge eating alone could predict steroid use with 65.2% accuracy. The MDAS item, which was negatively associated with steroid use, contributed an additional 6.54%, and Ineffectiveness, which was positively correlated with steroid use contributed an additional 4.35% in prediction of steroid use in competitive bodybuilders. Note that this model produced a balanced solution in that its accurate prediction of steroid-users (75.0%) and non-users (77.27%) was very similar.

Discussion

Previous research has shown that sports and physical activities that emphasize low body weight or leanness for enhanced performance or an aesthetically pleasing body shape to influence judges ratings are at increased risk of developing eating disorders (Sundgot-Borgen, 1993; Brownell et al., 1992). Serious or competitive bodybuilding, a sport in which the goal is to shape the body to achieve an exceptionally lean and mesomorphic ideal, has generally been shown to be associated with weight and shape preoccupation, disordered eating, body dissatisfaction and unhealthy weight control practices (e.g., strict dieting, fasting, diuretics, laxatives) compared to athletic and non-athletic comparison groups (Goldfield et al., in press). These psychological and behavioral indices are characteristic of individuals with eating disorders. However, no research has included a concurrent sample of eating disorder subjects in evaluating bodybuilders' eating disturbances and associated psychological factors. The absence of a concurrent eating disorder sample is a methodological flaw which limits the strength of conclusions regarding the degree of similarity between bodybuilders and eating disordered subjects. The primary purpose of the present study was to address this methodological shortcoming. The present study also provided much needed data on gender differences in eating-related disturbances in bodybuilders and extended these comparisons beyond body image and eating parameters to include more general psychological measures.

In discussing the results obtained in this study, findings regarding the main hypotheses of the study and how they relate to the literature will be addressed first. Following this, a discussion of results generated from exploratory analysis on

bodybuilders will be presented in order to provide a more comprehensive understanding of the nature of their psychological and behavioral characteristics and associated health risks. This will be followed by limitations of the study. Finally, summary and conclusions, directions of future research, and implications for education and prevention will be offered.

Eating Disorder Attitudes and Behavior

In contrast to predictions, results indicate that bulimics reported significantly more pathological eating attitudes and behavior than competitive and recreational bodybuilders, and the latter two groups did not differ significantly. However, the hypothesis that females would report significantly more severe eating disorder attitudes and behavior (measured by the aggregate “Eating Disorder” variable) compared to males was confirmed.

It was believed that due to biological limitations in malleability of body shape and size, combined with the narcissistic focus of the sport and exceptionally lean standards in competitive bodybuilding, that competitive bodybuilders may exhibit eating disturbances at levels comparable to bulimics. There are no published reports comparing bodybuilders and bulimics (or anorexics) on eating attitudes and behavior. Therefore these findings cannot be interpreted in relation to the literature examining eating disorder behavior in bodybuilders. Similarly, few studies examining eating disorder attitudes and behavior in athletes have employed clinical samples as a comparison group. Mallick et al. (1987) found that 87 female athletes reported more frequent dieting, vomiting, and self-reported anorexia compared to 120 normal female controls but less frequently than

41 females with eating disorders. However, it is uncertain whether the differences in eating pathology were significant because statistical analyses were not conducted.

Several factors may explain, in part, the lack of differentiation between competitive and recreational bodybuilders, and the larger than expected gap between bulimics and competitive bodybuilders on eating pathology. The principal investigator observed that recruiting competitive bodybuilders during the competitive season (i.e. Summer and Fall) was difficult as many bodybuilders were busy preparing for contests and claimed they did not have time to complete the surveys. Despite considerable effort to recruit in summer (competitive) months, it is estimated that 50-70% of questionnaires from competitive bodybuilders were completed in the “off season” when there is less emphasis on dieting, body sculpting and reducing body fat, and more emphasis on building muscle mass and bulk. Thus, the severity of abnormal eating attitudes and behavior may be underestimated in competitive bodybuilders as there is evidence that disordered eating, weight cycling, and unhealthy weight control practices in bodybuilders are more prevalent during the competitive season compared to the “off season” (Andersen et al., 1995; Andersen et al., in press; Lamar-Hildebrand et al., 1989). The deleterious effect that competition has on eating behavior has been reported in many other athletic groups, including wrestlers (Steen & Brownell, 1990) and ballet dancers (Hamilton et al., 1985). Interestingly, examination of mean scores on eating disorder attitudes and behavior in competitive versus recreational bodybuilders indicates that scores were generally not in the expected direction (only 1 of 4) in reference to male bodybuilders but were generally (3 out of 4 measures) in the expected direction with respect to female bodybuilders. That is, recreational male bodybuilders generally scored higher than

competitive male bodybuilders on eating-related pathology but this pattern was reversed for competitive and recreational female bodybuilders. This pattern of mean scores suggests the lack of differentiation between competitive and recreational bodybuilders on eating disorder attitudes and behavior may not be due to a lack of statistical power.

Several other factors may have contributed to the lack of differentiation between competitive and recreational bodybuilders in the present study. It is noteworthy that competitive bodybuilders were a rather inexperienced group of competitors, averaging only 2.3 competitions lifetime over an average span of 7.5 years of regular weight lifting, with the majority (68%) participating at local rather than upper (provincial, national) levels of competition (see Appendix L for breakdown by gender). Additionally, 14 bodybuilders (30%) included in the competitive condition had never competed but were included because they were in training for an upcoming competition. Moreover, differences between bodybuilder groups on behavioral factors associated with weight training indicate a rigorous weight training regimen for recreational bodybuilders considering recreational bodybuilders needed to average only two workouts per week for at least 7 months to be included in the present study. Appendix L shows that competitive bodybuilders reported lifting weights significantly longer (both in years of participation and duration of workouts) and more frequently than recreational bodybuilders. However, inspection of the mean scores reveal that although these group differences achieved statistical significance, the magnitude of differentiation may not be very meaningful in terms of practical utility. For example, the data indicate that recreational bodybuilders lifted weights on average almost 4 times per week for 76 minutes compared to a frequency of almost 5 times per week and 91 minutes for competitive bodybuilders.

These data suggest that recreational bodybuilders were quite dedicated and serious about their training considering they had no plans to compete in bodybuilding contests. Taken together, these findings suggest that a more active and experienced group of competitors, especially those who are tested during the competitive season, combined with a more stringent inclusion criteria for competition, may yield findings indicating significantly more disordered eating in competitive bodybuilders compared to recreational bodybuilders.

It is important to note, however, that despite reporting less eating pathology than bulimics, the results presented in Table 3 reveal that competitive and recreational bodybuilders exhibited elevated rates of disordered eating and diagnosed eating disorders. Perhaps the most striking finding is that almost 30% of competitive male bodybuilders met the criteria for BN at some point in their lifetime. This prevalence rate of BN in competitive male bodybuilders is considerably higher than that reported by competitive female bodybuilders in this study (10%). This finding stands in contrast with the results obtained from the athletic and non-athletic literature which typically shows a higher prevalence of eating disorders in females than males. The prevalence rate of eating disorders in competitive male bodybuilders found in the present study is substantially higher than the 3% reported for other samples of male bodybuilders (Pope et al., 1993). In addition, compared to other research using the same criteria (DSM-III-R) and similar methodology, this elevated prevalence of eating disorders in competitive male bodybuilders is substantially higher than the 2-10% reported for athletic male groups (Brownell et al., 1992; Fairbanks, 1987), and the 0.2%- 0.4% reported for males in the population (Heatherton, Nichols, Mahamedi & Keel, 1995; Pemberton, Vernon & Lee,

1996). Importantly, the 10% prevalence of BN in competitive female bodybuilders combined with an additional 30% reporting a subclinical form of BN ("Eating Disorder-Not Otherwise Specified") reveals that eating disorders are also common among competitive female bodybuilders. These rates of previous eating disorders in competitive female bodybuilders are similar to the 42% (Anorexia Nervosa) found by Walberg and Johnston (1991) and 32% (BN) reported by Guthrie et al. (1991), and are higher than the 5-6% of BN found in college women in recent survey research using the same diagnostic criteria (Heatherton et al., 1995; Pemberton et al., 1996). The higher than expected rates of BN in competitive bodybuilders found in the current research, especially in males, coupled with the high rates of eating disorders found in other bodybuilding samples provides evidence of a strong association between competitive bodybuilding and eating disorders. Due to correlational data, however, it cannot be determined if people with eating disorders disproportionately gravitate toward competitive bodybuilding, or if competitive bodybuilding precipitates an eating disorder. There is evidence to support both suppositions. Research has shown a substantial history of anorexia nervosa among male bodybuilders (3%, Pope et al., 1993) and competitive female bodybuilders (42%, Walberg & Johnston, 1991). In addition, Guthrie et al. (1994) found that 32% of competitive female bodybuilders reported having BN before they began bodybuilding. Moreover, self-reports from a sub-group of male bodybuilders indicated they engaged in rigorous bodybuilding, unhealthy eating and weight management behavior, and steroid use to compensate for a negative body image and to enhance self-esteem (Blouin & Goldfield, 1995; Pope et al., 1993). Consistent with the alternative, that activities which emphasize a lean body may foster eating disturbances, retrospective data from

competitive bodybuilders suggest that preoccupation with weight and shape, dieting and unhealthy body modification practices were employed in attempt to achieve the “championship” look (Guthrie et al., 1994). Similar retrospective accounts have been reported in a sub-group of male bodybuilders who claimed that their extreme preoccupation with becoming large and muscular and subsequent steroid use began well after initiating a bodybuilding program (Pope et al., 1993). In addition, the considerable weight loss reported by bodybuilders in preparation for a contest, which is contrasted with reported weight gain in the “off season”, provides further evidence that competitive bodybuilding precipitates excessive dieting, exercise, and extreme weight loss practices. Therefore, it is possible that people who are dissatisfied with their body shape and weight and engage in eating disorder behavior may gravitate toward bodybuilding to achieve personal and/or societal standards of attractiveness, and the narcissistic activity and environment of bodybuilding combined with the exceptionally high aesthetic standards required to compete may precipitate or exacerbate body dissatisfaction and disordered eating, thus potentiating the risk of eating disorders.

Several other findings displayed in Table 3 are of noteworthy importance. Over 30% of competitive bodybuilders and more than 20% of recreational bodybuilders were currently symptomatic as defined by binge eating an average of at least once per week for the last three months, being overconcerned with body shape or weight, and regularly using at least one purging method (usually strict dieting, vigorous exercise, or diuretics). This cluster of symptoms comprise much of the criteria for a diagnosis of BN and although the majority of symptomatic bodybuilders currently reported binge eating below a frequency (twice per week) threshold required for a current diagnosis of BN (i.e., twice

per week), the data nevertheless indicate a pattern of disordered eating at the subclinical level. These rates of bulimic behaviors in bodybuilders are substantially higher than that reported for college males (3-6%) and females (6-19%) in survey research that used methodology that is similar to the present study (Heatherton et al., 1995; Pemberton et al., 1996).

Results from the present study reveal a significantly higher prevalence of binge eating among competitive bodybuilders compared to recreational bodybuilders (47% vs 26%). Researchers and clinicians in the field of eating disorders have long purported that strict dieting is a precipitant to binge eating (Polivy & Herman, 1985). Moreover, dieting is believed to be a necessary but not sufficient cause of eating disorders (Fairburn, 1995; Wilson & Eldredge, 1992). Thus, a higher prevalence of binge eating in competitive bodybuilders was expected because of the exceptionally lean standards in which bodybuilders are evaluated were thought to necessitate strict dieting. Evidence supports this theory as competitive bodybuilders also reported significantly more regular and frequent use of dieting as a method of weight control compared to recreational bodybuilders (68% vs 44%). It is interesting to note that competitive bodybuilders reported a significantly higher prevalence of binge eating and dieting than recreational bodybuilders but no significant differences were found between groups on the "Eating Disorder" aggregate index. The relevance of this finding stems from the fact that the Eating Disorder aggregate index is comprised primarily by the Bulimia, Body Dissatisfaction, and Drive for Thinness scales of the EDI, all of which emphasize attitudinal measures more than behavioral dimensions of eating disorders. Similarly, pathogenic eating and weight control behavior among bodybuilders was far more

pronounced when assessed by the widely used paper and pencil version of the Diagnostic Interview Schedule, which primarily assesses eating-based behavior, compared to bodybuilders eating pathology as measured by the attitudinal-based EDI. This suggests that there is an imperfect correlation between cognitive and behavioral dimensions of eating disorder symptoms, so both are important to assess.

Results from the present study also indicate that binge eating in bodybuilders is positively associated with general psychopathology such as Depression, Ineffectiveness, Interoceptive Awareness, and lower Self-Esteem. Similarly, a positive relationship emerged between weight cycling, Depression and Ineffectiveness in competitive bodybuilders in the present study. Similar findings have been reported in samples of competitive male bodybuilders (Andersen et al., 1995; Sandoval et al., 1989) and several other clinical (Fairburn & Brownell, 1995), non-athletic (Foreyt et al., 1995) and athletic populations (Brownell et al., 1992). These findings have important health implications for bodybuilders, especially those who partake in competitions, as binge eating and weight cycling have not only been associated with an increased risk of psychological morbidity but also premature mortality (Blair et al., 1993).

Preoccupation with body shape and weight to the extent it has an undue influence on self-evaluation is a common psychological feature of eating disorders as evidenced by its inclusion in the DSM-IV criteria for BN (APA, 1994, see Appendix A). No significant differences in bodybuilding groups were found in the proportion of subjects endorsing measures reflecting over-concern with weight and shape. Given the goal of bodybuilding is to enhance body size and shape to achieve a lean and mesomorphic ideal, it is not surprising that, on average, over 50% of competitive and recreational

bodybuilders reported they were “worried about eating too much or being too fat”, “felt over concerned with weight or shape”, “felt their self-esteem was affected by their body shape or weight, ” and “their body shape was as important as their quality of friendships and performance at work.” Such high prevalence of admitted over-concern with body weight and shape found in this study is consistent with findings in the bodybuilding literature. For example, weight and shape preoccupation reflected by the Drive for Thinness subscale of the widely used EDI has been found to discriminate bodybuilders from non-athletic controls (Pasman & Thompson, 1988; Walberg & Johnston, 1991), and athletic comparison groups that included runners (Blouin & Goldfield, 1995), a group previously noted to be at risk for eating disorders (Yates et al., 1983). In addition, preoccupation with food, weight and shape has been widely reported in bodybuilders in studies that did not include comparison groups (Andersen et al., 1995; Pope et al., 1993). Importantly, preoccupation with weight and shape, combined with dieting and binge eating reported by bodybuilders in the present study has been previously noted to predispose athletes for developing eating disorders (Brownell et al., 1992; Wilson & Eldredge, 1992). These findings suggest that a sub-group of competitive and recreational bodybuilders in the present study who exhibited these psychological (overconcern with weight /shape) and behavioral characteristics (binge eating, purging) appear to be at increased risk of developing Binge Eating Disorder and/or BN.

The hypothesis that females would exhibit significantly more eating-related pathology than males was supported. *Post hoc* comparisons revealed, however, that significant gender differences were only found in bulimics. This finding was expected because 35% of male bulimics were asymptomatic (remitted) at the time of testing. No

significant gender differences on eating pathology emerged when only symptomatic male bulimics were compared with female bulimics (see Appendix M). The lack of gender differences in eating-related pathology in symptomatic bulimics found in this study is consistent with previous research (Edwin & Andersen, 1990; Mitchell & Goff, 1984; Robinson & Holden, 1986). Although this might be due to a lack of statistical power, it was surprising that female bodybuilders did not exhibit more eating pathology than male bodybuilders, especially in the competitive condition as the standards for leanness in competitive female bodybuilding are believed to be comparatively more difficult to attain than the standards imposed on competitive male bodybuilders. The comparable standards for leanness between the sexes is a problem for females because, on average, women typically have higher normal levels of body fat (i.e. 22-26%) than men (13-17%) (Katch & McArdle, 1988). Given that research has shown that biological factors influence body shape and weight (Bouchard et al., 1990; Stunkard et al., 1990), it was expected that female bodybuilders, especially those who partake in competitions, would need to engage in more rigorous dieting-related behaviors to achieve the ideal than male bodybuilders.

In addition to these physiological factors, this hypothesis regarding gender differences was based on research indicating that female athletes reported significantly more severe eating disturbances than male athletes, a finding that was also consistent with the non-athletic comparison groups (Boland & Lake, 1988; Wilkins et al., 1990). The lack of gender differences in eating pathology is also inconsistent with findings indicating greater eating disturbances in female athletes compared to their male counterparts in various sports, including swimming (Drummer et al., 1987), running (Kiernan et al.,

1993), ice skating, (Rucinski, 1989), and rowing (Sykora et al., 1993). Unfortunately, few studies have used sufficient numbers to adequately examine gender differences in eating disturbances in bodybuilders.

Another method of examining gender differences concerning eating pathology is to compare male and female bodybuilders' mean scores on eating pathology with normative data from males and females used in the validation of a standardized inventory. These comparisons, using normative data from the widely used EDI, are presented in Appendix N. Because no significant differences emerged between competitive and recreational bodybuilders for males or females, the bodybuilder groups were collapsed to increase the sample size and enhance statistical power, and also to simplify the results by reducing the number of comparisons. The data indicate that compared to the normative male sample, male bodybuilders reported significantly higher scores on Drive for Thinness (reflecting elevated weight and shape preoccupation and dieting concerns) and Body Dissatisfaction. However, female bodybuilders reported significantly less severe Bulimic tendencies and Body Dissatisfaction compared to females used in the normative sample. Prospective research has shown that Body Dissatisfaction and Drive for Thinness were the only scales on the EDI that significantly predicted the development of eating disorders in ballet dancers two years later (Garner et al., 1987). Thus, the data presented in Appendix N not only fail to support the hypothesized gender differences, they suggest that in comparison to gender-matched controls, male bodybuilders in the present study may be at greater risk for developing eating disorders, while female bodybuilders may be at lower risk.

Body Image

Body dissatisfaction is considered to be the most relevant antecedent of eating disorders (Rosen, 1995). The unhealthy and extreme methods of preventing weight gain observed by individuals with AN and BN are considered to be remedies for the disturbance in body image. Moreover, in a prospective study, Striegel-Moore, Silberstein, Frensch, and Rodin (1989) found that body dissatisfaction was a better predictor of students whose eating symptoms became worse during the first year of studies than perceived stress, ineffectiveness, perfectionism, and competitiveness. Three measures of body image were employed in the present study, Body Dissatisfaction, Drive for Bulk, and Drive for Tone. Each will be discussed in turn.

As predicted, bulimics and bodybuilders reported body dissatisfaction in opposite directions. Specifically, bulimics reported more Body Dissatisfaction than competitive or recreational bodybuilders indicating that they were more unhappy with their bodies and perceived their bodies to be larger than ideal compared to bodybuilders. In contrast, both bodybuilder groups reported more negative body dissatisfaction with the self-perception of being smaller than ideal (i.e., Drive for Bulk) and desiring greater muscle definition (Drive for Tone) compared to bulimics. Such qualitatively different body dissatisfaction between the groups was expected as bulimics desire a thin, svelte aesthetic ideal while bodybuilders pursue an exceptionally large and toned mesomorphic ideal. Thus, any self-ideal discrepancies in perceptions of body size and shape between bodybuilders and bulimics were expected to be expressed in different directions.

It is interesting to note that the only body image variable to differentiate the two bodybuilding groups was Drive for Bulk, with competitive bodybuilders reporting

significantly higher scores than recreational bodybuilders. Despite being large and presumably muscular (inferred from their height and weight data) competitive bodybuilders expressed a strong desire to be even larger and more muscular. This finding is consistent with previous research with male bodybuilders (Blouin & Goldfield, 1995) and extends the results to a sample of female bodybuilders. Due to the standards imposed on competitive bodybuilders, which emphasize extreme muscle mass and highly defined, striated muscles, it was surprising that competitive bodybuilders did not exhibit a stronger concomitant Drive for Tone than recreational bodybuilders. This suggests that, in the present study, recreational bodybuilders aspire to an exceptionally lean and toned, though smaller ideal, comparable to competitive bodybuilders.

Several interesting findings regarding gender differences on body image variables emerged. As expected, females scored significantly higher than males on the EDI's Body Dissatisfaction scale, but significantly lower than males on Drive for Bulk and Drive for Tone. The Body Dissatisfaction scale primarily reflects the extent to which subjects perceive their bodies to be larger than ideal. Females were expected to score higher than males as the body sites on this EDI subscale consist primarily of lower body parts (i.e., hips, buttocks, thighs), which can be considered "problem areas" for women as females are biologically predisposed to carry fat on their lower bodies whereas males tend to gain weight in upper body areas (i.e., stomach, chest, arms). Thus, it was expected that females would be more dissatisfied (larger than ideal) with lower bodies than males, and males would be more dissatisfied with upper bodies (smaller than ideal) than females. These findings are consistent with studies showing that most women in the general population are dissatisfied with their shape and weight. This is typically expressed as

feeling too large and heavy in lower body parts and often results in dietary restriction (Rodin et al., 1985). Men of the age represented in this study, however, often feel thinner than ideal and want to develop larger and more muscular upper bodies (Davis et al., 1991; Drewnowski & Yee, 1987; McCaulay et al., 1988; Mintz & Betz, 1986). These gender differences in body image perceptions in the sample obtained are consistent with current sociocultural norms of attractiveness, which emphasize a relatively, lean and toned (feminine) ideal in women, and a large, toned and muscular body for men (Lamb et al., 1993; Mishkind et al., 1986).

It is interesting to note that when weight was used as a covariate, gender differences indicating higher scores for males on Drive for Tone were no longer significant. This suggests that gender differences in Drive for Tone was a function of weight rather than basic differences between gender in a desire for a highly toned and sculpted body. Indeed, weight has been identified to be an important covariate in this area of research as it has been found to be positively correlated with body dissatisfaction in research employing clinical (Garner, Garfinkel, & O'Shaughnessy, 1985) and non-clinical populations (Huenemann, Shapiro, Hampton, & Mitchell, 1966). The high and similar scores between gender on Drive for Tone, when controlling for weight, may be a function of cultural values emphasizing a fit and lean body as the aesthetic ideal for males and females (Brownell, 1991). Although the male ideal is considerably larger and more muscular than the female ideal, both ideals emphasize considerable leanness as well as small hips and buttocks (Butler & Ryckman, 1994).

It is interesting to note that male bodybuilders reported higher mean scores on Body Dissatisfaction than the normative sample of males used in the validation of the

EDI, whereas female bodybuilders reported significantly lower scores than the normative female sample. These results are consistent with previous research that found that male bodybuilders reported higher body dissatisfaction compared to athletic comparison groups (Blouin & Goldfield, 1995; Loosemore & Moriarty, 1990) and non-athletic groups (Loosemore & Moriarty, 1990; Pasman & Thompson, 1988). The favorable findings concerning body dissatisfaction scores of female bodybuilders relative to female norms are not consistent with the literature, which generally tend to show no significant differences between female bodybuilders and athletic comparison groups (Pasman & Thompson, 1988) or non-athletic female controls (Guthrie et al., 1994; Walberg & Johnston, 1991). The findings from the present study indicate that even though female bodybuilders had higher absolute scores on Body Dissatisfaction than male bodybuilders, female bodybuilders had lower scores than male bodybuilders relative to gender-matched norms for both groups. This suggests that male bodybuilders may be at increased risk of body dissatisfaction, while female bodybuilders may be at decreased risk. These findings may have important health implications for male bodybuilders as body dissatisfaction has been shown to be the most important predictor of eating disturbances and frank eating disorders (Garner et al., 1987; Rosen, 1990), and is associated with poor self-esteem and risk of depression in males (Davis et al., 1991; Harmatz et al., 1985; Mintz & Betz, 1986) and females (McAulay et al., 1988; Mintz & Betz, 1986).

Psychological Variables

As predicted, bulimics reported significantly more general (non-eating related) psychopathology than either bodybuilding group characterized by more severe Depression, feelings of Ineffectiveness, Interpersonal Distrust, Maturity fears, and

Interoceptive Awareness (e.g., not in touch with feelings/sensations), and lower Self-Esteem. The depressed mood and associated feelings of ineffectiveness have been widely reported in BN (Garfinkel & Garner, 1982; Hudson et al., 1984) and typically are positively correlated with the severity of bulimic symptoms (Cooper & Taylor, 1987; Garfinkel & Garner, 1982).

It is surprising that bulimics and bodybuilders did not differ on Perfectionism. Initially, it was believed that bodybuilders may have scored abnormally high on the perfectionism scale given the precise manipulation of heavy weight training, dieting and aerobic exercise required to achieve the lean and mesomorphic ideal. It was expected, however, that bulimics would score significantly higher than bodybuilders as Perfectionism has been noted to be a predominant psychological feature in people with eating disorders (Bruch, 1974; Garner et al., 1983). The eating disordered individual is purported to strive for accomplishments, achievements and overall perfection in highly valued activities (including a slim body) in attempt to compensate for underlying deficits in self-concept (Bruch, 1974). Similarly, noncompetitive male bodybuilders have been found to engage in extreme and unhealthy methods of weight control and physique enhancement, most notably anorexic and bulimic behavior and steroid use, in attempt to enhance body image and feelings of personal effectiveness (Blouin & Goldfield, 1995; Pope et al., 1997). Results of the present study, however, do not fit with previous research findings as bulimics did not exhibit greater perfectionistic attitudes than bodybuilders despite exhibiting considerably more eating disturbances and general psychopathology. It is important to note, however, that the lack of differentiation in Perfectionism between groups was not a function of bodybuilders exhibiting abnormally

high levels of Perfectionism as bulimics and bodybuilders both scored in the normal range (Garner et al., 1983). The normal-range scores on Perfectionism exhibited by BN subjects in the present study are difficult to explain given the severity of eating-related pathology reported by this group, which was equal to or more severe than the scores reported for the clinical sample in the validation of the EDI (Garner et al. 1983).

A contribution to the literature made by the present study concerns the measurement of a broader scope of psychological characteristics of male and female bodybuilders. Results from the present study indicate that bodybuilders scored in the normal range on the majority of psychological measures employed. However, Interoceptive Awareness differentiated bodybuilders from normative data obtained in the validation of the standardized EDI (see Appendix N). Male bodybuilders reported significantly higher scores than normative males on Interoceptive Awareness, reflecting less skill in identifying emotions and sensations relating to hunger and satiety. This is consistent with findings that male bodybuilders in the present study also reported a stronger Drive for Thinness and Body Dissatisfaction compared to normative males. Similarly, female bodybuilders in the present study exhibited significantly lower scores on Interoceptive Awareness than females in the normative sample, a finding that is consistent with their lower scores on Body Dissatisfaction and Drive for Thinness relative to normative data of females reported above. The inability to identify sensations of hunger or satiety has been frequently shown to be associated with weight preoccupation, body dissatisfaction, and eating disturbances in anorexics and bulimics (Garfinkel & Garner, 1982; Garner et al., 1983) as well as male bodybuilders (Blouin & Goldfield, 1995). The only published study that has investigated Interoceptive

Awareness in female bodybuilders and non-athletic controls did not find significant differences, and both groups scored in the normal range (Walberg & Johnston, 1991).

Given that male bodybuilders reported significantly more body dissatisfaction, weight preoccupation, and dieting concerns compared to males that comprise the normative sample on the standardized EDI subscales, it is surprising that male bodybuilders did not also exhibit significantly stronger feelings of Ineffectiveness. Moreover, male bodybuilders' score on Self-Esteem and Depression also appeared to be in the normal range. Similarly, it was surprising that female bodybuilders in the present study did not exhibit significantly less general psychopathology on the EDI than females used in the normative sample given their more positive body image and lower weight preoccupation. This pattern of results is unexpected as a plethora of research has shown that body dissatisfaction is strongly correlated with depression (Hudson et al., 1984), self-esteem (Secourd & Jourard, 1953; McAulay et al., 1988), as well as with Ineffectiveness, Interpersonal Distrust, and Maturity Fears (Garner et al., 1983). The absence of depression despite the presence of body dissatisfaction and elevated scores on the Drive for Thinness scale in male bodybuilders is consistent with previous research (Blouin & Goldfield, 1995). Since depression is only one reflection of dissatisfaction with oneself, it is possible that male bodybuilders' body dissatisfaction and weight and shape preoccupation manifest themselves in behaviors such as steroid use, aggression, violence and/or other psychological measures that were not assessed in the present study.

The hypothesis that competitive bodybuilders would report more general psychopathology than recreational bodybuilders was not confirmed. The results indicate no significant differences between bodybuilder groups. Few studies have compared

competitive and recreational bodybuilders on non-eating related (general) psychological measures. However, these results are somewhat consistent with those obtained by Blouin and Goldfield (1995) in a sample of male bodybuilders and Walberg and Johnston (1991) using a sample of female bodybuilders. This hypothesis was based, in part, on research indicating that steroid use, which is more prevalent in competitive than noncompetitive bodybuilders (Blouin & Goldfield, 1995), is associated with negative psychological sequelae such as explosive hostility, labile mood, paranoia, ineffectiveness and maturity fears (Blouin & Goldfield, 1995). It is possible that there may not actually be true differences between competitive and recreational bodybuilders on psychological measures. Alternatively, perhaps the lack of differentiation between competitive and recreational bodybuilders on psychological measures may be due, at least in part, to lower than expected rates of steroid use found in the present study in competitive male (59%) and competitive female (40%) bodybuilders. These rates are considerably lower than those reported in previous research with competitive bodybuilders (Blouin & Goldfield, 1995; Pope et al., 1997). An additional explanation for the lack of differentiation on psychological measures may relate to the fact that competitive bodybuilders in the present study were a rather novice group that competed at a low level and the majority were not tested during the competitive season. If differences in psychological and behavioral characteristics exist between competitive and recreational bodybuilders, it appears that future research examining these groups may require the investigator to test subjects during the competitive season and/or implement a stricter inclusion criteria of competition in order to detect significant differences.

Dysfunctional Beliefs Concerning Weight and Shape and Eating Disturbances

According to cognitive theory, emotional and behavioral disturbances result from faulty or dysfunctional attitudes, beliefs, assumptions, perceptions or biased information processing (Beck & Weishaar, 1989; Meichenbaum, 1977). Individuals with eating disorders have been reported to hold the central belief that weight and shape determine one's self-worth and social acceptability (Beck & Weishaar, 1989; Fairburn et al., 1986; Garner, 1986). In other words, those with BN often hold the belief that , "to be fat is to be a failure, unattractive, and unhappy" (Fairburn et al., 1986), which according to cognitive theory, fosters a morbid fear of being fat and precipitates strict dieting and pathogenic eating and weight control practices. The present study was the first to investigate if similar maladaptive beliefs, or "cognitive distortions" relating to over valuing weight and shape are endorsed by bodybuilders and those with diagnosed eating disorders, and the extent to which they are associated with actual eating disturbances. The Dysfunctional Attitude Scale was modified (MDAS) in order to assess dysfunctional attitudes and beliefs in a population of bodybuilders in attempt to identify the core beliefs that may be driving them to use unhealthy methods of physique enhancement in pursuit of the mesomorphic ideal. While the MDAS was adapted to a bodybuilding population, it was believed that the instrument would still be appropriate for the bulimic sample as many items tapped into general dysfunctional attitudes relating to body weight and shape that were not specifically geared to bodybuilders.

Though not subjected to psychometric validation, it was believed that the relationship between MDAS items and eating-related pathology measured by the aggregate "eating disorder" variable would vary as a function of group membership. As

and therefore this belief and others related should be targeted for intervention (Fairburn et al., 1986).

It is surprising that MDAS items reflecting over valuing weight and shape were most strongly associated with eating pathology in recreational bodybuilders, accounting for a total of 40% of the variance. This finding may be due, in part, to the fact that recreational bodybuilders who participate in a narcissistic activity would be more likely to engage in unhealthy eating and weight control practices to compensate for self-perceived inadequacies (i.e., ineffectiveness). This may be compared to competitive bodybuilders, who may engage in high-risk behavior for both personal and competitive purposes. These findings have theoretical implications as they provide support for the cognitive model in that several dysfunctional attitudes and beliefs regarding weight, shape, body fat and physical appearance are predictive of eating disturbances. In addition, these findings have clinical implications, especially for recreational bodybuilders, as several cognitive distortions reflecting over valuing body shape and weight which are associated with eating disturbances may be targeted in a prevention program. Because cognitive-behavioral therapy has been found to be effective in reducing severity of bulimic symptoms and maladaptive attitudes and beliefs in people with eating disorders (Fairburn et al., 1991), these findings suggest that bodybuilders who hold similar maladaptive beliefs may also benefit from this type of intervention. Unfortunately, these benefits may never be realized as bodybuilders have been previously noted to be a “macho” group and therefore may be reluctant to seek the help of mental health practitioners (Pope et al., 1997).

Steroid Use, Binge Eating, and Eating Disorders in Bodybuilders

Although not a primary focus in the present study, a discussion of steroid use and its association with disordered eating is thought to be important because it represents a common body altering strategy used by bodybuilders that has potentially dangerous psychological and physiological consequences. As expected, the prevalence of steroid use in the present study was significantly higher in competitive than recreational bodybuilders (51% vs 12%). The rate of steroid use in competitive male bodybuilders did not differ significantly from that of female competitive bodybuilders (59% vs 40%). The higher rates of steroid use in competitive bodybuilders in comparison to recreational bodybuilders is consistent with previous findings obtained in samples of male bodybuilders (Blouin & Goldfield, 1995) and extends them to a sample of female bodybuilders. In addition, compared to recreational bodybuilders, the higher prevalence of steroid use in competitive bodybuilders is consistent with their high scores on Drive for Bulk, which has also been found to be a significant predictor of steroid use in previous research (Blouin & Goldfield, 1995). Few studies have investigated the prevalence of steroid use in competitive female bodybuilders. The rate of 40% obtained in this population in the present study is comparable to the 32% reported by Pope et al. (1997) and the 33% rate found by Guthrie et al. (1994), which were all considerably higher than the 10% rate found by Tricker et al. (1989). The 24% rate of use in recreational male bodybuilders is consistent with rates obtained by Blouin and Goldfield (1995) and Berube (1989), who reported 20% and 24% prevalence, respectively. Because recreational male bodybuilders in the present study did not plan to compete, this finding suggests that the 24% who reported using steroids had used them for cosmetic purposes

further dieting in attempt to meet the lean and mesomorphic ideal; thus potentially creating a vicious cycle of dieting and binge eating.

The average frequency of binge eating exhibited by steroid-using bodybuilders was over once per week (i.e., 1.3). Researchers and clinicians in the field of eating disorders suggest that binge eating once per week is indicative of disordered eating (Fairburn, 1995; Fairburn & Wilson, 1993). Moreover, it has been suggested that the frequency criteria of binge eating required for a diagnosis of BN be reduced from twice per week to once per week (Fairburn et al., 1993). Taken together, this suggests that steroid-using bodybuilders may be at risk for developing Binge Eating Disorder. This newly identified disorder is characterized by at least twice weekly binges for a period of six months, with feelings of disgust, anger and/or shame being experienced after or during the binge (APA, 1994). Although not all bodybuilders reported negative affect following a period of binge eating, approximately 46% of competitive males and over 66% of competitive females reported feeling angry and depressed after binge eating. Moreover, binge eating bodybuilders in the present study reported a more negative psychological profile compared to bodybuilders who did not binge. This profile was characterized by significantly more Depression, Ineffectiveness, Interoceptive Awareness and significantly lower scores on Self-Esteem. Importantly, since binge eating was associated with steroid use in the present study, and steroid users also reported a profile similar to binge eaters, it is uncertain whether the negative psychological characteristics exhibited by steroid-using bodybuilders are more strongly related to steroid use or binge eating. However, the outcome of the hierarchical regression analysis revealed that both binge eating and Ineffectiveness each contributed significantly and independently to the

prediction of steroid use in competitive bodybuilders. This suggests that the negative psychological sequelae of steroid use may be somewhat independent of binge eating. Future research comparing steroid-using bodybuilders who binge eat with steroid using bodybuilders who do not binge will help clarify this issue, which could not be examined adequately in the present study due to small numbers in these specific groups.

The current study's findings regarding the psychological and behavioral features of steroid-using bodybuilders (e.g., Drive for Bulk, Ineffectiveness) are somewhat consistent with a phenomenon described as muscle dysmorphia by Pope et al., (1997). Muscle dysmorphia is purported to be a variant of Body Dysmorphic Disorder in which the individual, despite appearing large and muscular, perceives himself/herself to be much smaller than ideal and is preoccupied with wanting to develop a larger and more muscular body. Although the present study was not designed to identify cases of muscle dysmorphia in bodybuilders, the pervasive Drive for Bulk and feelings of Ineffectiveness in association with steroid use reported by competitive bodybuilders in the present study are psychological and behavioral features that are characteristic of muscle dysmorphia (Pope et al., 1997). This suggests that competitive bodybuilders in the sample obtained may be at risk for developing problems associated with muscle dysmorphia. This has important health implications as muscle dysmorphia has been reported to be associated with feelings of ineffectiveness, social and occupational maladjustment, steroid use, eating disorders, and other psychiatric disturbances (Pope et al., 1993; Pope et al., 1997). Muscle dysmorphia is purported to be under recognized, occurring in approximately 10% (n=156) of male bodybuilders and 84% (n= 38) of competitive female bodybuilders interviewed. The phenomenology and prevalence of muscle dysmorphia in bodybuilders,

especially females, and its relationship to steroids, eating disorders and other psychiatric disorders is warranted.

Limitations of the Study

An important limitation of the present study relates to the generalizability of the findings to the populations studied, namely, bulimics, competitive and recreational bodybuilders. With regards to bodybuilders, approximately one in four packages of questionnaires handed out were completed and returned, constituting a response rate of approximately 25%. Bodybuilders have been noted to be a difficult population to recruit (Goldfield et al., in press; Pope et al., 1997). Their reluctance to participate may be related to the content of the study, such as eating disordered behavior, delicate psychological questions pertaining to self-esteem and depression, as well as steroid use which is illegal when taken for non-medical purposes such as performance enhancement or cosmetic reasons. It was believed that allowing subjects to complete the questionnaires anonymously and on their own time would elicit a better response rate. Despite these efforts, similar response rates have been reported in the bodybuilding literature (Blouin & Goldfield, 1995). The poor response rates suggests that the results obtained may not be representative of all competitive and recreational bodybuilders. However, even though not designed to obtain prevalence and incidence of eating disturbances, the present study identified a sub-group of bodybuilders who endorsed eating disorder attitudes and engaged in unhealthy weight control/physique enhancement behavior.

The response rate in the bulimic sample was approximately 70%. The primary limitation in the clinical sample employed in the present study is the fact that not all male

bulimics were symptomatic at the time of testing. This finding is a practical constraint that exists in clinical research because BN in men is rare, occurring in 0.2% of young men, and many who have BN may not seek treatment for what is considered a feminine disorder (Carlat & Camargo, 1991). These shortcomings, however, are not characteristic of the female bulimic sample which represented a group seeking treatment at an Eating Disorder Clinic (i.e., Ottawa sample) as well as those who responded to surveys in the community (Toronto sample). These groups did not differ significantly on variables of interest as shown in Table 1.

Several studies have reported that bodybuilders exhibited more eating disturbances compared to athletic comparisons (Blouin & Goldfield, 1995; Franco et al., 1988; Loosemore & Moriarty, 1990) and non-athletic controls (Pasman & Thompson, 1988; Walberg & Johnston, 1991). Although most of these studies used standardized inventories, these designs do not allow accurate comparisons to be made between bodybuilders and eating disordered individuals concerning eating attitudes and behavior. The present study is the first investigation to employ a concurrent sample of eating disordered individuals that allows direct comparisons to bodybuilders on psychological and behavioral characteristics. Although it was not central to the main hypotheses, inclusion of a non-athletic control group may have enhanced the generalizability of the present study's results as the normative data used from the validation of the EDI may be outdated since they were gathered in 1983. Since dieting and eating disturbances are generally believed to occur on a continuum (e.g., Rodin et al., 1985), including a concurrent sample of non-athletic controls would have made it easier to identify where

bodybuilders fall on the continuum ranging from normal to a full blown clinical syndrome.

Although many attempts were made to recruit competitive bodybuilders during the season (typically the summer months), the investigator of the current study observed that most of the competitive bodybuilders completed the questionnaires after the season. Previous research has noted that competitive bodybuilders displayed more disordered eating during the competitive season (Andersen et al., 1995; Sandoval et al., 1989), a finding that is consistent with the results of research with wrestlers (Steen & Brownell, 1990). Therefore, the similarities between competitive and recreational bodybuilders found in the present study may be a function of timing rather than reflecting a lack of differences between these groups. This limitation was a reflection of one the practical constraints of doing research with difficult populations such as bodybuilders. The investigators do not have control over the participation schedules of volunteer subjects. Andersen et al., 1995 reported an impressive response rate of 100% with all bodybuilders responding on the day of competition, which is ideal for tapping the attitudes and behavior of competitive bodybuilders. These types of situations, though desirable, are extremely rare and the Andersen et al. (1995) study was fortunate that the senior author (Dr. Ross Andersen) happened to be one of the judges of the bodybuilding contest. It has been suggested that the best method of recruiting a large sample of bodybuilders is simply to offer them money in return for their participation (Dr. Harrison Pope, personal communication, January 1998). Future research may benefit from these strategies.

specifically relating to weight and shape emerged as the best attitudinal predictor of steroid use in competitive bodybuilders, the group most likely to use steroids. Binge eating was found to be highly predictive of steroid use in bodybuilders, suggesting that steroid-using bodybuilders may be at increased risk for binge eating problems that may lead to Binge Eating Disorder. Future research is needed to corroborate these findings and further identify the core beliefs that may be driving bodybuilders to use unhealthy eating and weight control practices for the apparent purpose of modifying their bodies to meet personal and/or societal expectations (e.g., achieving the lean and muscular ideal). This line of investigation may yield information that is critical to the development of intervention programs designed to prevent steroid use and other unhealthy methods of altering weight and shape.

Despite exhibiting less severe eating-related pathology than bulimics as a group, several competitive and recreational bodybuilders, both males and females, reported overconcern with weight and shape, disordered eating, and full blown eating disorders at higher rates than expected given the prevalence reported in research using methodology and sample characteristics similar to that of the present study (Heatherton et al., 1995; Pemberton et al., 1996). The findings indicate that almost 30% of competitive male bodybuilders and 10% of competitive female bodybuilders met the criteria for BN at some point in their lifetime, with an additional 30% of competitive female bodybuilders exhibiting a subclinical type of BN described in the DSM-III-R as “Eating Disorder, Not Otherwise Specified.” Despite the fact that rates of eating disorders may be higher using self-report diagnostic methods instead of clinical interviews, the exceptionally high prevalence of BN found in bodybuilders in the present study is alarming considering that

recent survey research using the same criteria (i.e., DSM-III-R) shows that BN occurs in .2% of young men and 1-5% of young women (Heatherton et al., 1995; Pemberton et al. 1996). The high prevalence of BN reported by bodybuilders in the present study is consistent with previous research and indicates that competitive bodybuilding is associated with an increased risk of eating disorders.

The findings of the present study also indicate that 37% of competitive male bodybuilders and 30% of competitive female bodybuilders, and more than 20% of recreational male and female bodybuilders were found to be currently symptomatic as defined by binge eating an average of at least once per week for the previous three months, being persistently overconcerned with body shape or weight, and regularly engaging in at least one purging method (usually strict dieting, vigorous exercise, or diuretics). This pattern of disordered eating combined with weight and shape preoccupation have been reported to be characteristic of athletes that may lead to enhanced athletic performance, but also increases one's risk for developing an eating disorder (Brownell & Rodin, 1992; Wilson & Eldredge, 1992).

It is important to note that body dissatisfaction has been purported to be one of the most important antecedents of eating disorders (Garner et al., 1983; Rosen, 1995). In comparison to males in a normative sample, male bodybuilders reported significantly greater Body Dissatisfaction and more weight and shape preoccupation and dieting concerns as reflected by the Drive for Thinness. However, female bodybuilders in the present study as a group reported significantly lower scores on the Bulimia and Body Dissatisfaction subscales of the EDI in comparison to a normative sample of females. Thus, it appears that the high prevalence of dieting, aerobic exercise, and frequent

weightlifting reported by female bodybuilders in the current study has produced a body size and shape that meets their expectations, and may closely conform to the aesthetic ideal if evaluated by objective standards. This implies, however, that if female bodybuilders reduce the frequency or intensity of these behaviors (bodybuilding, dieting, exercise), they may be at risk for body dissatisfaction.

Taken together, the data indicate that bodybuilders exhibited less severe eating disorder attitudes and behavior and less general psychopathology than bulimics. However, male bodybuilders displayed more severe eating-related disturbances compared to a normative sample of males. Thus, as a group, male bodybuilders appear to be at increased risk of developing an eating disorder if they follow the progression reported in prospective studies by Striegel-Moore et al. (1989) and Garner et al. (1987). Regarding female bodybuilders, as a group, they appear to be somewhat protected against developing an eating disorder due to their above average body satisfaction and lower preoccupation with weight and shape. However, it is important to note that a sub-group of male and female bodybuilders in the present study, especially those who participated in competitions, reported elevated rates of regular binge eating, overconcern with weight and shape, and unhealthy methods of weight control and physique enhancement. These findings suggest that in pursuit of the lean and mesomorphic ideal, this sub-group of bodybuilders appear to be particularly disposed to developing Binge Eating Disorder and/or Bulimia Nervosa. It is noteworthy that even if these psychiatric disorders do not develop, the unhealthy eating and weight control practices (most notably anorexic and bulimic behavior and steroid use) reported by a sub-group of male and female bodybuilders have been noted to have deleterious psychological and physiological effects

(Blair et al., 1993; Brownell et al., 1987; Foreyt et al., 1995; Pope & Katz, 1988, 1994).

It has been suggested that people whose natural body weight or shape deviates most from the ideal in the sport will be at highest risk of developing eating disorders because they will be fighting biological and genetic factors that defend their natural body weight (Brownell, 1991; Wilson & Eldredge, 1992). Thus, bodybuilders who are not naturally lean may be particularly predisposed to develop subclinical eating disturbances or even full blown eating disorders.

Implications for Education and Prevention

Examination of muscle and fitness magazines over the past two decades indicates that the standards in bodybuilding, for both males and females, have become progressively more extreme and difficult to achieve through healthy training methods. This suggests that serious bodybuilders will have to rely more heavily on extreme physique enhancement practices in order to achieve the bodybuilding ideal, which may put them at even greater physiological and psychological risk. Since change within the bodybuilding community seems unlikely in the near future, and bodybuilders may be reluctant to seek the help of a mental health professional, development of educational programs aimed at prevention may be the most prudent and effective intervention. The following suggestions for education and prevention of unhealthy physique enhancement practices are based on current data and assumes that data in the field, including the present study, are reliable and valid.

1. Cognitive Restructuring

Findings from the present study indicate that several dysfunctional attitudes emerged as significant predictors of eating disturbances and steroid use in bodybuilders.

These findings have clinical implications as these dysfunctional attitudes in bodybuilders reflecting over valuing body shape and weight may be targeted in a prevention program. Because cognitive-behavioral therapy has been found to be effective in reducing severity of bulimic symptoms and maladaptive attitudes and beliefs in people with eating disorders (Fairburn et al., 1991), these findings suggest that bodybuilders who hold similar maladaptive beliefs may also benefit from this type of intervention. Since bodybuilders may be an unlikely group to seek help from mental health practitioners, it is recommended that a cognitive-based intervention designed to modify dysfunctional attitudes be incorporated in school curricula as part of Physical Education/Health class.

2. Education on Health Risks Associated with Unhealthy Physique Alteration Practices

Findings indicate that some bodybuilders, especially those who compete, engage in unhealthy eating and weight modification practices (most notably steroids, anorexic and bulimic behavior) in attempt to achieve the lean and mesomorphic ideal. The psychological and physiological effects of these body altering techniques must be communicated to bodybuilders. Recent articles in the popular press revealed that two collegiate wrestlers died from using unhealthy dehydration techniques (fasting and vigorous exercising in saunas) in attempt to “make weight”. Since adolescents and young adults often feel invincible or invulnerable to developing serious illnesses or life threatening conditions, it is recommended that negative social consequences of these unhealthy practices be emphasized in combination with psychological and biological risks. For example, a steroid prevention program may want to emphasize that anabolic steroids may cause baldness, acne, breast development, testicle shrinkage and sterility in males (Friedl, 1990; Yesalis et al. 1990). Among women, negative effects of steroid use

reported include facial hair, deeper voice, both of which are typically considered to be unattractive or undesirable by both men and women in current culture.

3. Convey that Achieving the Aesthetic Ideal Does Not Always Yield Vast Rewards

Brownell (1991) has noted that people strive to achieve the aesthetic body, not only for expected health benefits, but because they believe it will yield vast personal rewards: self-esteem, success, sexual desirability, and personal happiness. The pattern of data obtained from bodybuilders in the present study are consistent with Brownell's hypothesis. It is important to note, however, that despite meeting or exceeding the lean and mesomorphic standards of attractiveness for males, a number of male bodybuilders (both competitive and recreational) reported feelings of ineffectiveness, social maladjustment and body dissatisfaction (Blouin & Goldfield, 1995; Klein, 1987; Loosemore & Moriarty, 1991; Pope et al., 1993). It is important to incorporate these findings into an intervention program as they debunk the myth that achieving the "perfect body" will automatically bring unconditional happiness, feelings of self-worth, and other putative benefits. Although it is fine to try to enhance body shape and physical fitness through weight training, it is recommended that moderation be the guiding principle when initiating a bodybuilding program. It is also recommended that people try to empower themselves psychologically and socially through a variety of means, such as developing hobbies, making new friends, expanding their interests and participating in activities that are enjoyable.

4. Set Appropriate Body Shape and Weight Goals.

Despite being well above average weight for height, male bodybuilders in particular expressed a strong dissatisfaction with their bodies characterized by a

perception of being thinner than ideal and an accompanying Drive for Bulk. People must be informed that such unrealistic body weight and shape goals are problematic because body weight and shape are not totally malleable, they are limited by genetic and biological factors (Bouchard & Johnston, 1988; Bouchard et al., 1990; Stunkard et al., 1986). Thus, it is critical when beginning a weight training or bodybuilding program to set and maintain appropriate body weight and shape goals. Although no guidelines exist, this may be done by consulting physical education teachers, certified fitness trainers, family doctors, or other knowledgeable health care practitioners who have conducted a family history concerning body weight and shape. If an individual's body weight and shape goals are too unrealistic, they will be more likely to resort to extreme and unhealthy weight control and physique enhancement practices. In addition, Brownell (1991) has noted that the psychological consequences of falling short of one's body weight and shape goals can be devastating.

5. Reveal the True Perceptions of the Aesthetic Male and Female Ideals

There is evidence that men perceive the ideal body for women to be heavier than what women think males find attractive, and women's vision of the ideal male body is less muscular and smaller than what men think women find attractive (Cohen & Adler, 1992; Cash, Winstead & Janda, 1986; Fallon & Rozin, 1985). Incorporating these findings into an educational program may serve to reduce body dissatisfaction and help establish more realistic weight and shape goals. This may, in turn, result in a diminished likelihood of engaging in rigorous bodybuilding, aerobic exercise, and dangerous methods of weight control in attempt to achieve the unrealistic and misperceived ideal. Moreover, preliminary data from a pilot study conducted by

Goldfield and Blouin (in preparation) found that university women reported that intelligence and personality characteristics were more important in selecting a boyfriend than physical characteristics. University males, however, reported that physical characteristics and personality traits were equally important in selecting a romantic partner. These findings are consistent with findings from previous studies (Berscheid & Walster, 1974; Huston & Levinger, 1978). These findings suggest that recreational male bodybuilders seeking psycho-social empowerment may be better served by spending more time and effort developing their minds and personalities and less time in the gym. Since males' romantic interest in females is still strongly influenced by physical beauty, it is recommended that young women beginning exercise or bodybuilding routines be taught that body weight and shape are not completely malleable and to accept their body weights or shapes even if they are not perceived as ideal.

Future Research

The following suggestions for future research are based on the findings obtained from the present study.

1. Due to correlational nature of the data, it cannot be determined whether individuals who are preoccupied with weight and shape and exhibit disordered eating and full blown eating disorders gravitate to bodybuilding or whether the narcissistic activity and environment of bodybuilding precipitates and/or exacerbates these symptoms of eating disorders, or both. Longitudinal research is required to properly address this issue. Prospective studies of this nature will also help to identify the level of severity of eating disturbances exhibited by individuals at baseline that may eventually develop into an eating disorder. Such research is useful because it not only identifies which variables can

prospectively predict the development of an eating disorder in a population of bodybuilders, but it can also help identify more accurately how severe eating disturbances need to be before they are considered to be “at risk”.

2. It is unclear whether the Body Dissatisfaction and strong Drive for Bulk exhibited by male bodybuilders is a reflection of inaccurate perceptions of body size or shape or simply a reflection of attempting to achieve an unrealistic standard of mesomorphy.

Preliminary research in this area found that weightlifters showed less body image distortion compared to runners and non-athletic controls (Pasman & Thompson, 1988).

Future inquiry examining body size distortion and its relationship to body dissatisfaction in noncompetitive and competitive bodybuilders (male and female) is warranted.

3. Future research should attempt to assess eating disorder attitudes and behavior and associated psychological characteristics of competitive bodybuilders as close to competition as possible and during the off-season. A large discrepancy in eating disorder behavior between competitive and noncompetitive season would suggest that competitive bodybuilders may be engaging in abnormal eating and weight control behavior for performance enhancement. This research will also be able to identify the extent to which competition exacerbates unhealthy eating and weight control practices, and therefore helps to determine the level of risk competitive bodybuilders are disposed to in pursuit of the lean and mesomorphic ideal.

4. It would be beneficial to include a non-athletic sample to determine where along the continuum male and female bodybuilders fall concerning eating disorder attitudes and behavior and general psychopathology. Results from the present study, which have to be interpreted with caution due to a lack of a non-athletic control group, suggest that male

bodybuilders exhibit more eating-related disturbances than normal but less than people with eating disorders, while eating-related disturbances in female bodybuilders may be equal to or less severe than normal.

5. Bodybuilders who use steroids also appear to have problems with binge eating. It is important to obtain a further understanding of this relationship and to identify the extent to which the negative psychological correlates of steroid use reported in this study are a function of the negative effects of steroids or binge eating, or both.

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APPENDIX A

DSM-IV Criteria for Bulimia Nervosa

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 a 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.

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

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

E. The disturbance does not occur exclusively during episodes of Anorexia Nervosa

Purging Type: during the current episode of Bulimia Nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

Nonpurging Type: during the current episode of Bulimia Nervosa, the person has used other inappropriate compensatory behaviors, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

APPENDIX B:DSM-III-R Criteria for Bulimia Nervosa

- A. Recurrent episodes of binge eating (e.g., rapid consumption of a large amount of food in a discrete period of time).
- B. A feeling of lack of control over eating behavior during the eating binges.
- C. The person regularly engages in either self-induced vomiting, use of laxatives or diuretics, strict dieting or fasting, or vigorous exercise in order to prevent weight gain.
- D. A minimum average of two binge episodes a week for at least three months.
- E. Persistent over concern with body shape and weight.

DSM-III-R Criteria for a Eating Disorder-Not Otherwise Specified

Disorders of eating that do not meet the criteria for a specific eating disorder

Examples

- 1) a person of average weight who does not have binge eating episodes but frequently engages in self-induced vomiting for fear of gaining weight.
- 2) all of the features of Anorexia Nervosa in a female except for absence of menses
- 3) all of the features of Bulimia Nervosa except the frequency of binge eating episodes

APPENDIX C:**DSM III Criteria for Bulimia Nervosa**

- A. Recurrent episodes of binge eating (rapid consumption of a large amount of food in a discrete period of time, usually less than two hours).
- B. At least three of the following:
 - (1) consumption of high-caloric, easily ingested food during a binge
 - (2) inconspicuous eating during a binge
 - (3) termination of such episodes by abdominal pain, sleep, social interruption, or self-induced vomiting
 - (4) repeated attempts to lose weight by severely restrictive diets, self-induced vomiting, or use of cathartics or diuretics.
 - (5) frequent weight fluctuations greater than ten pounds due to alternating binges and fasts.
- C. Awareness that the eating pattern is abnormal and fear of not being able to stop eating voluntarily.
- D. Depressed mood and self-deprecating thoughts following eating binges.
- E. The bulimic episodes are not due to Anorexia Nervosa or any known physical disorder.

APPENDIX D:Informed Contact Sheet

ARE YOU INTERESTED IN BEING A VOLUNTEER IN A RESEARCH PROJECT?

By signing below, I agree to be contacted by Dr. A. Blouin or Gary Goldfield, a doctoral student at Carleton University, in order to discuss whether or not I would be interested in participating voluntarily in research. By signing this form, I am not volunteering, but I am simply agreeing to discuss the possibility of participating with one of the people involved in this research. The extent of my participation will be to complete questionnaires, which will be further explained when I am contacted.

Print Name _____

Date: _____

Signature _____

Phone: _____

Appendix E

Telephone Contact

Hello, my name is Gary Goldfield. I am collaborating on a research project with Dr. Art Blouin at the Eating Disorders Clinic at Carleton University. I received your signed contact sheet indicating that you want to know more about the study I am conducting. In general, the aim of the project is to investigate psychological and behavioral characteristics among people who have eating concerns and those who engage in bodybuilding. The variables that are most relevant to this project are eating attitudes and behavior, body image, and general psychological factors such as self-esteem and mood.

In past research that we have conducted, we have found that bodybuilders are at high risk for developing an eating disorder due to serious dieting that is observed in the sport. Such dieting is likely a response to the extremely low level of body fat required to do well in competitions. This study is a follow-up project designed to further identify similarities and differences between bodybuilders and people who have eating concerns.

Participation in the study involves completing a series of questionnaires, which takes approximately 45-60 minutes to complete. You can complete these questionnaires at home and return them to Dr. Blouin's office at Carleton University. If you do not have an appointment with Dr. Blouin in the near future, please drop the pre-stamped, self-addressed envelop in the mailbox. The questionnaires deal with a variety of characteristics including eating attitudes and behavior, body image, and general psychological factors such as self-esteem and mood.

There are no risks or benefits of participating in this study. Participation is strictly voluntary. If you decide not to participate, this will not affect your care or treatment in any way at the Eating Disorder Clinic. Are you interested in participating? We are looking for people with specific eating symptoms. Can I ask you a few questions in order to determine if you can be included? At this point, questions pertaining to eating symptoms, serious medical conditions or diseases, and pregnancy were posed to assess exclusion criteria.

APPENDIX F

Informed Consent

A Comparison of Eating Attitudes and Behavior and General Psychological Characteristics among Bodybuilders and Individuals with Eating Concerns

I am being asked to participate in this study being conducted by Dr. Dan Harper and Gary Goldfield of Carleton University. The principal aim of the study is to investigate eating-related attitudes, weight control practices, and other psychological characteristics among male and female body builders and individuals who have concerns about eating and weight.

My participation will mean that I will complete a series of paper and pencil questionnaires, which takes approximately 45 minutes. Upon completion of the questionnaires, I will place the forms in the pre-stamped envelope provided, seal it, and put the envelope in a mailbox. If the envelope does not have a stamp, please return it to the front desk of your fitness club where it will be collected or return it to Dr. Blouin's office at Carleton University. I understand that I am not to write my name on any of the questionnaires, and this procedure will guarantee my anonymity. This informed consent with my signature will be completed prior to, and separated from my questionnaires, further ensuring my anonymity and confidentiality. If I choose to mail the questionnaires back to the investigator, I will submit my address so that I can be mailed a debriefing form, which will describe the purpose of the research, and provide a brief review of the research issues. If I rather be debriefed in person (to ask questions or offer comments) I should contact Gary Goldfield for an appointment at 823-1345.

I understand that there are no physical or psychological risks or benefits involved in this study. I understand that my participation is completely voluntary and that I can withdraw from the study at any time. If I have any questions or concerns about this study, I can contact the principal investigator, Gary Goldfield, at the number provided above. The results of this study may be published in scientific journals, or presented at scientific meetings but my identity will remain strictly confidential. I may have a copy of this form if I wish.

I have read the above description of this study and understand the conditions of my participation. I agree to participate in the study.

Signed: _____

Date: _____

APPENDIX G

Debriefing

The purpose of this research was to collect information that will help enable bodybuilders and recreational weight trainers make informed decisions about training techniques and have the opportunity to modify attitudes toward their training. Past research has shown that certain attitudes may make some people prone to engage in risky training techniques to achieve their objectives, including strict dieting and weight control practices, dangerous overtraining and / or excessive use of performance enhancing agents. It was the aim of this study to verify if in fact body builders have attitudes and beliefs which contribute to dangerous training practices and how these attitudes and behaviors differ from those people with eating problems. Your participation in this study helped to achieve these goals by providing the most up to date information that can be used in the future to develop the best training methods in the safest environment. Your participation in this study and others like it is critical for developing educational strategies designed to help bodybuilders improve their attitudes and training methods.

We would like to thank you for participating in this study. Your time and efforts are greatly appreciated. If you are concerned about your body image or eating behavior, please contact your family physician or the National Eating Disorder Information Centre (416-340-4156), where you will receive information concerning appropriate assistance in your community.

If you have any questions or comments about this research, or desire further information, please feel free to contact Gary Goldfield (principal investigator) at 613-823-1345 or Dr. Dan Harper (faculty sponsor) at 613-562-0050, ext 1697. If speaking with these people is not satisfactory, you may contact Dr. L. Paquet, (Chair, Department of Psychology Ethics Committee) at 788-2600 ext. 2692.

Appendix H

Correlation between Eating-Related Dependent Variables (N=145)

	EDI1	EDI2	EDI3	#binges/wk	Drivebulk	Drivetone
EDI1	1.00					
EDI2	0.69	1.00				
EDI3	0.75	0.60	1.00			
#binges	0.41	0.69	0.37	1.00		
Drivebulk	-0.27	-0.18	-0.27	-0.17	1.00	
Drivetone	-0.08	-0.11	-0.08	-0.15	0.67	1.00

EDI1 = Drive for Thinness

EDI2 = Bulimia

EDI3 = Body Dissatisfaction

#binges= Average number of binges per week in last three months

Correlation Between Psychological Outcome variables (N=145)

	SE	BDI	EDI4	EDI5	EDI6	EDI7	EDI8
SE	1.00						
BDI	-.81	1.00					
EDI4	.82	.80	1.00				
EDI5	-.03	.16	.18	1.00			
EDI6	-.54	.54	.65	.15	1.00		
EDI7	-.68	.71	.81	.18	.58	1.00	
EDI8	-.51	.53	.68	.19	.41	.58	1.00

SE = Self esteem

BDI = Depression

EDI4 = Ineffectiveness

EDI5 = Perfectionism

EDI6 = Interpersonal Distrust

EDI7 = Interoceptive Awareness

EDI8 = Maturity Fears

APPENDIX J

Correlation Coefficients of Demographic Measures and Primary Dependent Variables (N=145)

	Age	Education	Weight
Drive for Thinness	.09	-.26**	-.05
Bulimia	.05	-.21*	.05
Body Dissatisfaction	.04	-.14	-.02
# binges per week	-.02	-.12	-.03
Eating Disorder Composite Index	.07	-.23**	-.09
Drive for Bulk	-.26**	-.16	.35***
Drive for Tone	-.25**	-.09	.26**
Self-Esteem	-.21*	.25**	.03
Depression	.22**	-.30**	.08
Ineffectiveness	.23**	-.25**	.09
Perfectionism	.10	.15	.07
Interpersonal Distrust	.07	-.18*	-.06
Interoceptive Awareness	.09	-.29**	.06
Maturity Fears	.01	-.28**	.05
* p < .05 ** p < .01 *** p < .001			

Appendix L

Table L-1

Behavioral Aspects of Weight Training in Groups

Variable	M (sd)	Bulimics		Comp. BB's		Rec. BB's	
		Male (N=7)	Female (N=8)	Male (n=27)	Female (n=20)	Male (n=25)	Female (n=25)
Weight training (yrs.) ^{E, F}	M (sd)	10.3 (7.3)	4.6 (3.7)	8.6 (3.9)	6.0 (3.9)	6.7 (4.6)	4.2 (3.6)
Frequency per week ^{A, B, C, D}	M (sd)	3.6 (0.8)	3.0 (1.3)	4.7 (0.7)	4.9 (0.8)	3.9 (0.9)	3.5 (1.3)
Duration (minutes) ^D	M (sd)	76.3 (60.9)	86.3 (30.8)	86.6 (41.8)	98.8 (30.5)	78.0 (21.4)	75.6 (28.7)
Importance of ^{E, F} aerobics	M (sd)	3.7 (1.7)	4.3 (0.7)	3.3 (1.2)	4.2 (0.9)	3.3 (1.0)	4.3 (0.8)
Number of competitions	M (sd)	n/a	n/a	1.8 (1.2)	2.8 (1.7)	n/a	n/a
Highest level of competition	M (sd)	n/a	n/a	2.3 (1.2)	2.3 (1.4)	n/a	n/a

Note. Values on the "Importance of aerobics" variable represent mean scores measured on a Likert scale ranging from 1 denoting "not at all important" to 5 reflecting "very important". Values on "highest level of competition" range from 1 to 5, with 1= local, 2= regional, 3 = provincial, 4 = national, 5 = international.

- A Male Bulimics vs Competitive Male BB; $p < .05$
 B Competitive Male BB's vs Recreational Male BB's; $p < .05$
 C Female Bulimics vs Female Competitive BB's; $p < .05$
 D Competitive Female BB's vs Recreational Female BB's; $p < .05$
 E Competitive Male BB's vs Competitive Female BB's; $p < .05$
 F Recreational Male BB's vs Recreational Female BB's; $p < .05$

Appendix L

Table L-2

Correlation Coefficients of Behavioral and Psychological Aspects of Weight Training and Primary Dependent Variables (N= 112)

Variables	Years of weights	Frequency	Duration of workouts	Import. Aerobics
Drive for Thinness	-.06	.02	.19*	.25**
Bulimia	.10	-.15	.11	.05
Body Dissatisfaction	-.20	-.24	.13	.25**
# binges per week	.22	-.06	-.02	-.18
ED Composite variable	-.06	-.14	.17	.23*
Drive for Bulk	.17	.28**	.05	-.21*
Drive for Tone	.03	.28**	.19	.06
Self-Esteem	-.01	.27**	-.06	-.15
Depression	.01	-.13	.18	.16
Ineffectiveness	.06	-.13	.17	.14
Perfectionism	.11	.10	-.07	.16
Interpersonal Distrust	.07	-.07	.19*	.07
Interoceptive Awareness	.03	-.18	.20*	.06
Maturity Fears	.04	-.04	.15	.00

Note. Import Aerobics = Importance placed on aerobic exercise.

* $p < .05$

** $p < .01$

Appendix M

Means Scores and (Standard Deviations) on Primary Dependent Measures in Symptomatic Male and Female Bulimics

Variable	Symptomatic Male Bulimics	Female Bulimics
	(N=15)	(N=25)
	M (SD)	M (SD)
Drive for Thinness	11.53 _a (5.55)	14.50 _a (4.40)
Bulimia	8.40 _a (5.30)	9.13 _a (6.54)
Body Dissatisfaction	14.13 _a (6.50)	17.88 _a (6.87)
Average # binges/week	3.57 _a (4.84)	4.52 _a (5.40)
Standardized ED variable ^A	2.36 _a (2.1)	3.78 _a (2.51)
Ineffectiveness	12.67 _a (7.85)	8.63 _a (7.19)
Perfectionism	7.53 _a (4.93)	6.88 _a (5.30)
Interpersonal Distrust	8.20 _a (4.52)	5.79 _a (4.87)
Interoceptive Awareness	10.40 _a (5.91)	11.21 _a (9.34)
Maturity Fears	7.67 _a (6.64)	4.38 _a (4.63)
Self-Esteem	25.87 _a (11.40)	28.42 _a (11.32)
Depression	24.93 _a (8.80)	20.87 _a (10.47)

Note. Means in the same row that do not share subscripts differ at $p < .05$.

^A Standardized ED variable = standardized aggregate eating disorder variable

Appendix N

Mean Scores and Standard Error of EDI Scales in Bodybuilders and Normative Sample

Variable	Mean (se)	Normative		Comp. BB's		Rec. BB's	
		Male (n=166)	Female (n=577)	Male (n=27)	Female (n=20)	Male (n=25)	Female (n=25)
Drive for Thinness ^A	m (se)	1.60 (0.24)	5.00 (0.22)	3.48 (0.74)	5.35 (1.12)	3.16 (0.79)	4.48 (0.94)
Bulimia ^B	m (se)	1.00 (0.14)	2.00 (0.14)	1.15 (0.32)	1.30 (0.67)	1.20 (0.52)	0.96 (0.25)
Body Dissatisfaction ^{A,B}	m (se)	3.90 (0.39)	10.20 (0.32)	4.63 (0.69)	7.45 (1.31)	4.92 (0.67)	8.40 (1.48)
Ineffectiveness	m (se)	1.60 (0.24)	2.00 (0.15)	2.11 (0.71)	1.35 (0.47)	1.76 (0.58)	2.00 (0.66)
Perfectionism	m (se)	6.20 (0.30)	5.20 (0.16)	6.78 (0.91)	6.50 (0.86)	7.12 (0.88)	6.44 (0.97)
Interpersonal Distrust	m (se)	3.10 (0.24)	2.20 (0.12)	3.22 (0.75)	3.90 (0.87)	3.24 (0.52)	2.68 (0.66)
Interoceptive Awareness ^A	m (se)	1.40 (0.39)	2.90 (0.47)	2.19 (0.69)	1.35 (0.54)	2.76 (0.93)	1.60 (0.44)
Maturity Fears	m (se)	2.70 (0.44)	2.50 (0.33)	2.74 (0.58)	2.40 (0.49)	3.40 (0.73)	2.04 (0.50)

Note. Bodybuilding conditions were collapsed because competitive and recreational male bodybuilders did not differ significantly, neither did competitive and recreational female bodybuilders.

^A Normative Males vs Male Bodybuilders; $p < .05$

^B Normative Females vs Female Bodybuilders; $p < .05$

APPENDIX O:Inventories

International Federation of Bodybuilders (IFBB) Endorsement Letter

Demographics

Bodybuilding/Weight Training Questionnaire (BBQ)

Dysfunctional Attitude Scale (MDAS)

Anabolic Steroid Questionnaire (ASQ)

Eating Disorder Inventory (EDI)

Self-Perceptions Inventory (SPI)

Beck Depression Inventory (BDI)

Physical Traits / Sexual Attractiveness (PTSA)

National Institutes of Mental Health- Diagnostic Interview Schedule (NIMH-DIS)

DEMOGRAPHICS

Please answer the following demographical questions.

1) Are you male or female? _____

2) How old are you? _____

3) Please circle your highest level of education achieved

a) elementary school

b) some high school

c) grade 12

d) grade 13

e) some college or university

f) college/university graduate

g) masters degree

h) doctorate degree

Major: _____

Major: _____

4) What is your occupation? _____

5) What is your Marital Status? _____

6) How tall are you? (feet & inches) _____

7) How much do you weigh? (pounds) _____

BODYBUILDING/WEIGHT TRAINING QUESTIONNAIRE

Instructions

The following questions deal with your attitudes and approach toward weight training and bodybuilding. Please read each question carefully. Please answer every question. Do not spend too long on each question. Do not write your name on the questionnaire.

1. How long have you been lifting weights? _____
2. On average, how many times per week do you lift weights? _____
3. On average, how many scheduled workouts do you miss per month? _____
4. How long do your workouts normally last (minutes)? _____
5. Please indicate how important aerobic exercise (e.g., cycling, running, stairmaster, etc.) is in your weight training or bodybuilding regimen by circling a response from the scale below. The numbers which indicate the degree of importance that aerobic exercise plays in your bodybuilding/weight training routine range from 1 "Not at all important" to 5 "extremely important".

1. Not at all
2. A little
3. Moderately
4. A lot
5. Extremely

6. Circle the two main reasons for missing your workouts?

Fatigue Lack Time Injury Lack motivation Illness

Other, please specify _____

7. Have you ever entered a bodybuilding competition?

Yes _____

No _____

If "yes" go to 7A

if "no" go to 8

7A) Please indicate how seriously you competed in bodybuilding competition(s) by circling a response from the scale below. The numbers which indicate the degree of seriousness in which you competed range from 1 "Not at all serious" to 5 "extremely serious".

1. Not at all
2. A little
3. Moderately
4. A lot
5. Extremely

7B) Have you competed within the last 12 months?

Yes _____

No _____

if "yes" go to 7C

if "no" go to 8

7C) If "yes" please report the name and level of competition
(e.g. local, provincial, etc.)

8. Do you intend to enter any bodybuilding competitions in the next 12 months?

Yes _____

No _____

if "yes" go to 8A

if "no" go to 9

8A). Please specify the name and level of competition (e.g. local, provincial etc).

IF YOU HAVE NEVER COMPETED IN A BODYBUILDING COMPETITION,
PLEASE GO TO QUESTION #13.

9. How many bodybuilding competitions have you entered? _____

10. How many times have you placed in the top 5 in a bodybuilding competition? _____

11. What is the highest that you have placed in a bodybuilding competition? _____

12. What is the highest level of competition that you have entered in bodybuilding? (circle)

a) within my club

b) inter club competition (local)

c) provincial competition

d) national competition

e) international competition

13. Have you ever entered a powerlifting or weightlifting competition?

Yes _____

No _____

If "yes" go to 13A

if "no" go to 14

13A) Please indicate how seriously you competed in powelifting by circling a response from the scale below. The numbers which indicate the degree of seriousness in which you competed range from 1 "Not at all" serious to 5 "extremely" serious.

1. Not at all
2. A little
3. Moderately
4. A lot
5. Extremely

13B) Have you competed in powerlifting within the last 12 months?

Yes _____

No _____

if "yes" go to 13C

if "no" go to 14

13C) If "yes" please report the name and level of competition.
(e.g local, provincial, etc.)

14. Do you intend to enter any powerlifting competitions in the next 12 months?

Yes _____

No _____

if "yes" go to 14A

if "no" go to 15

14A). Please specify the level of competition (e.g. local, provincial etc).

IF YOU HAVE NEVER COMPETED IN A POWERLIFTING COMPETITION, PLEASE GO TO QUESTION #19.

15. How many powerlifting competitions have you entered? _____

16. How many times have you placed in the top 5 in a powelifting competition? _____

17. What is the highest that you have placed in a powerlifting competition? _____

18. What is the highest level of competition that you have entered in powerlifting? (circle)

- a) within my club
- b) inter club competition (local)
- c) provincial competition
- d) national competition
- e) international competition

19. What is your primary form of weight training?(can circle more than one response)

- a. free weights
- b. nautilus
- c. universal type (machines)
- d. other, please specify _____

20. Please specify the year, and the highest level of competition **in any sport** in which you have participated (other than bodybuilding or powerlifting). Please start with the most recent.

<u>Name of Sport</u>	<u>Year</u>	<u>Highest Level of Competition</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

DAS -BI

This Inventory lists different attitudes or beliefs which people sometimes hold.

Read EACH statement carefully and decide how much you agree or disagree with the statement.

For each of the attitudes, show your answer by circling the response alternatives that **BEST DESCRIBES HOW YOU THINK**. Be sure to choose only one answer for each attitude. Because people are different, there is no right answer or wrong answer to these statements.

To decide whether a given attitude is typical of your way of looking at things, simply keep in mind what you are like most of the time.

ATTITUDES

1. I have to be considered good looking or attractive in order to be happy and content with myself.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

2. I can be truly happy with myself even when I feel quite chubby or fat.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

3. People with well developed muscles will be more successful than those people with small underdeveloped muscles.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

ATTITUDES

14. If a person is physically unattractive, then they will probably not be respected or admired by others.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

15. People who are thin and possess underdeveloped muscles are usually more physically attractive than those people with bodies that look big and muscular.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

16. It is difficult to be happy unless one is good looking, intelligent, rich and creative.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

17. It is possible to gain another person's respect without being especially talented at anything.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

18. If a person asks for help, it is a sign of weakness.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

19. I feel very unhappy with myself when I think of myself as thin.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

20. I feel that people will look up to me more if I have large muscles that are well defined rather than underdeveloped, small muscles.

1. totally disagree
2. disagree very much
3. disagree slightly
4. neutral
5. agree slightly
6. agree very much
7. totally agree

Thank You!

ASQInstructions

The following questions ask about your attitudes toward anabolic steroid use. Please read each question carefully. Please answer every question. Do not spend too long on each question. Do not write your name on the questionnaire.

1. Please indicate your level of agreement with the following statements by circling one of the numbered responses using the scale below.

1	2	3	4	5
strongly agree	agree	neutral	disagree	strongly disagree

a) If I knew taking steroids would guarantee that I would win a gold medal or become world champion, but would also cause me to develop cancer within 5 years, I would take steroids.

1	2	3	4	5
strongly agree	agree	neutral	disagree	strongly disagree

b) If I knew that steroid use would bring me immense popularity among my friends and members of the opposite sex, but would also cause me to develop cancer, I would take steroids.

1	2	3	4	5
strongly agree	agree	neutral	disagree	strongly disagree

c) I have considered taking steroids or human growth hormone.

1	2	3	4	5
strongly agree	agree	neutral	disagree	strongly disagree

2. The following questions deal with various reasons why people may or may not use steroids. This section will require you to give **YOUR OWN REASONS** for taking or not taking steroids under the heading "Me **PERSONALLY**". This section also asks you to give your opinion as to why you think **MOST PEOPLE IN GENERAL** use or do not use steroids under the heading "**MOST PEOPLE IN GENERAL**". This information is obtained by several statements and you are requested to rate your level of agreement with these statements by circling one of the numbered responses. Please see the example below.

EXAMPLE :

PEOPLE HAVE TAKEN OR WOULD TAKE STEROIDS:

a) out of curiosity

ME PERSONALLY

- ① strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
- ⑤ strongly disagree

In the above example, the circle around number 1 ("strongly agree") under ME PERSONALLY" indicates that I have personally taken or would take steroids out of curiosity. The circle around number 5 (strongly disagree) under the heading "MOST PEOPLE IN GENERAL" indicates that I do not believe that most people take steroids out of curiosity. You can now begin!

2) PEOPLE HAVE TAKEN OR WOULD TAKE STEROIDS:

a) for cosmetic purposes (to look more muscular)

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

PEOPLE HAVE TAKEN OR WOULD TAKE STEROIDS:

b) to increase strength for competitive sport

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

c) to increase body size for competitive sport

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

d) to speed the recovery of an injury

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

e) for medical purposes and prescribed by a doctor

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

f) to increase overall athletic performance

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

PEOPLE HAVE TAKEN OR WOULD TAKE STEROIDS:

g) to keep up with the competition

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

h) because friends take them (to fit in with the crowd)

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

i) because a trainer or coach suggested it

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

j) to increase the likelihood of becoming a professional athlete

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

k) to increase muscle definition (become "cut")

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

PEOPLE HAVE TAKEN OR WOULD TAKE STEROIDS:

l) in order to defend myself better (self-defense)

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

m) in order to boost self-esteem and feel better about oneself

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree
6. I have never and would never take steroids for this reason

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

n) Please specify other reasons why you have used or would use steroids. _____

3. Please indicate your level of agreement with the following statements by circling one of the numbered responses using the scale below.

1. strongly disagree
2. disagree
3. neutral
4. agree
5. strongly agree

PEOPLE DO NOT USE STEROIDS OR FEEL UNCOMFORTABLE ABOUT USING STEROIDS BECAUSE:

a) steroid use is illegal

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

PEOPLE DO NOT USE STEROIDS OR FEEL UNCOMFORTABLE ABOUT USING STEROIDS BECAUSE:

b) steroids are potentially harmful to one's health

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

c) it is important to compete drug- free.

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

d) people do not know how to get steroids.

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

e) steroids make you too muscular.

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

f) there are too many unpleasant side effects from steroid use.

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

PEOPLE DO NOT USE STEROIDS OR FEEL UNCOMFORTABLE ABOUT USING STEROIDS BECAUSE:

g) steroids are too expensive to purchase

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

h) one can become physically and psychologically dependent on steroids

ME PERSONALLY

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

MOST PEOPLE IN GENERAL

1. strongly agree
2. agree
3. neutral
4. disagree
5. strongly disagree

i) Please specify any others reasons why you have not or would not use steroids

4. In your opinion, of all the people you know in bodybuilding, what percentage of them have ever taken steroids? _____

5. Do you think that the negative or "dangerous" effects of steroid use will disappear once steroid use is stopped?

- A. Yes
- B. No
- C. Not sure

6. Have you ever taken anabolic steroids or human growth hormone?

Yes _____

No _____

if "yes" please go to 7

if "no" stop. Thanks!

If you have never used steroids, then you have completed this questionnaire. Thank you!

The following section will ask questions about using steroids. The following questions will deal with the frequency and quantity of steroid use, and how you felt when you were taking steroids. **Remember that this information will be kept completely confidential and your identity will be anonymous (unknown) because you have not written your names on any of the questionnaires.** With this in mind, please answer the questions honestly and accurately.

7. How old were you the first time you took steroids? _____

8. What is the maximum number of steroids that you have used at the same time (e.g., stacking)? _____

9. How many different types of steroids have you taken in your life and list the names of these steroids? _____

10. Please circle the method of steroid use that you have used most often?

- a. injection
- b. orally (mouth)

11. Which method of administration do you prefer and please explain why?

- a. injection
- b. orally

explain _____

12. How did you or how do you usually obtain your steroids?

- 1. through a friend
- 2. from a physician
- 3. in the locker room (a friend of a friend etc.)
- 4. from a drug dealer
- 5. from a coach/trainer
- 6. other: specify _____

19A. I have not tried to stop using steroids because _____

20. Do you think a program or some other form of assistance would help you be able to stop taking steroids? (when finished this question go to 25)

Yes _____

NO _____

Please explain

Please explain

explain your answer _____

21. Did you find it difficult to stop (quit) using steroids?

1
not at all

2
a little

3
moderately

4
a lot

5
extremely

22. How long has it been since you stopped using steroids? _____

23. Why did you stop using steroids? _____

24. Do you plan to use steroids in the future?

Yes _____

No _____

please explain _____

25. Please circle the response (from the scale below) that best indicates how much the following characteristics have affected you during the period in which you were using steroids.

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

WHEN I USE STEROIDS OR HAVE USED STEROIDS:

a) I experienced a reduction in testicle size

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

b) I experienced increased irritability and moodiness

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

c) I experienced sleep disturbances, such as insomnia, nightmares etc.

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

d) I noticed an increase in muscle mass

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

e) I increased my strength/power

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

f) I developed acne

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

g) I experienced hair loss

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

WHEN I USE STEROIDS OR HAVE USED STEROIDS:

h) I experienced kidney or liver problems

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

i) I experienced an elevation in blood pressure

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

j) I experienced increased amounts of angry feelings and/or thoughts

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

k) I became more aggressive when I was using steroids.

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

l) I experienced an increase in cholesterol

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

m) I felt depressed

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

n) I felt more energetic

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

o) I felt invincible

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

WHEN I USE STEROIDS OR HAVE USED STEROIDS:

p) I felt really happy (euphoric, high)

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

q) I tended to use recreational drugs (e.g., alcohol, marijuana, cocaine) less often

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

r) I tended to use recreational drugs more often

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

s) I became more violent when I was using steroids

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

t) my sex drive increased

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

u) Please specify any other thoughts, feelings or behaviors that you experienced when using steroids. _____

26. Please circle the response (from the scale below) that best indicates how much the following characteristics have affected you **during the first week after you stopped using steroids**. If you have not stopped taking steroids, please go to question 27.

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

DURING THE FIRST WEEK AFTER I STOPPED TAKING STEROIDS:

a) I had headaches

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

b) I felt depressed

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

c) I felt more tired

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

d) I felt agitated and irritable

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

e) I couldn't sleep well (insomnia).

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

f) my sex drive (libido) decreased.

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

g) I lost my appetite.

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

27. Have you ever shared needles while injecting steroids?

Yes _____

No _____

if "yes" please go to 28

if "no" please go to 29

28. Are you concerned about contracting AIDS from your needle sharing?

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

29. Do you think steroids are harmful to your health and please explain why?

1	2	3	4	5
not at all	a little	moderately	a lot	extremely

Please explain: _____

THANK YOU!

EDI

INSTRUCTIONS:

This is a scale which measures a variety of attitudes, feelings and behaviours. Some of the items relate to food and eating. Others ask you about your feelings about yourself. **THERE ARE NO RIGHT OR WRONG ANSWERS SO TRY VERY HARD TO BE COMPLETELY HONEST IN YOUR ANSWERS. RESULTS ARE COMPLETELY CONFIDENTIAL.** Read each question and place **X** or **✓** in the box under the column which applies best to you. Please answer each question very carefully. Thank you.

	Always	Usually	Often	Some times	Rarely	Never
1. I eat sweets and carbohydrates without feeling nervous.						
2. I think that my stomach is too big.						
3. I wish that I could return to the security of childhood.						
4. I eat when I am upset.						
5. I stuff myself with food.						
6. I wish that I could be younger.						
7. I think about dieting.						
8. I get frightened when my feelings are too strong.						
9. I think that my thighs are too large.						
10. I feel ineffective as a person.						
11. I feel extremely guilty after overeating.						
12. I think that my stomach is just the right size.						
13. Only outstanding performance is good enough in my family.						
14. The happiest time in life is when you are a child.						
15. I am open about my feelings.						
16. I am terrified of gaining weight.						
17. I trust others.						
18. I feel alone in the world.						
19. I feel satisfied with the shape of my body.						
20. I feel generally in control of things in my life.						
21. I get confused about what emotion I am feeling.						
22. I would rather be an adult than a child.						
23. I can communicate with others easily.						
24. I wish I were someone else.						
25. I exaggerate or magnify the importance of weight.						
26. I can clearly identify what emotion I am feeling.						

	Always	Usually	Often	Some times	Rarely	Never
27. I feel inadequate.						
28. I have gone on eating binges where I have felt that I could not stop.						
29. As a child, I tried very hard to avoid disappointing my parents and teachers.						
30. I have close relationships.						
31. I like the shape of my buttocks.						
32. I am preoccupied with the desire to be thinner.						
33. I don't know what is going on inside me.						
34. I have trouble expressing my emotions to others.						
35. The demands of adulthood are too great.						
36. I hate being less than best at things.						
37. I feel secure about myself.						
38. I think about bingeing (over-eating).						
39. I feel happy that I am not a child anymore.						
40. I get confused as to whether or not I am hungry.						
41. I have a low opinion of myself.						
42. I feel that I can achieve my standards.						
43. My parents have expected excellence of me.						
44. I worry that my feelings will get out of control.						
45. I think that my hips are too big.						
46. I eat moderately in front of others and stuff myself when they're gone.						
47. I feel bloated after eating a normal meal.						
48. I feel that people are happiest when they are children.						
49. If I gain a pound, I worry that I will keep gaining.						
50. I feel that I am a worthwhile person.						
51. When I am upset, I don't know if I am sad, frightened, or angry.						
52. I feel that I must do things perfectly, or not do them at all.						
53. I have the thought of trying to vomit in order to lose weight.						
54. I need to keep people at a certain distance (feel uncomfortable if someone tries to get too close)						

	Always	Usually	Often	Some times	Rarely	Never
55. I think that my thighs are just the right size.						
56. I feel empty inside (emotionally).						
57. I can talk about personal thoughts or feelings.						
58. The best years of your life are when you become an adult.						
59. I think that my buttocks are too large.						
60. I have feelings that I can't quite identify.						
61. I eat or drink in secrecy.						
62. I think that my hips are just the right size.						
63. I have extremely high goals.						
64. When I am upset, I worry that I will start eating.						
65. I would like my muscles to be larger.						
66. I think my arms are too small.						
67. I would like my shoulders to be larger.						
68. I want my chest to be bigger.						
69. I think my legs are too small.						
70. I wish my back had more muscular development.						
71. I want my muscles to be more "ripped" and "cut".						
72. I would like to increase the definition of my stomach muscles.						
73. I want my chest to look more "cut".						
74. I want my shoulders to be more "ripped".						
75. I would like to have more muscle definition in my legs.						
76. My goal is to be extremely large and very "cut".						
77. My goal is to be bigger than average and very "cut".						
78. My goal is to be average in size and highly defined or "cut".						
79. My goal is to be below average in size (slim) and "cut".						
80. My goal is to be extremely large with good tone but not "cut".						
81. My goal is to be bigger than average with good tone but not "cut".						
82. My goal is to be average in size with good muscle tone but not "cut".						
83. My goal is to be below average in size with good muscle tone but not "cut".						

	Always	Usually	Often	Some times	Rarely	Never
84. My goal is to be extremely large with average muscle tone.						
85. My goal is to be bigger than average with average muscle tone.						
86. My goal is to be average in size with average muscle tone.						
87. My goal is to be below average in size with average muscle tone.						

EDI

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Self-Perceptions Inventory

Please read each statement below. Then indicate how much you agree or disagree with the statement by circling a number (and only one) using the scale below. There are no right or wrong answers. It is important that you answer as honestly as possible.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

1. I feel I am a person of worth, at least on an equal plane with others.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

2. I feel that I have a number of good qualities.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

3. All in all, I am inclined to feel that I am a failure.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

4. I am able to do things as well as most other people.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

5. I feel that I do not have much to be proud of.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

OVER

6. I take a positive attitude toward myself.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

7. On the whole, I am satisfied with myself.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

8. I wish I could have more respect for myself.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

9. I certainly feel useless at times.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

10. At times I think I am no good at all.

-3	-2	-1	0	1	2	3
Strongly Disagree	Disagree	Disagree Somewhat	Neutral	Agree Somewhat	Agree	Strongly Agree

INSTRUCTIONS:

Below there are groups of statements. Please read each group of statements carefully. Then pick the statement in each group that best describes the way you have been feeling in the past week, including today.

If several statements apply equally well, select each one. Be sure to read all the statements in each group before making your choice.

DATE:

1. () 0 I do not feel sad.
 1 I feel sad.
 2 I am sad all the time and I can't snap out of it.
 3 I am so sad or unhappy that I can't stand it.

2. () 0 I am not particularly discouraged about the future.
 1 I feel discouraged about the future.
 2 I feel I have nothing to look forward to.
 3 I feel that the future is hopeless and that things cannot improve.

3. () 0 I do not feel like a failure.
 1 I feel I have failed more than the average person.
 2 As I look back on my life, all I can see is a lot of failures.
 3 I feel I am a complete failure as a person.

4. () 0 I get as much satisfaction out of things as I used to.
 1 I don't enjoy things the way I used to.
 2 I don't get real satisfaction out of anything anymore.
 3 I am dissatisfied or bored with everything.

5. () 0 I don't feel particularly guilty.
 1 I feel guilty a good part of the time.
 2 I feel quite guilty most of the time.
 3 I feel guilty all of the time.

6. () 0 I don't feel I am being punished.
 1 I feel I may be punished.
 2 I expect to be punished.
 3 I feel I am being punished.

7. () 0 I don't feel disappointed in myself.
 1 I am disappointed in myself.
 2 I am disgusted with myself.
 3 I hate myself.

8. () 0 I don't feel I am any worse than anybody else.
 1 I am critical of myself for my weaknesses or mistakes.
 2 I blame myself all the time for my faults.
 3 I blame myself for everything bad that happens.

9. () 0 I don't have any thoughts of killing myself.
 1 I have thoughts of killing myself, but I would not carry them out.
 2 I would like to kill myself.
 3 I would kill myself if I had the chance.

10. () 0 I don't cry anymore than usual.
 1 I cry more now than I used to.
 2 I cry all the time now.
 3 I used to be able to cry, but now I can't even though I want to.

PTSA

The following questions will ask about the physical traits that you prefer in men and women as well as the physical traits in which you think most people find attractive.

All questions may be answered by filling in a blank or by circling the letter opposite a provided answer. You may list more than one preference if you feel that a single choice cannot be made, or you may list "no preference." If the provided answers to some questions are not adequate, please state your own answer in the "other" blank.

1. I prefer the following eye color among sexual partners.

- a. Light blue
- b. Dark blue
- c. Green
- d. Mixed (hazel)
- e. Brown
- f. Black
- g. No preference
- h. Other _____

2. I prefer the following hair color among sexual partners:

- a. Red
- b. Brown
- c. Blond
- d. Black
- e. No preference
- f. Other _____

3. Please rate how important the following characteristics are for you in selecting a mate using a scale ranging from 1 (not at all important) to 10 (very important).

- a. Qualities of character and personality....._____
- b. Attractive facial features....._____
- c. Intelligence....._____
- d. Attractive body....._____

4. In this section we would like you to indicate how attractive each body type is to you by placing a number in the blank provided underneath each figure. The numbers which indicate the degree of attractiveness range from 1 "very unattractive" to 10 "very attractive". Please rate both male and female body types.

5. People generally believe the most preferred style of facial hair for a man is:

- a. No facial hair- clean shaven
- b. A full beard (including mustache)
- c. A mustache but no beard
- d. A beard but no mustache
- e. Small beard- cut short
- f. Goatee
- g. One or two days of growth, 5 o'clock shadow
- h. No opinion
- i. Other _____

6. I think the most attractive style of facial hair for a man is:

- a. No facial hair- clean shaven
- b. A full beard (including mustache)
- c. A mustache but no beard
- d. A beard but no mustache
- e. Small beard- cut short
- f. Goatee
- g. One or two days of growth, 5 o'clock shadow
- h. No preference
- i. Other _____

7. People generally believe the most attractive male body type is:

- a. Fat and rounded
- b. Heavy, but not too fat, like many pro-football linemen
- c. Quite extreme in development like Hercules and professional bodybuilders
- d. Muscular and athletic like Tarzan
- e. Medium in proportion and development
- f. Slender
- g. No opinion
- h. Other _____

8. I think the most attractive male body type is:

- a. Fat and rounded
- b. Heavy, but not too fat, like many pro-football linemen
- c. Quite extreme in development like Hercules and professional bodybuilders
- d. Muscular and athletic like Tarzan
- e. Medium in proportion and development
- f. Slender
- g. No preference
- h. Other _____

9. People generally believe the most attractive breast size is:

- a. Very Large
- b. Large
- c. Medium
- d. Small
- e. Very Small
- f. No opinion
- g. Other _____

10. I think the most attractive breast size is:

- a. Very Large
- b. Large
- c. Medium
- d. Small
- e. Very Small
- f. No preference
- g. Other _____

11. People generally believe the most preferred size of women's legs to be:

- a. Very heavy
- b. Heavy
- c. Medium
- d. Slender
- e. Very slender or very thin
- f. No opinion
- g. Other _____

12. I think the most attractive size of women's legs to be _____

- a. Very heavy
- b. Heavy
- c. Medium
- d. Slender
- e. Very slender or very thin
- f. No preference
- g. Other _____

13. People generally believe the most attractive female figure is:

- a. Fat and rounded
- b. Round and plump but not too fat- basically chubby
- c. Curvy, with a small waist but fairly large hips, breasts and shoulders; the Marilyn Monroe look
- d. Extremely muscular like a female bodybuilder
- e. Athletic, with good muscle development and tone
- f. Large breasts with slim hips, legs and buttocks (current model figure)
- g. Slender but as much curves as possible
- h. Slender and "boyish" - not many curves
- i. No opinion
- j. Other _____

14. I think the most attractive female figure is:

- a. Fat and rounded
- b. Round and plump but not too fat- basically chubby
- c. Curvy, with a small waist but fairly large hips, breasts and shoulders; the Marilyn Monroe look
- d. Extremely muscular like a female bodybuilder
- e. Athletic, with good muscle development and tone
- f. Large breasts with slim hips, legs and buttocks (current model figure)
- g. Slender but as much curves as possible
- h. Slender and "boyish" - not many curves
- i. No preference
- j. Other _____

THE FOLLOWING QUESTIONS ARE TO BE ANSWERED BY INDIVIDUALS WHO ARE IN A SEX/LOVE RELATIONSHIP:

15. My significant other fits my above stated preferences:

- a. Quite closely
- b. In most categories but not the following _____

c. Not very closely probably because _____

16. Since I have been involved in my my current sex/love relationship, my preferences on the above listed characteristics:

- a. Have not changed
- b. Have changed in the following areas _____

(NIMH-DIS)

The following questions deal with problems that some people have with eating and weight. Please answer every question below.

1. Have you ever worried a lot about eating too much, gaining too much weight, or being too fat?

a) NO _____

b) YES _____

2. Have you ever lost a lot of weight - that is 15 lbs/6.5kgs or more either by dieting or without meaning to (not by having a baby or operation)?

a) NO _____

If NO, go to #4

b) YES _____

If YES, go to #2a

2a. Did you ever tell a doctor or health professional about your weight loss?

a) NO _____

b) YES _____

2b). What is the lowest your weight ever dropped to after losing 15 lbs/6.5 kgs

_____ lbs OR _____ kgs

2c). Did relatives or friends ever say that you were much too thin or looked like a skeleton?

a) NO _____

If NO, go to #4

b) YES _____

If YES, go to #3

3. How tall were you at your lowest weights? (please answer in feet and inches or centimetres)

_____ feet _____ inches OR _____ Centimetres

4. Did you ever think you were overweight when other people such as your parents or friends said that you had gotten too thin ?

a) NO _____

b) YES _____

5. FOR WOMEN ONLY: Did you ever miss three menstrual periods in a row around the time you were losing weight?

a) NO _____

b) YES _____

6. Have you ever had a period when you would eat abnormally large amounts of food within a few hours (e.g., binge eating)

a) NO _____

IF NO, GO TO # 20.

b) YES _____

IF YES, GO TO # 6a

6a) Have you had several periods like that?

a) NO _____

b) YES _____

6b) Have you ever had a period of of three months or more when you went on eating binges at least twice a week?

a) NO _____

b) YES _____

7. When you ate these large amounts, did you eat fattening or high calorie foods, like cookies, or ice cream, or pizza, or french fries?

a) NO _____

b) Yes _____

8. When you ate these large amounts, did you try to eat in private so that others wouldn't see how much you were eating?

a) NO _____

b) YES _____

9. Have you ever been afraid that you might not be able to stop one of these eating binges (e.g., a sense of having lost control)?

a) NO _____

b) YES _____

10. When you ate unusually large amounts, have you ever had to do something special to make yourself quit -- like going to sleep, leaving the house or making yourself vomit?

a) NO _____

b) YES _____

11. Have you sometimes stopped only because your stomach hurt?

a) NO _____

b) YES _____

12. After an eating binge, did you feel especially good, especially down in the dumps, or were you in your normal mood?

a) Good

b) Normal

c) Depressed or down in the dumps

13. After an eating binge, did you feel disappointed in yourself or angry with yourself?

a) NO _____

b) YES _____

14. Have you ever spoken to a doctor or other health professional about your eating binges?

a) NO _____

b) YES _____

15. Have you ever gained weight as a result of a binge?

a) NO _____

IF NO, go to #16

b) YES _____

IF YES, go to #15a

15a) What is the most weight you have gained as a result of a period of binge eating?

_____ lbs

15b) If you gained more than 10 lbs from binging, did this happen once, twice, or more often?

a) Once

b) Twice

c) More often

16. When was your last eating binge?

a) within the last two weeks or current

b) within the last month

c) within the last 3 months

d) within the last 6 months

e) within the last year

f) More than 1 year ago

17. For the last three months, how many binge episodes did you have per week on average?

18. How old were you when you had your first eating binge?

19. Have you tried fasting several times in order to make up for eating binges (e.g., not eating at all, or only taking liquids)?

a) NO _____

If NO, go to #20

b) YES _____

If YES, go to #19a

19a) What is the most weight you have lost by fasting after a binge?

_____lbs

19b) If you lost more than 10 pounds by fasting after a binge, did this happen once, twice, or more often?

- a) Once
- b) Twice
- c) More often

20. Have you ever been persistently overconcerned with your body shape or weight?

a) NO _____

IF NO, go to #21

b) YES _____

if YES, go to #20a

20a) For the last three months, have you been persistently overconcerned with your body shape or weight ?

a) NO _____

b) YES _____

21. Has your shape or weight ever been of such importance to you, that it influences how you think about yourself as a person?

a) NO _____

IF NO, go to #22

b) YES _____

If YES, go to #21a

21a) For the last three months, has your shape or weight ever been of such importance to you, that it influences how you think about yourself as a person?

a) NO _____

b) YES _____

22. Has your shape and weight ever been as important as your performance at home or at work, or the quality of your relationships?

a) NO _____

IF NO, go to #23

b) YES _____

if YES, go to #22a

22a) **For the last three months**, has your shape and weight ever been as important as your performance at home or at work, or the quality of your relationships?

a) NO _____

b) YES _____

23. Have you ever done anything regularly in order to keep from gaining weight - things like: (Please indicate your answer by circling either NO or YES).

A. Exercising a lot -	NO	YES
B. Staying on a strict diet	NO	YES
C. Taking water pills or diuretics	NO	YES
D. Taking laxatives or enemas	NO	YES
E. Making yourself vomit	NO	YES

If you have never done any of these things in order to keep from gaining weight then you have completed this questionnaire. Thank You! If you have answered "YES" to any of the previous ways of preventing weight gain, please go to # 24.

24. **For the last three months**, how many times per week on average have you used these techniques in order to keep from gaining weight?

- A. Exercising a lot - _____
- B. Staying on a strict diet _____
- C. Taking water pills or diuretics _____
- D. Taking laxatives or enemas _____
- E. Making yourself vomit _____

25. When was the last time you engaged in vomiting, use of laxatives or diuretics, strict dieting or fasting, or vigorous exercise, in order to prevent weight gain?

- a) within the last two weeks or current
- b) within the last month
- c) within the last 3 months
- d) within the last 6 months
- e) within the last year
- f) More than 1 year ago

THANK YOU!

IMAGE EVALUATION TEST TARGET (QA-3)

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