

Body Image in Men: Drive for Muscularity and
Social Influences, Body Image Evaluation and Investment,
and Psychological Well-Being

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ABSTRACT

Over the past decade, the study of male body image has increased considerably and substantial levels of body discontent among males have been reported. Accompanying this dissatisfaction is a rise in the documentation of the Drive for Muscularity (DFM), or the desire for increased lean muscle mass, in men. The current study had three objectives. The first was to identify theoretical variables associated with the DFM. The second was to examine body image evaluation and investment in relation to the DFM. The third was to explore the DFM and psychological well-being. Two-hundred fourteen men completed the study and multiple regressions were carried out to examine the various relations. Awareness and internalization of the male body ideal and universalistic social comparison accounted for 35% of the variance in the DFM. Body image investment, but not evaluation, accounted for 26% of the variance in the DFM. Regarding psychological well-being, the DFM accounted for an additional 23% of the variance in muscle pathology after controlling for levels of depression and self-esteem. Other notable findings included men's self-reported intentions to use potentially unhealthy body change strategies to increase size and musculature in the future, and statistically significant associations between the DFM and self-esteem, social physique anxiety, and general worry. These results contribute to the growing literature on male body image and the implications for clinical practice with men presenting with body dissatisfaction are discussed.

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Introduction

In the appearance-driven nature of North American culture, there is a prevailing belief that beauty is equated with goodness. Research has demonstrated there are a number of positive qualities associated with being attractive. A seminal study by Dion, Berscheid, and Walster (1972) determined that attractive individuals are perceived to lead more fulfilling lives than unattractive individuals. Attractive individuals are also believed to be more socially skilled and interpersonally successful than those considered unattractive (Dion, 1986). Not only are there social benefits associated with being attractive, our perception of how we present ourselves to others is related to our psychological well-being (Schlenker & Leary, 1982). For example, perceiving that one has failed to portray a desirable physical impression is associated with increased depression and decreased self-esteem (Davis, Brewer, & Weinstein, 1993; Russell, 2002). Importantly, when individuals experience body image dissatisfaction efforts will be made to improve appearance and become closer to a body image ideal (Silberstein, Striegel-Moore, Timko, & Rodin, 1988). Capitalizing on the body image dissatisfaction of society's members is a multi-billion dollar industry that offers a wide range of options to fix perceived physical flaws and enhance attractiveness, including fitness facilities, cosmetic products, and surgery (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999).

Historically, research has focused on body image in women and less attention has been given to the body image concerns of men. In recent years, however, the study of male body image has increased, and researchers have determined that the male body ideal has evolved into a lean and largely muscular physique, also known as a muscular mesomorphic build (Leit, Pope, & Gray, 2001; Pope, Philips, & Olivardia, 2000). Accompanying this change in the male body ideal has been a rise in documentation of the Drive for Muscularity (DFM), which refers to the desire to attain a muscular physique (McCreary & Sasse, 2000; Morrison, Morrison, Hopkins, & Rowan, 2004).

Images of the body ideal are pervasive, easily accessible, and popular in the media and this muscular physique is difficult to attain by most men even with a large and

sustained effort (Pope, Philips, et al., 2000). With the inability to embody the type of physique idealized by society, one might expect that a growing number of men will experience some type of body image dissatisfaction. This would appear to be the case. Research has shown that there are substantial levels of body discontent among men and much of their dissatisfaction centers around being too small (Lynch & Zellner, 1999; Raudenbush & Zellner, 1997; Tucker, 1982). Men dissatisfied with their size are making negative self-evaluations of their bodies. The associations between the desire to be muscular and facets of body image specific to men, however, have yet to be explored. These facets include satisfaction with the upper body and physical conditioning.

Research suggests that men engage in activities to increase their muscularity and size, termed body investment strategies (Muth & Cash, 1997). Many of these body change strategies are healthy such as weightlifting (McCreary & Sasse, 2000; Morrison et al., 2004). Some body change strategies, however, can be quite harmful such as steroid use, binge eating, and consuming foods high in saturated fats (Jacobi & Cash, 1994; O'Dea & Rawstorne, 2001; Pope, Gruber, Choi, Olivardia, & Phillips, 1997). Due to the risks associated with some of these body change strategies it is important to identify the extent to which men are engaging in their use.

Recently, psychometrically derived measures designed to assess the desire to be muscular have been developed (Edwards & Launder, 2000; McCreary & Sasse, 2000; Morrison et al., 2004). Research with these new instruments demonstrates that the DFM is associated with decreased self-esteem and increased depression in adolescents (McCreary & Sasse, 2000), and decreased physical appearance self-esteem (Morrison et al., 2004) and increased social physique anxiety in adult males (Duggan & McCreary, 2004). These results are consistent with studies that demonstrate a connection between body image dissatisfaction and psychological well-being (Harmatz, Gronendyke, & Thomas, 1985; Tantleff-Dunn & Thompson, 2000; Tucker, 1983). The current study added to extant research by examining the relations between the DFM and other psychological correlates, such as general worry and the pathological preoccupation with muscularity, known as Muscle Dysmorphia (Pope et al., 1997). It is essential that research advance the understanding of the relation between the desire to obtain

muscularity and psychological well-being to better understand this phenomenon in men and to ultimately inform the treatment of men with body image concerns.

Preliminary research examining theoretical perspectives and male body image has identified aspects of sociocultural and social comparison theories that are relevant to the DFM (Duggan & McCreary, 2004; Morrison, Morrison, & Hopkins, 2003). Duggan and McCreary (2004) found that exposure to muscle and fitness magazines was related to the desire to be muscular in gay and heterosexual men. Morrison and colleagues (2003) determined that the DFM is associated positively with magazine exposure and social comparison with global targets such as models or celebrities. This comparison is known as universalistic comparison. Research has also determined that internalization of the muscular ideal is associated with concerns about being *too small* in adolescent males (Smolak, Levine, & Thompson, 2001). Research has not yet examined, however, the relative importance of internalization and awareness of the male ideal body to the desire to be muscular in men. Additionally, the association between the DFM and particularistic comparison, which entails social comparison with similar targets such as peers, has not been researched. This study examined these aspects of sociocultural and social comparison theories to attain a better understanding of the social and cultural experiences men have that may be related to negative feelings about their bodies. This research aimed to build upon theoretical knowledge already acquired and provide direction for future research in this important, developing area of study.

The current study contributed to the literature on male body image by meeting the following objectives: (a) examining the contributions of sociocultural and social comparison theories to the desire to be muscular; (b) exploring the desire to be muscular and its association with body image evaluation and investment; and (c) investigating the relationship between the desire to be muscular and psychological well-being. This paper will begin with a literature review in the areas of body image, sociocultural and social comparison theories, body image evaluation and investment, and psychological variables associated with body image.

Body Image, Body Image Dissatisfaction, and the Current Male Body Ideal

Body Image and Body Image Dissatisfaction

Body image is the self-perceived mental representation of the appearance of one's body (Cash & Brown, 1989). Once conceived as a unidimensional construct, body image is now considered a multidimensional construct incorporating both emotional and cognitive *perceptions* and *attitudes* (Cash & Brown, 1989; Keeton, Cash, & Brown, 1990; Muth & Cash, 1997). Research has raised several methodological concerns with the perceptual component of body image, which focuses on body size estimation, and has demonstrated that the attitudinal component has greater clinical utility (Cafri & Thompson, 2004; Keeton et al., 1990). As such, the present study focused on the attitudinal component of the body image construct.

The body image attitudinal component is comprised of two dimensions, namely evaluation/affect and investment (Muth & Cash, 1997). The evaluation/affect dimension consists of a number of concepts such as global body dissatisfaction, emotions associated with self-evaluations of the body, dissatisfaction related to separate body aspects, discrepancies between perceptions of the body and internalized ideals, and cognitive appraisals related to appearance (Cash, 1994; Muth & Cash, 1997; Thompson & Van den Berg, 2002). For the purpose of the present study, the body image evaluation/affect dimension will be referred to as body image evaluation. Body image investment refers to the cognitive emphasis one places on appearance, the focus on and importance of appearance to one's sense of self, and the behavioural manifestation of efforts to manage or enhance one's appearance (Cash, 1994; Muth & Cash, 1997; Thompson & Van den Berg, 2002). The present study examined the attitudinal component of male body image by exploring the association between the desire to be muscular and body image evaluation and investment.

Body image dissatisfaction, as encompassed by the evaluation dimension, is considered to be the most important aspect of body image discontent because it is believed to capture the individual's internal experience (Thompson et al., 1999).

Researchers in the area of body image conceptualize body image dissatisfaction on a continuum with the majority of people experiencing a mild to moderate level of distress (Thompson et al., 1999). At one end of the continuum is low body dissatisfaction, which has been associated with the term *normative discontent* in previous research (Rodin, Silberstein, & Striegel-Moore, 1985). Near the other end of the body image dissatisfaction continuum where higher levels of distress are reached, a greater degree of clinical difficulties are noted including eating disturbances, depression, and low self-esteem (Blouin & Goldfield, 1995; Olivardia et al., 2000; Silberstein et al., 1988; Tantleff-Dunn & Thompson, 2000; Tucker, 1983). At the highest end of the continuum is an extreme level of body image dissatisfaction, which may be associated with mental illness such as eating disorders and body dysmorphic disorder (Thompson et al., 1999). In the current study, body image disturbance – be it cognitive, behavioural, or affective – will be referred to as body image dissatisfaction.

Current Male Body Ideal

The contemporary ideal male body type is well-proportioned and of average build, and is known as mesomorphic (Mishkind et al., 1986). This body type is preferred to the endomorphic (fat) or ectomorphic (thin) body type (Tucker, 1982). Within the mesomorphic category, the muscular mesomorphic physique is chosen by the majority of men as the most desirable or ideal body type (Mishkind et al., 1986). Preference for this type of body is estimated to develop around the age of seven, intensify through adolescence, and peak in adulthood (Spitzer et al., 1999). Characteristics of this body type include well-developed chest and arm muscles complemented by wide shoulders and a narrow waist (i.e., a V-shaped body). Notably, the upper body is a particularly important aspect of the male body ideal, with a large and muscular chest being most desirable (Horvath, 1986; Tantleff-Dunn & Thompson, 2000; Thompson & Tantleff, 1992). Men report higher levels of body satisfaction when their body shape is closest to the muscular mesomorphic ideal (Keeton et al., 1990; Mishkind et al., 1986; Tantleff-Dunn & Thompson, 2000; Tucker, 1982, 1983).

Sociocultural and Social Comparison Theories and Male Body Image

Sociocultural Theory

Sociocultural theory focuses on the influence of cultural values on individual values in an attempt to understand human behaviour (Jackson, 2002). A fundamental assertion in this theory is that how individuals perceive themselves and are perceived by others is influenced by cultural values. For example, when society places value in physical attractiveness, its members will value attractiveness in others as well as in themselves. Characteristics or traits that society deems unimportant, consequently, will be non-influential in individuals' judgments of themselves or others (Jackson, 2002).

With respect to body image, the basic premise of sociocultural theory is that “individuals are exposed to pervasive, culturewide ideals and expectations regarding what is deemed attractive” (Thompson et al., 1999, p. 125). According to this theory, society dictates which physical characteristics are valued and the consequences of embodying or not embodying those characteristics. Society also attributes specific physical characteristics according to gender. For example, thinness is associated with femininity and muscularity is associated with masculinity (Cash & Brown, 1989).

Sociocultural theory also points out the importance of the media in conveying messages regarding expectations about the ideal physique (Thompson et al., 1999). Individuals of all ages are exposed to the media in Western society, and sociocultural theory states that mounting pressure to embody the ideal shape found in the media is influencing levels of body image dissatisfaction. The portrayed ideal is out of reach for the majority of the population, and is often manipulated, airbrushed, or edited to create a perfect image (Thompson et al., 1999). Unfortunately, many individuals are not aware of these editing techniques and may perceive the images they view as realistic. The media also provides large amounts of information on how to attain the ideal body, for example, through diet, exercise, and supplement use (Cash, 2002; O'Dea & Rawstorne, 2001; Tiggemann, 2002). Consequently, individuals may erroneously believe that the portrayed ideal is easily attainable (Thompson et al., 1999). The media also links the ideal body to

happiness, status, and desirability. Sociocultural theory posits that an inability to attain the ideal physique is associated with negative affective, perceptual, and behavioural consequences (Tiggemann, 2002). Existing in a society that endorses a virtually unattainable body standard is believed to be an important context in which body image disturbance develops (Thompson et al., 1999).

Sociocultural theory is considered to be the predominant theory in the area of body image and the implication of sociocultural variables in body image disturbance has received much empirical support (Cusamano & Thompson, 1997; Thompson et al., 1999; Tsiantas & King, 2001). The majority of the literature regarding sociocultural variables, however, has focused on females. This focus on females is likely due to the high incidence of body dissatisfaction and eating disorders in women and adolescent girls. Research has determined that exposure to the ideal female body is associated with increased body dissatisfaction (Hargreaves & Tiggemann, 2002; Heinberg & Thompson, 1995; Tiggemann & Pickering, 1996). Additional research has found that the awareness and internalization of the female body ideal is predictive of body dissatisfaction, decreased appearance satisfaction, bulimic and restrictive eating symptomatology, and decreased self-esteem (Cusumano & Thompson; 1997; Heinberg & Thompson, 1995; Heinberg, Thompson, & Stormer, 1995; Tsiantas & King, 2001). Females high on internalization and awareness of the ideal report the highest levels of negative body image. Notably, internalization of these ideals accounts for up to six times the variance in body image disturbance and eating dysfunction than awareness of ideals (Heinberg et al., 1995).

There has been a cultural change in attitude toward the male body in the past 20 years, which can be observed in the media (Leit et al., 2001; Spitzer, Henderson, & Zivian, 1999). The ideal of a muscular mesomorphic body is seen in television programs, motion picture films, the toy market, and popular magazines. Pope, Olivardia, Gruber, and Borowiecki (1999) investigated the evolution of male action figure toys across 30 years and found that earlier male action figures were representative of the average sized man, whereas later action figures (i.e., of the 1990s) were hugely muscular. Pope and colleagues (1999) also determined that many of the action figures of the 1990s had physiques that no man could achieve without the use of large amounts of anabolic

steroids. Some figures were unattainable even with the use of steroids. Male children are exposed to this ideal from an early age, which may influence their expectations about what a healthy, strong body should look like. Unfortunately, this ideal body is unrealistic and unattainable, and in turn may contribute to significant distress as these males mature.

Further evidence supporting the change in the male body ideal is found in research that shows that the body size of male *Playgirl* models has increased in the last three decades (Leit et al., 2001; Spitzer, Henderson & Zivian, 1999). Spitzer and colleagues (1999) examined the change in size of 130 *Playgirl* models from 1986 to 1997. Body Mass Index (BMI), which is a measure that gauges body fat by taking into account weight relative to height, was calculated for each model. The changes in the indices were examined over the time period and the results indicated that the BMIs of the male models increased from one decade to the next. In another study, Leit and colleagues (2001) examined changes in size and muscularity in *Playgirl* models from 1973 to 1997. In addition to examining the BMIs of these models, the authors also calculated the models' body fat percentages and their Fat Free Mass Indices (FFMIs), which is an index of muscularity. The models' BMIs and FFMIs increased from 1973 to 1997, as indicated by their positive correlations with time ($r_s = .29$ and $.38$). However, body fat percentage was correlated negatively with time ($r = -.34$). This suggests that the *Playgirl* models' size and musculature increased while they became leaner over the 24-year time period. Of note, eight (7%) of the models from 1994 to 1997 had FFMIs greater than 25, which represents a level of muscularity and size that is believed to be virtually impossible to attain without the use of steroids (Pope, Philips, et al., 2000). Taken together, the above studies' results support the contention that the ideal male body is increasing in size.

Images of the new mesomorphic ideal are highly visible in the media. In an analysis of 505 commercials, Lin (1998) found that 30.4% of male television models displayed a muscular physique, as opposed to 4.4% and 8.7% of models that displayed underweight or overweight physiques, respectively. Similarly, Kolbe and Albanese (1996) examined characteristics of male models in *Business Week*, *Esquire*, *GQ*, *Playboy*, *Rolling Stone*, and *Sports Illustrated* magazines. These magazines are deemed as male-audience magazines due to their large percentages of male readers and because the

advertisements in these magazines are targeted at male readers. Between 79 and 94.6% of models in 1158 advertisements embodied a mesomorphic physique. Underweight and overweight models were highly under-represented in these popular magazines. These studies demonstrated that body types different from the mesomorphic ideal are not as readily depicted in advertisements in the media as are strong and muscular bodies. This may be an indication that society is placing increased value on a male body that reflects the muscular mesomorphic physique.

Not only are images of the mesomorph ideal prominent in the media, they are presented to males and females in a disproportionate fashion. Frederick, Fessler, and Haselton (2005) compared the portrayal of the muscular male body in male- and female-audience magazines. The researchers examined the level of muscularity of male models on the covers of *Cosmopolitan*, *Men's Health*, *Men's Fitness*, and *Muscle & Fitness* between 2001 and 2004. These magazines have readerships comprising millions of people in North America and abroad (Frederick et al., 2005). Five coders of both sexes independently rated the degree of muscularity of the models. The male cover models in the female-audience magazine were significantly less muscular than male cover models in each of the three male-audience magazines. These results suggest that the ideal male figure presented to men in male-audience magazines is larger than the ideal male figure presented to women in female-audience magazines. This finding may partially explain why men tend to overestimate the amount of muscle that they believe females find attractive in a man (Pope, Gruber, et al., 2000), which may further contribute to the pressure men feel to attain a muscular physique.

The focus of advertisements directed at men has also changed over time. Petrie, Diehl, Rogers, and Johnson (1996) examined magazine content of advertisements and articles across a 32-year period. The magazine content was coded in the categories of weight loss, beauty, fitness, or health. Overall, there was no change in the amount of weight loss and beauty messages men received over time. Media messages with content that provided information about sculpting one's body and increasing one's health, however, increased over the three decades. Anderson and DiDomenico (1992) found similar results in their study of magazine content in male- and female-audience magazines; men were exposed to a disproportionately higher number of advertisements

promoting a change in one's body shape, as compared to advertisements that promoted weight loss.

The images in the media convey important messages about embodying a muscular physique. White and Gillett (1994) examined advertisements in 12 issues of *Flex*, a magazine devoted to professional and amateur bodybuilding, to determine the way male physiques were portrayed. Three main themes emerged. The first was that readers lacked power and control unless they were male mesomorphs. The second theme involved the promise of transformation from a weak, less powerful self to a strong and powerful self. The advertisements suggested that by using their products and adhering to their bodybuilding techniques the reader will achieve a mesomorphic shape and a superior self-identity. The third theme equated muscularity with masculinity. The advertisements suggested that by obtaining a mesomorphic body shape, the reader would have greater power in the social world and dominance over women and other men. White and Gillett (1994) suggested that the advertisements in magazines such as *Flex* convey messages that the male mesomorphic physique is the naturally desired shape and one that is equated with superiority, power, and masculinity. These findings are important as reading health and fitness magazines is related to an increased commitment to becoming muscular among adolescent boys (Botta, 2003). Additionally, boys report that fitness magazines are an important source of information for weight gaining behaviours to increase size and muscularity (O'Dea & Rawstorne, 2001).

The way men's bodies are perceived by society, as observed in the media, also appears to have changed. Pope, Olivardia, Borowiecki, and Cohane (2001) found an increase in the level of undress of male models in magazines over time. Pope and colleagues (2001) explored the use of the male body and style of dress in advertising by comparing male models across 40 years in *Glamour* and *Cosmopolitan*. There was no correlation between the number of males in advertisements and year of magazine publication. The percentage of undressed male models correlated highly, however, with year of publication (r s of .93 and .91 for *Glamour* and *Cosmopolitan* magazines, respectively). Notably, the degree of female undress in *Glamour* and *Cosmopolitan* advertisements remained relatively constant across the 40-year period. In contrast, the degree of male undress increased considerably over time, from 3% in the 1950's to 35%

in the 1990's. Additionally, many of the undressed men were used to promote products that were unrelated to the body. These results suggest that the male body's market value has increased substantially in the past four decades, which coincides with the increase in self-reported dissatisfaction regarding the physical appearance of the male body.

Recent research also suggests that the muscular mesomorphic ideal is observed in countries outside of North America (Pope, Gruber, et al., 2000). Pope and colleagues (2000) investigated the desire for a leaner and more muscular body in the United States, France, and Austria. In all three countries, men chose an ideal body image that was 28 pounds, on average, more muscular than their actual bodies. Furthermore, these men believed women would prefer a male body type that was approximately 30 pounds more muscular than themselves. In actuality, however, females indicated that their preferred male body type was mesomorphic without added muscle. These results suggest that men in European countries, as in North America, are desirous of a larger, more muscular physique.

Another way that society may influence men's desire to attain the muscular ideal is by emphasizing the benefits associated with embodying that physique. Society's view of men with muscular physiques is quite positive. Mesomorphic men are believed to be more capable, skillful, and psychologically healthy than those who are less mesomorphic (Tucker, 1987). Men with muscular bodies are described by others as happier and more successful, better able to elicit cooperation in conflictual situations, receiving of help more often, having more satisfying interpersonal relationships, and having increased success of attaining jobs (Mishkind et al., 1986). Muscular mesomorphs are consistently rated as more attractive than ectomorphs or endomorphs (Wienke, 1998). Furthermore, positive personality traits, such as healthy, brave, smart, happy, polite, strong, neat, and friendly, are associated with this body type (Raudenbush & Zellner, 1997). Muscular men also appear to perceive themselves in a more positive light. Tucker (1983) examined the relation between self-concept and muscular strength in men; feelings of self-worth, self-confidence, and self-satisfaction were predicted by muscular strength. More muscular men exhibited more general satisfaction with themselves than men who were not as muscular (Tucker, 1983). Men may perceive special benefits to being

muscular mesomorphs and strive to attain this physique to obtain these social and psychological rewards.

Similar findings are seen in qualitative studies. Grogan and Richards (2002) found that young boys, adolescent males, and young adult males in focus groups all associated being muscular with social acceptance, power, self-confidence, and self-esteem. Furthermore, participants emphasized that the appearance of the body was more closely associated with self-esteem and confidence than with the function of the body. Looking muscular and toned was associated with power and confidence, and not with how well the body performed. Another qualitative study by Morrison and colleagues (2003) found that men reported to strive for muscularity for social benefits including enhancing self-esteem and self-confidence, being perceived as attractive by the other sex, obtaining status in society, projecting masculinity, and being intimidating.

A more understated societal benefit for men of attaining a muscular physique put forth in the literature is related to the differentiation of the sexes. Some researchers have speculated that men endeavor to attain the ideal physique in response to perceived threats to masculinity, resulting from the increased autonomy and independence of women in today's society (Pope, Phillips, et al., 2000; White & Gillett, 1994). Women have increasingly approached parity with men in many aspects of life. Women today participate to a much greater extent in the workforce and are obtaining higher education than women in previous generations (Harris & Firestone, 1998). Women have become increasingly self-sufficient and assertive, and there has been an erosion of conventional male privilege (Pope, Phillips, et al., 2000; White & Gillett, 1994). The traditional male gender role as the provider and protector of the family no longer prevails. White and Gillett (1994) posit that these changes have resulted in a *crisis of masculinity*, which may contribute to men relying on their bodies as the primary determinant of masculinity (Pope, Gruber, et al., 2000; White & Gillett, 1994). Becoming strong and muscular is a clear way for men to differentiate themselves in society from women (Mishkind et al., 1986). Similarly, Wienke (1998) suggests that by embodying the muscular mesomorph ideal, men can achieve hegemonic masculinity, which refers to society's cultural ideals, dominant conceptions, and ideological constructions of acceptable masculinity.

A number of studies have examined the sociocultural influence on male body image (Agliata & Tantleff-Dunn, 2004; Cashel, Cunningham, Landeros, Cokley, & Muhammad, 2003; Grogan, Williams, & Conner, 1996; Leit et al., 2002; Morry & Staska, 2001; Vartanian, Gian, & Passino, 2001). Morry and Staska (2001) explored the connections among magazine exposure and body satisfaction, eating behaviours, and self-objectification. Sixty-one men completed measures of eating disordered behaviour, body shape satisfaction, magazine exposure, self-objectification, and internalization and awareness of sociocultural attitudes. Internalization of the ideal predicted self-objectification and body shape dissatisfaction. Men who adopted the male ideal physique placed increasing emphasis on their physical appearance and reported increased body shape concerns. Additionally, magazine exposure predicted body shape concerns such that increased exposure to fitness magazines was associated with increased body dissatisfaction. This relation was indirect, however, as it was mediated by internalization of the body ideal. Morry and Staska (2001) also found that exposure to fitness magazines was associated positively with disordered eating behaviour. As such, the pattern of results suggests that adopting the ideal male body is associated with an increased self-focus on physical appearance and greater body dissatisfaction.

A number of limitations in Morry and Staska's study are notable. The measure of magazine exposure did not take into account the actual time spent reading fitness magazines. Magazine exposure was in a check-list format, which only indicated whether or not that magazine had been read. There also was no indication of whether time spent exposed to the magazines consisted of reading the articles and advertisements or looking at images of models. Hence, it is uncertain how magazine exposure specifically contributed to internalization of ideals and disordered eating behaviour. Additionally, the instrument of eating disordered symptomatology measured the presence of symptoms associated with anorexia or bulimia nervosa. Although one item was changed to include steroid use, the scale predominantly measured restrictive and disordered eating behaviour in the direction of decreasing one's size. It did not measure eating behaviour designed to increase muscularity or mass, which is central to male body image. Similar problems exist for the body shape concern questionnaire used. The majority of the items reflected feelings of fatness or a fear of becoming fat; only 2 of 34 questions were changed to

address muscularity concerns in men. This study is important as it demonstrated that internalization of the ideal and magazine exposure is related to body dissatisfaction in men. It is possible, however, that employing measures designed specifically to address male concerns with increased size and muscularity may have yielded even more meaningful results.

Vartanian and colleagues (2001) also examined sociocultural variables and their association with overall body satisfaction in 111 undergraduate men. The sociocultural variables included susceptibility (i.e., easily affected by) to mass media including magazine articles and advertisements, television programs and commercials, frequency of teasing by family and peers regarding appearance, and exposure to peers with negative body image. Both susceptibility to mass media and family/peer teasing regarding appearance were predictors of body satisfaction and together accounted for 26% of its variance. The influence of mass media and a history of teasing about appearance were negatively associated with overall feelings of satisfaction with the body.

Cashel and colleagues (2003) explored sociocultural attitudes, body dissatisfaction, and eating disorder symptoms. One-hundred thirty eight men completed the study. There was a correlation between internalization of the male ideal and body dissatisfaction ($r = .29$). Additionally, drive for thinness was associated positively with internalization ($r = .35$). Although this study found statistically significant results, a major limitation is that the authors used measures related to female body image. The wording of the sociocultural measure was not changed to reflect the male body image ideal of muscularity, and the body dissatisfaction and eating disorder measure focused on concerns with thinness and bulimia. Given the research that supports the importance of muscularity to male body image, measures that focus on muscularity concerns may be better suited to research with males.

Experimental studies have also assessed the sociocultural influence on perceived body image and body image evaluation (Agliata & Tantleff-Dunn, 2004; Baird & Grieve, 2006; Bartlett, Harris, Smith, & Bonds-Raacke, 2005; Grogan et al., 1996; Leit et al., 2002; Lorenzen, Grieve, & Thomas, 2004). Agliata and Tantleff-Dunn (2004) examined the effects of exposure to the male body via television advertisements depicting the male ideal body. One hundred fifty-eight men were assigned randomly to either an

experimental or control group after a pre-test administration of body image, sociocultural, and mood measures. Exposure to the stimuli for men in both the experimental and control groups occurred one week later. The stimuli were in the form of 30-minute videotapes of a neutral television program interspersed with either 16 appearance- or nonappearance-loaded advertisements during commercial time. The experimental tapes contained muscular, lean male actors that were shirtless or dressed in athletic apparel. The control tapes contained male actors dressed in casual or business attire. After exposure to the videotapes, participants in both groups were administered measures of affect and body satisfaction. Men reported higher levels of depression after exposure to the experimental video as compared to control men who viewed neutral images. Notably, men scoring high on internalization and awareness of the ideal experienced greater levels of depression, anger, anxiety, and body dissatisfaction.

Similar work to Agliata and Tantleff-Dunn (2004) was carried out by Leit and colleagues (2002). To examine the influence of the media on male body image the researchers used a posttest design and presented media images to both control ($n = 40$ males) and experimental groups ($n = 42$ males). The experimental group was exposed to media advertisements depicting largely muscular men. The control group was exposed to neutral advertisements, which were those without physiques in them or those not focusing on the body. After presentation of the stimuli, men completed a computerized measure of body image, where they rated their current physique, ideal physique, the average male's physique, and their perception of females' ideal male physique. Leit and colleagues found that men in the experimental group experienced a greater gap between their current and ideal physiques than the control group. Furthermore, men in the experimental condition also perceived a larger discrepancy between the average male's muscularity and their current muscularity. The authors suggested that increased body dissatisfaction is associated with even relatively short exposure to the cultural ideal body. This study employed a posttest designed, however, and baseline body image dissatisfaction was not taken into account. Additionally, subsequent research determined that the measure used for muscular dissatisfaction in this study has unacceptable test-retest reliability (Cafri, Roehrig, & Thompson, 2003).

Further support for the sociocultural influence on body image comes from Grogan and colleagues (1996), who explored the effects of exposure to pictures of same-sex models on body satisfaction. Forty-nine undergraduate men were split into control and experimental groups. Participants in the experimental group were exposed to attractive same-sex models while those in the control group were exposed to landscape images. Unlike Leit and colleagues (2002), Grogan and colleagues (1996) used a pre- and posttest design measuring body satisfaction before and after exposure to the attractive same-sex models. Men in the experimental groups reported lower levels of body satisfaction after exposure to the attractive models. The control group participants evidenced no change in body satisfaction when exposed to landscape images. Other studies have found similar results. Lorenzen and colleagues (2004) exposed 104 college men to photographs of either muscular or average men. The men exposed to the muscular photographs evidenced a decrease in their overall body satisfaction not observed in participants exposed to pictures of average men. Baird and Grieve (2006) exposed 173 college men to advertisements depicting either muscular male models with cologne or clothing products or advertisements of the products themselves. An increase in body dissatisfaction among males who viewed the advertisements with muscular male models was found, whereas men who viewed advertisements of just clothing or cologne products evidenced no change in body satisfaction levels (Baird & Grieve, 2006).

As reviewed above, several studies have manipulated exposure to images of muscular mesomorphs and its association with male body image. Recent experimental research has also examined the effect of physically manipulating muscular action figures on male body image across three studies (Bartlett et al., 2005). In study one, 82 undergraduate men were assigned randomly to a control group and two experimental groups. Participants in the experimental groups handled either moderately or extremely muscular action figures by manipulating them into 13 different positions for 30 minutes. Men who manipulated the extremely muscular figures reported lower body esteem than control males or those who manipulated moderately muscular figures. The second study had a control group and two groups that handled extremely muscular figures of two different heights and produced similar results. Men in both experimental groups had lower body esteem than control males. In the third study, men were either in a control

group or a group that manipulated a figure of average size (i.e., *Ken* doll). No differences in body esteem between men manipulating the *Ken* doll and control males were found (Barlett et al., 2005). The authors concluded that manipulating unrealistically muscular figures for even a short period of time was associated with negative feelings toward the body in men.

The above findings suggest that body dissatisfaction is associated with media exposure. This research is important in that it demonstrates even short-term exposure to the male body ideal is associated with men's self-reported, negative feelings about their bodies. Taken together, these studies provide support for the notion that exposure to the male body ideal is associated with increased body image dissatisfaction and negative affect. Additionally, the studies demonstrate that internalization of the male ideal is predictive of body shape dissatisfaction in men.

Although there is some research addressing sociocultural variables and male body dissatisfaction, there are few studies that address sociocultural influences on the DFM. Morrison and colleagues (2003) explored media exposure and the DFM in 310 men from a community college. The results indicated that magazine exposure was correlated positively with the desire to be muscular ($r = .34$). Men who reported never having read male-oriented magazines had significantly lower levels of the desire to be muscular than men who sometimes or often read the magazines (Morrison et al., 2003). Duggan and McCreary (2004) found a positive association between exposure to muscle and fitness magazines and the desire to be muscular in both gay and heterosexual men, with correlations of .42 and .44, respectively. Agliatta and Tantleff-Dunn (2004) examined the effects of exposure to television advertisements on male body image in 158 men. Men exposed to video of the male body ideal reported significantly higher muscle dissatisfaction than control males exposed to video of neutral images. Additionally, Hatoum and Belle (2004) explored media consumption and body image in university men. The types of media examined included magazines, television, motion films, and music videos. The researchers correlated the total hours spent per month with each of the types of media and the desire to be muscular. Number of hours reading male-audience magazines correlated with overall desire to increase muscularity ($r = .40$). The desire to

be muscular was not related to time spent watching television, motion films, or music videos.

Smolak and colleagues (2001) explored the associations between sociocultural variables, muscle building techniques, and muscularity concerns in adolescent males. Internalization of the muscular body ideal was correlated with the use of muscle building techniques and muscularity concerns ($r_s = .38$ and $.30$, respectively). Awareness of the ideal was also associated with muscle building techniques and muscularity concerns ($r_s = .21$ and $.20$). A limitation of this study is that the questions related to muscularity concerns were worded such that they asked about concerns regarding being *too small* (e.g., “In the past year, how often have you worried about being too thin or too small?”). Hence, it is uncertain whether the questions tapped concerns with muscularity or weight as *too small* is not necessarily congruent with muscularity.

Vartanian and colleagues (2001) studied the relation between muscularity/fitness satisfaction and sociocultural variables including peer and family teasing regarding appearance, susceptibility to mass media, and exposure to peers’ negative body image in 111 undergraduate men. An absolute discrepancy score was calculated by subtracting the figure men identified that best represented their actual body and the one that represented their ideal body. Larger absolute values were indicative of higher muscularity dissatisfaction. Susceptibility to mass media was the only statistically significant predictor and accounted for 14% of the variance in muscularity/fitness satisfaction. Teasing history and exposure to peer body image concerns did not predict satisfaction with one’s level of muscularity and fitness. A limitation of the study was the use of silhouette drawings in the measure of muscularity discrepancy. Limitations when using silhouette drawings include spurious test-retest correlations and restriction of range. Measuring muscularity and fitness satisfaction together is also problematic as research shows these are distinct facets of male body image concern (Franzoi & Shields, 1984).

The above studies provide an introduction to understanding the link between sociocultural factors and the DFM. With the exception of Morrison and colleagues (2003) and Duggan and McCreary (2004), however, a common and substantial limitation to all the studies is that they did not use reliable and valid measures designed specifically to measure muscularity concerns in males. Further research is necessary to examine

aspects of sociocultural theory and the desire to be muscular in adult men, including internalization and awareness of the mesomorph ideal. It was expected that internalization and awareness of the ideal and exposure to the ideal would predict the desire to be muscular in men. In the current study, sociocultural theory was examined in conjunction with social comparison theory.

Social Comparison Theory

Social comparison theory states that individuals compare themselves to others on a variety of dimensions in order to self-evaluate (Festinger, 1954). This comparison is thought to take place in the social environment when there is an absence of other objective evidence against which the individual can use to evaluate his or her abilities, opinion, or any other dimension of interest. Festinger (1954) posits that social comparison is an important process because self-impressions are unstable if there is no basis for comparison, objective or otherwise. When comparing themselves to others (targets), individuals will take action to reduce any discrepancies they observe on the abilities, opinions, or other dimensions of comparison to their reference group.

With respect to body image, researchers hypothesize that individual differences in the propensity to judge oneself against others are responsible for the varying degrees of body image disturbance observed in a cultural context that approves of a specific body ideal (Thompson et al., 1999). There are certain factors associated with target selection in social comparison, such as whether it is particularistic or universalistic (Miller, Turnbull, & McFarland, 1988). Particularistic comparison occurs by comparing oneself to similar others on the dimension of interest (e.g., a male comparing his weight with males in his immediate peer group). Universalistic comparison occurs by comparing oneself to a global target on the dimension of interest (e.g., a male comparing his weight with other males in general) (Miller et al., 1988). Another characteristic that influences social comparison is the relative standing of the target in comparison to oneself. For example, downward social comparison occurs when individuals compare themselves to others whom are inferior on the dimension of interest while upward comparison occurs when the comparison target is superior on the dimension of interest (Wood & Taylor, 1991). Research suggests that downward comparison may be self-enhancing while

upward comparison is associated with lowered self-esteem and emotional distress (Major, Testa, & Bylsma, 1991; Wood, 1989).

Using multidimensional scaling techniques, Fisher, Dunn, and Thompson (2002) determined the underlying cognitive comparison processes in males and females (i.e., cognitive organization of appearance comparison schemas). The comparison dimension that males use is along a muscle/non-muscle continuum whereas the primary comparison dimension for females is along on a weight/non-weight continuum. The results were consistent for both male and female students from seventh grade to college, and are indicative of a basic cognitive organization that may explain men's greater interest in muscularity as opposed to thinness.

Most social comparison research on body image has focused on females as opposed to males. Research with female participants has demonstrated that higher levels of social comparison are associated with greater body image dissatisfaction (Heinberg & Thompson, 1992b; Thompson, Heinberg, & Tantleff, 1991). Stormer and Thompson (1996) found that the frequency of appearance related social comparison was a predictor of female body image dissatisfaction, drive for thinness, and disordered eating. Researchers have also found that negative, particularistic body image comparison between female siblings during teenage years predicted later body image distortion and body dissatisfaction in the younger sisters of the sibling dyad (Tsiantis & King, 2001). Cattarin, Thompson, Thomas, and Williams (2000) found that women instructed to compare themselves to thin models on a videotape experienced an increase in body image dissatisfaction and negative affect from pre- to post-viewing. This increase in body image dissatisfaction and negative affect was greater when compared to women exposed to the same videotape but given neutral or distraction instructions and control females viewing a neutral videotape. The authors determined that upward comparisons to the models in the experimental videotape affected both body image and mood in women.

Other studies have determined that a generic tendency to compare one's body is related to negative body image, regardless of whether the target is universalistic or particularistic (Faith, Leone, & Allison, 1997; Heinberg & Thompson, 1992a). It is possible that just engaging in the act of social comparison is associated with body dissatisfaction. Researchers have also suggested that the importance assigned to a

comparison target may be a better predictor of body image dissatisfaction than the degree of similarity between the target and the comparing individual (Heinberg & Thompson, 1992b; Thompson & Heinberg, 1993). The collection of research on social comparison in females suggests that comparison on the body image dimension is related to increased body dissatisfaction, eating disturbance, and negative affect.

Experimental research on social comparison with males has also found that negative body image is associated with comparison to the ideal male body (Botta, 2003; Jones, 2001; Thornton & Moore, 1993). For example, Thornton and Moore (1993) completed three studies to explore the influence of social comparison on a number of variables. The researchers manipulated exposure to highly attractive models and examined the impact of the exposure on men's perceived physical attractiveness, social anxiety, private and public self consciousness, and global self-esteem. Twenty-five men participated in the first study. Compared with control males who were not exposed to photographs of models, men exposed to the attractive models self-reported lower perceived attractiveness, heightened public self-consciousness, lowered social self-esteem, and increased social anxiety. These results were replicated in a second study with 38 men. In a third study, the authors again manipulated exposure to attractive male models with three participant groups. Men in the experiment group compared themselves to attractive models while men in the control group were not exposed to any photographs. A third group of men was exposed to pictures of males who were rated as unattractive. The men in the experimental condition exposed to attractive males had poorer ratings of perceived attractiveness, public self-consciousness, and social self-esteem than control men and those exposed to unattractive males. These studies suggest that making upward comparisons is associated with negative self-perceptions of attractiveness, concern about how others perceive the self, and perceived level of social competence.

Hausenblas, Janelle, Gardner, and Hagan (2003) looked at the effects of self-comparison and social comparison to models on body image and affect in men with low and high body dissatisfaction. Thirty-six men were placed in either a high body satisfied or low body satisfied group. Following this, three separate counterbalanced sessions were completed where participants were exposed to eight photographs each of their own bodies, control images (i.e., neutral, non-body pictures), and those of a male model.

Measures of anger, anxiety, depression, and body dissatisfaction were completed before, during, and after each session. Regardless of previous level of body satisfaction, men had increased body dissatisfaction after viewing the model and self-pictures. Negative affect, including anger and depression, was observed after men with low and high body dissatisfaction were exposed to the self-pictures. Interestingly, affect did not change in the low or high body dissatisfied men during and after exposure to the model pictures. Only body satisfaction was impacted by viewing the model pictures. There were no differences between low and high body dissatisfied men regarding their responses to the neutral, control slides. It is important to consider that men with affective difficulties may evaluate their bodies more poorly and are reacting negatively to the self-pictures and model images, rather than the other way around. Even men in the high body satisfaction group, however, reported body dissatisfaction after exposure to self and model slides, which demonstrates an association between social comparison and body image.

Botta (2003) explored social comparison, magazine reading, and body image and eating disturbance in a combined sample of 196 college and high school males. The body image and eating disturbance variables included body satisfaction, drive to be thin, anorexic and bulimic behaviours, and focus on muscularity. Social comparison (i.e., frequency of comparison with models in magazines, the level of motivation to attain the physiques of models in magazines, and contemplation regarding how models attained their physiques), reading fashion magazines, and reading health/fitness magazines were predictors of commitment to attaining a muscular physique and thinking about or taking pills or supplements to gain muscle. Increased commitment to muscularity was associated positively with reading fitness/health magazines. However, reading fashion magazines was related to decreased focus on muscularity. Social comparison was also predictive of the drive to be thin and behaviours designed to decrease weight, which may be indicative of a desire in males to not only be muscular but lean as well. Finally, there was an interaction between social comparison and sports magazine reading in predicting body satisfaction. Decreased body satisfaction was reported by males with increased time spent comparing their bodies to images in sports magazines. For those who did not spend much time engaging in comparison to the images in sports magazines, reading the sports magazines was related to increased body satisfaction. Although this study is

important as it demonstrated an association between social comparison and body satisfaction in males, it is limited due to the measures used. The measure of muscularity focused on commitment to attaining a *larger* physique and *larger* is not necessarily synonymous with *muscularity*. Much of the focus on body image concerns remained on behaviours and attitudes geared towards thinness, which is not the primary focus of body image concern in males. It is imperative that measures tap directly into muscularity concerns and associated behaviours to obtain an accurate picture of body dissatisfaction in males. The sample also combined adolescent and adult males, which may be problematic as these two groups are at different stages developmentally.

Jones (2001) explored body dissatisfaction and social comparison across two studies. In study one, the physical attributes that male and female adolescents deemed most important in male physical appearance were identified. Both males and females identified body build, which consisted of good muscle tone and a muscular body, as an essential male physical attribute. Height and face were also noted as important physical characteristics in males, whereas weight was less readily endorsed as important. Body dissatisfaction and the frequency of both universalistic and particularistic social comparison on the ideal body attributes were examined in study two (i.e., body build, height, face, weight). One-hundred ninety seven males completed measures of social comparison and body dissatisfaction. Two items on a body dissatisfaction subscale were changed to reflect satisfaction with biceps and the chest. Adolescent males were equally likely to engage in social comparison with peers and models regarding their body build and face. Height and weight were the attributes males were more likely to compare with their peers. Increased social comparison with models and peers was correlated with higher experienced levels of body dissatisfaction in adolescent males ($r_s = .25$ and $.30$, respectively).

The above research demonstrates that engaging in social comparison is associated with body dissatisfaction in males. However, much of this research has been carried out with adolescent males, and further research is necessary to examine social comparison theory and the body image concerns of men. In addition, measures of dissatisfaction have been either global in nature or have focused on concerns regarding thinness. These measures do not take into account specific facets of male body image, namely

muscularity. Research has also tended to focus on comparisons made to models or celebrities, and does not address the associations between particularistic comparison and male body image.

Only one known study to date has examined the construct of DFM and social comparison in adult males. Morrison and colleagues (2003) found that universalistic social comparison was related positively to the DFM ($r = .67$) in a sample of 310 community college men. The more men compared themselves with muscular male models, the higher their desire to achieve a muscular physique. This study examined universalistic comparison, which is only one type of social comparison. Some research has found that peers are rated as more important comparison targets than celebrities (Heinberg & Thompson, 1992b), yet other research indicates that the relation between frequency of peer comparison and body dissatisfaction is comparable to that of model comparison in adolescent males (Jones, 2001). Consequently, another important avenue of study is to evaluate particularistic comparison and the DFM. As such, the current study examined both universalistic and particularistic social comparison and the desire to be muscular. The relation between the DFM and social comparison of attributes specific to body attractiveness in men (i.e., the muscularity dimension) was also explored.

In summary, research has demonstrated that aspects of sociocultural and social comparison theories are related to male body image. The current study builds on existing theoretical knowledge regarding male body image by examining the importance of these two theories in their ability to predict the desire to be muscular in men. As sociocultural theory is considered to be the predominant theory in body image research, sociocultural variables' (i.e., awareness, internalization, magazine exposure) relation to the DFM was examined first, followed by social comparison variables (i.e., universalistic and particularistic comparison). Previous research has shown that internalization and awareness of the muscular ideal is associated with concern about being small in adolescent males (Smolak et al., 2001). Morry and Staska (2001) found that internalization of the ideal predicted body satisfaction in adult males. Other researchers have found a relationship between the DFM and magazine exposure (Duggan & McCreary, 2004; Morrison et al., 2003). Hence, exposure to, internalization, and awareness of the muscular ideal were expected to predict the DFM in men. As the level

of internalization, awareness, and exposure increases, the level of the DFM was hypothesized to increase. Given that research with females has found internalization to be more salient to female body image than awareness or exposure (Cusumano & Thompson, 1997), it was expected that of the three sociocultural variables, internalization of the ideal would have the strongest association with the DFM.

The current study also determined whether social comparison theory would account for additional variance in the desire to be muscular over and above what was accounted for by sociocultural variables. Although social comparison research suggests that individuals prefer to compare themselves to similar targets (Festinger, 1954), it was expected that universalistic comparison would evidence a stronger relation with the DFM than particularistic comparison. This hypothesis was put forth because it is unlikely that men will find a large number of mesomorphs in their peer reference group, whereas there will be an overrepresentation of mesomorphic comparison targets in the media (i.e., universalistic targets). It was expected that increased frequency of comparison to mesomorphic universalistic targets would be associated with a higher DFM.

Body Image Evaluation and Investment

Body Image Evaluation

Body image evaluation refers to self-evaluations that give rise to feelings, beliefs, and thoughts about one's body and the degree of satisfaction with one's physical aspects (Muth & Cash, 1997). Although research has focused primarily on female body image evaluation, it is also important to consider body image evaluation in men.

The increase in the study of male body image has been linked to cultural changes in attitudes towards men's bodies (Mishkind et al., 1986; Pope et al., 1999; Spitzer et al., 1999). Accompanying this change has been an increase in the reporting of male body image dissatisfaction. Researchers such as Tucker (1983; 1984), and Raudenbush and Zellner (1997) have demonstrated that approximately 70% of college aged men report dissatisfaction with their body image. Tucker (1984) found that 78% of men reported that their actual body image was incongruent with their ideal body image. Overweight men reported a desire to be thinner whereas underweight men reported a desire to be heavier. Davis, Elliott, Dionne, and Mitchell (1991) noted that approximately 80% of the men in their sample experienced body dissatisfaction, with some men wanting to gain weight and some men wanting to lose weight. Raudenbush and Zellner (1997) found that over half of the men in their sample deemed to be an appropriate weight for their height and build evidenced body dissatisfaction. Similar to the underweight men, their ideal body type was heavier than their perceived actual body type. Other researchers have found comparable results, with males' ideal body type heavier than their perceived actual body type (Cohn & Adler, 1992; Keeton et al., 1990; Lynch & Zellner, 1999). Cohn and Adler (1992) examined body type preferences in men and when asked to select a body type that they believed same-sex peers would chose as the ideal physique, participants chose bodies that were significantly larger than the physique they chose as their own ideal. The participants also believed that this larger physique was more attractive to females. In addition, 38% of the males in Cohn and Adler's (1992) sample reported a

desire to be heavier. Keeton and colleagues (1990) found similar results in their sample of men who perceived their own bodies to be smaller than the ideal body.

Males may also misperceive themselves as smaller than they actually are. For example, a study of 2609 adolescent males found that 7.7% of males were classified as underweight (Neumark-Sztainer & Hannon, 2000). However, 14% of the sample perceived themselves to be underweight. Similarly, Moore (1990) reported that 42% of adolescent males were dissatisfied with their weight. Of those, 11% were classified as underweight, whereas 18% believed themselves to be underweight. The greatest body dissatisfaction was found in males who perceived themselves to be underweight (Moore, 1990). Of the 204 males that expressed body dissatisfaction, a large percentage of them reported they would like to increase the size of their arms and chest (43% and 40%, respectively). The desired increase in upper body mass was most pronounced in the 18% of males who perceived themselves as underweight (Moore, 1990).

Many males are dissatisfied with their weight, and researchers have explored the association between being underweight and psychological and social difficulties. Harmatz and colleagues (1985) examined the association between weight classification and eating attitudes and self-image in 210 men. Participants were classified as normal, overweight, or underweight according to sex, height, and weight charts. Men either filled out an eating patterns questionnaire tapping eating and dieting patterns and attitudes, or a relationships questionnaire measuring frequency and quality of interpersonal relationships. Although underweight men did not report any concerns with becoming overweight, they had significant body and interpersonal concerns. Underweight men believed others thought poorly of their physiques. These men reported feeling less good-natured, less sexually appealing, and less handsome than overweight and normal weight men. Underweight men reported that they believed that their level of attractiveness would increase if they were stronger. Furthermore, when describing their ideal romantic partner underweight men were the least expecting of attractiveness in potential partners. These men also described their current or previous romantic partners as less intelligent, assertive, humorous, and sexually attractive than all other groups. Finally, underweight men reported lower dating frequency, higher levels of perceived loneliness, and a greater perceived likelihood of rejection by potential partners than overweight and normal weight

men. Harmatz and colleagues (1985) concluded that because underweight men experience these significant body image and interpersonal difficulties, they are an important group to be aware of with respect to body image concerns.

The above research focused on dissatisfaction with size in the context of weight rather than muscularity and outlined significant difficulties associated with being underweight. Lynch and Zellner (1999) focused on muscularity and compared body satisfaction between college aged and adult men. The researchers used a set of nine figure drawings varying in degrees of muscularity to assess satisfaction with muscle. More college than adult men desired a larger physique (84% to 44%). Additionally, 30% of adult men were satisfied with their physiques, whereas only 16% of college men reported satisfaction. The results indicated that college aged men desire an increasingly larger physique and are experiencing greater dissatisfaction with their muscularity than older adult men. Overall, these studies suggest that an increasing number of men are choosing an ideal body type that is larger and more muscular, and are evaluating their bodies negatively if they do not meet that ideal.

A previously identified aspect unique to male body image is chest size. In 1992, Thompson and Tantleff looked at chest size dissatisfaction and found that men's actual chest size ratings were smaller than their ideal chest size ratings. In this same study, the authors also found that larger chest sizes were associated with descriptors such as confident and popular, while smaller chest sizes were associated with descriptors such as depressed and lonely. More recently, Tantleff-Dunn and Thompson (2000) examined the association between chest size satisfaction and body image and psychological correlates. Sixty-eight men completed measures of global self-esteem, physical appearance anxiety, and appearance evaluation. Participants were also given a measure that determined the level of discrepancy between their ideal and actual chest sizes. In addition, participants' actual chest ratings were compared with what they perceived the other sex to rate as an ideal chest size. Higher absolute discrepancies between ideal and actual chest size were associated with greater chest dissatisfaction and greater perceptions that one's own chest size did not match the other sexes' ideal size. With increasing discrepancies between actual and ideal chest size, men experienced greater physical appearance anxiety, higher body image dissatisfaction, and lower global self-esteem. Seventy-six percent of men in

the study indicated a desire to have a larger chest. Thus, not only was discontent with chest size related to body dissatisfaction, it generalized to how men globally felt about themselves (i.e., self-worth). In conjunction with the other results of the study, this finding suggests that chest size is an important component of male body image and chest size dissatisfaction appears to be associated with male body image dissatisfaction. Likewise, Horvath (1981) found that both men and women rated high levels of chest muscularity in males as more attractive than middle or low levels of chest muscularity. Men and women also rated broad shoulders in males as attractive.

These above results are consistent with previous work by Franzoi and Shields (1984), who examined body esteem in adult males. Body esteem is the affective dimension of body image and refers to the overall feelings one has regarding the body and the level of satisfaction with various aspects of the body (Franzoi & Shields, 1984). Franzoi and Shields determined that individuals do not globally judge their bodies but rather judge various aspects and functions of their bodies, and these specific ratings contribute to their overall levels of body esteem. In the development of the Body Esteem Scale (BES), these authors found that upper body strength, physical condition, and physical attractiveness were the most important aspects of body esteem for males. The Upper Body Strength subscale consists of upper body parts and functions such as width of shoulders, arms, biceps, chest, body build, and muscular strength. These aspects of the body are those that can be changed through specific anaerobic exercises such as weightlifting, and the attractiveness of these body parts is improved by increasing their size through enlarging and broadening them (Franzoi & Herzog, 1986; Franzoi & Shields, 1984).

The Physical Condition subscale of body esteem reflects a man's satisfaction with his agility, physical stamina, and general body strength, and consists of body parts and functions such as stomach and waist size, weight, energy level, physical coordination, physical stamina, reflexes, and agility (Franzoi & Shields, 1984). These aspects of the body are assessed according to whether they hinder or facilitate physical activity. The Physical Attractiveness subscale includes specific body parts and facial features that largely contribute to whether or not a male is deemed attractive. This element of body esteem includes items such as the chin, cheekbones, hips, sex organs, and buttocks. Body

functions are not pertinent to this aspect of body esteem in males (Franzoi & Shields, 1984). Franzoi and Herzog (1986) raised concerns about the validity of the physical attractiveness subscale, therefore, it was not included in the current study.

Franzoi and Herzog (1987) carried out a study to determine the body parts integral in judging physical attractiveness in men and women. One-hundred fifty men and 193 women participated and evaluations of both other-sex and participants' own bodies were examined. All of the items comprising the Upper Body Strength subscale of the BES, including width of shoulders, arms, biceps, chest, body build, and muscular strength, were endorsed in females' judgments of male attractiveness. This suggests that a large part of what comprises male attractiveness to a female centers around the male's upper body appearance (Franzoi & Herzog, 1987). When choosing important bodily aspects or functions in judgments of their own attractiveness, men endorsed 89% of the Upper Body Strength items. It appears as though there is a high level of congruence between males and females' judgments of what comprises male attractiveness. These results are consistent with previous research on the importance of chest size and support the notion that the male upper body is a fundamental component of male body image (Tantleff-Dunn & Thompson, 2000; Thompson & Tantleff, 1992).

Given the importance placed on the male upper body as outlined in the literature, the BES was used in the current study to measure satisfaction with the upper body. This is a significant aspect of male body image that has implications for the way men feel about their bodies and themselves and has yet to be examined in association with the desire to be muscular. Physical conditioning has also been identified as a distinct facet of male body image. Maintaining physical health and success in the pursuit of athletics are motivators for the acquisition of a muscular physique (Morrison et al., 2003). Other research has found a direct correlation between size of the muscle and strength (Tucker, 1983). Physical conditioning appears to be related to muscularity in men and, as such, physical conditioning was also examined in association with the DFM.

Although the aforementioned research has determined a relation between weight and body dissatisfaction, few studies have examined directly the association between the DFM and body dissatisfaction. Morrison and colleagues (2004) examined the relation between the desire to be muscular and body dissatisfaction in a series of studies. In a

sample of 412 undergraduate men, the DFM was related positively to discrepancies between men's ideal and actual bodies on the dimension of muscularity ($r = .49$), indicating greater body dissatisfaction (Morrison et al., 2004). The authors also found that the higher a man's desire to be muscular, the more muscular the figure he chooses as his ideal body ($r = .46$). In a follow-up study with 250 undergraduate men, Morrison and colleagues found a negative association between the DFM and physical appearance self-esteem ($r = -.23$). Morrison and Harriman (2005) found that the desire to be muscular was correlated negatively with a one-item measure of muscle satisfaction ($r = -.32$) in 202 male undergraduates. Hence, it appears as though the DFM is related to negative evaluations of one's body.

Hildebrandt, Langenbucher, and Schlundt (2004) examined the desire to be muscular and body image dissatisfaction in 245 male weightlifters. Higher scores on the drive for size and drive for bulk subscales of a Muscle Dysmorphia inventory were associated with increased levels of body dissatisfaction (measured by an eating disorder measure), $r_s = .25$ and $.34$, respectively. A limitation of Hildebrandt and colleagues study is that the items on these subscales did not directly measure muscularity, rather they referred to being *too small* and a desire to *get bigger*.

The results of the above studies are an important step in examining how the DFM is associated with the way men evaluate their appearance. With the exception of Morrison and Harriman's (2005), and Morrison and colleagues (2004) findings, previous body image evaluation research with men has not taken into account important facets of body image that are specific to males. The current study was designed to address this limitation by further examining associations between the DFM and body image evaluation. Given the pressure on men to embody the muscular ideal and the difficulty attaining such an ideal, it is likely that many men will experience some type of discontent with their physiques. The current study expanded on previous research on male body image evaluation by employing a measure of body image evaluation with domains specific to men, such as upper body strength esteem and physical conditioning. Upper body strength esteem and physical conditioning esteem were expected to be related negatively to the desire to be muscular.

Body Image Investment

The above research suggests that failure to embody the ideal body image, and the desire to be more muscular, is associated with body dissatisfaction in men. Consequently, men may be motivated to increase their size and to decrease the gap between their ideal and actual body image by investing in their bodies (Silberstein et al., 1988). Body image investment refers to the importance of one's body to self-evaluation, the degree to which an individual attends to one's body, and the behaviours one engages in to maintain or improve the body's appearance (Cash, 2002; Muth & Cash, 1997). The following is a review of the literature examining body image investment in males in relation to supplement/substance use, dieting, exercise, and other strategies such as plastic surgery and clothing. Body image investment is an important area of study as some of the strategies are healthy and represent positive health behaviours, whereas some are unhealthy strategies that are associated with significant psychological and health risks (King et al., 1999; LeBow, 1999). It is imperative to research body investment in men in order to facilitate the continued use of healthy strategies and to intervene when the strategies utilized may have serious emotional and physical consequences.

Supplement/Substance Use. Supplement use is one way that men can increase size and muscularity (Hatoum & Belle, 2004; Kanayama, Gruber, Pope, Borowiecki, & Hudson, 2001; Williams, Anderson, & Winett, 2004). Hatoum and Belle (2004) found the prevalence rate for supplement consumption to gain muscle to be 30% in a sample of 89 men. In a study of creatine use among men, 48% of participants reported having used the supplement at some point in time to increase size (Williams et al., 2004). Creatine users in the study were also more likely to use other performance enhancing supplements, such as protein and ephedrine. Similar results were found by Kanayama and colleagues (2001) who examined the three-year prevalence rates of substance use in 334 men that attended commercial fitness facilities. The authors found that 47% of their sample used creatine. Research with male collegiate athletes has revealed up to 36% use creatine as a supplement to build muscle (Jonnalagadda, Rosenbloom, & Skinner, 2001).

Protein is another commonly used supplement for increasing size and muscularity. Protein supplement use was reported by 61% of the men in the Kanayama and colleagues' (2001) sample. Protein consumption has also been found in samples of

adolescent males (Fleischer & Read, 1982; Riccardelli & McCabe, 2002). Fleischer and Read (1982) found that approximately 36% of adolescent males used protein supplements to build muscle and gain weight.

Other types of substance use related to increasing size have been noted in the literature. O'Dea and Rawstorne (2001) found that 5% of adolescent males in their study reported using drugs or medications, such as pills or insulin, to increase their mass. Prohormones, synthetic hormones that have a similar chemical structure to anabolic steroids, are another substance identified in the area of body investment. Prohormones are not illegal substances like steroids and are readily available for purchase in nutrition stores. Kanayama and colleagues (2001) found that 18% of their sample disclosed taking prohormones. Williams and colleagues (2004) found a prevalence rate of 7% for prohormone use in their sample of 148 men. The identification of prohormone use in men is significant, as research has found similar risks with prohormone use as those associated with steroid use (King et al., 1999).

Supplement use to decrease body fat has also been documented. Kanayama and colleagues (2001) reported a three-year, 26% rate of ephedrine use to decrease body fat among men in fitness facilities. Ephedrine is a substance with a chemical structure similar to amphetamines and acts as a stimulant of the sympathetic nervous system (Rawson & Clarkson, 2000). Physical and psychological difficulties associated with ephedrine use include irritability, sleeplessness, dependence, headache, nausea, tachycardia, vomiting, motor restlessness, and urinary disorders (Physician's Desk Reference, 2000). More serious problems associated with use include psychosis, seizure, stroke, myocardial infarction, and death (Rawson & Clarkson, 2000). Other research has found that 15% of males report that they consume dietary supplements in order to burn fat (Hatoum & Belle, 2004).

Anabolic steroid use is another identified investment strategy used by males to increase muscularity. Many men and adolescent boys are using anabolic steroids to achieve the muscular mesomorph ideal with greater ease and speed. Prevalence rates of 2 to 12% have been reported (Blouin & Goldfield, 1995; Brower, Blow, & Hill, 1994; Neumark-Sztainer, Story, Falkner, Beuhring, & Resnick, 1999; Wang, Yesalis, Fitzhugh, Buckley, & Smicklas-Wright, 1994). The physical effects of steroid use include

reduction in body fat percentage, increased strength, and increased fat free mass (Kulipers, Wijnen, Hartgens, & Willems, 1991). Muscle size and strength increase with steroid use and decrease after cessation of the drug (Evans, 1997). Steroid users report significantly less dissatisfaction with body size when compared with non-using males (Brower et al., 1994). Positive reinforcement from the benefits of steroid use may be a strong motivator among males to begin or continue use of the substance.

There are serious physical and psychological side effects associated with prolonged use of anabolic steroids (Blouin & Goldfield, 1995; Brower et al., 1994), therefore, this is an important investment strategy to examine in conjunction with the desire to be muscular. Physical side effects of steroid use include striae (stretch marks), acne, gynaecomastia (breast enlargement), sterility, heart disease, and early onset diabetes (Blouin & Goldfield, 1995; Evans, 1997). Psychological correlates include depression, mania, suicidal ideation, aggression, psychosis, addiction, and homicidal violence (Brower et al., 1994). Another associated risk may arise from engaging in risky behaviours such as needle sharing, which increases the risk of transmitting diseases such as hepatitis and HIV (Brower et al., 1994). Research has also demonstrated that steroid users engage in the use of other pharmaceuticals while taking steroids, either to enhance the steroids' effects or to minimize adverse side effects (Brower et al., 1994; Evans, 1997; Kanayama et al., 2001). Examples of these drugs include ephedrine (increases leanness), tamoxifen (reduces breast tissue density), clenbutaral (enhances muscle healing), and human chorionic gonadotrophin (increases testosterone production and restores testicular size) (Evans, 1997). Given the psychological and physical risks associated with steroid use and the effectiveness of steroids in obtaining increased lean muscle mass, it is imperative to examine the association between steroid use and the desire to be muscular.

Dieting. Dieting is another investment strategy that has been studied in the area of body image. O'Dea and Rawstorne (2001) examined the dietary methods used by 397 adolescent males attempting to gain weight. Although the males identified appropriate and healthy means of attaining mass (e.g., eating well and exercising), many of them reported engaging in unhealthy eating patterns. These practices included eating more and exercising less; eating fatty, fried, and junk foods; eating butter or chocolate; and

drinking beer or other alcohol. Moore (1990) found similar results with respect to unhealthy dieting practices in adolescents. Of 142 adolescent males in the sample who reported a desire to gain weight, 30% engaged in binge eating and 22% in binge drinking. These males also engaged in fasting (16%), self-induced vomiting (2%), and problem eating (15%). Other research has determined that adolescent males ingest large amounts of food, increase their caloric intake, and eat special foods as strategies to increase size (Ricciardelli & McCabe, 2002; Rosen & Gross, 1987). Approximately 71% of males in Fleischer and Read's (1982) study reported eating to gain weight.

Ricciardelli and McCabe (2002) provided additional information on dieting behaviour, with their finding that adolescent males may use different types of body change strategies, concurrently or alternating, to both increase their muscle and decrease their weight. An example of this is a two-phase diet, wherein an individual cycles between attempts to minimize body fat percentage and increase musculature. This type of behaviour may involve both dieting and exercise. This finding is important as it suggests that the focus of male body image concern includes both increasing muscle mass and leanness.

With respect to reducing size, Neumark-Sztainer and Hannan (2000) found that approximately 7% of adolescent males engage in bingeing and purging behaviour to increase leanness. Other research has demonstrated that males desiring weight loss engage in unhealthy practices such as bingeing, fasting, vomiting, and skipping meals (Moore, 1990; Rosen & Gross, 1987). Research examining dieting strategies, particularly unhealthy ones, and the desire to be muscular is important as the literature suggests that harmful dieting practices may be a precursor to diagnosable mental disorders related to body image (Marchi, 1990; Patton, Johnson-Sabine, Wood, Mann, & Wakeling, 1990).

Exercise. A fundamental body investment strategy that has received a great deal of attention in the area of body image is exercise. Exercise is related positively to body satisfaction (Davis et al., 1991; Hausenblas & Fallon, 2002) and perceptions of sports competence, bodily attractiveness, strength, physical conditioning, and physical self-worth (Asci, 2002; Hayes, Crocker, & Kowalski, 1999). Exercising for health and fitness is correlated positively with self-esteem (McDonald & Thompson, 1992). Studies have

also indicated that exercise is associated negatively with social physique anxiety (Davis, Brewer, & Weinstein, 1993; Hausenblas & Fallon, 2002; Lantz, Hardy, & Ainsworth, 1997).

Research on exercise as a body investment strategy to increase size has demonstrated that males view physical activity, such as weightlifting or recreational bodybuilding, as an important body change strategy to increase mass and augment musculature (Brower et al., 1994; McCabe & Ricciardelli, 2003; Ricciardelli & McCabe, 2002). Weight training is associated with improved body satisfaction, including satisfaction with the upper body (Schwerin et al., 1996; Williams & Cash, 2001). Adolescent males identify exercise as the most frequently used strategy to change their body size and shape, whether it is to increase or decrease size (McCabe & Ricciardelli, 2001; Neumark-Sztainer et al., 1999). Moore (1990) found that 16% of underweight adolescent males were involved in a personal exercise program and 25% of them participated in sports. O'Dea and Rawstorne (2001) examined weight gain practices in adolescent males and found that 28% of boys in their sample used exercise as a strategy to increase their size. Other research has found that 63% of college males used exercise to gain weight (Rosen & Gross, 1987).

Efforts to increase size or muscularity may be associated with the increased accessibility to commercial fitness services. Petrie and colleagues (1996) investigated the societal emphasis on health and fitness over three decades by examining the growth rate of exercise and fitness facilities in a large metropolitan city. They found a 50-fold increase in health and fitness facilities from 1960 to 1990 while the city population only doubled in the same time span. This result indicates a highly disproportionate growth in fitness facilities when compared to population growth. The increased accessibility of fitness facilities may be reflective of an increase in body image investment across time.

Other. Two body investment strategies related to male body image that have been identified in the literature are clothing use and plastic surgery. Frith and Gleeson (2004) explored body image and clothing in 75 men and found that men use clothing to both conceal and reveal the body. Men who expressed less satisfaction with their weight (i.e., too thin or too heavy) or muscularity concealed their bodies (Frith & Gleeson, 2004). Confidence in one's body was linked to the types of clothing worn. Men wore clothes to

appear larger if they felt thin or lacking in musculature and they disclosed wearing tight fitting clothing when they felt their chests and arms were well muscled. Moreover, men reported concurrently wearing clothes that camouflaged certain parts of their bodies and revealed other parts of their bodies, based on the satisfaction with those particular areas (Frith & Gleeson, 2004). The results not only demonstrated that clothes are an important body investment strategy, but that men are cognizant of how they can strategically use clothing to alter or manipulate their appearance to manage how their bodies appear to themselves and to others.

Plastic surgery is another body investment strategy that can be utilized to alter the appearance of the body. Surgical enhancement has become a multi-billion dollar industry in the past 10 years and is expected to continue to grow (Pope, Phillips, et al., 2000). Surgical procedures completed on men have increased progressively in the past decade and men are spending billions of dollars annually on this body investment strategy. In 1996 alone, over 600,000 cosmetic procedures were performed on men, including pectoral implants, liposuction, hair transplantations, buttock implants, and breast reduction (Pope, Phillips, et al., 2000; Thompson et al., 1999). Cosmetic surgery is available to improve men's appearance in the size and muscularity domains, and research demonstrates that men are utilizing this strategy (Pope, Phillips, et al., 2000, Thompson et al., 1999). Males are likely drawn to this body investment strategy due to the gains they can make in their appearances in a short period of time. For example, there is a special liposuction procedure that defines the abdominal muscles, providing a *six-pack* look by removing fat (Pope, Phillips, et al., 2000). Plastic surgery is an important strategy to investigate, as this type of elective surgery is not without risk.

While the aforementioned research has examined prevalence rates and types of body investment strategies used by adolescent and adult males, few studies have explored the association between the desire to be muscular and body image investment. Four studies were located in the literature that examined the construct of the DFM and body image investment (Hildebrandt et al., 2004; McCreary & Sasse, 2000; McCreary, Sasse, Saucier, & Dorsch, 2004; Morrison et al., 2004). Hildebrandt and colleagues (2004) determined that drive for bulk and drive for size was associated positively with the number of supplements used by men ($r_s = .35$ and $.25$, respectively). However, a

limitation of Hildebrandt and colleague's study is the use of subscale items worded such that they tap the desire to be *bigger* as opposed to directly assessing muscularity.

Morrison and colleagues (2004) found that the desire to be muscular was associated with weightlifting behaviours and consumption of protein supplements with correlations of .25 and .40, respectively. In the same study, the DFM was also correlated with contemplation of steroid use ($r = .25$) and cardiovascular exercise ($r = .13$). McCreary and Sasse (2000) revealed that boys who dieted to gain weight had higher drives to be muscular than those not attempting to gain weight. They also found that the DFM was related positively to frequency of weightlifting ($r = .24$), however, separate correlations were not reported for males and females so it is presumed that the sexes were combined. McCreary and colleagues (2004) also determined that muscle-oriented behaviours were related to the desire to be muscular ($r = .43$).

The above four studies demonstrated the relation between investing in one's body and the desire to attain a muscular physique. However, the DFM has yet to be investigated in conjunction with other body investment behaviours (e.g., substance and supplemental use like ephedrine and prohormones, additional dieting and exercise behaviours, and clothing and cosmetic surgery strategies) or a general tendency to invest in one's appearance. Much of the previous research on body investment in males has also focused on adolescents (McCabe & Ricciardelli, 2003; O'Dea and Rawstorne, 2001; Ricciardelli & McCabe, 2002; Wang et al., 1994) and further information on adult body investment is needed. Males are desirous of increasing their muscularity (McCreary & Sasse, 2000; Morrison et al., 2003; Morrison et al., 2004) and many experience dissatisfaction with their muscularity (Lynch & Zellner, 1999). In the current study, it was expected that the DFM would be associated with the above body investment strategies designed to help one appear leaner and more muscular, thereby reducing the gap between men's perceived actual and ideal bodies.

In summary, research has demonstrated that aspects of both body image evaluation and investment have been linked to the DFM (McCreary & Sasse, 2000; Morrison et al., 2003). Yet, no one has examined which of the two is more strongly related to the DFM. It was expected that both body image evaluation and investment would predict the desire to be muscular in the current study. However, it was believed

that body image evaluation would have a stronger association with the DFM than body image investment. This result was anticipated as there may be many men with a high DFM who do not make the efforts to attain their desired shape. Men may be dissatisfied with their shape and negatively evaluate their bodies without necessarily making the investment to change their physiques. The current study determined whether body image investment variables would account for a significant amount of the variance in the DFM over and above what was accounted for by body image evaluation. With respect to the direction of the proposed relations, it was expected that the DFM would be associated negatively with body image evaluation and associated positively with body image investment. Determining whether body image evaluation or body image investment evidences a stronger relation to the desire to be muscular is important as it may have implications for the focus of psychological treatment for men with body image concerns.

Male Body Image and Psychological Well-Being

Psychological Well-Being

The previous sections focused on how sociocultural and social comparison theories, body image evaluation, and body image investment may be related to body image in males. Another major objective of the current study was to investigate psychological variables and their relation to the DFM. The following is a review of the literature related to body image and depression, self-esteem, general worry, social physique anxiety, and muscle dysmorphia.

Depression. An important psychological variable studied in relation to body image is depression. Research has established that body image dissatisfaction is related to negative affect (Fox & Corbin, 1989; Kaur, Singh, & Javed, 2003; Noles, Cash, & Winstead, 1985; Sonstroem & Potts, 1996). Studies have found depression levels are associated with body dissatisfaction at various lifespan stages including adolescence and early adulthood (Kaur et al., 2003; Noles et al., 1985). Longitudinal research has also examined depression and body image in adolescents. Holsen, Kraft, and Roysamb (2001) demonstrated that negative body image predicted depressed affect in adolescent males. Noles and colleagues (1985) reported that, compared to individuals with moderate or high levels of body satisfaction, college students with negative body image evidenced greater levels of depression. Negative affect has also been associated with social comparison and exposure to the ideal male physique (Agliatta & Tantleff-Dunn, 2004; Hausenblas et al., 2003). Males with eating disorders evidenced a 72% comorbidity rate for depression (Olivardia, Pope, Mangweth, & Hudson, 1995). One study revealed that underweight males have a greater likelihood of suicidal ideation and suicide attempts compared to average weight males (Carpenter, Hasin, Allison, & Faith, 2000).

Physical self-worth (PSW), which refers to the feelings of confidence, pride, happiness, and satisfaction associated with the body, has been investigated in conjunction with affect (Marsh, 1997). Associated with PSW are four areas of physical self-perceptions, including bodily attractiveness, sports competence, physical conditioning,

and strength and muscle development (Fox & Corbin, 1989). Physical self-perceptions consist of perceptions of the particular area of focus, confidence in the area, and the ability to maintain the area. For example, strength and muscle development includes self-perceptions of one's strength, confidence in settings requiring strength, and ability to maintain muscular development (Marsh, 1997).

Sonstroem and Potts (1996) examined the associations between physical self-perceptions and psychological adjustment (i.e., mood) in 126 male college undergraduates. Physical self-perceptions accounted for a statistically significant amount of variance in psychological adjustment. Sport competence, physical conditioning, bodily attractiveness, muscle development and strength, and physical self-worth predicted both positive affect and depression in participants. Higher scores were associated with increased positive affect and decreased depression. Sonstroem and Potts (1996) demonstrated that physical self-perceptions are associated with mood in males, indicating that the way a male feels about his body is related to his psychological well-being. In summary, the above studies suggest there is a connection between negative evaluation of the body and negative affect.

Self-Esteem. Another important psychological construct examined in the body image literature is self-esteem, which refers to the evaluative component of overall self-concept. Researchers conceptualize self-esteem as a stable trait that includes general feelings of self-worth and perceptions of competence (Sonstroem, 1998). A number of studies in the literature have linked body dissatisfaction to self-esteem (Abell & Richards, 1996; Franzoi & Herzog, 1986; Franzoi & Shields, 1984; Henriques & Calhoun, 1999; Mendelson et al., 1995; Tantleff-Dunn & Thompson, 2000; Yelland & Tiggemann, 2003). Several researchers have found associations between self-esteem and physical self-worth (Fox & Corbin, 1989; Hayes et al., 1999; Sonstroem, Spiliotis, & Fava, 1992). Longitudinal research also demonstrates that body dissatisfaction is a precursor for negative self-esteem in females (Hargreaves & Tiggemann, 2002). The following section is a brief review of research examining body dissatisfaction and self-esteem.

Silberstein and colleagues (1988) found that males who wanted to be heavier evidenced lower self-esteem than males desiring to be thinner and those with no gap between their ideal and actual body image. Abell and Richards (1996) found similar

results with a strong correlation between satisfaction with overall body image and self-esteem in males ($r = .64$). Tucker (1983) examined the relation between self-concept and muscular strength in men. Feelings of self-worth, self-confidence, and self-satisfaction were predicted by muscular strength. More muscular men exhibited greater general satisfaction with themselves than men who were not as muscular (Tucker, 1983). Franzoi and Shields (1984) found correlations between self-esteem and Upper Body Strength ($r = .45$) and Physical Condition ($r = .51$) body esteem in men. Franzoi and Herzog (1986) demonstrated that body esteem accounted for approximately 18% of the variance in global self-esteem in men; as body esteem increased, overall self-esteem also increased. Yelland and Tiggemann (2003) found a positive correlation between body esteem and self-esteem in men ($r = .50$). Henriques and Calhoun (1999) examined the association between self-esteem and body esteem in Caucasian and African American males. Results revealed statistically significant correlations between overall body esteem and self-esteem in Caucasian and African American men ($r_s = .50$ and $.37$, respectively). Associations between self-esteem and Upper Body Strength and Physical Condition ranged from $.36$ to $.55$ for Caucasian and African American men. The above studies suggest that body satisfaction is related to overall feelings of self-worth. Research demonstrated that satisfaction with one's upper body was related to self-esteem (Franzoi & Shields, 1984; Henriques & Calhoun, 1999). The association between upper body esteem and self-esteem is consistent with research that found increasing discrepancies between actual and ideal chest size were negatively correlated with global self-esteem (Tantleff-Dunn & Thompson, 2000). Discontent with chest size was not only related to body dissatisfaction, it generalized to how men globally felt about themselves.

Fox and Corbin (1989) have also found a relation between self-esteem and body image in men. Their research revealed that physical self-worth was correlated with global self-esteem in men ($r = .61$). Correlations between the four physical self-perceptions and global self-esteem ranged from $.30$ to $.48$. Hayes and colleagues (1999) found mixed support for the relation between body dissatisfaction and self-esteem. They found that global self-esteem was strongly correlated with physical self-worth. Muscle development and strength, however, was not associated with global self-esteem in this study. Sonstroem and colleagues (1992) also examined self-esteem and physical self-

perceptions in a sample of 111 men. Physical self-worth, bodily attractiveness, and sports competence were significantly correlated with global self-esteem. In summary, these studies support an association between general self-worth and satisfaction with one's overall body and specific body facets.

Anxiety. There is research in the body image literature that demonstrates an association between anxiety and body dissatisfaction (Agliata & Tantleff-Dunn, 2004; Kostanski & Gullone, 1998). Most of the research, however, has focused on the comorbidity between eating disorders and anxiety disorders (Keel, Mitchell, Miller, Davis, & Crow, 1999; Olivardia et al, 1995). For example, Olivardia and colleagues (1995) found that 16% of males diagnosed with eating disorders also met criteria for an anxiety disorder. Other research has found a positive relation between general levels of anxiety and body satisfaction in adolescents (Kostanski & Gullone, 1998). Agliatta and Tantleff-Dunn (2004) found that exposure to male body ideal was associated with self-reported anxiety in men. Additionally, researchers have found that neuroticism, which refers to an individual's emotional reactivity and proneness to anxiety, is a statistically significant predictor of body dissatisfaction in exercising and non-exercising men (Davis et al., 1991). Thus, there is evidence of a link between body image dissatisfaction and anxiety. It is also important to note that depression and anxiety share common variance (Clark & Watson, 1991; Haaga, McDermut, & Ahrens, 1993), therefore, if depression is related to negative body image, anxiety will also likely be related to negative body image.

Social Physique Anxiety (SPA). SPA is the perceived anxiety experienced by persons when their bodies are evaluated or observed by others (Hart et al., 1989). According to the social anxiety literature, persons are motivated to reduce the likelihood of social rejection by creating positive impressions, especially in evaluative situations (Schlenker & Leary, 1982). Social anxiety develops when persons perceive that they have not made a desirable impression. This desire to portray a favourable impression is not exclusive to the social realm. It also exists in the physical social realm in the form of physique anxiety. SPA results when individuals believe their physique is being evaluated negatively because they have not portrayed the desired physical impression (Hart et al., 1989). SPA is considered a subtype of social anxiety because it pertains not to anxiety

that arises through a person's own physique evaluation but to the resultant anxiety from evaluation of one's physique by others.

Hart and colleagues (1989) suggest that how much SPA individuals experience is variable, including those who experience very little SPA and those who chronically experience high levels of SPA. Two possible reasons for chronically experiencing high levels of SPA include holding unrealistic expectations about how the body must look and embodying an objectively unappealing physique. Hart and colleagues (1989) suggested that there are potential negative consequences to having high levels of SPA. These include experiencing high distress when one's physique is on display and engaging in activities to improve one's body's appearance that may be harmful (e.g., fasting). Individuals may also potentially avoid participating in physical activity that could be beneficial to them due to anxiety surrounding their physiques (Hart et al., 1989).

SPA has been examined in relation to body dissatisfaction (Davis et al., 1993; Hart et al., 1989; Petrie et al., 1996). Because SPA was expected to be associated with the desire to be muscular in the current study, research on SPA is reviewed. Studies have demonstrated a relation between SPA and body satisfaction in males (Hart, Leary, & Rejeski, 1989; Petrie, Diehl, Rogers, & Johnson, 1996). Hart and colleagues (1989) examined the associations between SPA and a number of body image variables in 98 men. The authors found that SPA was correlated with the Upper Body Strength esteem and Physical Condition esteem ($r_s = -.26$ and $-.53$, respectively). In the same study, a second measure of body esteem called the Body Cathexis Scale (Secord & Jourard, 1953) was also correlated negatively with SPA ($r = -.37$). These results suggest that individuals unhappy with their bodies report higher anxiety levels at the thought of interpersonal evaluation of their physiques. This is consistent with other research that found that underweight men believed others thought poorly of their physiques (Harmatz et al., 1985).

Petrie and colleagues (1996) examined social physique anxiety and physical self-esteem and found that SPA levels were related positively to concerns about body shape in 120 men ($r = .63$). Negative associations were also found between SPA and perceptions of physical conditioning, physical self-worth, sports competence, and physical strength ($r_s = -.51, -.69, -.25$, and $-.51$, respectively) (Petrie et al., 1996). Men with lower levels

of social physique anxiety perceived themselves to be in good physical condition and exhibited elevated physical self-worth. Men who perceived themselves to be more muscular and strong reported lower physique anxiety.

Davis and colleagues (1993) examined appearance anxiety and its relation to body dissatisfaction, body composition, and social anxiety in 71 university men. Body dissatisfaction, body fat percentage, and social anxiety correlated positively with SPA. A strong negative correlation between SPA and the Upper Body Strength esteem was found ($r = -.65$), indicating that as men's satisfaction with their upper body strength decreased levels of physique anxiety increased. Upper Body Strength esteem accounted for approximately 42% of the variance in SPA. These results are consistent with other research that found that one of the most pronounced areas of body dissatisfaction in men is the chest area, and that dissatisfaction with this area is associated with negative body image (Tantleff-Dunn & Thompson, 2000; Thompson & Tantleff, 1992).

Three studies were identified in the literature that have examined the association between SPA and muscularity concerns (Duggan & McCreary, 2004; Hildebrandt et al., 2004; Mayville, Williamson, White, Netemeyer, & Drab, 2002). Duggan and McCreary (2004) found a positive relation between the desire to be muscular and social physique anxiety in gay and heterosexual men with correlations of .32 and .42, respectively. Mayville and colleagues (2002) found that Muscle Dysmorphia, the pathological preoccupation with muscularity, was positively related to SPA ($r = .40$). Hildebrandt and colleagues determined that SPA was associated with drive for size and drive for bulk (r s = .21 and .31, respectively), however, these scales refer to being *larger* and did not directly assess muscularity.

Research has found an association between men's satisfaction with their upper bodies and physique anxiety. Negative perceptions of physical conditioning and muscular strength and development are also related to SPA (Davis et al., 1993; Hart et al., 1989; Petrie et al., 1996). As such, it appears that there is a connection between feelings about the upper body and muscularity and physique anxiety. The DFM has also been linked to discrepancies in men's ideal and perceived bodies (Morrison et al., 2004). Since the DFM has been associated with this discrepancy, it is likely that social physique anxiety will also arise in men who do not feel that they have made a desirable physical

impression with respect to their muscularity. It was expected that men's desire to be muscular would be related positively to SPA.

The relation between the DFM and SPA is important to study as physique anxiety is associated with variables such as depression and body image dissatisfaction (Davis et al., 1993; Davis et al., 1991) and research investigating this association is lacking in the literature. Social physique anxiety has also been correlated with decreased physical activity levels in men (Davis et al., 1993; Hausenblas & Fallon, 2002; Lantz, Hardy, & Ainsworth, 1997). Lantz and colleagues (1997) investigated the relation between exercise behaviour and SPA in 126 men aged 18 to 60. For the entire sample, SPA was correlated negatively with exercise frequency ($r = -.26$), however, this relation was strongest in males grouped in ages 18 to 30 and 31 to 45 ($r_s = -.37$ and $-.49$, respectively). These results suggest that exercise levels decrease in males aged 18 to 45 who feel anxious about interpersonal evaluation of their bodies. Social physique anxiety may be problematic because men may not place themselves in situations in which they experience increased physique anxiety, such as a fitness facility, where they may receive the many physiological and psychological benefits of exercise.

Muscle Dysmorphia. One of the major body image disorders noted in the literature is body dysmorphic disorder, which is the distressing preoccupation with slight or imagined defects in physical appearance (American Psychiatric Association, 2000). Body dysmorphic disorder is classified as one of the somatoform disorders, which are a collection of problems typified by continual bodily concerns or symptoms that do not fall readily into a diagnosable disease (American Psychiatric Association, 2000). Philips and Diaz (1997) examined sex differences in body dysmorphic disorder. Although males and females with body dysmorphic disorder were similar in terms of demographic characteristics (e.g., unmarried, unemployed) and clinical features (e.g., number of body parts preoccupied with, age at onset), they differed in the presentation of the disorder. The authors found that females were more likely than males to be preoccupied with the size of their hips and their weight. In contrast, males were more likely to be concerned with their overall body build, believing it was too thin or small and insufficiently muscular (Philips & Diaz, 1997). While both males and females experience severe preoccupations with their bodies, the direction of their concern is opposite. Males

believe they are too small and females believe they are too large. This finding is consistent with existing research on the desire to be muscular that has found the DFM is more salient to males than females (McCreary & Sasse, 2000).

When body image dissatisfaction becomes extreme and the focus of the preoccupation is with body size and muscularity, the resulting disorder is called Muscle Dysmorphia (Pope et al., 1997; Pope, Phillips et al., 2000). An estimated 100,000 individuals worldwide meet criteria for Muscle Dysmorphia (Pope, Phillips, et al., 2000). Muscle Dysmorphia, and the associated misperception of insufficient muscularity and leanness, can result in compulsive behaviours that impair social and occupational functioning. These behaviours include: extreme dieting; rigorous weight lifting; eating large amounts of food; constant comparison with others; excessive mirror checking; reassurance-seeking; wearing extra layers of clothing to increase appearance size; camouflaging the body with clothing; giving up relationships and job opportunities; and reduced standard of living due to high costs of performance enhancing drugs and supplements (Pope et al., 1997). Persons with Muscle Dysmorphia frequently report feelings of embarrassment and shame at their condition (Pope, Phillips, et al., 2000). These are individuals who perceive themselves as small and weak despite the fact they are objectively large and muscular (Pope et al., 1993). Other psychological sequelae of the pathological preoccupation with muscularity have been found. Men with Muscle Dysmorphia have higher lifetime prevalence rates of eating disorders, anxiety disorders, and major mood disorders (Olivardia et al., 2000).

Maida and Armstrong (2005) recently investigated the classification of Muscle Dysmorphia. The authors explored the relations between Muscle Dysmorphia symptoms and measures of somatization, body dysmorphic disorder, obsessive-compulsive disorder, depression, anxiety, and eating disorders. The results demonstrated that Muscle Dysmorphia was not correlated with somatoform disorder and eating disorder symptoms. Muscle Dysmorphia, however, was correlated positively with indices of body dysmorphic disorder, obsessive-compulsive disorder, anxiety, and depression. Body dysmorphic disorder, obsessive-compulsive disorder, body dissatisfaction, and hostility were significant predictors of Muscle Dysmorphia. Body dysmorphia also mediated the relation between obsessive-compulsive disorder symptoms and Muscle Dysmorphia

symptoms. The results suggest that Muscle Dysmorphia is a type of body dysmorphic disorder, which in turn fits in the category of an obsessive-compulsive spectrum disorder. Muscle Dysmorphia appears to be less well suited to being categorized as a somatoform disorder, especially in light of the lack of relation found between Muscle Dysmorphia symptoms and somatization (Maida & Armstrong, 2005). These results are supported by other research that has found that body dysmorphic disorder is related to the obsessive-compulsive disorder spectrum (McElroy, Philips, & Keck, 1994). It is also consistent with research that has demonstrated that interventions for obsessive-compulsive disorder, namely cognitive-behavioural therapy entailing exposure with response prevention, are effective in treating body dysmorphic disorder (McKay et al., 1997; Rosen, Reiter, & Orosan, 1995).

Research on the pathological preoccupation with muscularity has found that Muscle Dysmorphia is associated with bodybuilding dependence and social physique anxiety (Mayville et al., 2002). Hildebrandt and colleagues (2004) also found that Muscle Dysmorphia was correlated positively with social physique anxiety. Olivardia and colleagues (2000) found an association between Muscle Dysmorphia and anxiety and mood disorders. It is important to note that Muscle Dysmorphia and the DFM are distinct constructs. Muscle Dysmorphia is a clinical disorder where persons believe they are not lean and muscular enough and major impairments in social and occupational functioning are present. The DFM represents the desire to attain a lean and muscular physique, but is not necessarily clinical or pathological. The current study explored the association between the DFM and Muscle Dysmorphia symptoms to determine the degree to which the two constructs are related.

Summary. The aforementioned research demonstrates that body dissatisfaction is associated with a number of psychological variables. Few studies, however, have investigated the desire to be muscular and psychological variables using instruments designed specifically to measure muscularity concerns. Research has linked the DFM to self-esteem in adolescent males (McCreary & Sasse, 2000). Participants in Morrison and colleagues (2003) study identified enhancing one's overall mental well-being (e.g.'s, self-esteem and self-confidence) as a reason to strive for muscularity. Fat-free mass index (FFMI) has been correlated positively to self-esteem, with greater levels of lean

muscularity associated with increased feelings of general self-worth (Olivardia, Pope, Borowiecki, & Cohane, 2004). Olivardia and colleagues (2004) also found that self-esteem was correlated negatively with perceiving oneself to be less muscular than in actuality, and with the discrepancy between one's perceived and ideal muscularity. The results regarding muscularity in Olivardia and colleagues (2004) study should be interpreted with caution, however, as the muscle dissatisfaction measure they used has been found to have poor reliability (Cafri, Roehrig, & Thompson, 2003). With respect to depression, McCreary and Sasse (2000) found that the DFM was associated positively with depression in adolescent males. McCabe and Ricciardelli (2003) determined that the use of strategies to increase muscle mass was correlated with depression in adolescent males. Another study found a positive correlation between men's levels of depression and the perception that their bodies were less muscular than they actually were (Olivardia et al., 2004).

Research to date has not examined the relation between the DFM and body image pathology in men. It is generally accepted that discontent with muscularity is the focal concern in Muscle Dysmorphia, however, it has not yet been studied in conjunction with instruments designed specifically to assess the DFM. The current study investigated the relation between the DFM and Muscle Dysmorphia to determine the degree of association between the two variables. This study also investigated the predictive utility of the DFM in male body image pathology. It is important to determine if the DFM is a risk factor in poor male body image, as the drive for thinness is to poor body image and psychopathology in females (Ackard & Peterson, 2001; Stice & Bearman, 2001). Previous research has controlled for self-esteem and depression when examining body image (Thompson & Heinberg, 1993) and these variables are related to the DFM in adolescent males (McCreary & Sasse, 2000). The present study controlled for self-esteem and depression while determining the degree to which the DFM predicts levels of Muscle Dysmorphia in men. After partialing out the variance in Muscle Dysmorphia accounted for by self-esteem and depression, it was expected that the DFM would be a statistically significant, positive predictor of Muscle Dysmorphia.

The current study also explored the association between the desire to be muscular and other psychological correlates in adult males including depression, self-esteem, social

physique anxiety, and worry. The desire to be muscular was expected to be related positively to depression, social physique anxiety, and worry, and related negatively to self-esteem. These relations are important to study, as it is necessary to further develop the understanding of the association between psychological well-being and the desire to be muscular.

Limitations of Previous Research

Historically, there has been a common misconception that males are generally satisfied with their bodies and experience little, if any, body image dissatisfaction. This misconception may be an artifact of how data have been reported in previous research. When data are not reported in terms of absolute values, the resulting average score of body dissatisfaction for males is zero, as some males want to be thinner and some want to be heavier (Cohn & Adler, 1992; Raudenbush & Zellner, 1997; Silberstein et al., 1988). The scores cancel each other out resulting in the perception that men are satisfied with their bodies (Raudenbush & Zellner, 1997). This does not occur in females, as the direction of their body dissatisfaction is typically in one direction; virtually all women dissatisfied with their body image desire to be thinner (Raudenbush & Zellner, 1997). There is growing evidence, however, that males have body image concerns and experience body image dissatisfaction (Cohn & Adler, 1992; Mishkind et al., 1986; Pope, Philips et al., 2000; Raudenbush & Zellner, 1997; Tucker, 1982).

Cafri and Thompson (2004) carried out a review of the current, most commonly used methodology in male body image research. The authors concluded that there are several limitations with previously used methodology. For example, body size estimation procedures were deemed inappropriate due to their focus on body size as opposed to body composition. Body composition, which includes muscularity and degree of body fat, is important to men and body size estimation measures do not tap men's true perceptions regarding their appearance. Because these measures do not assess muscularity they are inadequate for use in male body image research.

Perceptual measures of body image dissatisfaction that focus on weight categories according to BMI (e.g., normal, under-, or over-weight) were also reviewed (Cafri & Thompson, 2004). These instruments measure the discrepancy between one's perceived and actual body weight. The biggest limitation of these perceptual measures is that the majority of them do not assess muscularity. Only weight is considered and fat and

muscle distribution is not taken into account. Other problems with this method include the possibility that responses may be biased due to previous exposure to height and weight tables or that participants may respond based on stereotyped biases instead of personal assessment (Cafri & Thompson, 2004). Not taking body composition into account may also result in certain males being considered overweight (e.g., due to muscle mass) when they are not. Use of this method is strongly discouraged in male body image research.

When reviewing the methodology in male body image research, Cafri and Thompson (2004) found several limitations with subjective measures of body dissatisfaction. The majority of these measures do not query concerns directly related to muscularity. These measures are more general in nature and do not examine dissatisfaction specific to male body image (e.g., body fat, muscularity, upper body strength, physical conditioning) (Cafri & Thompson, 2004). Along the same lines, many of these questionnaires measure dissatisfaction with weight in the direction of not being thin enough, and males experience body weight dissatisfaction in both directions (Raudenbush & Zellner, 1997; Tucker, 1984). For example, the Eating Disorder Inventory Body Dissatisfaction subscale measures mid and lower torso satisfaction and the Multidimensional Body Self Relation Questionnaire Body Area Satisfaction subscale is geared towards assessing concerns with thinness. The authors suggest that many of these measures may not be appropriate for use in male body image research as they do not address the core body image concern in men (e.g. muscularity). Exceptions to these measures are the Drive for Muscularity Scale (DMS) and the Drive for Muscularity Attitudes Questionnaire (DMAQ), which directly assess concerns with muscularity.

One of the most widely used techniques for assessing perceptual body image is the contour-silhouette method. The traditional silhouettes, employed since the early 1980's, focus on body size and range from less adipose (thin) to very adipose (obese). Participants identify their ideal physique and the physique they feel best represents their actual body. The discrepancy between the two figures represents the degree of body dissatisfaction. Cafri and Thompson (2004) point out a number of problems when using this method to measure body dissatisfaction. First and foremost, the silhouettes vary in terms of their body fat and not in terms of their muscularity and, as such, they are not

assessing dissatisfaction with muscularity (the central appearance concern of males). Only a few studies have adapted this method for use with muscular dissatisfaction (Lynch & Zellner, 1999; Morrison et al., 2004), therefore, care must be taken when interpreting early research on males with the silhouette method. Even the scales that have incorporated muscularity have several methodological shortcomings. For instance, it is very difficult to discern whether dissatisfaction is due to unhappiness with body fat or with muscularity using the silhouette method.

Gardner, Friedman, and Jackson (1998) point out other methodological problems with the silhouette method. Spuriously high test-retest correlations may occur due to the figure presentation. Figures are typically arranged from smallest to largest in a left to right fashion, which may influence participants' memories of their previously rated figures. Another problem is scale coarseness, which arises when a continuous variable is measured using a response set that has a discrete number of options. The problem with scale coarseness is that information can be lost or conflicted findings may occur (Gardner et al., 1998). Restriction of range may also occur when these instruments are employed. Analysis of previous work with silhouettes found that the standard deviations may be very small, indicating that although there are several options to choose from, only three or four figures are used. Finally, Gardner and colleagues (1998) measured the proportion of size change from one adjacent figure to the next using a precision caliper technique. They found that the progressive size changes between figures were unequal, indicating that the drawings are not on an interval scale. As such, analysis of the data obtained from these measures is limited to nonparametric statistics. Given these concerns with the silhouette method it is recommended that alternative techniques be employed in body image research (Cafri & Thompson, 2004; Gardner et al., 1998).

Due to inconsistent results observed in the body image literature Keeton and colleagues (1990) researched the reliability and validity of perceptual and evaluative body image measures. Multiple indicators of each type of body image measure were employed in addition to instruments tapping psychological adjustment, social desirability, and eating disordered behaviour. All measures were found to have adequate reliability and the effects of social desirability on responding were found to be negligible. There was more evidence of convergent and construct validity for evaluation measures of body

image than for perceptual measures. Moderate to high correlations were found among each of the evaluation body image instruments ($r_s = .46$ to $.66$), demonstrating strong convergent validity for these measures. Perceptual distortion measures did not correlate with the perceptual discrepancy measures, however, the perceptual discrepancy measures yielded statistically significant associations with each other.

As for validity of the perceptual and evaluative measures, body image evaluation was consistently associated with measures of psychological maladjustment and eating disturbances, with 14 of 16 correlations attaining statistical significance ($r_s = .29$ to $.61$; Keeton et al., 1990). Perceptual body image measures were less consistently related to psychological indices, with only 4 of 16 associations significant. The perceptual discrepancy measures appeared to be more valid than the perceptual distortion measures, demonstrating adequate convergence with psychologically relevant indices. Minimal associations were found between perceptual distortion and evaluation. Keeton and colleagues (1990) suggested that of the perceptual measures, retention of the global discrepancy indices was warranted. The authors suggested, however, that their overall results indicate that the attitudinal (i.e., evaluation) component of body image had greater clinical utility than the perceptual component. Further research exploring the evaluation component of body image, such as in the current study, is warranted to determine how men feel about and evaluate their bodies.

Although much of the recent research exploring male body image has strictly focused on males, previous research has been completed using combined samples of males and females. This practice may mask what is actually taking place with body concerns in males as there are differences in the way males and females experience body dissatisfaction (Garner, 1997). Additionally, when examining body image concurrently in both sexes the measures often focus on dissatisfaction with levels of thinness, which leaves out a proportion of males concerned with muscularity and weight gain. By combining sexes in data analysis results may not present an accurate picture of what is occurring for body image with males.

After reviewing the limitations in the existing literature on male body image, Cafri and Thompson (2004) proposed three criteria that are essential when examining body image in men. The first and most important criterion is that the measures used

should assess muscularity. The second criterion is that measures assessing characteristics indirectly associated with the body's appearance, such as physical activity participation or eating behaviours, should be related to muscularity (e.g., weight training, protein supplement ingestion). Given the importance of upper body image to men, the third and final criterion is that the male upper body must be included if the measure is focusing on particular body regions or parts (Cafri & Thompson, 2004).

The current study addressed several of the limitations identified in the literature taking into account Cafri and Thompson's (2004) guidelines for conducting body image research with males. First and foremost, this study focused on males only to avoid the use of combined samples as in earlier research. As the study examined male body image, the measures used focused specifically on muscularity and aspects of body image pertinent to males, in adherence with Cafri and Thompson's (2004) criteria. Moreover, the evaluation component of body image was explored in this study, as opposed to the less supported perceptual component. Finally, the study employed measures that tap into dimensions specific to male body image, most notably upper body strength and physical conditioning, rather than relying on measures of general satisfaction with the body.

Hypotheses

Given the research objectives of the current study and the review of available literature on male body image and the DFM, the following hypotheses are offered:

Theory and the Drive for Muscularity

1. Components of both sociocultural and social comparison theories were expected to predict the desire to be muscular. It was hypothesized that exposure to, internalization, and awareness of the muscular ideal would predict the DFM in males. Specifically, as the level of internalization, awareness, and exposure increases the level of the DFM increases. Of the three sociocultural variables (internalization, awareness, magazine exposure), internalization of the ideal was expected to have the strongest association with the DFM.

Of the social comparison variables, it was hypothesized that universalistic comparison would evidence a greater relation with the DFM than particularistic comparison. Increased frequency of comparison to mesomorphic universalistic targets would be associated with a higher DFM. Universalistic social comparison was expected to account for a statistically significant amount of variance in the DFM over and above what was accounted for by sociocultural variables.

2. Based on previous findings in the literature (Morrison et al., 2003), it was predicted that the DFM would be related positively to (a) magazine exposure and (b) universalistic comparison.
3. It was hypothesized that the desire to be muscular would be correlated positively with both particularistic and universalistic social comparison along the muscular dimension.
4. Percentage of time spent reading articles and looking at pictures/advertisements was hypothesized to be associated positively with the DFM. No prediction was made regarding which of the two would be more strongly related to the DFM. It was also hypothesized that men's exercise and fitness magazines would correlate more strongly with the DFM than men's fashion magazines.

Body Image Evaluation and Investment and the Drive for Muscularity

5. It was hypothesized that both body image evaluation and investment would predict the desire to be muscular and that body image evaluation would more strongly related to the DFM than body image investment. The DFM would be associated negatively with body image evaluation and associated positively with body image investment. Body image investment was expected to account for a statistically significant amount of the variance in the DFM over and above what was accounted for by body image evaluation.
6. As previously documented (McCreary & Sasse, 2000; Morrison, et al., 2003), the DFM was hypothesized to be associated positively with behaviours designed to increase one's size and musculature. Specifically, it was expected that the desire to be muscular would be associated with frequency of weightlifting, frequency of cardiovascular exercise, consumption of protein, and dieting to gain weight.
7. It was hypothesized that the DFM would be related positively to current use of other body investment strategies designed to increase lean musculature that have not previously been examined. These body investment strategies include: consumption of supplements like prohormones, ephedra, and creatine; consumption of high fat and/or caloric foods to gain weight; bingeing to gain weight; following special two-phase diets to gain muscle and lose weight/fat; wearing clothes to look larger and/or more muscular; and participation in sport to increase muscle mass and/or leanness.
8. The DFM was expected to be associated with current use of body investment strategies. However, males desiring increased muscularity and leanness that currently do not make efforts to change their bodies may aim to invest more into their body images in the future. As such, it was hypothesized that the intention to use body investment strategies in the future would also be correlated positively with the desire to be muscular. These body investment strategies include: consumption of supplements like prohormones, ephedra, and creatine; consumption of high fat and/or caloric foods to gain weight; bingeing to gain weight; following special two-phase diets to gain muscle and lose weight/fat;

wearing clothes to look larger and/or more muscular; and participation in sport to increase muscle mass and/or leanness.

9. Previous research demonstrates that adolescent males' desire to be muscular is related to dieting to gain weight (McCreary & Sasse, 2000). It was expected that the DFM would be associated positively with men's self-reported desire to gain weight and musculature in pounds.

Psychological Well-Being and the Drive for Muscularity

10. After partialing out the variance in Muscle Dysmorphia accounted for by self-esteem and depression, it was hypothesized that the DFM would be a statistically significant, positive predictor of Muscle Dysmorphia.
11. Muscle Dysmorphia was expected to be associated with increased depression and anxiety, as demonstrated in prior research (Olivardia et al., 2000).
12. As one of the primary indicators of Muscle Dysmorphia is the perception of not being sufficiently lean or muscular enough, it was hypothesized that men with an increased desire to be muscular would exhibit higher levels of Muscle Dysmorphia symptoms. Specifically, it was thought that the DFM would correlate positively with body building dependence, checking behaviour (i.e., reassurance seeking), substance use, and proneness to injury. The DFM was hypothesized to correlate negatively with muscle satisfaction.
13. Based on previous research in adolescent males (McCreary & Sasse, 2000), it was expected that a positive relation between the DFM and depression and a negative relation between the DFM and self-esteem would be found.
14. Research has not yet examined the associations between the DFM and general worry. Previous research has demonstrated a relation between the DFM and social physique anxiety. Therefore, it was hypothesized that the desire to be muscular would be associated positively with both social physique anxiety and worry in the current sample.

Method

Participants

One-hundred twenty seven undergraduate men from the University of Saskatchewan Psychology Department and 96 men from the general university population participated in this study. The mean age of the participants was 20.4 ($SD = 2.97$). The mean height and weight were 70.10 ($SD = 2.63$) inches and 173.55 ($SD = 30.34$) pounds, respectively. Nine participants were excluded from the analyses. One man was excluded based on age. He reported an age of 50, which was approximately 10 standard deviations above the mean. One participant who left 43% of the questionnaire items unanswered was also excluded. Seven participants were excluded on the basis of sexual orientation, as research suggests that there are differences in body image dissatisfaction between gay and heterosexual men (Kaminski, Chapman, Haynes, & Own, 2005; Levesque & Vichesky, 2006; Morrison, Morrison, & Sager, 2004; Yelland & Tiggemann, 2003). Studies have shown that gay men experience more general body image dissatisfaction than heterosexual men (Kaminski et al., 2005; Levesque & Vichesky, 2006; Yelland & Tiggemann, 2003). A meta-analysis by Morrison and colleagues (2004) supports these results, wherein their findings demonstrated a small but statistically significant difference in body image dissatisfaction between gay men and heterosexual men, with the latter experiencing less dissatisfaction. In addition, research suggests that gay men evidence a higher desire to be muscular and decreased muscle satisfaction than heterosexual men (Kaminski et al., 2005; Yelland & Tiggeman, 2003).

Due to the multiple predictors (i.e., 13) involved in this study, sample calculations were computed according to Tabachnick and Fidell's (2001) conventions. The final sample of 214 men was sufficient for analyses. The breakdown of the participants' areas of study and their self-identified ethnicity are reported in Tables 1 and 2, respectively.

Measures

Demographics. A self-report demographics questionnaire was used to assess age, sex, major area of study, year of study, self-identified sexual orientation, self-identified

ethnicity, height, and weight (see Appendix A). Major area of study was coded based on the College to which the participant belonged. Height was reported in feet and inches and weight was reported in pounds. Participants were also asked to rate their level of physical activity relative to individuals their same sex and age on a scale from 1 (much less active) to 5 (much more active).

Drive for Muscularity. The DFM was measured using the Drive for Muscularity Attitudes Questionnaire (DMAQ; Morrison et al., 2004) (see Appendix B). The DMAQ is an eight-item self-report scale which participants answer on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Scores range from 8 to 40 with higher scores indicative of a higher drive for muscularity. The DMAQ has good internal consistency, with reported Cronbach's alphas of .84, .82, and .80 in adult male samples (Morrison et al., 2004). With respect to validity, factor analyses revealed that the DMAQ demonstrated a unidimensional factor structure (Morrison & Harriman, 2005; Morrison et al., 2004). Scores on the DMAQ were correlated positively with figure rating selections of males' ideal physiques ($r = .46$). Scores on the DMAQ were also correlated positively with discrepancies between participants' actual and ideal physiques ($r = .49$). Morrison and Harriman (2005) found that the DMAQ was correlated negatively with muscle satisfaction ($r = -.32$). Scores on the DMAQ were also correlated positively with behaviours and cognitions related to increasing muscularity, including consumption of protein supplements, weight training, and contemplation of steroid use ($r_s = .40, .25$, and $.25$, respectively; Morrison et al., 2004). The DMAQ was not found to be associated with social desirability (Morrison & Harriman, 2005). In the current study, the DMAQ was also correlated with one-item asking men to indicate the degree to which they would like to be more muscular on a scale from 1 to 100 ($r = .74$).

Sociocultural Variables. Magazine exposure was measured using a Magazine Checklist (created for the purposes of this study), and sociocultural internalization and awareness were measured using the Sociocultural Attitudes Towards Appearance Questionnaire – Revised: Male Version (SATAQ-M; Thompson et al., 1999).

The Magazine Checklist was created for the purpose of measuring magazine exposure in males and consisted of a list of 19 fitness, sport, and lifestyle magazines oriented towards men (see Appendix C). The magazine checklist is a common measure

that is designed and utilized by researchers in the area of body image to explore magazine consumption and exposure (Levine, Smolak, & Hayden, 1994; Morrison et al., 2003; Morry & Staska, 2001). Examples of the male-audience magazines listed in the current study include *Men's Health*, *Men's Fitness*, *Sports Illustrated*, *Maxim*, and *Flex*. These magazines were selected after a survey of popular male magazines and a review of other literature examining magazine exposure and body image. Participants were asked to report the frequency of their magazine consumption from 1 (Hardly/Never) to 3 (Often). Scores range from 19 to 57 and higher scores denote greater magazine exposure. For the purposes of this study, the researcher added three other sections to this questionnaire. After indicating frequency of reading magazines, participants were asked to record the number of minutes they spend per month reading each magazine and to provide percentages of how much time they spent reading the articles and how much time they spent looking at the advertisements and pictures.

The SATAQ-M (Thompson et al., 1999) is a 21-item questionnaire designed to measure internalization and awareness of the male body ideal (see Appendix D). Participants were asked to rate their agreement to a number of statements on a Likert scale from 1 (Completely disagree) to 5 (Completely agree). The SATAQ-M consists of two subscales, Internalization (11 items) that measures the degree to which a male adopts the male's body ideal, and Awareness (10 items) that measures a male's knowledge of the existence of a male body ideal. Scores range from 11 to 55 for the Internalization subscale and 10 to 50 for the Awareness subscale. Higher scores denote greater internalization of and familiarity with the male body ideal. The SATAQ-M is a modified version of the SATAQ – Revised: Female Version (Cusumano & Thompson, 1997), and includes items that are related to the attainment of a physically fit and toned body rather than focusing on thinness. As such, this version is more relevant to male body image. Cashel and colleagues (2003) determined the internal consistencies of the original SATAQ to be .79 and .60 for the Internalization and Awareness subscales, respectively, in a male sample. In another study of men, the wording of four questions was changed to reflect the dimension of being fit or muscular and internal consistencies were .78 and .56 for Internalization and Awareness, respectively (Morry & Staska, 2001). Agliata and

Tantleff-Dunn (2004) found Cronbach's alphas of .85 for the Internalization subscale and .84 for the Awareness subscale with an adult male sample.

No reliability or validity data on the SATAQ-M was reported in the available literature. Item content of the SATAQ-M used in the current study, however, is similar to the items on the Sociocultural Attitudes Towards Appearance Questionnaire presented to males in Smolak, Levine, and Thompson's (2001) study. Smolak and colleagues (2001) examined the use of a previous 14-item version of the SATAQ with adolescent males, with the SATAQ items emphasizing a muscular and fit body as opposed to thinness when referencing the ideal body. They found internal consistencies of .87 and .75 for the Internalization and Awareness subscales, respectively. Smolak and colleagues (2001) identified a third factor, which they called Muscular Look. This subscale did not correlate with measures of muscle building techniques or muscularity concern, therefore its validity is questionable. The total SATAQ and Internalization scores correlated with body esteem, weight control and muscle building techniques, and muscularity concern (r s ranging from -.16 to .38). The Awareness subscale was associated with muscularity concerns and weight control and muscle building techniques. Hence, this version of the SATAQ with males appears to have adequate validity. The SATAQ and SATAQ-3 have also been well-validated in females (Heinberg et al., 1995; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) and the SATAQ has been used in other body image research with males (Cashel et al., 2003; Morry & Staska, 2001).

Social Comparison Variables. Universalistic and particularistic social comparison of general comparison and specific body parts were measured using the Body Comparison Scale (BCS; Fisher et al., 2002) and the Universalistic Social Comparison Scale (USC; Morrison, Kalin, & Morrison, 2003).

The BCS is a 36-item questionnaire designed to measure the frequency of particularistic social comparison (see Appendix E). All items are rated on a Likert scale from 1 (Never) to 5 (Always). The first 25 items comprise three subscales that measure the frequency an individual compares his or her specific body parts to those of his or her peers. The subscales include: a) general appearance, non-weight, non-muscular scale (nine items); b) muscular scale (six items); and c) weight scale (five items). In the current study, only the muscular scale was utilized. Scores on this subscale range from 6

to 30, with higher scores indicating greater comparison with peers of specific body parts related to muscularity. The last 11 items measure general comparison tendencies of individuals in regards to their peers. Scores in this second part range from 11 to 55, with higher scores denoting more frequent general comparisons with peers. The BCS has high internal consistency, with a Cronbach's alpha of .95 in a sample of 2171 college, high school, and junior high males and females (Thompson et al., 1999). Fisher and colleagues (2002) determined that the cognitive organization of appearance comparison is consistent across adolescence and adulthood for both males and females, with males' primary organization along a muscularity dimension and females' primary organization along a thinness dimension. Participants completed the BCS two times in the current study; once comparing themselves to their peers (see Appendix E) and once comparing themselves to models or celebrities (see Appendix F).

The USC (Morrison et al., 2004) is a seven-item questionnaire that measures an individual's use of universalistic social comparison (see Appendix G). The first three items are rated on a Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The last four items are rated on a Likert scale from 1 (Never) to 5 (Very Often). Total scores range from 7 to 35, with higher scores indicative of more use of universalistic social comparison. Reliability of the USC is good, with a Cronbach's alphas of .84 in college men (Morrison et al., 2003) and .78 in an adolescent male sample (Morrison et al., 2004). The scale correlates with consumption of magazines in male adults and adolescents ($r_s = .34$ and $.26$, respectively) and does not correlate with measures tapping diet and exercise behaviour in men (Morrison et al., 2004).

Body Image Evaluation. Body image evaluation was measured by the Body Esteem Scale – Upper Body Strength and Body Esteem Scale – Physical Condition subscales (BES-UBS, BES-PC-M; Franzoi & Shields, 1984), and the Multidimensional Body Self-Relationship Questionnaire – Appearance Evaluation subscale (MBSRQ-AE; Brown, Cash, & Mikulka, 1990).

The BES is a 35-item self-report measure designed to assess the degree to which an individual is satisfied with various bodily aspects and functions (see Appendix H). The BES has six subscales consisting of Sexual Attractiveness, Weight Concern, and Physical Condition subscales for females, and the Physical Attractiveness (PA), Upper

Body Strength (UBS), and Physical Condition (PC-M) subscales for the males. Since the current study is examining male body image and there are validity concerns regarding the Physical Attractiveness subscale (Franzoi & Herzog, 1986), only the UBS and PC-M subscales of the BES were included in the analyses. Participants rate each body part or function on a five-point Likert scale from 1 (have strong negative feelings) to 5 (have strong positive feelings). Scores on the subscales range from 9 to 45 for the UBS and 13 to 65 for the PC-M subscales. Higher scores are indicative of higher body esteem in each subscale domain.

Internal consistency of the BES is good, with alpha coefficients in men of .85 and .86 for the UBS and PC-M subscales, respectively (Franzoi & Shields, 1984). With respect to validity, Franzoi and Herzog (1986) found that the UBS and PC-M subscales correlated positively with global self-esteem ($r_s = .25$ and $.40$, respectively). The BES subscales accounted for approximately 18 percent of the variance in global self-esteem in males. These results support the notion that the BES measures a particular aspect of overall self-esteem. Furthermore, body competence was correlated strongly with the PC-M subscale in males ($r = .60$). The BES appears to demonstrate adequate convergent validity. In addition, the UBS subscale was able to differentiate between weightlifters and non-weightlifters, with weightlifters demonstrating higher UBS scores than non-weightlifters (Franzoi & Shields, 1984). This result is expected, as men who lift weights would likely have a more well-developed upper torso and, therefore, would presumably experience more satisfaction with that aspect of their bodies. With respect to discriminant validity, the BES was correlated weakly with public and private body consciousness; therefore, the BES is not tapping into how attentive individuals are to their bodies, but rather how they subjectively feel about their bodies (Franzoi & Herzog, 1986).

The MBSRQ (Brown et al., 1990) is a 69-item multidimensional self-report questionnaire that measures the cognitive behavioural orientation and evaluative components of body image (see Appendix I). Fifty-seven questions are on a five-point Likert scale from 1 (Definitely Disagree) to 5 (Definitely Agree), one item is on a scale from 1 (Never) to 5 (Very Often), and two items are on a scale from 1 (Very Underweight) to 5 (Very Overweight). The remaining nine items are on a 5-point Likert

scale that range from 1 (Very Dissatisfied) to 5 (Very Satisfied). The MBSRQ has seven stable, replicable factors corresponding to seven subscales: Appearance Evaluation, Appearance Orientation, Fitness Evaluation, Fitness Orientation, Health Evaluation, Health Orientation, and Illness Orientation. There are also three other subscales that are used called the Self-Classified Weight Scale, Overweight Preoccupation Scale, and the Body Area Satisfaction Scale.

The current study utilized the Appearance Evaluation Orientation subscale as a measure of body image evaluation. The Appearance Evaluation subscale has seven items and measures general feelings of satisfaction or dissatisfaction with one's appearance and feelings of attractiveness or unattractiveness. Scores range from 7 to 35, with higher scores indicating greater satisfaction with appearance. Internal consistency of the Appearance Evaluation subscale is good, with a Cronbach's alpha reported at .88 and a one-month test-retest reliability of .81 in a sample of 996 men (Cash, 2000). Keeton et al. (1990) found a Cronbach's alpha of .87 for the Appearance Evaluation subscale in college males. Brown and colleagues (1990) performed a cross-validated principal components analyses, which supported the conceptually derived structure of the MBSRQ across the two major attitudinal dimensions it measures, Orientation (the degree of cognitive and behavioural investment) and Evaluation (feelings of satisfaction or dissatisfaction).

Body Image Investment. Body image investment was measured using a composite questionnaire of exercise behaviours, dieting, and drug and supplement usage. This questionnaire was created for the purposes of this study and is called the Body Investment Inventory (BII). In addition, the Appearance Orientation subscale of the MBSRQ was administered as another measure of body image investment.

The BII was created after surveying the relevant literature on body change techniques in males (Cafri et al., 2005; McCabe & Ricciardelli, 2003; Morrison et al., 2004; Ricciardelli & McCabe, 2002; see Appendix J). Researchers have developed and utilized questions similar to this for the measurement of body change techniques (Davis, Fox, Cowles, Hastings, & Schwass, 1990; Morrison et al., 2004). Eighteen body change strategies were listed in the measure and participants were asked to rate the frequency of use of each strategy on a scale from 1 (Never) to 5 (Very Often) according to two time

frames. Participants rated the frequency that they are currently using the body investment strategy and then the frequency that they intend to use the noted strategy in the future. Both the individual items and total scores for current and future use were examined in conjunction with the DFM. Total scores for usage in the present and future range from 18 to 54, with higher scores denoting more frequent use of body change strategies. Participants were also asked 14 other questions on their dieting and exercise practices, their ideal weight, and their desire to be muscular on a visual analog scale ranging from 0 to 100. In the current sample, the BII current use total score correlated positively with general investment in appearance, as measured by the Appearance Orientation subscale of the MBSRQ ($r = .27$).

The Appearance Orientation subscale of the MBSRQ (MBSRQ-AO; Brown et al., 1990) was used to measure an individual's general tendency to invest in his appearance (see Appendix I). The Appearance Orientation subscale has 12 items. Scores range from 12 to 60, with higher scores indicating a greater investment in appearance. Cronbach's alpha for the Appearance Orientation subscale was reported at .88 and the one-month test-retest reliability was .89 in a sample of 996 undergraduate males (Cash, 2000). Principal components analyses support the conceptually derived structure of the MBSRQ-AO subscale (Brown et al., 1990).

Psychological Well-Being. Self-esteem, depression, physique anxiety, and worry were measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965), Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), the Social Physique Anxiety Scale (SPAS; Hart et al., 1989), and the Penn State Worry Questionnaire, respectively (PSWQ; Meyer, Miller, Metzger, Borkovec, 1990). Symptoms of the pathological preoccupation with muscularity were measured using the Muscular Appearance Satisfaction Scale (MASS; Mayville et al., 2002).

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a 10-item questionnaire that measures global self-esteem by examining personal beliefs and attitudes towards oneself (see Appendix K). Participants were asked to rate how strongly they agree with self-acceptance and self-worth statements on a Likert scale from 1 (strongly agree) to 4 (strongly disagree). Scores range from 10 to 40 with higher scores indicative of greater global self-esteem. The test-retest coefficient of the scale is .82 and the Cronbach's alpha

coefficient is .88 in an adult sample, suggesting the scale has good test-retest and internal reliability (Fleming & Courtney, 1984). In addition, scores on the scale correlate positively with other measures of self-esteem, such as the Coopersmith Self-Esteem Inventory ($r = .66$; Demo, 1985). Scores on the Rosenberg Self-Esteem Scale also correlate negatively with measures of anxiety and depression ($r_s = -.64$ and $-.59$, respectively) (Fleming & Courtney, 1984). Thus, the Rosenberg Self-Esteem Scale demonstrates good reliability and validity.

The CES-D (Radloff, 1977) is a 20-item self-report symptom inventory that measures the degree of depressive symptomatology in an individual (see Appendix L). Participants were asked to rate how often they have experienced a particular symptom in the past week on a scale from 0 (Rarely or none of the time – less than 1 day) to 3 (most or all of the time – 5 to 7 days). Scores range from 0 to 60, with higher scores indicative of higher levels of depression. Radloff (1977) identified a cutoff score of 16 as an indicator of the possible presence of major depression. The reliability of the CES-D has been well-documented in various populations. Cronbach's alphas in Radloff's (1977) original samples were very good, with alphas of .85 and .90 in the general population and patient groups, respectively. Skorikov and Vandervoort (2003) found a Cronbach's alpha of .90 for the CES-D in university undergraduates. Test-retest reliability was generally found to be moderate. Radloff (1977) reported correlations of $r_s = .51, .67, .59, .59$ at two, four, six, and eight week intervals, respectively. These correlations are not surprising, given the episodic and fluctuating nature of depression.

The CES-D has been moderately to highly correlated with another well-validated measure of depression, the Beck Depression Inventory (BDI; Beck & Steer, 1993). Correlations between the CES-D and BDI of $r_s = .86, .82$, and $.75$ have been reported in samples of undergraduate students (Joseph, Lewis, & Olsen, 1996; Santor, Zuroff, Cervantes, Placios, & Ramsey, 1995; Skorikov & Vandervoort, 2003) and clinically depressed outpatients ($r = .87$; Santor et al., 1995). Correlations between the CES-D and other measures of depressive symptomatology have also been reported, including the Bradburn Negative Affect scale ($r = .51$), the Bradburn Balance scale ($r = .60$), and the Lubin ($r = .61$) (Radloff, 1977). The CES-D is able to discriminate between patient and general population groups, with patient groups reporting significantly higher depression

scores than the general population (Radloff, 1977). Therefore, the CES-D demonstrates good reliability and validity.

The SPAS (Hart, Leary, & Rejeski, 1989) is 9-item questionnaire designed to measure social anxiety that occurs as a result of interpersonal evaluation of one's physique (see Appendix M). Each question is on a five-point Likert scale from 1 (not at all like me) to 5 (like me a lot.) Scores range from 9 to 45 with higher scores representing greater levels of physique anxiety. The SPAS was reduced from its original 12-item version by deleting one awkwardly worded item and two items with no social evaluative element (Martin, Rejeski, Leary, McAuley, & Bane, 1997). The deletion of the three items resulted in a clearer, unidimensional conceptualization of SPA. The scale demonstrates very good internal consistency in adult samples, with a Cronbach's alphas ranging from .89 to .93 found in a number of studies (Crawford & Eklund, 1994; Davis et al., 1993; Eklund & Crawford, 1994; Hart et al., 1989; Petrie et al., 1996). The eight-week test-retest reliability of the SPAS was .82 (Hart et al., 1989). Accordingly, the scale demonstrates both high internal and test-retest reliability.

The SPAS demonstrates convergent validity as it correlates moderately with measures tapping general concerns with others' evaluations and with measures of public self-consciousness (i.e., Fear of Negative Evaluation Scale; $r = .35$; Hart et al., 1989). Petrie and colleagues (1996) found that physique anxiety correlated positively with body shape concerns in males and females, wherein greater concerns with body shape and size were associated with higher SPA. SPA was also related negatively to physical self-perceptions and physical self worth. The higher the SPA scores, the lower one's perceptions of general physical self-worth, physical conditioning, sports competence, and strength and musculature for both males and females (Petrie et al., 1996). The SPAS has associations in the expected direction with related physiological indices, including body mass index (BMI) and body fat percentage; high BMI's and body fat percentages were related to higher levels of SPA (Cox, Lantz, & Mayhew, 1997; Petrie et al., 1996). As such, the SPAS appears to be a valid measure of physique anxiety.

The PSWQ (Meyer et al., 1990) is a 16-item questionnaire that measures the intensity, tendency, and uncontrollability of worry (see Appendix N). Participants are asked to rate the degree to which they worry by rating items on a five point Likert scale

from 1 (not at all typical of me) to five (very typical of me). Scores range from 16 to 80, with higher scores denoting a higher level of general worry. The scale demonstrates good internal consistency with alpha coefficients ranging from .86 to .95 in both clinical and non-clinical samples across several studies (Brown, Antony, & Barlow, 1992; Kelly, 2004; Meyer et al., 1990). Test-retest coefficients for the scale at two, four, and eight weeks were $r_s = .75, .93$, and $.92$, respectively, with several samples (Meyer et al., 1990). Research demonstrates that the PSWQ correlates with the State-Trait Anxiety Inventory ($r = .49$ for the state subscale and r_s ranging from $.64$ to $.75$ for the trait subscale) (Kelly, 2004; Meyer et al., 1990; van Rijsoort, Emmelkamp, & Vervaeke, 1999). Research has also found that the PSWQ is associated with measures of anxiety, including the Worry Domains Questionnaire – Revised ($r = .61$), the Cognitive Somatic Anxiety Questionnaire ($r = .69$), and the Rumination subscale of the Padua Inventory Revised ($r = .66$) (Meyer et al., 1990; van Rijsoort et al., 1999). The PSWQ does not correlate with social desirability, Internal-External Locus of Control, and the Disinhibition and Experience Seeking subscales of the Sensation Seeking Scale (Meyer et al., 1990). Therefore, the PSWQ appears to exhibit adequate reliability and validity.

The MASS (Mayville et al., 2002) is a 19-item questionnaire designed to measure features associated with Muscle Dysmorphia (see Appendix O). Participants rate how strongly they agree with the statements on a Likert-scale from 1 (strongly disagree) to 5 (strongly agree). The MASS has five stable factors identified in the following subscales: Bodybuilding Dependence has five items and measures the tendency to excessively engage in weightlifting; Muscle Checking has 4 items and taps reassurance-seeking behaviour that one engages in to assess their muscular appearance; Substance Use has four items and measures an individual's openness to use risky means to increase their muscularity, including steroid use; Injury has three items and taps symptoms that may indicate over-training and beliefs about such unsafe behaviour; and Muscle Satisfaction has three items and measures the degree of satisfaction individuals have with their muscle size and definition. Scores on the various subscales ranges from 3 to 25 and a total score can also be calculated, which ranges from 19 to 95. Higher scores denote more Muscle Dysmorphia symptoms.

Cronbach's alphas for the MASS total score and five subscales ranged from .73 to .87 across two independent samples (Mayville et al., 2002). Two week test-retest correlations for the total MASS score and subscales ranged from $r_s = .84$ to .89, with the exception of the retest correlation of .76 for the Bodybuilding Dependence subscale. The MASS and its subscales are correlated with a measure of body dysmorphic disorder called the Body Dysmorphic Disorder Examination Self-Report scale (BDDE-SR). The BDDE-SR is correlated with the MASS total score ($r = .40$), Muscle Checking ($r = .39$), Substance Use ($r = .53$), and Muscle Satisfaction ($r = .54$). The MASS total score, Muscle Checking subscale, and Muscle Satisfaction subscale are correlated with physique anxiety ($r_s = .40, .30$, and $.63$, respectively). The MASS Bodybuilding Dependence subscale correlated with the Social Dependency ($r = .66$), Training Dependency ($r = .48$) and Mastery ($r = .43$) subscales of another bodybuilding dependence measure called the Bodybuilding Dependence Scale. Neither the total score nor any of its subscales correlated with measures of social desirability or vocabulary ability, demonstrating divergent validity (Mayville et al., 2002). The MASS appears to demonstrate acceptable reliability and validity.

Procedure

Participants were recruited in two ways. One-hundred twenty seven males were recruited through the Psychology Department Participant Pool and received partial course credit toward their introductory psychology class for volunteering. Of these 127 males, 30 completed the measures on paper-and-pencil questionnaires. The other 97 psychology students completed the measures online. The remaining 96 males were recruited from the general undergraduate population at the University of Saskatchewan and completed the measures online. The study was advertised to the general university population by posters distributed throughout the campus and with a larger version of the poster stationed at a table in one of the university common areas with the primary researcher present. Participants from the general population received \$10 for volunteering to participate in the study.

An online version of the questionnaires was employed in this study. Benefits to online administration of questionnaires have been identified in the literature, and include 1) ease of obtaining data, 2) the ability to collect a large amount of data quickly, 3)

convenience of scheduling for participants, and 4) cost effectiveness (Gosling, Vazire, Srivastava, & John, 2004; Pettit, 1999). There are also benefits to the environment due to the reduced use of paper. Data entry errors are minimized because data can be imported directly into statistical software programs. Other data errors, such as out-of-range values, are reduced in online questionnaires as participants do not have the option to endorse these values. Participants report being more comfortable disclosing personal information on online questionnaires than paper-and-pencil measures (Locke & Gilbert, 1995). Another advantage is that there is a reduced likelihood of socially desirable responding (Richman, Keisler, Weisband, & Drasgow, 1999). This may be due to increased privacy and confidentiality associated with completing the measures online and reduced demand characteristics (Epstein, Klinkenberg, Wiley, & McKinley, 2001). Research has demonstrated that the presentation format of questionnaires (i.e., online versus paper-and-pencil) does not change the nature or quality of results (Gosling et al., 2004). Studies have also found that the psychometric properties of online and paper-and-pencil questionnaires do not differ significantly (Epstein et al., 2001; Gosling et al., 2004; Riva, Teruzzi, & Anolli, 2003).

Informed consent was obtained online from participants who completed the questionnaires on the web-based system. Research has reported no significant differences between participants' understanding and recall of informed consent information when comparing paper-and-pencil and online administration (Varnhagen, Gushta, Daniels, et al., 2005). Informed consent was obtained on paper from participants who completed the measures using paper-and-pencil questionnaires. After obtaining informed consent, participants were asked to fill out the questionnaires. Participants received a debriefing form upon completing the questionnaires. See Appendix P for the consent forms, debriefing form, and ethics approval for the current study.

Results

Data Screening and Assumption Testing

Missing variables were analyzed to determine the pattern of missing values. Analyses were carried out for Likert-scale items and demographic and exercise variables. Little's MCAR test was statistically non-significant, $\chi^2(10151) = 356.46, p > .05$, indicating that the pattern of missing values was random. In addition, none of the Likert-scale questionnaire items had more than five percent of items missing. Subsequently, 78 missing values across 54 Likert-scale and demographic items were replaced with mean substitution (Field, 2005; Tabachnik & Fidell, 2001). Missing value estimations using expectation maximization were also calculated and compared to mean substitution values. Any differences between the values generated by the two methods were negligible. Examination of missing values for demographic, diet, and exercise questions that were pertinent to secondary research questions revealed that 15 questions had more than 5% of data missing. These items included current weight, ideal weight, weight loss in past year, weight gain in past year, weight loss desired, weight gain desired, muscle gain desired, frequency of weight training, number of weight exercises per workout, number of sets per workout, number of repetitions per set, frequency of cardiovascular activity, and duration of cardiovascular activity. These missing items were not replaced as they were related to research questions of secondary interest and the analyses pertaining to these questions was not dependent upon access to the complete data set.

All variables were examined for outliers and outliers greater than 3 standard deviations were truncated to 3 standard deviations to reduce their impact (Tabachnik & Fidell, 2001). One case each for the CES-D, DMAQ, and RSE scales and subscales; two cases for each of the BES-Physical Conditioning, MBSRQ – Appearance Evaluation, BII – Current, and Magazine Checklist scales and subscales; and three cases for the MASS – Substance Use subscale were identified and truncated.

Normality was examined by using frequency histograms and stem-and-leaf plots to examine symmetry and peakedness of the distributions. Skewness, kurtosis, and

Kolmogorov-Smirnoff statistics were also calculated for each variable. Standard scores for the skewness and kurtosis values were calculated. Expected normal probability plots and detrended expected normal probability plots were also inspected. Non-normal distributions for four variables were identified: CES-D, MBSRQ – Appearance Evaluation subscale, Magazine Checklist, and MASS – Substance Use subscale. Square root transformations were calculated for the CES-D and MBSRQ – Appearance Evaluation variables, and logarithmic transformations were calculated for the Magazine Checklist and MASS – Substance Use variables. Re-evaluation of the normality of these variables' distributions revealed that each distribution, and the standard z scores for skewness and kurtosis, improved minimally after transformation. In addition, the regression and correlational analyses in the current study were completed both with the transformed variables and with the untransformed variables. Close inspection of the outcomes revealed no substantive differences between the analyses run with the transformed variables and those performed with the untransformed variables. Through visual inspection of the distributions and computing the standard scores for skewness and kurtosis, no remaining variable was determined to be in need of transformation (Field, 2005; Tabachnik & Fidell, 2001). Therefore, all of the results presented are from analyses completed with the untransformed variables.

Assumption testing was carried out for the correlational analyses and the assumptions of related pairs, scale of measurement, and normality were met for each correlation. Linearity and homoscedasticity were ensured by examining the scatterplots for each correlation. All correlations carried out were one-tailed. Of note, some correlational analyses were not completed with the full data set due to missing data. For these analyses, the total number of participants is reported.

Reliability Analyses

Reliability analyses were carried out on all of the scales and subscales of the questionnaires. Internal consistencies were calculated and the Cronbach's alpha coefficients were evaluated according to Cicchetti's (1994) guidelines. These guidelines state that alpha coefficients: less than .70 are unacceptable; between .70 and .79 are fair; between .80 and .89 are good; and equal to or greater than .90 are excellent. Table 3 provides a summary of the computed reliability analyses. The means and standard

deviations for each variable are also reported in Table 3. Inspection of the table reveals that the measures used in the current study demonstrate adequate internal consistency, with the exception of Weightlifting 1 and Cardiovascular 1.

Group Differences

Analyses were conducted to determine if there were statistically significant differences between paper-and-pencil and online participants' responses to the questionnaires. Independent groups multiple *t*-tests were carried out on all scales and subscales. A Bonferroni's correction with an alpha level of .002 was employed to account for family-wise error. The assumption of independence of groups was met as each participant was in either the paper-and-pencil or online group. Homogeneity of variance was examined using Levene's test for equality of variances. Five variables were identified with statistically significant Levene's statistics: PSWQ, BII – Future, MASS – Substance Use, MASS – Muscle Satisfaction, and Cardiovascular 1. Inspection of the statistical significance values of these variables assuming unequal variances revealed no statistically significant values. As such, statistical significance values assuming equal variances were then examined. No statistically significant differences between the two groups' responses were noted, therefore, all subsequent analyses combined the groups.

Theory and the Drive for Muscularity

Hypothesis 1. To test the hypothesis that sociocultural and social comparison variables would predict the desire to be muscular, a hierarchical regression analysis was carried out. Drive for muscularity was the outcome variable, as measured by the DMAQ. SATAQ-M – Internalization, SATAQ-M – Awareness, and the Magazine Checklist were predictors in Step 1 of the regression and represented sociocultural variables. The BCS – General and USC were added as predictors in Step 2 to determine whether these social comparison variables accounted for additional variance in the DFM over and above the sociocultural variables. Analyses were conducted to assess for multivariate outliers, normality, linearity, homoscedasticity, and multicollinearity and revealed that the data was acceptable for use in the regression (see Appendix Q).

Table 4 displays the correlation matrix for the outcome and predictor variables for the regression. Table 5 displays the unstandardized regression coefficients (B), the standard error terms (SE B), the standardized regression coefficients (β), the zero-order

correlations, and the 95% confidence intervals for the statistically significant predictors. Table 4 indicates that all of the variables in the regression are significantly correlated.

Table 5 reveals that the sociocultural variables entered on Step 1 of the regression accounted for 31% of the variance in the desire to be muscular ($R^2 = .31$, $F(3, 213) = 30.99$, $p < .001$, Adjusted $R^2 = .30$). SATAQ-M – Internalization and SATAQ-M – Awareness of the male body ideal were statistically significant predictors and related positively to the DMAQ. After adding the social comparison variables to the model, the overall regression was statistically significant, $R^2 = .35$, $F(5, 208) = 22.01$, $p < .001$, Adjusted $R^2 = .33$. An additional 4% of the variance was accounted for in the desire to be muscular by social comparison variables. There was a significant F change from Step 1 to Step 2 in the regression, indicating a significant improvement in the model from the first step to the second. The USC was a statistically significant predictor related positively to the DMAQ. Together, sociocultural and social comparison variables accounted for 35% of the variance in the desire to be muscular. These results are in support of Hypothesis 1.

Hypothesis 2. To replicate previous research regarding the desire to be muscular and sociocultural and social comparison variables in university males, correlations were calculated between the DMAQ, USC, and Magazine Checklist. The DMAQ was related positively to both universalistic comparison, $r(212) = .53$, $p < .001$ and magazine exposure, $r(212) = .29$, $p < .001$. The results obtained support Hypothesis 2.

Hypothesis 3. To examine the relation between the DFM and particularistic and universalistic social comparison along the muscle dimension, correlations were calculated between the DMAQ, BCS – Peer Version, and BCS – Model Version scales. The DMAQ correlated positively with the BCS – Peer scale, $r(212) = .52$, $p < .001$ and the BCS – Model scale, $r(212) = .49$, $p < .001$. These results are in support of Hypothesis 3.

Hypothesis 4. To test the prediction that both percentage of time reading articles and percentage of time looking at pictures/advertisements in magazines would be related to the DFM, and that men's exercise and fitness magazines would be more strongly associated with the DFM than men's fashion magazines, correlations were completed (see Table 6). To account for family-wise error, an alpha level of .003 was used. Hypothesis 4 was partially supported. Percentage of time looking at

pictures/advertisements of two magazines (*Men's Fitness* and *Muscle & Fitness*) was related positively to the desire to be muscular.

Body Image Evaluation and Investment and the Drive for Muscularity

Hypothesis 5. To test the hypothesis that body image evaluation and investment would predict the desire to be muscular, a hierarchical regression analysis was completed using the DMAQ as the outcome variable. Predictors in Step 1 included the body image evaluation variables (BES - UBS, BES - PC, and MBSRQ - AE). Step 2 added the body image investment variables (Body Investment Inventory and the MBSRQ - AO) to determine whether they accounted for additional variance in the DFM over and above body image evaluation variables. Analyses were completed to assess for multivariate outliers, normality, linearity, homoscedasticity, and multicollinearity and revealed that the data was acceptable for use in the regression (see Appendix R).

Table 7 displays the correlation matrix for the outcome and predictor variables for the regression. Table 8 displays the unstandardized regression coefficients (B), the standard error terms (SE B), the standardized regression coefficients (β), zero-order correlations, and the 95% confidence intervals for the significant predictors. Table 7 reveals the statistically significant correlations between the desire to be muscular and body image investment variables.

Table 8 reveals that the body image evaluation variables entered in Step 1 of the regression were not significant. Body image investment variables were entered in the model on Step 2 and the overall regression was statistically significant, $R^2 = .26$, $F = (5, 208) = 14.99$, $p < .001$, Adjusted $R^2 = .25$. There was a significant F change from Step 1 to Step 2, indicating improvement in the model from the first step to the second. The MBSRQ - AO and the BII - Current were statistically significant, positive predictors of the DMAQ. The overall regression accounted for 26% of the variance in the DFM. The results of the hierarchical regression partially support Hypothesis 5.

Hypothesis 6. To replicate previous research relating to the DFM and body image investment, correlation coefficients were calculated between the desire to be muscular and frequency of weightlifting, frequency of cardiovascular exercise, protein consumption, and dieting to gain weight (see Table 9).

The relation between DFM and weightlifting was examined by correlating the DMAQ with: 1) A multiplicative index of times per week, repetitions completed, and sets completed (Weightlifting 1); 2) Times per week weightlifting (Weightlifting 2); and 3) Item 28 on the Body Investment Inventory (see Appendix J), which obtained frequency of weightlifting activities on a Likert scale from 1 (Never) to 5 (Very Often). The DMAQ correlated positively with weightlifting activity.

The relation between the DFM and frequency of cardiovascular exercise was examined by correlating the DMAQ with: 1) Frequency per week multiplied by minutes of cardiovascular exercise; and 2) Item 11c on the Body Investment Inventory (see Appendix J), which obtained frequency of cardiovascular exercise on a Likert scale from 1 (Never) to 5 (Very Often). As shown in Table 9, the DMAQ correlated positively with cardiovascular exercise. Protein consumption (measured by item 6c on the Body Investment Inventory; see Appendix J), also correlated positively with the DMAQ.

The relation between the DFM and dieting to gain weight was examined by asking participants how much weight in pounds they had gained in the previous year and if the weight gain was purposeful. Sixty-six participants indicated purposeful weight gain in the previous year. The DMAQ correlated positively with pounds gained for those 66 participants (see Table 9). In summary, the results support Hypothesis 6.

Hypothesis 7. To test the prediction that the desire to be muscular would be related positively to current use of body investment strategies (i.e., prohormones, creatine), correlations were calculated between the DMAQ and self-reported, currently utilized body change strategies from the Body Investment Inventory. The various strategies are grouped according to substance/supplement usage, diet, exercise, and other and are found in Table 10.

To account for family-wise error, a more stringent alpha level of .003 was calculated by dividing .05 by the number of body change strategies (18). There were a number of statistically significant, positive correlations between the DMAQ and body change strategies (see Table 10). Hypothesis 7, which predicted that current use of body investment strategies would correlate positively with the DFM, was supported.

Hypothesis 8. To test for the relation between the DFM and the intention of future body investment in males, correlations were also calculated between the DMAQ

and body change strategies males intended to use in the future. The body investment strategies were the same as those in Hypothesis 7 and Table 11 is a summary of their correlations with the DMAQ.

To account for family-wise error, a more stringent alpha level of .003 was employed. There were 11 statistically significant, positive correlations between the DMAQ and body change strategies that participants intend to use in the future (see Table 11). These results lend support to Hypothesis 8, which predicted that the desire to be muscular would be associated positively with the intention to use body investment strategies in the future.

Hypothesis 9. To test for the relation between the drive to be muscular and desire to gain weight and musculature, correlations were completed between the DMAQ and amount of weight and muscle gain desired (in pounds). There was a positive relation between the DMAQ and both the desire to gain weight, $r(193) = .33, p < .001$ and the desire to gain muscle, $r(194) = .40, p < .001$. These results support Hypothesis 9.

To determine how much of the overall gain men sought was muscle, pounds desired in muscle was divided by total weight gain desired, multiplied by 100. The results revealed that 77% of men who desired weight gain indicated that they would like all the weight gained to be muscle.

Psychological Well-Being and the Drive for Muscularity

Hypothesis 10. To test the hypothesis that the desire to be muscular would predict Muscle Dysmorphia after accounting for depression and self-esteem, a hierarchical regression was completed. Total score on the MASS was the criterion variable. The CES-D and RSE were entered as predictors into Step 1 of the regression equation to partial out the effects of depression and self-esteem. In Step 2 the DMAQ was added. Analyses were completed to assess for multivariate outliers, normality, linearity, homoscedasticity, and multicollinearity and revealed that the data was acceptable for use in the regression (see Appendix S).

Table 12 displays the correlation matrix for the outcome and predictor variables for the regression. Table 13 displays the unstandardized regression coefficients (B), the standard error terms (SE B), the standardized regression coefficients (β), zero-order correlations, and the 95% confidence intervals for the significant predictors. There were

several statistically significant correlations between the DMAQ, RSE, CES-D, and MASS total score (see Table 12).

Table 13 reveals CES-D and RSE were entered on Step 1, which was statistically significant, $R^2 = .07$, $F(3, 213) = 7.48$, $p < .001$, Adjusted $R^2 = .06$. This step accounted for 7% of the variability in Muscle Dysmorphia. The CES-D was a statistically significant and positive predictor of Muscle Dysmorphia. The DMAQ was added to the model in Step 2 and the overall regression was statistically significant, $R^2 = .30$, $F(5, 208) = 29.60$, $p < .001$, Adjusted $R^2 = .29$. There was a statistically significant F change from Step 1 to Step 2 in the regression, indicating improvement in the model from the first step to the second. The DMAQ was a statistically significant and positive predictor of Muscle Dysmorphia. The overall regression accounted for 30% of the total variance in Muscle Dysmorphia. The results of the hierarchical regression support Hypothesis 10.

Hypothesis 11. To replicate the previous finding that Muscle Dysmorphia is related to depression and anxiety, correlations were calculated between the total MASS score, the CES-D, and the PSWQ. Total MASS demonstrated statistically significant and positive correlations with both the CES-D, $r(212) = .24$, $p < .001$ and PSWQ, $r(212) = .23$, $p < .001$. Consequently, Hypothesis 11 was supported.

Hypothesis 12. To determine the relations between the DFM and the various dimensions of Muscle Dysmorphia (i.e., bodybuilding dependence, checking, substance use, injury, muscle satisfaction) correlations were completed. Table 14 summarizes these relations and indicates that all five of the Muscle Dysmorphia subscales were correlated significantly with the DMAQ. These results support the predictions made in Hypothesis 12.

Hypothesis 13. To determine the relation between the desire to be muscular and depression and self-esteem, correlations were calculated between the DMAQ, CES-D, and RSE (see Table 12). Only self-esteem evidenced a small negative correlation with the DMAQ, $r(212) = -.13$, $p < .05$, therefore, Hypothesis 13 was partially supported.

Hypothesis 14. To determine the relation between the DFM, social physique anxiety, and levels of general worry, correlations were calculated between these variables. The results revealed statistically significant, positive correlations between the

DMAQ and both the SPAS, $r(212) = .19, p < .01$ and the PSWQ, $r(212) = .19, p < .01$. Hypothesis 14 was supported.

Discussion

This section will begin with a review of the results and discussion of the relations between the desire to be muscular and theory, body image investment and evaluation, and psychological well-being. The contributions of this study to the area of male body image will follow and the implications the findings have for clinical practice will be reviewed. Finally, the limitations of the current study and directions for future research in male body image will be presented.

Theory and the Drive for Muscularity

The first goal of the current study was to identify relevant theoretical variables associated with the desire to be muscular in men. Given their importance in the body image literature, sociocultural and social comparison theories were the focus of this examination. The results of the regression analysis supported the prediction that variables from both sociocultural and social comparison theory would predict the desire to be muscular in adult males (Hypothesis 1).

All sociocultural variables were expected to predict the DFM based on a review of previous literature. This expectation was partially met. Of the sociocultural variables, internalization of the male body ideal, awareness of the male body ideal, and magazine exposure were related positively to the desire to be muscular. In the first step of a hierarchical regression, internalization and awareness of the ideal predicted the desire to be muscular. Although the correlation between the DFM and magazine exposure was statistically significant, which is congruent with other research (Hatoum & Belle, 2004; Morrison et al., 2003), when entered as a predictor with internalization and awareness, magazine exposure was statistically nonsignificant.

With the exception of magazine exposure, these results are consistent with other sociocultural research that found internalization, awareness, and susceptibility to mass media is associated with concerns about being too small among adolescent boys (Smolak et al., 2001) and muscle satisfaction in adult males (Vartanian et al., 2001). It is also congruent with both experimental and correlational research that has found positive

correlations between internalization and awareness and body dissatisfaction (Agliata & Tantleff-Dunn, 2004; Cashel et al., 2003; Morry & Staska, 2001). As there is an element of dissatisfaction with muscularity associated with the DFM (Morrison & Harriman, 2005; Morrison et al., 2004), it was not unexpected that internalization and awareness predicted the desire to be muscular.

Previous research has also found that magazine exposure predicts body dissatisfaction, however, this relation was only indirect as it was mediated by internalization of the ideal (Morry & Staska, 2001). Perhaps magazine exposure is more relevant to male body concerns in the context of internalizing the ideal portrayed in those magazines than on its own. This may partially explain why when entered in the regression with internalization and awareness of the ideal in the current study, magazine exposure was not a statistically significant predictor of the desire to be muscular.

With respect to the relative importance of the sociocultural variables, it was also hypothesized that internalization of the male body ideal would have a greater association to the DFM than awareness. This was observed. It appears that for the current sample, being aware of the male appearance ideal is not as strongly related to the desire to be muscular as internally adopting and striving towards that ideal. One possible explanation is that the male body ideal is so pervasive that the majority of people are aware that it exists and, hence, it only has a certain amount of predictive ability. Internalization is a progressive process where “interactions between person and outer world are replaced by inner representations of the self and body” (Kearney-Cooke, 2002, p. 100). Perhaps the adoption of the muscular body is more strongly associated with the DFM because an internal change occurs and the ideal is accepted rather than simply being aware an ideal exists. That internalization of the male body ideal evidenced a greater relation to the desire to be muscular than awareness is similar to research with females, which has demonstrated that internalization accounts for substantially more variance in body dissatisfaction than awareness (Cusumano & Thompson; 1997; Heinberg & Thompson, 1995; Heinberg et al., 1995; Tsiantas & King, 2001). These results are also consistent with a recent meta-analysis that found that internalization of the ideal has a substantively larger effect size than awareness in its relation to body image in females (Cafri, Yamamiya, Brannick, & Thompson, 2005).

To determine if social comparison theory would account for additional variance in the DFM above that accounted for by sociocultural variables, universalistic comparison and particularistic general comparison were entered on the second step of the regression. Universalistic social comparison along the appearance dimension was expected to better predict the DFM than particularistic comparison and this premise was supported. Comparison with male models and celebrities (i.e., universalistic social comparison) accounted for unique variance (4%) over and above what was accounted for by the sociocultural variables. Particularistic social comparison (i.e., comparison with peers) did not predict the DFM. This was expected, as it was anticipated that there would not be many men embodying the ideal physique in the participants' peer reference groups, whereas there is an abundance of muscular mesomorphs to compare oneself to in the media. Consequently, it makes sense that comparing oneself to peers whom are likely not as largely muscular as the models in the media was not associated with the desire to be muscular. These results replicate Morrison and colleagues (2003) study, which found a strong association between the desire to be muscular and comparison with universalistic targets. The results are congruent with previous research that demonstrated the cognitive organization of appearance comparison in males is along a muscle/non-muscle continuum (Fisher et al., 2002). They are also consistent with previous research that demonstrated men who engage in upward social comparison have greater body dissatisfaction than those exposed to neutral images (Thornton & Moore, 1993), and are more committed to attaining a muscular body (Botta, 2003). The results parallel the literature on female body image, where social comparison is consistently related to the drive for thinness and body dissatisfaction in women (Heinberg & Thompson, 1992a; Storer & Thompson, 1996; Thompson, Heinberg, & Tantleff, 1991).

The current study posited that variables from both theories would account for a significant amount of variability in the desire to be muscular. This prediction was supported as 35% of the variance in the DFM was accounted for by sociocultural and social comparison variables. As men's awareness of the male body ideal, internalization of that ideal, and comparison of their own physiques to that ideal increase, their desire to become muscular also increases.

Sociocultural theory stresses the importance of the mass media in portraying idealized images to individuals in society (Thompson et al., 1999). These idealized images send important messages to society's members regarding physical appearance and what is considered attractive, as well as the costs and benefits associated with embodying a specific body shape. In Western society, muscularity is considered attractive and desirable in men, and this ideal is pervasive. Recent research by Labre (2005) indicated that 82% of models in popular male-audience magazines were categorized as very muscular (high muscle definition) and 96% of models met criteria for having low body fat (i.e., very lean, no visible body fat). The muscular mesomorph in these magazines is the type of image that males of all ages consistently see in the media. The current sample of men not only appears to have knowledge of the male body ideal endorsed by society, they also self-report an internal representation of that ideal. Men also reported that they compare their bodies to this ideal. It is likely that the comparison taking place is upward in nature and men are judging themselves to be worse off on the dimension of interest (i.e., muscularity), as social comparison is related to a desire to increase musculature. Social comparison literature suggests that people will engage in behaviour designed to improve themselves on the dimension they judge themselves to be lacking (Festinger, 1954). If men are internalizing the male ideal and judging themselves to be lacking in musculature when comparing themselves to society's standard, it is possible they may engage in unhealthy behaviours to improve their standing on the muscularity dimension.

In summary, tenets of both sociocultural and social comparison theories are applicable to male body image, particularly in reference to muscularity. These results are important in light of research that demonstrates the negative impact of exposure to the ideal on men's affect and body satisfaction (Agliata & Tantleff-Dunn, 2004; Grogan et al., 1996; Leit et al., 2002) and the increase in these difficulties for males high on internalization and awareness (Agliata & Tantleff-Dunn, 2004). Similar problems with body dissatisfaction and negative mood are also observed in men who engage in social comparison with the ideal (Hausenblas et al., 2003; Thornton & Moore, 1993). Given the difficulties associated with awareness, internalization, and social comparison to the ideal, it is important to highlight the importance of these social influences in male body image.

Because particularistic general comparison tendencies did not predict the desire to be muscular, a separate analysis of peer and model comparison along the muscularity dimension was completed to look more closely at social comparison processes. Universalistic and particularistic social comparison on the muscularity dimension were hypothesized to be correlated to the DFM (Hypothesis 3). As expected, both comparison to peers and models/celebrities on body aspects related to muscularity were moderately correlated with the DFM. As comparison of body parts such as the chest, shoulders, upper arms, and forearms increases, the desire to augment one's muscularity also increases. The act of engaging in social comparison of body parts specific to muscularity, regardless of to whom men were comparing themselves, was related to the DFM. This finding is consistent with research with adolescents that found males were as likely to engage in particularistic comparison as they were universalistic comparison of their body build (Jones, 2001). It may also explain why general particularistic comparison did not predict the DFM in the multiple regression, whereas universalistic comparison along the appearance dimension did predict the DFM. It appears that comparison of specific body parts related to muscularity with peers is more salient to men's desire to be muscular than their general appearance comparison tendencies with their peers. These results also lend support for the role of social comparison processes in male body image.

Although magazine exposure was not a statistically significant predictor of the DFM, a more detailed analysis of magazine exposure and the DFM provided insight into a different and previously unexamined aspect of this relation. The current study was interested in determining whether reading the articles or looking at the pictures and advertisements in the male-audience magazines was more strongly related to the DFM. Percentage of time spent viewing the ideal images was more important in relation to the desire to increase musculature than reading the content of the publication. Exercise and fitness magazines were also expected to have a stronger relation with the DFM than fashion magazines (Hypothesis 4) and the expected result was observed. Looking at the advertisements and pictures of male models in exercise and fitness magazines was associated positively with the DFM, whereas none of the fashion magazines evidenced correlations with the DFM. Given the powerful messages conveyed by magazine images

and advertisements regarding the power of muscularity and the superiority and masculinity associated with it (White & Gillett, 1994), it is not surprising that the DFM is related to focusing on the images in these magazines. Men are exposed daily to these magazines and the muscular images and advertisements inside them and on their covers. They are readily available in drugstores, gas stations, convenience stores, and grocery stores. Fitness facilities provide access to these magazines for their clientele. Although it is not even necessary to purchase the magazines to be exposed to them, men purchase millions of popular male-audience fitness magazines each year in North America (Frederick et al., 2005). The current study's results support sociocultural theory and suggest that viewing these images and advertisements, which transmit important messages about muscularity, is related to the desire to acquire a more muscular physique.

The finding that looking at pictures and advertisements is related to the DFM is important, as previous research has explored the association between magazine exposure and body image but no study has examined what that *exposure* has entailed. This result provides some insight into how magazine exposure may be related to the desire to be muscular. It appears as though actively viewing the images and advertisements may be more relevant to male body image than reading the articles. Replication of this result and experimental research to further examine this relation is warranted.

Body Image Evaluation and Investment and the Drive for Muscularity

The second objective of the current study was to examine the relations between the DFM and body image evaluation and investment. It was expected that both body image evaluation and investment would predict the desire to be muscular in men (Hypothesis 5). It was also hypothesized that body image evaluation variables would be more strongly related to the DFM than investment variables. This hypothesis was partially supported. The body image evaluation variables of appearance evaluation, upper body strength esteem, and physical conditioning esteem were not related to the desire to be muscular. The relations between the DFM and body image evaluation variables were in the expected direction (i.e., negative) but were not statistically significant. In the first step of the hierarchical regression, these same variables did not predict the desire to be muscular. Body investment variables of appearance orientation and currently used body change strategies, however, were related positively to the desire

to be muscular. In the second step of the hierarchical regression, these same variables predicted the desire to be muscular and accounted for 26% of its variance. The more appearance orientated men are, the higher their desire to be muscular. The frequency of men's current use of body change strategies increases as their DFM increases. The specific strategies to increase musculature and leanness included supplement/substance use, diet, exercise, and cosmetic or camouflaging techniques.

The finding that body image investment predicted the DFM fits with research that has demonstrated an association between the DFM and discrepancies between one's perceived and ideal body (Morrison et al., 2004). This literature states that individuals will be motivated to decrease the gap between the bodies they perceive they have and the bodies they desire (Silberstein et al., 1988). This is consistent with the notion that when individuals judge themselves to be lacking in a particular area, efforts will be made to become closer to their personal ideal on the dimension they are lacking (Festinger, 1954). In the case of men and muscularity, men will strive to increase their size to perceive less of a discrepancy between the bodies they have and the bodies they want. Body investment is the way to achieve this because the strategies are designed to not only maintain but also improve the body (Cash & Pruzinsky, 2002; Muth & Cash, 1997). The results of the above analyses are consistent with other research that has demonstrated men are using substances, diet, exercise, and other strategies to change their bodies (Blouin & Goldfield, 1995; Frith & Gleeson, 2004; Kanayama et al., 2001; McCabe & Ricciardelli, 2003; O'Dea & Rawstorne, 2001), and with studies that have found associations between the desire to increase muscularity and body image investment (Hildebrandt et al., 2004; Morrison et al., 2004; McCreary & Sasse, 2000).

The findings indicate that men are placing importance on how they look, engaging in grooming behaviours, and paying attention to their appearances. This focus on appearance is not surprising, given the appearance driven nature of North American culture and the pressure on men to embody the muscular physique. Men not only appear to be more cognizant of the importance of their appearance, they are reporting the use of specific strategies to change their bodies. Moreover, this body image investment predicts the desire to be muscular. The results suggest that men are experiencing a level of discontent with their muscularity and they are thinking actively about their appearance

and engaging in behaviour to improve their view of their bodies. This investment in appearance fuels a multi-billion dollar industry designed to capitalize on men's body concerns, and includes things like fitness facility memberships, grooming products, supplements, cosmetic procedures, and male-audience magazines. Improving one's appearance costs money. Not only are there financial costs to achieving the male body ideal, there may be emotional and physical costs, as some of these body investment strategies are unhealthy and potentially dangerous (i.e., steroid use or elective surgery). For these reasons, it is important to improve our understanding of the extent to which men will go to change their appearance.

That body image evaluation did not predict the DFM was unexpected, as the literature has consistently demonstrated an association between negative body evaluation and dissatisfaction with size (Moore, 1990; Raudenbush & Zellner, 1997; Tucker, 1983, 1984), as well as between body dissatisfaction and chest-size dissatisfaction (Tantleff-Dunn & Thompson, 2000). The result is also incongruent with research that found associations between the desire to be muscular and muscle dissatisfaction and physical appearance self-esteem (Morrison & Harriman, 2005; Morrison et al., 2004). The current study utilized a reliable and valid body evaluation measure that is specific to male body image, namely one that measures satisfaction with the upper body and physical conditioning. Therefore, the finding that body image evaluation was unrelated to the DFM is unlikely due to a methodological problem. There are a few plausible explanations that may elucidate the lack of a significant finding.

One plausible explanation for the lack of relation between the DFM and body image evaluation may be related to the level of the drive for muscularity in the current sample. The mean score on the DMAQ was 28.1, which is similar or slightly higher than the mean DMAQ scores reported in other samples (i.e., means of 28, 25.9, and 26.3, respectively, in Morrison & Harriman, 2005; Morrison et al., 2003; Morrison et al., 2004). Morrison and colleagues categorize this level of the drive for muscularity as modest. Perhaps the drive for muscularity was not at levels sufficient enough to observe a considerable degree of body dissatisfaction in the current sample, hence, the statistically non-significant finding. It is possible that with moderate to extreme levels of the DFM, body dissatisfaction may have come into play in the prediction of the DFM. Future

research to investigate this possibility with populations expected to have a higher drive for muscularity (i.e., bodybuilders, male models) will be necessary to further illuminate the relation between the DFM and body image evaluation.

Another possibility to explain the statistically non-significant relation between the DFM and body evaluation may be related to the concept of *normative discontent*, which refers to the idea that a certain level of dissatisfaction with the body is typical (Rodin et al., 1985). It is conceivable that men are experiencing *normative discontent* in reference to their muscularity. Thus, although they could be experiencing some dissatisfaction with their bodies, men may view this as normal and subsequently may not be endorsing it on traditional measures. This would leave the impression that the DFM is not related to body dissatisfaction.

Men in the current sample may also not have been willing to admit dissatisfaction with their physiques due to social desirability. Males are socialized to view body image concerns as a women's issue and, therefore, may keep the extent of their concerns to themselves (Pope, Phillips, et al., 2000). Another plausible explanation is that men are trying to maintain their view of themselves as mentally healthy by minimizing their body image concerns, which is also known as defensive denial (Shedler, Mayman, & Manis, 1993). Men in the current study endorsed the intended use of several dangerous body change strategies in the future, which would appear to invalidate the possibility of social desirability in their responses. Research demonstrates, however, that men are high on the trait of agency, which is the gender-role personality component associated with masculinity (Helgeson, 1994). Agency manifests itself in characteristics such as dominance, repression of feelings, self-control, self-protection, and urge to master (Bakan, 1966; Helgeson, 1994). Given men's tendency to be agentic, it is worth considering that men may be more likely to admit to actions they will take to solve a particular problem (i.e., body image dissatisfaction) as opposed to sharing their feelings about the problem. This may explain why men may not have admitted to negative body image evaluation even though they did admit an intention to use unhealthy means of body image investment in the future. Men have self-reported dissatisfaction with their physiques in previous research (Lynch & Zellner, 1999; Tantleff-Dunn & Thompson, 2000), which may render the social desirability explanation as less plausible.

This raises an important point in relation to the variables measured in the current study. It is possible that body image evaluation did not predict the DFM because there are other variables important to the DFM that were not measured in the current study. The variability in the DFM that was not accounted for by body image evaluation could be accounted for by other important variables that are related to the DFM. For example, recent research by McCreary, Saucier, and Courtenay (2005) determined that gender-role socialization is associated with the DFM. The authors found that unmitigated agency, which represents the tendency to focus exclusively on the self to the exclusion of others, was a statistically significant predictor of the DFM. Individuals higher in unmitigated agency exhibited higher levels of the DFM (McCreary et al., 2005). The researchers also determined that male-typed behaviours (i.e., behaviours stereotypical of males but socially acceptable for males and females to exhibit) and male sex-specific behaviours (i.e., behaviours stereotypical and more desirable for men to exhibit) were positive predictors of the DFM. Finally, the study found that traditional attitudes about men (i.e., controlling emotions, taking risks), difficulty balancing work and family, and being concerned with success and dominance over others were related positively to the DFM (McCreary et al., 2005). These results are consistent with previous qualitative research that revealed men associate muscularity with masculinity (Grogan & Richards, 2002), and the notion that men may feel muscularity is a way to differentiate themselves from women (Pope, Philips et al., 2000). Recent research has also examined personality correlates and their association with the DFM (Davis, Karvinen, & McCreary, 2005). Davis and colleagues (2005) looked at whether narcissism, neuroticism, perfectionism, appearance orientation, and fitness orientation predicted the desire to be muscular. Neuroticism, perfectionism, and appearance and fitness orientation were statistically significant, positive predictors of the DFM. These variables demonstrate a relation to the DFM and are important variables to consider when considering the unexplained variance in the DFM. Therefore, the picture of the DFM in men is more complex and not just associated with body related variables. Researchers will need to be mindful of additional variables such as gender-role socialization and personality when investigating the DFM in the future.

Another conceivable explanation for not finding a relation between body evaluation and the DFM is that the measure of the desire to be muscular may not have been specific enough. Recent qualitative research has demonstrated that muscularity is multifaceted (Ridgeway & Tylka, 2005). Several characteristics of muscularity that are important to men were identified in Ridgeway and Tylka's study, including *strong, definition, athletic, big, and large size...but not too large*. Men identified other body parts in addition to their upper body parts that they would like to be muscular, such as abdominal region, upper legs, calves, and buttocks. Perhaps by taking into account these other aspects and body parts associated with muscularity concerns, a significant relation between body image evaluation and the desire to be muscular may have been observed.

Given the lack of relation between the desire to be muscular and body evaluation, one may consider that the DFM, at modest levels, is a motivator for men to engage in the strategies necessary to bring about change in their bodies. The results of the analyses suggest that both a general level of investment in appearance and the current use of body change strategies predict the desire for muscularity in men. Previous studies have linked minimal to moderate level of body discontent with positive health behaviours, such as exercise and eating well (Heinberg, Thompson, & Matzon, 1999; McDonald & Thompson, 1992), and the level of the DFM in the current sample was considered to be modest. Thus, it is plausible that a certain level of the DFM may be beneficial and bring about health related behaviours in college-aged men. Some of the strategies on the body investment measure utilized in the current study would be considered healthy, such as weightlifting and participating in sport. Other strategies that men have access to and knowledge about are not so healthy, however, including consuming high-fat and caloric food and using substances like steroids and ephedrine. One may speculate that at a high enough desire to acquire more muscularity, the DFM may be related to the use of potentially harmful strategies. The results of a more detailed examination of the specific strategies men are using to change their bodies will be reviewed next.

To look more closely at body image investment in men, the current use of specific types of investment strategies and their relation to the desire to be muscular was explored. It was expected that a number of body change strategies would be correlated positively to the DFM (Hypothesis 7). This hypothesis was supported. The present study

identified several positive associations between currently used strategies and the DFM. The DFM was related positively to current use of the following body investment strategies: protein consumption and creatine use; high fat/caloric diet to increase weight and special diet to increase muscle (eating 5 to 6 times per day); weightlifting and participating in sport to increase muscle; and wearing clothes to appear larger. These correlations strongly suggest that as men's desire to be muscular increases, so does the intensity of their use of specific body change strategies to increase muscularity. It appears as though men are currently using a wide range of techniques to achieve the physique idealized in Western culture. In doing so, many are going about changing their bodies using health-related behaviours, such as weightlifting and sport. However, there are men that are resorting to other ways to achieve their goals that may be less healthy, such as high fat diets.

The present study identified a number of currently used body change strategies that were associated with the DFM. It was considered, however, that although many men may contemplate using the various strategies, it might not translate directly into current use of these techniques. There may be men who currently are not pursuing muscularity but this does not mean that they will not pursue muscularity in the future. Therefore, analyses were completed to determine if the desire to be muscular was related to the intention to use these same strategies in the future. It was hypothesized that the DFM would be associated with the intention to use body investment strategies in the future (Hypothesis 8). This prediction was supported. All of the strategies in the Substance/supplement category were related to the DFM. The intention to use steroids, prohormones, and ephedra in the future were statistically significant correlates of the DFM, although they were not as current body investment strategies. In the Diet category, special diets to increase muscle, 2-phase diets to increase muscle and leanness, and high fat/caloric food intake were associated with the DFM. With respect to Exercise and Other strategies, weightlifting, participation in sport to increase muscle, and wearing clothes to appear larger were related positively to the desire to be muscular. As with current use of body change strategies, the results suggest that as the DFM increases, so does the intention to use body change strategies to increase muscularity and leanness in the future.

The above results may be even more substantial than those found for current use of body change strategies because several of the strategies endorsed for future use may pose serious risks to one's health. In particular, there is a large body of research on the physical and psychological risks associated with steroid use, such as cardiovascular damage (Blouin & Goldfield, 1995; Brower et al., 1994; Evans, 1997). Similar risks have been identified with prohormone use (King et al., 1999), and ephedrine use has been linked to cardiovascular and neurological risks (PDR, 2000; Rawson & Clarkson, 2000). Although men may not be currently using some of these more dangerous body investment strategies, they may be planning to use them in the future to build their muscle mass and increase their leanness. Men may feel pressure to attain the muscular physique idealized in Western culture and contemplate engaging in behaviour that has the potential to damage their emotional and physical well-being. Due to the psychological and physical dangers associated with body investment strategies such as steroids, prohormones, and ephedrine, it is especially important that clinicians are aware of men's intentions to use unhealthy ways to change their bodies in the future. Men who present to treatment with body image concerns will need important information regarding the risks associated with some of these body investment strategies. Clients will also need to be screened and monitored throughout treatment so that any unhealthy behaviour can be addressed as a part of the treatment plan. Psychoeducational programs developed to target the prevention of these types of behaviours would also be beneficial.

A secondary goal of the study was to replicate previous relations between body investment and the desire to be muscular that have been found in the literature. The results supported the expectation that the DFM would be related to weightlifting, protein use, cardiovascular exercise, and dieting to gain weight (Hypothesis 6) (Hildebrandt et al., 2004; McCreary & Sasse, 2002; Morrison et al., 2004). To obtain further information on weight gain in men, participants were asked how much of a gain in weight and musculature (in pounds) they desired. It was expected that the number of pounds of muscle desired would correlate positively with the DFM (Hypothesis 9). Not only was desired weight gain (in pounds) associated with the DFM, desired muscle gain (in pounds) evidenced a moderate correlation with the DFM. Moreover, 77% of males who reported that they desired weight gain indicated they would like all of the weight increase

to consist of muscle. For men whose desired muscle gain is relatively small, this may be achievable. Many men in the sample, however, reported that they would like to gain a large amount of muscle, some upwards of 60 pounds. For these men, acquiring this type of muscle mass is unrealistic and unattainable, and may be associated with further body dissatisfaction and disappointment. There is also the possibility that desiring such a large amount of muscle gain may be related to the use of strategies designed to help one acquire muscularity quickly, such as steroids and prohormones, which are potentially harmful. In summary, the above results provide further support that as men's desire to acquire muscularity increases, they increasingly invest in body change strategies designed to get them closer to the muscular mesomorphic ideal.

Psychological Well-Being and the Drive for Muscularity

The third major objective of the present study was to examine the desire for muscularity and psychological variables that may be associated with it, such as depression, self-esteem, worry, physique anxiety, and Muscle Dysmorphia. The current study investigated the predictive utility of the DFM regarding Muscle Dysmorphia while controlling for depression and self-esteem. It was expected that the desire to be muscular would predict Muscle Dysmorphia symptomatology, over and above what was accounted for by affective distress and general feelings of self-worth (Hypothesis 10). This prediction was supported. Depression contributed 7% of the variance in Muscle Dysmorphia symptoms in the first step of the hierarchical regression, and the DFM accounted for an additional 23% of the variance on the second step. Although self-esteem had a statistically significant zero-order correlation with Muscle Dysmorphia on its own, when entered with depression in the first step of the regression, its effect was statistically non-significant. Semi-partial correlations for CES-D and the DMAQ with Muscle Dysmorphia were .16 and .48, respectively, indicating the relation between these variables and the DFM when all other variables are held constant. The results of the analysis demonstrate that both depression and the DFM predict muscle pathology. Even after accounting for general distress levels (e.g., depression), the presence of Muscle Dysmorphia symptoms increases as men's desire to be muscular increases. These results are indicative of a strong association between the desire to be muscle and the presence of

Muscle Dysmorphia symptoms. The DFM appears to be a good predictor of muscle pathology in men.

The current study demonstrated the DFM is related to total Muscle Dysmorphia symptomatology. To obtain more detailed information regarding this relation, the specific facets of Muscle Dysmorphia and their connection to the DFM were examined more closely. Each dimension of Muscle Dysmorphia assessed by the MASS was expected to be related to the DFM (Hypothesis 12). Bodybuilding dependence, checking, substance use, and injury evidenced positive correlations with the DFM. As the desire to be muscular increases, the compulsive tendency to engage in weightlifting (bodybuilding dependence), reassurance seeking and mirror checking regarding muscularity (checking), willingness to use steroids and other substances to increase muscularity (substance use), and overtraining (injury) increase. The DFM was also associated negatively with muscle satisfaction, such that satisfaction with muscularity decreases as the DFM increases. Not only is the total level of Muscle Dysmorphia symptomatology associated with the desire to be muscular, each unique facet of the disorder is connected to the drive.

The above results are concerning because they suggest that as men desire increased muscularity, they experience an increasing amount of symptoms indicative of pathology. These symptoms include ignoring physical pain when weight lifting, spending large amounts of time looking at their muscles in the mirror, getting reassurance from others that they are large, and believing that it is acceptable to use steroids or any other means necessary to become larger. It is important that clinicians be aware that the desire for and pursuit of muscularity is potentially related to pathology in men, just as the desire for and pursuit of thinness is in women.

The above results support previous research that has found depression to be comorbid in men diagnosed with Muscle Dysmorphia (Olivardia et al., 1995). There is a substantial amount of research that has connected affect and body image (Fox & Corbin, 1989; Holsen et al., 2001; Kaur et al., 2003; Noles et al., 1985; Sonstroem & Potts, 1996) and experimental studies that have demonstrated exposure to the ideal body produces negative mood (Agliatta & Tantleff-Dunn, 2004; Hausenblas et al., 2003). The results of the current study also suggest that desiring an increased level of muscularity is related to potentially serious psychological symptoms. This does not mean that the DFM is

necessarily pathological in and of itself, but that it has an important connection to Muscle Dysmorphia. The central feature of Muscle Dysmorphia is concern one is insufficiently lean and muscular and men with Muscle Dysmorphia experience very high levels of muscle dissatisfaction. The DFM represents the desire to be more muscular, and has been associated with muscle satisfaction (Morrison & Harriman, 2005). As such, men with Muscle Dysmorphia and those who experience higher levels of the DFM both experience some degree of dissatisfaction with their current level of musculature. Men with Muscle Dysmorphia will likely have a strong desire to acquire muscularity that is associated with their dissatisfaction with their muscularity (i.e., discrepancy between perceived and ideal muscularity). The DFM appears to be related to the evaluation component of Muscle Dysmorphia, which is supported by the correlation between muscle satisfaction and the DFM. However, the desire to be muscular was highly related to the compulsive behaviours associated with Muscle Dysmorphia. It is interesting to note that the DFM was moderately associated with the behaviours associated with Muscle Dysmorphia (r s of .39 to .49), whereas the relation between the DFM and the evaluative dimension of Muscle Dysmorphia (i.e., muscle satisfaction) was considerably smaller ($r = -.26$). These results parallel those found with body investment and the DFM, and provide further evidence that when men are desirous of increasing their musculature, they increasingly engage in behaviour to alter their bodies. These behaviours may be healthy (e.g., weightlifting, sport) but they may also be indicative of an unhealthy preoccupation with muscularity (e.g., reassurance seeking, weightlifting when injured). The results of the current study suggest that the way in which the DFM is connected to Muscle Dysmorphia may be more strongly related to the act of engaging in behaviours to acquire muscularity, as opposed to evaluation of the body. This is consistent with the notion that individuals will engage in behaviours designed to decrease the gap between how they perceive themselves to be on a particular dimension and how they want to appear (Silberstein et al., 1988). In this particular instance, when men perceive themselves to be lacking in muscularity, they engage in behaviours to increase their muscle mass to get closer to their ideal level of muscularity. Given the association between the DFM and Muscle Dysmorphia, it is plausible that the DFM, at very high levels, could be a precursor to Muscle Dysmorphia, just as the drive for thinness is a precursor to the

development of eating disordered behaviour in women (Stice & Whitenton, 2002).

Determining whether the DFM could be a risk factor associated with the development of body image pathology in men will require further study of a longitudinal nature.

Regarding other psychological variables and their relation to Muscle Dysmorphia, the current study demonstrated that muscle pathology is associated with depression, which supports Hypothesis 11 of the current study. The results also revealed an expected, positive relation between Muscle Dysmorphia and worry, which replicates another recognized psychological correlate of Muscle Dysmorphia (Olivardia et al., 2000). The more self-reported Muscle Dysmorphia symptoms reported by men, the higher their level of worry. This replication of previous work provides further support for the psychological difficulties associated with extreme levels of dissatisfaction with one's muscularity. When working with men with Muscle Dysmorphia, clinicians will need to be aware of and address difficulties with mood and anxiety during the course of treatment.

The above results demonstrated a connection between the DFM and muscle pathology. The current study also expected to replicate previous relations observed in adolescent males and identify relevant psychological variables to male body image. The first goal in this regard was to replicate associations between the desire to be muscular and depression and self-esteem that were previously found in adolescent males (McCreary & Sasse, 2000). Both depression and self-esteem were hypothesized to be related to the DFM (Hypothesis 13). However, only self-esteem was correlated with DFM. As men's desire to be muscular increases, their general feelings of self worth drop. This is consistent with a large amount of research in the body image literature that has connected body dissatisfaction with self-esteem (Abell & Richards, 1996; Franzoi & Herzog, 1986; Franzoi & Shields, 1984; Henriques & Calhoun, 1999; Mendelson et al., 1995; Tantleff-Dunn & Thompson, 2000; Yelland & Tiggemann, 2003). That being desirous of more musculature is associated with general self worth is not surprising, particularly in light of research that has demonstrated that objectively more muscular men are more satisfied with themselves than less muscular men (Tucker, 1983). This finding is important as it suggests experiencing concerns regarding one's muscularity has implications for an individual's core feelings of self-acceptance and perceptions of self-

confidence. Perhaps being unable to achieve the physique idealized by society and, therefore, not benefiting from the positive feedback associated with being muscular leaves men feeling less satisfied with themselves in general. Longitudinal research with adolescent females has revealed that body dissatisfaction is a precursor to negative self-esteem (Hargreaves & Tiggemann, 2002). Depression was not related to the desire to be muscular in men, as was found in adolescent males (McCreary & Sasse, 2000). One possible explanation for this finding is that adolescent males are farther away from the male body ideal due to their smaller size, whereas adult males may be closer to the ideal by virtue of their larger stature as grown men. Older males may also have other positive things in their lives besides being muscular that could buffer against feelings of depression, such as an occupation, romantic relationships, or increased education.

The second objective with respect to psychological correlates was to examine the association between the DFM and anxiety. Two types of anxiety were explored, general worry and SPA. It was posited that both worry and physique anxiety would be related to the DFM (Hypothesis 14). The results supported this prediction. As the DFM increases, so do general levels of worry and anxiety related to interpersonal evaluation of the physique. The finding that the desire to be muscular is related to general worry is consistent with literature that has shown anxiety to be related to body satisfaction in adolescents (Kostanski & Gullone, 1998) and experimental research in which exposure to the male body ideal produced anxiety in adult males (Agliatta & Tantleff-Dunn, 2004). It is also congruent with recent research that found that neuroticism, which measures anxiety proneness and emotional reactivity, was a predictor of the desire to be muscular in adult men (Davis et al., 2005). Neuroticism was related positively to the DFM ($r = .27$) in a sample of 100 men. As such, anxiety is another psychological correlate of the desire to be muscular that clinicians and researchers will need to be aware is relevant to male body image.

Social physique anxiety was also related positively to the DFM in men, which is consistent with a recent study demonstrating that relation (Duggan & McCreary, 2004). The results are also congruent with the theory behind SPA. Social anxiety theory suggests that anxiety arises when individuals believe that they have not made a desirable impression (Schlenker & Leary, 1982). In the physical arena, presenting to others a body

that one believes will not make a favourable impression is expected to result in physique anxiety. There are clear messages from society and the media about the form of the ideal male body. Men in the current study self-reported awareness and internalization of the ideal physique. This ideal physique is unrealistic and unattainable for most men without a massive amount of effort (Pope, Phillips, et al., 2000). Given the pervasiveness of images of the ideal physique, men likely hold unrealistic expectations about how their bodies should look, which is associated with social physique anxiety (Hart et al., 1989). Men may strive to embody this unrealistic body and due to the difficulty attaining it many may not succeed in this endeavor. With rising concerns regarding men's level of muscularity, the desire to increase musculature, and the difficulty in attaining the ideal, it is not surprising that men's anxiety about not meeting others' expectations regarding their physical appearance increases.

The finding that the desire to be muscular is related to physique anxiety also fits with research that has connected SPA with body dissatisfaction (Davis et al., 1993; Hart et al., 1989; Petrie et al., 1996). In particular, research has demonstrated lower physique anxiety in men who perceived themselves to be more muscular and strong (Petrie et al., 1999) and a high correlation between dissatisfaction with upper body strength and SPA. Furthermore, underweight men have reported that they believe others think poorly of their physiques (Harmatz et al., 1985). Given this collection of research, it is expected that men desirous of a more muscular build worry that others negatively evaluate their bodies.

There are implications surrounding the relation between SPA and the DFM. For example, studies have found physique anxiety is negatively correlated with exercise in men (Davis et al., 1993; Hausenblas & Fallon, 2002; Lantz et al., 1997). There may be men experiencing muscularity concerns with associated physique anxiety that are missing out on the potential psychological and physical benefits of exercise. Research has demonstrated that weight training is associated with improvements in body satisfaction and social physique anxiety (Williams & Cash, 2001). If men are dissatisfied with their muscularity and worry about how others evaluate their bodies, they may avoid working out and their bodies will not change, which may reinforce their fear about not making the desired impression. Social physique anxiety is also associated with depression in men

(Davis, et al., 1993; Davis et al., 1991), therefore it is important to understand the extent to which physique anxiety is related to the desire to be muscular. Clinicians will need to be cognizant of addressing physique anxiety during the treatment of body image concerns in men.

Contributions of the Current Study

The current study met a number of its objectives and has made several contributions to the area of male body image research. This research has elucidated a number of variables that are salient to the DFM in men. In the area of theory, this study determined that aspects of both sociocultural and social comparison theory are important to the desire to be muscular in men. The results highlighted the importance of awareness and internalization of the ideal male physique as well as social comparison processes and their connection to men's desire to acquire muscularity. These key variables were identified as relevant to the prediction of the desire to be muscular and will be important to examine in the future using longitudinal research to assess whether they are antecedents in the development of the DFM. The current study also found that looking at the pictures and advertisements in magazines appears to be more important to the desire to be muscular than reading the content of the magazines.

With respect to body image investment, the role of body change strategies and general investment in appearance as predictors of the desire to be muscular was illuminated. An extensive list of body change strategies, many of which were previously unexamined, was investigated in the current study. Importantly, the results revealed that men intend to use a number of potentially unhealthy strategies in the future to increase their muscularity. The current study also determined that body image investment may be more salient to the desire to be muscular (i.e., at modest levels) than body image evaluation. Clinicians will need to focus on the behaviours men are engaging in to change their bodies when treating men with body image concerns.

The DFM was also linked to psychological well-being in the current study. Several important psychological variables, such as self-esteem, worry, and social physique anxiety were connected to the desire to be muscular in men. Muscle Dysmorphia also evidenced a strong relation with the DFM. It appears that the desire to acquire muscularity, even at modest levels, is related to the experience of negative

psychological symptoms. The results do not indicate that the DFM itself is necessarily pathological, however, both researchers and clinicians will need to be aware of the connection between the desire to be muscular and psychological well-being in their future endeavors. It will also be important to consider the possibility that the DFM, at very high levels, may represent a risk factor in the development of muscle pathology in men.

Another interesting and informative finding of this research surrounds magazine exposure and its relation to body image. The percentage of time spent looking at advertisements and images in male-audience magazine was relevant to the DFM, not reading the content in those magazines. Therefore, the current study further explained the association between the desire to be muscular and magazine exposure by clarifying what *exposure* entailed. Future research will need to take into consideration that it is not necessarily just the frequency of exposure to magazines that is related to male body image, but that exposure may encompass different processes.

The present study also replicated of a number of relations in extant work, providing further support for previously identified associations in the literature. These relations were in the areas of theory (e.g., DFM and universalistic comparison), body image investment (e.g., DFM and protein consumption, weight training, and dieting to gain weight), and psychological well-being (e.g., DFM and self-esteem and physique anxiety).

Methodologically, the current study addressed several limitations noted in previous research. A psychometrically valid and reliable questionnaire designed specifically to measure the desire to be muscular was employed, as well as a number of other instruments designed to examine male body image, such as the Upper Body Strength and Physical Conditioning subscales of the BES, the SATAQ-Male Version, and the USC. The use of these measures falls within Cafri and Thompson's (2004) criteria necessary for investigating body image in men by using measures that assess: muscularity; characteristics such as physical activity participation or eating behaviours related to muscularity; and the male upper body.

A unique aspect of this study methodologically was the use of online versions of all the instruments. Analyses revealed no statistically significant differences between the responses of men who completed the questionnaires online and a small sample of men

who completed them on a paper-and-pencil version. This is important as there are several benefits associated with the use of online testing, including time efficiency, ensuring the privacy of participants, conservation of paper, and cost effectiveness. Researchers should consider online methodology as an efficient, cost effective, and participant friendly means of advancing the literature in the area of body image.

Implications for Clinical Practice

The results of the current study have several implications for clinical practice with men who present with body image concerns. It is important to recognize that men with diagnosable DSM-IV body image disorders are not the only men who may require treatment. An increasing number of men are self reporting body dissatisfaction and there are likely a proportion of men, as there are women, who will present to clinicians with subclinical levels of body image concern. These men may not meet full criteria for a mental disorder, however, the level of dissatisfaction they experience may impact their functioning in a significant way. Treatment with individuals such as this will require knowledge of the relevant variables associated with male body image, particularly in regards to muscularity concerns and the desire to be muscular. The results of the current study demonstrate that being aware of and internalizing the male body ideal are predictors of the desire to attain muscularity. In addition, engaging in comparison of one's body to models and celebrities who embody that muscular ideal is also predictive of the DFM. Treatment for body concerns will need to address the messages society communicates to men regarding what is deemed attractive, challenge the importance of those messages, and work toward reducing men's tendencies to compare themselves with the images in the media.

Cognitive-behavioural and psychoeducational treatments have been developed and well researched in women (Cash & Strachan, 2002). Components of these approaches focusing on the body image concerns pertinent to men will be important in treatment. For example, a cognitive approach to treatment may center on identifying and challenging cognitive distortions and underlying beliefs related to sociocultural expectations of muscularity (e.g., "I need to look like the muscular models and celebrities I see in the media to be happy," "muscularity equals success and power"). Additionally, challenging society's message that not achieving the ideal body is a result of laziness,

irresponsibility, or weakness will be an important part of addressing body image concerns (LeBow, 1999). Behavioural interventions, such as paying attention to other characteristics of comparison targets as opposed to their appearance (Wilhelm, 2006), may be required to reduce the amount of appearance social comparison on the dimension of muscularity the individual engages in. Psychoeducation focusing on being more critical of the media and the images and messages it transmits regarding muscularity will also be an important aspect of treatment for men with body image concerns. Prevention programs have recently been developed to target body concerns and minimize the internalization of messages from the media in adolescent males (Stanford & McCabe, 2005; Wilksch, Tiggemann, & Wade, 2006). Stanford and McCabe (2005) developed a two-session psychoeducational program focusing on: Increasing satisfaction with and decreasing the importance of muscularity and weight; decreasing or preventing the use of body change strategies; and decreasing the impact of negative body image and the use of body change strategies on psychological well-being. Adolescent boys who participated in the program evidenced an increase in muscle satisfaction and self-esteem and a decrease in depression when compared to the control group. No changes in the use of body change strategies were noted in the boys participating in the group. Wilksch and colleagues (2006) developed a six-session media literacy program designed to decrease the internalization of media messages about the ideal body. The program focused on challenging how realistic stereotypes presented in the media are and becoming more critical of the messages portrayed. One-hundred thirty seven boys participated in the program and the results demonstrated decreases in the amount that boys internalized messages from the media from pre- to post-intervention. These programs demonstrate that changes can be made in muscular satisfaction and that the level of internalization of media messages can be reduced. Although these programs were developed for adolescents, the concepts used within them may well be applied to treatment with adult males.

The current study also highlights the importance of body change strategies and their relation to the DFM. Although some of the strategies used by men to acquire muscularity and decrease body fat are healthy and lower risk (i.e., weightlifting and cardiovascular exercise), many of the strategies accessible to men are dangerous and have

potential deleterious consequences for psychological and physical health. Men with muscle dissatisfaction who are engaging in these dangerous body change strategies may benefit from psychoeducation regarding the potential health implications of using certain body change strategies, particularly in reference to substance use. Men may require assistance in minimizing or ceasing their use of potentially harmful activities.

Importantly, clinicians need to be aware that although men may not disclose present use of dangerous strategies to change their bodies, the current study demonstrated there are many strategies that men intend to use in the future to build lean muscle mass. Due to health risks associated with some of these strategies, such as steroid, prohormone, and ephedrine use, it will be important for clinicians to continuously assess and monitor men's body image investment behaviours.

It will also be very important for clinicians to monitor the severity of the muscle dissatisfaction men present with in addition to their drive to be muscular. The current study found a strong link between the DFM and Muscle Dysmorphia symptomatology. It was also demonstrated that the DFM is related to decreased self-esteem, increased worry, and increased physique anxiety in men. According to Morrison and colleagues (2004, 2005), the level of DFM in the current sample reported was modest. Hence, even modest levels of the DFM are associated with decreased psychological well-being. For this reason, clinicians will need to be particularly mindful of the link between the DFM and potential negative psychological correlates. One may speculate that at more moderate to severe levels, a man's DFM may be indicative of an unhealthy preoccupation with his physical appearance, just as the drive for thinness is with women. Cognitive-behavioural therapy may be a useful approach to help men identify cognitive distortions (i.e., labeling and all-or-nothing thinking) regarding their bodies that may contribute to feelings of low self-esteem, worry, and physique anxiety (Cash & Strachan, 2002; LeBow, 1999; Wilhelm, 2006). Treatment may also focus on enhancing men's coping strategies for dealing with psychological distress related to body image. For example, recent research with adolescent males demonstrates that they use several types of strategies to cope with social physique anxiety (Kowalski, Mack, Crocker, Niefer, & Fleming, 2006). Common strategies identified for dealing with SPA that would be considered adaptive included acceptance of one's body, short-term appearance management, and obtaining social

support. Encouragement of these types of strategies for managing anxiety surrounding the physique would be beneficial. Aspects of other strategies identified by Kowalski and colleagues, however, could be considered problematic, including behavioural and cognitive avoidance. For example, individuals with body image concerns often avoid activities such as social interaction, which may lead to isolation and low mood (Wilhelm, 2006). Additionally, cognitive avoidance (i.e., ignoring other's negative comments regarding one's physique) may be helpful in certain situations, however, other types of cognitive avoidance (i.e., thought suppression) have been shown to intensify the frequency of negative thoughts (Wegner & Schneier, 1989). Therefore, behavioural and cognitive interventions targeting avoidance will be an important part of treatment.

With respect to Muscle Dysmorphia, even if an individual does not meet full criteria for body dysmorphic disorder, the symptoms and underlying issues will need to be addressed, as subclinical levels may result in significant impairments in functioning (Pope et al., 1997; Pope et al., 1993; Pope, Phillips, et al, 2000). Clinicians will need to become familiar with the symptoms of Muscle Dysmorphia and the various psychological correlates of the disorder (i.e., depression and anxiety) so that they may provide appropriate assistance. A commonly used treatment for body dysmorphic disorder is a combination of cognitive and behavioural interventions, including evaluating and changing cognitive distortions and exposure with response prevention (Cash & Strachan, 2002; McKay et al., 1997; Wilhelm, 2006). Research has demonstrated that cognitive-behavioural therapy is an effective treatment for Muscle Dysmorphia (Pope, Phillips et al., 2000; Wilhelm, 2006). The use of antidepressants (i.e., fluoxetine), alone or in conjunction with therapy, is also a treatment option to address the pathological preoccupation with muscularity (Leone, Sedory, & Gray, 2005; Pope, Phillips, et al., 2000). A recent meta-analysis examining the efficacy of cognitive, behavioural, or cognitive-behavioural therapy and medication for body dysmorphic disorder found support for all the modalities of treatment, with a slight edge for psychological interventions (Williams, Hadjistavropoulos, & Sharpe, 2006). Given the association between the desire to be muscular and Muscle Dysmorphia, further research will be required to determine whether the DFM has the potential to be a risk factor in the development of Muscle Dysmorphia and what that threshold would look like.

Limitations of the Current Study

There are several limitations in the current study that must be noted. The first of these is the use of self-report questionnaires, which may be associated with social desirability. Social desirability has been noted as a common problem in questionnaire-based research (Horvat, 1986), therefore, methods to prevent socially desirable responses were employed. These methods included telling participants why the research was being performed (i.e., this research is part of a doctoral thesis) and including a plea for honesty (i.e., it is important to answer the questions as honestly and openly as you can). Horvat (1986) reported that although personal pleas for honesty do not result in 100% honesty, they work better than other techniques. The writer also attempted to maximize the confidentiality for participants by using online measures, which allowed participants to complete the questionnaires in privacy. Despite these methods, the possibility of socially desirable responses in the data does exist. Body image concerns are largely considered a female issue by society, therefore, men in the current sample may have been reluctant to admit the full extent of their body dissatisfaction. The results should be interpreted with the possibility of social desirability in mind. Future research should consider employing objective measures, such as observation or third party reporting of muscle satisfaction and body investment behaviours, to supplement subjective data.

Another limitation concerns the measurement of specific body investment strategies in the current study. The Body Investment Inventory was created for the purposes of this study. The items in the measure were included based on a survey of the relevant literature on body investment in adult males. However, the BII was missing some important items on healthy investment strategies, such as eating well to increase weight or wearing clothes to look leaner. In addition, with the exception of reliability as measured by Cronbach's alpha, the psychometric properties of the measure were not examined extensively. Although the scale was created to use the individual items, and each item was included in the measure because it represented one body change strategy, the writer was curious about the structure of the inventory for potential use in future research. Therefore, a post-hoc principal component analysis of the BII was completed (see Appendix T for the results of the analysis). Another measurement issue concerns the use of the SATAQ-M to measure sociocultural attitudes in men. This scale was a

modified version of the revised SATAQ, which was created and validated to assess sociocultural attitudes in women. As the original scale was developed for women the content validity of the SATAQ-M may be called into question. Further research will be necessary to validate the male version of the SATAQ in a sample of men.

A further limitation in the study was excluding a measure of dissatisfaction with, or the desire for, leanness. Leanness appears to be related to the DFM, as men engage in activities designed to reduce body fat, such as cardiovascular activity (Morrison et al., 2004). It is also possible that males may be more willing to self-report the extent of their dissatisfaction with body fat than concerns regarding musculature. Leanness will be particularly important to study in further detail, in light of recent research that has demonstrated an association between the desire to be muscular, drive for thinness, and body dissatisfaction geared toward weight (Wojtowicz & von Ranson, 2006). When examining the psychometric properties of two measures of the desire to be muscular, Wojtowicz and von Ranson (2006) found that the attitude subscale of the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) and the total score of the Swansea Muscularity Attitudes Questionnaire (SMAQ; Edwards & Launder, 2000) correlated positively with body dissatisfaction related to weight and shape. The authors also found that the total DMS and SMAQ scores, as well as the SMAQ subscales, were associated positively with the drive for thinness. These relations were observed for men but not women, indicating that leanness may be more important to men's perceptions of muscularity than it is to women's perceptions of muscularity. Leanness, and its meaning to men's body image, will require further study. Pertinent questions include whether the importance associated with leanness in men entails the ability to show off muscles that are present due to a lower percentage of body fat (i.e., abdominals, chest), or if actual weight and embodying a more slender physique with only some muscle is important. The recent development of the Male Body Attitudes Scale (Tylka, Bergeron, & Schwartz, 2005), which includes a subscale measuring concerns about low body fat, appears promising in this regard. Further research may help elucidate what proportion of leanness and muscularity is most desirable in men.

Recent research has also identified other aspects that may be important to male body image. Ridgeway and Tylka (2005) found that in addition to muscularity, men

reported that they also view leanness and height as components that made up an ideal body. This is congruent with previous research with adolescents that found height is an important physical characteristic in male attractiveness (Jones, 2001). Ridgeway and Tylka (2005) also found that men disclosed wanting body parts in the lower body region to be muscular as well, including the calves and upper legs. In addition, men in the study reported that muscularity consisted of having definition, being big or large...but not too large, and having a strong and athletic look (Ridgeway & Tylka, 2005). Future research should consider that muscularity may not be a unidimensional concept and develop new measures accordingly.

A further limitation in the current study is that the sample consisted of only undergraduate men. Consequently, the generalizability of the results is limited to adult, college age males and should not be applied to individuals outside of the academic setting. Much of the previous research on body image with men, however, has been carried out with undergraduate samples. The present study is in keeping with previous research in this area and will provide a baseline from which future research exploring body image in other samples (i.e., community, older men, athletes, ethnically diverse) can be compared.

Probably the largest limitation of the current study is that it is correlational in nature. As such, causal inferences cannot be made regarding the relations between the DFM and the theoretical, body image investment, and pathology variables. For example, it is uncertain whether awareness and internalization of the ideal, and universalistic social comparison, leads to the desire to be muscular. It is possible that having a strong desire to attain muscularity leads to being more aware of, internalizing, and comparing one's body with the ideal physique that is prevalent in the media. Alternatively, a reciprocal relation may be occurring where awareness, internalizing, and comparing the body to the ideal leads to the desire to be muscular, which in turns leads to the intensification of awareness, internalization, and social comparison. Similarly, engaging in body investment strategies to increase muscularity may lead to an increased desire to acquire muscularity. The reverse of this relation or a reciprocal relation for the DFM and body image investment may also be possible. Even though causality cannot be determined due to the correlation nature of the study, the results contribute to the literature, as

correlational studies are essential in determining the associations among variables that have not been extensively examined. Future research, which may build upon the current study while addressing some of its aforementioned limitations, will be reviewed next.

Directions for Future Research.

The current study is an important step in examining numerous aspects important to body image in men. Future research in the area should focus on using longitudinal studies in children and adolescents to determine the origins of the desire to be muscular. Particularly, exploring whether awareness and internalization of the ideal and social comparison are precursors to the DFM and body dissatisfaction is essential for understanding the development of body discontent in men. Examining changes in the DFM over time will be important, as evidence suggests that body image includes both static and dynamic components (Cash et al., 2002). Well-controlled, experimental studies exploring the causal antecedents of the DFM will supplement long-term research carried out. For example, experiments could: a) expose men to the male body ideal; or b) instruct them to engage in upward or downward comparison, and then examine levels of the DFM, Muscle Dysmorphia, SPA, worry, and self-esteem. It would also be pertinent to explore if men with greater baseline levels of internalization and awareness experience higher scores on the aforementioned variables after exposure to or social comparison with the male body ideal. Another interesting study would be to examine the effects of magazine exposure on the DFM using instructional sets to either read magazine content or look at the pictures and advertisements. This type of research would further clarify the relation between magazine exposure and body image. Other research examining the efficacy of body image interventions in men with body dissatisfaction, such as cognitive-behavioural therapy and psychoeducational programs designed to decrease internalization, will be an important area of study in the field of male body image.

The present study identified a number of theoretical variables associated with the DFM. Research examining other theories or explanatory factors for body image concerns in men is warranted, such as self-discrepancy theory, cognitive-processing models, or history of family or peer teasing. Exploring other aspects of social influence on male body image such as interpersonal messages regarding muscularity and the importance of muscularity to men's self-worth due to feeling *sized-up* by others, as has been done with

females and thinness (Delaney, O'Keefe, & Skene, 1997), would be beneficial. As increased knowledge of variables central to the desire to be muscular is acquired, more advanced research may be carried out and the understanding of male body image will be furthered.

Methodologically, it is important that research in this area begins to explore body image in individuals outside of the traditional academic setting. In particular, research in populations where men may be expected to have a higher level of the DFM will provide further insight in male body image. For example, studying the DFM and body image in male models, dancers, actors, bodybuilders, and athletes to determine if they may be at risk clinically merits empirical attention. Research with these populations will also contribute to the development of theory and interventions for men with body dissatisfaction.

Future research will also benefit from the development of valid and reliable body investment measures that encompass the wide range of strategies men can potentially use to change their bodies. The investment measure created for the purposes of this study may be a good starting point in this regard. The possibility that muscularity is multifaceted (i.e., includes muscularity, leanness) and that muscularity concerns also involve the lower body should also be considered when developing these measures. Additionally, height may be an important component of body image in men. Currently, body investment measures for males are limited to adolescents and existing measures are lacking due to the absence of focus on specific strategies to increase lean musculature. Reliable measures that tap the desire for leanness or height would also be important additions to the list of instruments available in the study of male body image. The use of objective measures of muscle dissatisfaction, such as family and peer interview, would also contribute methodologically to the area by providing richer data and addressing potential issues such as social desirability. Additionally, examining body composition and its relation to the DFM warrants empirical attention, although preliminary research indicates that men's actual level of muscularity (i.e., FFMI) is not associated with their desire to be muscular (McCreary, Karvinen, & Davis, 2006).

Future research will need to consider the evolution of measurement related to male body image. The current study followed Cafri and Thompson's (2004) criteria for

measuring body image in men and, surprisingly, did not find that body image evaluation was related to the DFM. This lack of finding suggests that there is a need to explore other variables in conjunction with body image and widen the perspective regarding what body image in men entails. So how should male body image measurement evolve? When contemplating the evolution of male body image measurement, a number of other areas of study may be considered. Variables such as gender, sexual orientation, personality, sociocultural and social comparison theories, and body image evaluation and investment have received some attention regarding their associations to male body image. Future research can expand upon existing research by exploring related variables such as hypermasculinity, other areas of body concern such as height, and eating disordered and pathological behaviour specific to male body image investment (i.e., bingeing to gain weight and steroid use). Researchers may also consider moving beyond the aforementioned variables by studying other constructs and their relation to the DFM. For example, variables such as age, health, and quality of life and their associations to body image in men warrant empirical attention. Ethnicity, occupation, and socioeconomic status are variables that are also worth exploring. Further investigation of the motivation behind the desire to be muscular as well as the ways in which men cope with pressure to be muscular, whether it is internal or external pressure, would also contribute to the literature in this area. For example, qualitative research focused on coping with the pressure to be muscular would complement extant quantitative research on the DFM, as has been done in the physique anxiety literature (Kowalski et al., 2006). Body image is not a simple construct and the factors that influence how men feel about their bodies are varied and complex. For this reason, it will be important for research in male body image to expand and explore a broader range of constructs to facilitate greater understanding of this multifaceted issue.

With respect to pathology, the current study found a strong association between the desire for muscularity and Muscle Dysmorphia. Future research to determine if the DMAQ can be utilized as a screening instrument for identifying men with serious body image concerns would be extremely beneficial to clinicians working in the area of male body image. This would entail research to assess the DMAQ's ability to discriminate between men with and without Muscle Dysmorphia. In the same regard, establishing a

cut-off score on the DMAQ that signals an unhealthy or pathological preoccupation with muscularity would largely contribute to the assessment and diagnosis of body image concerns in men.

The present study met a number of its objectives and hopes to act as a springboard for future research in the complex and dynamic area of male body image. There are a plethora of avenues for researchers to take in the study of male body image. With further research in this area, more progress can be made into understanding the determinants, consequences, and treatment of male body discontent. Longitudinal research with females suggests two paths to body dissatisfaction, namely adiposity and pressure to be thin (Stice & Whitenton, 2002). Recent research has postulated that body weight and muscularity represent two paths to body dissatisfaction in adolescent males (Carlson-Jones & Crawford, 2005). It is possible that objectively lacking muscularity in conjunction with the pressure to be muscular may be related to similar body dissatisfaction in men. Considering the unwavering appearance-driven nature of Western society and the current prevalence of body dissatisfaction in men, one may anticipate an increase of adult males pursuing treatment for body related concerns in the future. Therefore, it is imperative that research continue to develop in this ever expanding, important body of literature.

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Table 1

Area of Study Breakdown for Participants

College	<i>N</i>	Percent
Arts and Science	153	71.50
Commerce	22	10.30
Engineering	14	6.50
Kinesiology	5	2.30
Agriculture	6	.90
Other, Open, or Unclassified	16	7.50

Note. *N* = 214.

Table 2
Self-Identified Ethnicity of Participants

Self-Identified Ethnicity	<i>N</i>	Percent
Caucasian	161	75.20
Aboriginal or Metis	9	4.20
Asian	23	10.70
African	5	2.30
Middle Eastern	4	1.90
East Indian	4	1.90
Other	8	3.80

Note. *N* = 214.

Table 3

Cronbach's Alphas, Mean Inter-Item Correlations, Means, and Standard Deviations for Scales

Scale/Subscale	Cronbach's Alpha	Mean Inter-Item Correlation	Mean	SD
DMAQ	.82	.36	28.10	5.65
SATAQ-M-Internalization	.87	.38	33.85	7.80
SATAQ-M-Awareness	.79	.29	35.78	5.18
Magazine Checklist	.74	.17	21.54	2.67
BCS-General	.85	.34	25.33	7.27
USC	.77	.33	-.05	4.51
BCS-Muscle (peers)	.90	.60	15.84	5.21
BCS-Muscle (models)	.92	.64	15.23	5.52
MBSRQ-AE	.88	.51	24.63	5.12
MBSRQ-AO	.84	.31	38.73	7.29
BII-Current	.77	.19	28.90	7.10
BII-Future	.80	.18	31.82	8.37
BES-UBS	.85	.37	31.61	6.10
BES-PC	.88	.37	46.61	8.25
Weightlifting 1	.68	.39	7072.44	48431.60
Weightlifting 2	-	-	2.14	1.89
Weightlifting 3	-	-	2.60	1.33
Cardiovascular 1	.51	.34	38.63	27.49
Cardiovascular 2	-	-	3.20	1.20
Protein Consumption	-	-	1.85	1.25
Purposeful Weight Gain (lbs)	-	-	10.56	6.74
Desired Weight Gain (lbs)	-	-	7.90	8.64
Desired Muscle Gain (lbs)	-	-	11.28	9.20
CES-D	.86	.24	12.88	7.83

Table 3 (continued)

Cronbach's Alphas, Mean Inter-Item Correlations, Means, and Standard Deviations for Scales

Scale/Subscale	Cronbach's Alpha	Mean Inter-Item Correlation	Mean	SD
RSE	.88	.44	31.95	4.89
MASS-Total	.88	.27	41.83	11.30
MASS-BD	.81	.46	10.38	4.04
MASS-Checking	.84	.58	8.51	3.69
MASS-Substance Use	.77	.47	6.51	3.08
MASS-Injury	.76	.52	7.67	2.77
MASS-Muscle Satisfaction	.81	.59	8.75	2.61
SPAS	.88	.44	23.32	7.83
PSWQ	.94	.48	45.79	14.68

Note. $N = 214$. Dashes represent Cronbach's alphas that were not calculated as measure had one item. DMAQ = Drive for Muscularity Attitudes Questionnaire; SATAQ-M = Sociocultural Attitudes Toward Appearance Questionnaire – Male Version; BCS = Body Comparison Scale; USC = Universalistic Social Comparison Scale (calculated based on the standardized scores due to two different response formats in measure); MBSRQ = Multidimensional Body Self Relations Questionnaire, AE = Appearance Evaluation, AO = Appearance Orientation; BII = Body Investment Inventory; BES = Body Esteem Scale, UBS = Upper Body Strength, PC = Physical Conditioning; Weightlifting 1 = repetitions by sets by times per week; Weightlifting 2 = times per week weightlifting; Weightlifting 3 = frequency of weightlifting; Cardiovascular 1 = times per week by minutes per workout; Cardiovascular 2 = frequency of cardiovascular activity; Protein Consumption = frequency of consuming protein; CES-D = Center for Epidemiologic Studies Depression Scale; RSE = Rosenberg Self-Esteem Scale; MASS = Muscle Appearance Satisfaction Scale, BD = Bodybuilding Dependence; SPAS = Social Physique Anxiety Scale; PSWQ = Penn State Worry Questionnaire.

Table 4

Intercorrelations Between the Drive for Muscularity, Sociocultural, and Social Comparison Variables

Variable	1	2	3	4	5	6
1. DMAQ	-	.53***	.40***	.29***	.26***	.53***
2. SATAQ-M - Internalization		-	.55***	.37***	.56***	.78***
3. SATAQ-M - Awareness			-	.26***	.33***	.43***
4. Magazine Checklist				-	.18**	.29***
5. BCS - General					-	.54***
6. USC						-

Note. $N = 214$. DMAQ = Drive for Muscularity Attitudes Questionnaire; SATAQ-M = Sociocultural Attitudes Toward Appearance Questionnaire – Male Version; BCS = Body Comparison Scale; USC = Universalistic Social Comparison Scale.

** $p < .01$, *** $p < .001$

Table 5

Hierarchical Multiple Regression Analysis for Sociocultural and Social Comparison Variables Predicting the Drive for Muscularity

Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i>	<i>95% CI</i>
Step 1					
SATAQ-M - Internalization	.30	.05	.42*	.53	
SATAQ-M - Awareness	.15	.08	.14*	.40	
Magazine Exposure	.23	.13	.11	.30	
Step 2					
SATAQ-M - Internalization	.17	.07	.23*	.53	.02 - .31
SATAQ-M - Awareness	.16	.07	.14*	.40	.01 - .30
Magazine Exposure	.21	.13	.10	.30	
BCS - General	-.08	.05	-.10	.26	
USC	.39	.11	.31***	.53	.17 - .62

Note. $N = 214$. SATAQ-M = Sociocultural Attitudes Toward Appearance Questionnaire – Male Version; BCS = Body Comparison Scale; USC = Universalistic Social Comparison Scale.

$R^2 = .31$ for Step 1 ($p < .001$); $\Delta R^2 = .04$ for Step 2 ($p < .01$); r = zero-order correlations.

* $p < .05$, *** $p < .001$.

Table 6

Correlations Between the Drive for Muscularity and Percentage of Time Reading Articles and Looking at Pictures/Ads

Magazine	<i>N</i>	% of Time Reading Articles (<i>r</i>)	% of Time Looking at Pictures/Ads (<i>r</i>)
Sports Illustrated	194	-.02	.09
Men's Journal	213	.09	.11
Men's Fitness	209	.10	.20***
Men's Health	201	.10	.18**
Men's Workout	214	.01	.10
Muscle & Fitness	201	.14*	.22***
Maxim	199	.04	-.01
Stuff	200	.06	.07
FHM	205	.06	-.01
GQ	210	-.04	.09
Runner's World	213	-.03	.01
Flex	211	.11	.14*
Esquire	212	-.05	.04
Playboy	207	-.01	.08
Monster Muscle	212	.06	.06
OnFitness	213	.01	.01
Pump	213	.05	.10
Ironman	214	.04	.06
Hardcore	213	.04	.06

* $p < .05$, ** $p < .01$, *** $p < .003$.

Table 7

Intercorrelations Between the Drive for Muscularity and Body Evaluation and Investment Variables

Variable	1	2	3	4	5	6
1. DMAQ	-	-.01	-.02	-.05	.35***	.44***
2. BES - UBS		-	.73***	.56***	.04	.21**
3. BES - PC			-	.62***	.10	.18**
4. MBSRQ - AE				-	.01	.11*
5. MBSRQ - AO					-	.27***
6. BII - Current						-

Note. $N = 214$. DMAQ = Drive for Muscularity Attitudes Questionnaire; BES = Body Esteem Scale, UBS = Upper Body Strength, PC = Physical Conditioning; MBSRQ = Multidimensional Body Self Relations Questionnaire, AE = Appearance Evaluation, AO = Appearance Orientation; BII = Body Investment Inventory.

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 8

Hierarchical Multiple Regression Analysis for Body Image Evaluation and Investment Variables Predicting the Drive for Muscularity

Variable	<i>B</i>	<i>SE B</i>	β	<i>r</i>	<i>95% CI</i>
Step 1					
BES - UBS	.01	.10	.01	-.13	
BES - PC	.01	.08	.02	-.15	
MBSRQ - AE	-.07	.10	-.06	-.05	
Step 2					
BES - UBS	-.04	.08	-.05	-.13	
BES - PC	-.04	.07	-.06	-.15	
MBSRQ - AE	-.04	.09	-.03	-.05	
MBSRQ - AO	.20	.05	.25***	.35	.10 - .29
BII - Current	.31	.05	.39***	.44	.21 - .41

Note. $N = 214$. BES = Body Esteem Scale, UBS = Upper Body Strength, PC = Physical Conditioning; MBSRQ = Multidimensional Body Self Relations Questionnaire, AE = Appearance Evaluation, AO = Appearance Orientation; BII = Body Investment Inventory.

$R^2 = .00$ for Step 1 ($p = \text{ns}$); $\Delta R^2 = .26$ for Step 2 ($p < .001$); r = zero-order correlations.

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 9

Correlations Between the Drive for Muscularity and Weightlifting, Cardiovascular Exercise, Protein Consumption, and Dieting to Gain Weight

Body Investment Strategy	<i>N</i>	<i>r</i>
Weightlifting 1	193	-.04
Weightlifting 2	196	.36***
Weightlifting 3	214	.48***
Cardiovascular 1	192	.36***
Cardiovascular 2	214	.17**
Protein Consumption	214	.36***
Dieting to Gain Weight	66	.27*

Note. Weightlifting 1 = repetitions by sets by times per week; Weightlifting 2 = times per week weightlifting; Weightlifting 3 = frequency of weightlifting; Cardiovascular 1 = times per week by minutes per workout; Cardiovascular 2 = frequency of cardiovascular activity; Protein Consumption = frequency of consuming protein.

** $p < .05$, ** $p < .01$, *** $p < .001$.

Table 10

Means and Standard Deviations of Body Change Strategies and Their Correlations with the Drive for Muscularity

Body Change Strategy	Mean	SD	<i>r</i>
Substance/Supplement Use			
1. Anabolic Steroids	1.00	.07	.10
2. Prohormones	1.10	.44	.15*
3. Ephedra/ephedrine	1.10	.40	.13*
4. Protein	1.85	1.25	.36***
5. Creatine	1.32	.86	.29***
Diet			
1. Diet to lose weight	1.42	.86	.08
2. High fat/caloric food to increase weight	1.58	.96	.22***
3. Special diet to increase muscle	1.56	1.05	.35***
4. 2 phase diet to increase muscle/leanness	1.30	.78	.16**
5. Binging to increase weight	1.29	.67	.23**
6. Vomiting, diet pills, laxatives to lose weight	1.05	.34	.03
Exercise			
1. Weightlifting to increase muscle	2.58	1.33	.48***
2. Cardiovascular to increase leanness	3.19	1.20	.17**
3. Sport to increase muscle	2.40	1.30	.21***
4. Sport to increase leanness	2.30	1.30	-.03
Other			
1. Wear clothes to look larger/muscular	1.93	1.00	.30***
2. Cosmetic procedures to increase leanness	1.00	.14	.06
3. Cosmetic procedures to increase muscle	1.00	.15	.10

Note. $N = 214$. Special diet to increase muscle (eating 5 to 6 times per day); 2 phase diet to increase muscle/leanness (alternately dieting to gain muscle and increase leanness).

* $p < .05$, ** $p < .01$, *** $p < \text{or} = .001$

Table 11

Means and Standard Deviations of Body Change Strategies (Future Use) and Their Correlations with the Drive for Muscularity

Body Change Strategy	Mean	SD	<i>r</i>
Substance/Supplement Use			
1. Anabolic Steroids	1.10	.36	.26***
2. Prohormones	1.30	.72	.31***
3. Ephedra/ephedrine	1.21	.65	.24***
4. Protein	2.30	1.35	.50***
5. Creatine	1.53	1.04	.38***
Diet			
1. Diet to lose weight	1.80	1.07	.14*
2. High fat/caloric food to increase weight	1.55	.91	.19***
3. Special diet to increase muscle	1.90	1.23	.49***
4. 2 phase diet to increase muscle/leanness	1.48	1.00	.22***
5. Binging to increase weight	1.28	.65	.20**
6. Vomiting, diet pills, laxatives to lose weight	1.06	.34	.04
Exercise			
1. Weightlifting to increase muscle	3.14	1.36	.58***
2. Cardiovascular to increase leanness	2.90	1.21	.30**
3. Sport to increase muscle	2.71	1.33	.24***
4. Sport to increase leanness	2.60	1.31	-.17
Other			
1. Wear clothes to look larger/muscular	2.02	1.04	.28***
2. Cosmetic procedures to increase leanness	1.02	.18	-.13*
3. Cosmetic procedures to increase muscle	1.05	.26	.05

Note. $N = 214$. Special diet to increase muscle (eating 5 to 6 times per day); 2 phase diet to increase muscle/leanness (alternately dieting to gain muscle and increase leanness).

* $p < .05$, ** $p < .01$, *** $p < \text{or} = .001$

Table 12

Intercorrelations Between Muscle Dysmorphia, Depression, Self-Esteem, and the Drive for Muscularity

Variable	1	2	3	4
1. DMAQ	-	.03	-.13*	.50***
2. CES-D		-	-.63***	.24***
3. RSE			-	-.22**
4. MASS Total				-

Note. $N = 214$. DMAQ = Drive for Muscularity Attitudes Questionnaire; CES-D = Center for Epidemiologic Studies Depression Scale; RSE = Rosenberg Self-Esteem Scale; MASS = Muscle Appearance Satisfaction Scale.

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 13

Hierarchical Multiple Regression Analysis for Psychological Variables and the Drive for Muscularity Predicting Muscle Dysmorphia

Variable	<i>B</i>	<i>SE B</i>	<i>B</i>	<i>r</i>	<i>95% CI</i>
Step 1					
CES-D	.25	.12	.17*	.24	
RSE	-.26	.20	-.11	-.22	
Step 2					
CES-D	.30	.11	.21**	.24	.09 - .52
RSE	-.06	.17	-.03	-.22	
DMAQ	.97	.12	.49***	.50	.74 – 1.20

Note. $N = 214$. DMAQ = Drive for Muscularity Attitudes Questionnaire; CES-D = Center for Epidemiologic Studies Depression Scale; RSE = Rosenberg Self-Esteem Scale; MASS = Muscle Appearance Satisfaction Scale.

$R^2 = .07$ for Step 1 ($p < .01$); $\Delta R^2 = .23$ for Step 2 ($p < .001$); r = zero-order correlations.

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 14

Means and Standard Deviations of Muscle Dysmorphia Subscales and Their Correlations with the Drive for Muscularity

Muscle Dysmorphia Subscale	Mean	<i>SD</i>	<i>r</i>
1. Bodybuilding Dependence	10.38	4.04	.49***
2. Checking	8.51	3.70	.49***
3. Substance Use	6.51	3.10	.44***
4. Injury	7.67	2.77	.39***
5. Muscle Satisfaction	8.75	2.61	-.26***

Note. $N = 214$.

*** $p < .001$.

Appendix A

Thank you for taking the time to participate in this study. This questionnaire should take you approximately 60 minutes to complete. This questionnaire is designed to be kept anonymous, so please do **not** put your name or any identifying information on the questionnaire. Please answer each question honestly and remember that the questions are to be answered individually. Remember there are no incorrect answers; you want to answer the questions in a way that reflects how you feel.

Demographics Questionnaire

We are interested in learning more about you. Please follow the directions carefully, and answer **ALL** of the questions.

Remember that your answers will remain private and confidential and will be seen only by the researcher, research supervisor, or research assistant

1. How old are you? _____ years
 2. What is your gender (circle one)? Male Female
 3. What College are you enrolled in? _____
 4. What year of study are you in? _____
 5. What is your self-identified sexual orientation (e.g., heterosexual, homosexual, bisexual, unsure?) _____
 6. What is your height? _____ feet _____ inches
 7. What is your weight? _____ pounds
 8. What is your self-identified ethnicity (e.g., white, asian, African, middle eastern)? _____
 9. Compared to others of your age and sex, how much physical activity do you get?
- | | | | | |
|------------------|---|---|---|------------------|
| 1 | 2 | 3 | 4 | 5 |
| much less active | | | | much more active |

Appendix B

Drive for Muscularity Attitudes Questionnaire (DMAQ)

Instructions: On this page are listed a number of statements. Please read each item carefully and indicate *the degree to which you agree* with the statements using the following scale:

Strongly disagree	Disagree	Don't Know	Agree	Strongly agree
1	2	3	4	5

- | | | | | | |
|--|---|---|---|---|---|
| 1. I do not want to become more muscular. | 1 | 2 | 3 | 4 | 5 |
| 2. I wish my legs were more muscular. | 1 | 2 | 3 | 4 | 5 |
| 3. When I see a guy who is really muscular, it inspires me to get bigger myself. | 1 | 2 | 3 | 4 | 5 |
| 4. Muscularity is important to me. | 1 | 2 | 3 | 4 | 5 |
| 5. I think I need to gain a few pounds of "bulk" (muscle mass). | 1 | 2 | 3 | 4 | 5 |
| 6. I do not wish my arms were more muscular. | 1 | 2 | 3 | 4 | 5 |
| 7. I should work out more to increase muscle mass. | 1 | 2 | 3 | 4 | 5 |
| 8. I would feel more confident if my lats (back muscles) were bigger. | 1 | 2 | 3 | 4 | 5 |

Appendix C

Magazine Checklist

Please carefully fill out the following chart that looks at people's consumption of *fitness/exercise/sport-orientated* magazines. In the first column, please indicate the frequency that you read the magazine by circling the appropriate number. Circle "*Never/Hardly Ever*" if you never read the magazine or have only glanced through it; circle "*Sometimes*" if you look through the magazine on an irregular basis; and circle "*Often*" if you regularly read the magazine (please circle only one number). In the third column, please indicate the time (in minutes) that you spend per month reading the magazine. In the fourth and fifth columns, give the percentages that you spend reading the articles and looking at advertisements/pictures.

For example, Jack *often* reads *People Magazine*. He spends *120 minutes per month* reading the magazine. Jack reads the articles *50% of the time* (60 minutes) and he looks at the advertisements/pictures *50% of the time* (60 minutes). Therefore, Jack would fill out the chart in the following way:

Magazine	Frequency Reading Magazine (circle number)	Time Spent Per month (minutes)	Portion of time spent reading Articles (%)	Portion of time spent looking at Pictures/Ads (%)
People Magazine	Never/Hardly Ever = 1 Sometimes = 2 Often = 3	120	50%	50%
Magazine	Frequency Reading Magazine (circle number)	Time Spent Per month (minutes)	Portion of time spent reading Articles (%)	Portion of time spent looking at Pictures/Ads (%)
Sports Illustrated	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Men's Journal	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Men's Fitness	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Men's Health	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Men's Workout	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			

Magazine	Frequency Reading Magazine (circle number)	Time Spent Per month (minutes)	Portion of time spent reading Articles (%)	Portion of time spent looking at Pictures/Ads (%)
Muscle & Fitness	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Maxim	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Stuff	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
FHM	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
GQ	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Runner's World	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Flex	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Esquire	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Playboy	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Monster Muscle	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
OnFitness	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Pump	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Ironman	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Hardcore	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			
Other (specify):	Never/Hardly Ever = 1 Sometimes = 2 Often = 3			

Appendix D

Sociocultural Attitudes Towards Appearance Questionnaire -Revised: Male Version (SATAQ-M)

Please read each of the following items, and circle the number that *best reflects your agreement* with the statement.

Completely disagree		Neither agree nor disagree		Completely agree		
1	2	3	4	5		
1.	I would like my body to look like the men who appear in TV show and movies.	1	2	3	4	5
2.	I believe that clothes look better on men that are in good physical shape.	1	2	3	4	5
3.	Music videos that show men who are in good physical shape make me wish that I were in better physical shape.	1	2	3	4	5
4.	I do not wish to look like the male models who appear in magazines.	1	2	3	4	5
5.	I tend to compare my body to TV and movie stars.	1	2	3	4	5
6.	In our society, fat people are regarded as attractive.	1	2	3	4	5
7.	Photographs of physically fit men make me wish that I had a better muscle tone.	1	2	3	4	5
8.	Attractiveness is very important if you want to get ahead in our culture.	1	2	3	4	5
9.	It's important for people to look attractive if they want to succeed in today's culture.	1	2	3	4	5
10.	Most people believe that a toned and physically fit body improves how you look.	1	2	3	4	5
11.	People think that the more attractive you are, the better you look in clothes.	1	2	3	4	5
12.	In today's society, it's important to always look attractive.	1	2	3	4	5
13.	I wish I looked like the men pictured in magazines who model underwear.	1	2	3	4	5
14.	I often read magazines and compare my appearance to the male models.	1	2	3	4	5
15.	People with well-proportioned bodies look better in clothes.	1	2	3	4	5
16.	A physically fit man is admired for his looks more than someone who is not fit and toned.	1	2	3	4	5

Completely disagree		Neither agree nor disagree		Completely agree			
1	2	3	4	5			
17.	How I look does not affect my mood in social situations.		1	2	3	4	5
18.	People find individuals who are in good shape more attractive than individuals who are not in good shape.		1	2	3	4	5
19.	In our culture, someone with a well-built body has a better chance of obtaining success.		1	2	3	4	5
20.	I often find myself comparing my physique to that of athletes pictured in magazines.		1	2	3	4	5
21.	I do not compare my appearance to people I consider very attractive.		1	2	3	4	5

Appendix E

Body Comparison Scale (BCS) – Peer Version

For these items below, use the following scale to rate *how often* you compare these aspects of your body to those of other individuals of the same sex.

NOTE: Please be sure that you read and respond to all of the questions according to how you would compare yourself to **your same-sex PEERS**.

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

1. Ears	1	2	3	4	5
2. Nose	1	2	3	4	5
3. Lips	1	2	3	4	5
4. Hair	1	2	3	4	5
5. Teeth	1	2	3	4	5
6. Chin	1	2	3	4	5
7. Shape of face	1	2	3	4	5
8. Cheeks	1	2	3	4	5
9. Forehead	1	2	3	4	5
10. Upper arm	1	2	3	4	5
11. Forearm	1	2	3	4	5
12. Shoulders	1	2	3	4	5
13. Chest	1	2	3	4	5
14. Back	1	2	3	4	5
15. Waist	1	2	3	4	5
16. Stomach	1	2	3	4	5
17. Buttocks	1	2	3	4	5
18. Thighs	1	2	3	4	5
19. Hips	1	2	3	4	5
20. Calves	1	2	3	4	5
21. Muscle tone of upper body	1	2	3	4	5
22. Overall shape of upper body	1	2	3	4	5
23. Muscle tone of lower body	1	2	3	4	5
24. Overall shape of lower body	1	2	3	4	5
25. Overall body	1	2	3	4	5

Use this scale to answer items 26 – 36.

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

- | | | | | | |
|---|---|---|---|---|---|
| 26. I find myself thinking about how my nose is different than others'. | 1 | 2 | 3 | 4 | 5 |
| 27. When I am with other people, I find myself comparing my complexion with theirs. | 1 | 2 | 3 | 4 | 5 |
| 28. Being around people with firm, muscular arms makes me self-conscious. | 1 | 2 | 3 | 4 | 5 |
| 29. When I compare myself with others, I compare their degree of muscle-tone with my muscle-tone. | 1 | 2 | 3 | 4 | 5 |
| 30. When with others, I compare my thighs to those of my peers. | 1 | 2 | 3 | 4 | 5 |
| 31. When I am with others, I compare my weight with theirs. | 1 | 2 | 3 | 4 | 5 |
| 32. When I compare my weight with others, I feel that I am overweight. | 1 | 2 | 3 | 4 | 5 |
| 33. I compare my physical appearance to the physical appearance of others. | 1 | 2 | 3 | 4 | 5 |
| 34. When I see people who are overweight, I compare my body size to theirs. | 1 | 2 | 3 | 4 | 5 |
| 35. I compare the attractiveness of my facial features with the facial features of others. | 1 | 2 | 3 | 4 | 5 |
| 36. I compare how thin or overweight someone is more than I compare how muscular and in shape they are. | 1 | 2 | 3 | 4 | 5 |

Appendix F

Body Comparison Scale (BCS) – Model Version

For these items below, use the following scale to rate *how often* you compare these aspects of your body to those of other individuals of the same sex.

NOTE: Please be sure that you read and respond to all of the questions according to how you would compare yourself to **same-sex MODELS OR CELEBRITIES**.

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

1. Ears	1	2	3	4	5
2. Nose	1	2	3	4	5
3. Lips	1	2	3	4	5
4. Hair	1	2	3	4	5
5. Teeth	1	2	3	4	5
6. Chin	1	2	3	4	5
7. Shape of face	1	2	3	4	5
8. Cheeks	1	2	3	4	5
9. Forehead	1	2	3	4	5
10. Upper arm	1	2	3	4	5
11. Forearm	1	2	3	4	5
12. Shoulders	1	2	3	4	5
13. Chest	1	2	3	4	5
14. Back	1	2	3	4	5
15. Waist	1	2	3	4	5
16. Stomach	1	2	3	4	5
17. Buttocks	1	2	3	4	5
18. Thighs	1	2	3	4	5
19. Hips	1	2	3	4	5
20. Calves	1	2	3	4	5
21. Muscle tone of upper body	1	2	3	4	5
22. Overall shape of upper body	1	2	3	4	5
23. Muscle tone of lower body	1	2	3	4	5
24. Overall shape of lower body	1	2	3	4	5
25. Overall body	1	2	3	4	5

Appendix G

Universalistic Social Comparison Scale (USC)

Please answer the following items using the following scale:

Strongly disagree 1	Disagree 2	Don't Know 3	Agree 4	Strongly agree 5
---------------------------	---------------	-----------------	------------	------------------------

- | | | | | | |
|--|---|---|---|---|---|
| 1. Most of the men who appear on television and in movies have the type of muscular body that I see as my goal | 1 | 2 | 3 | 4 | 5 |
| 2. Music videos that show muscular men make me wish that I were more muscular | 1 | 2 | 3 | 4 | 5 |
| 3. I do NOT want to look like the men I see in fitness magazines | 1 | 2 | 3 | 4 | 5 |

Please answer the following items using the following scale:

Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
------------	-------------	----------------	------------	-----------------

- | | | | | | |
|---|---|---|---|---|---|
| 4. Photographs of muscular men make me wish that I were more muscular | 1 | 2 | 3 | 4 | 5 |
| 5. I compare my body to the muscular men I see on television | 1 | 2 | 3 | 4 | 5 |
| 6. I compare my body to the muscular men I see in movies | 1 | 2 | 3 | 4 | 5 |
| 7. I compare my body to the bodies I see in muscle magazines | 1 | 2 | 3 | 4 | 5 |

Appendix H

Body Esteem Scale (BES)

Instructions: On this page are listed a number of body parts and functions. Please read each item and indicate ***how you feel*** about this part or function of your own body using the following scale:

Have strong negative feelings	Have moderate negative feelings	Have no feeling one way or the other	Have moderate positive feelings	Have strong positive feelings
1	2	3	4	5

- | | |
|--------------------------------|--------------------------------|
| 1. body scent_____ | 21. appearance of eyes_____ |
| 2. appetite_____ | 22. cheeks/cheekbones_____ |
| 3. nose_____ | 23. hips_____ |
| 4. physical stamina_____ | 24. legs_____ |
| 5. reflexes_____ | 25. figure or physique_____ |
| 6. lips_____ | 26. sex drive_____ |
| 7. muscular strength_____ | 27. feet_____ |
| 8. waist_____ | 28. sex organs_____ |
| 9. energy level_____ | 29. appearance of stomach_____ |
| 10. thighs_____ | 30. health_____ |
| 11. ears_____ | 31. sex activities_____ |
| 12. biceps_____ | 32. body hair_____ |
| 13. chin_____ | 33. physical coordination_____ |
| 14. body build_____ | 34. face_____ |
| 15. physical coordination_____ | 35. weight_____ |
| 16. buttocks_____ | |
| 18. width of shoulders_____ | |
| 17. agility_____ | |
| 19. arms_____ | |
| 20. chest or breasts_____ | |

Appendix I

The Multidimensional Body Self Relations Questionnaire

INSTRUCTIONS--PLEASE READ CAREFULLY

The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to YOU personally.

Your answers to the items in the questionnaire are anonymous, so please do not write your name on any of the materials. In order to complete the questionnaire, read each statement carefully and decide how much it pertains to you personally. Using a scale like the one below, indicate your answer by entering it to the left of the number of the statement.

EXAMPLE:

I am usually in a good mood

In the blank space, enter a 1 if you definitely disagree with the statement;

enter a 2 if you mostly disagree;

enter a 3 if you neither agree nor disagree;

enter a 4 if you mostly agree;

or enter a 5 if you definitely agree with the statement.

There are no right or wrong answers. Just give the answer that is most accurate for you. Remember, your responses are confidential, so please be completely honest and answer all items.

(Duplication and use of the MBSRQ only by permission of Thomas F. Cash, Ph.D., Department of Psychology, Old Dominion University, Norfolk, VA 23529)

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Strongly Agree

- _____1. Before going out in public, I always notice how I look.
- _____2. I am careful to buy clothes that will make me look my best.
- _____3. I would pass most physical-fitness tests.
- _____4. It is important that I have superior physical strength.
- _____5. My body is sexually appealing.
- _____6. I am not involved in a regular exercise program.
- _____7. I am in control of my health.
- _____8. I know a lot about things that affect my physical health.
- _____9. I have deliberately developed a healthy lifestyle.
- _____10. I constantly worry about being or becoming fat.
- _____11. I like my looks just the way they are.
- _____12. I check my appearance in a mirror whenever I can.
- _____13. Before going out, I usually spend a lot of time getting ready.
- _____14. My physical endurance is good.
- _____15. Participating in sports is unimportant to me.
- _____16. I do not actively do things to keep physically fit.
- _____17. My health is a matter of unexpected ups and downs.
- _____18. Good health is one of the most important things in my life.
- _____19. I don't do anything that I know might threaten my health.

continued on the next page

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Strongly Agree

- _____20. I am very conscious of even small changes in my weight.
- _____21. Most people would consider me good-looking.
- _____22. It is important that I always look good.
- _____23. I use very few grooming products.
- _____24. I easily learn physical skills.
- _____25. Being physically fit is not a strong priority in my life.
- _____26. I do things to increase my physical strength.
- _____27. I am seldom physically ill.
- _____28. I take my health for granted.
- _____29. I often read books and magazines that pertain to health.
- _____30. I like the way I look without my clothes on.
- _____31. I am self-conscious if my grooming isn't right.
- _____32. I usually wear whatever is handy without caring how it looks.
- _____33. I do poorly in physical sports or games.
- _____34. I seldom think about my athletic skills.
- _____35. I work to improve my physical stamina.
- _____36. From day to day, I never know how my body will feel.
- _____37. If I am sick, I don't pay much attention to my symptoms.
- _____38. I make no special effort to eat a balanced and nutritious diet.

continued on the next page

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Strongly Agree

- _____ 39. I like the way my clothes fit me.
- _____ 40. I don't care what people think about my appearance.
- _____ 41. I take special care with my hair grooming.
- _____ 42. I dislike my physique.
- _____ 43. I don't care to improve my abilities in physical activities.
- _____ 44. I try to be physically active.
- _____ 45. I often feel vulnerable to sickness.
- _____ 46. I pay close attention to my body for any signs of illness.
- _____ 47. If I'm coming down with a cold or flu, I just ignore it and go on as usual.
- _____ 48. I am physically unattractive.
- _____ 49. I never think about my appearance.
- _____ 50. I am always trying to improve my physical appearance.
- _____ 51. I am very well coordinated.
- _____ 52. I know a lot about physical fitness.
- _____ 53. I play a sport regularly throughout the year.
- _____ 54. I am a physically healthy person.
- _____ 55. I am very aware of small changes in my physical health.
- _____ 56. At the first sign of illness, I seek medical advice.
- _____ 57. I am on a weight-loss diet.

continued on the next page

For the remainder of the items use the response scale given with the item, and enter your answer in the space beside the item.

_____58. I have tried to lose weight by fasting or going on crash diets.

1. Never
2. Rarely
3. Sometimes
4. Often
5. Very Often

_____59. I think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

_____60. From looking at me, most other people would think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

continued on the next page

61-69. Use this 1 to 5 scale to indicate how dissatisfied or satisfied you are
with each of the following areas or aspects of your body:

1	2	3	4	5
Very Dissatisfied	Mostly Dissatisfied	Neither Satisfied Nor Dissatisfied	Mostly Satisfied	Very Satisfied

- _____ 61. Face (facial features, complexion)
 _____ 62. Hair (color, thickness, texture)
 _____ 63. Lower torso (buttocks, hips, thighs, legs)
 _____ 64. Mid torso (waist, stomach)
 _____ 65. Upper torso (chest or breasts, shoulders, arms)
 _____ 66. Muscle tone
 _____ 67. Weight
 _____ 68. Height
 _____ 69. Overall appearance

Appendix J

Body Investment Inventory (BII)

Please read the following body change strategies and indicate, using the following scale, the frequencies with which you are using the listed strategies **currently** and the frequency that you **intend to use them in the future**.

Never 1	Rarely 2	Sometimes 3	Often 4	Very Often 5
------------	-------------	----------------	------------	-----------------

For example, if you are using protein supplements to gain muscle mass:

Very often *currently*; and
You intend to use them **sometimes** *in the future*;

Then your ratings would be: **5** and **3** in the **Current** and **Future** columns.

BODY CHANGE STRATEGY	Current	Future
1. Steroid use to gain muscle mass		
2. Prohormone use to gain muscle mass (i.e., Andro – found at nutrition stores like GNC)		
3. Ephedrine/ephedra use (also known as Ma Huang) or other substances to achieve leanness		
4. Diet to lose weight and increase leanness		
5. Consumption of high fat and/or caloric foods to gain weight (e.g.'s, fast food, butter, chocolate, alcohol)		
6. Consumption of protein supplements to gain muscle mass (e.g.'s, protein shakes, protein bars)		
7. Follow a special diet to increase muscle mass (e.g., eat 5 – 6 times per day)		
8. Follow 2 phase diets to increase both muscle mass and leanness (i.e., alternatively dieting to gain muscle and lose weight/fat)		
9. Wear clothes to look larger and/or more muscular		
10. Lift weights to gain muscle mass		
11. Cardiovascular workouts to increase leanness/lose weight		
12. Consumption of creatine to build muscle mass		
13. Participation in sport to increase muscle mass		
14. Participation in sport to increase leanness/lose weight		
15. Binging on food (i.e., consume very large amounts of food in a single sitting) to gain weight		
16. Vomiting, using diet pills, or using laxatives to lose weight		
17. Cosmetic procedures to look more muscular (e.g., chest implants, calf implants, abdominal implants)		
18. Cosmetic procedures to look more lean (e.g., liposuction)		

Please answer **ALL** of the following questions:

Remember that your answers will remain private and confidential and will be seen only by the researcher, research supervisor, or research assistant

19. What is your **current** weight? _____ lbs
20. What is your **ideal** (i.e., desired) weight? _____ lbs
21. How much **weight** have you lost in the past year? _____ lbs
Did you lose the weight on purpose? Y / N
22. How much **weight** have you gained in the past year? _____ lbs
Did you gain the weight on purpose? Y / N
23. How much **weight** would you like to lose? _____ lbs
24. How much **weight** would you like to gain? _____ lbs
25. How much **muscle** would you like to gain? _____ lbs
26. How **frequently** do you weight train? _____ (times/week) _____ hours
27. How **many weight exercises** do you do per workout? _____
28. How **many sets per exercise** do you do when you weight train? _____
29. How **many repetitions per set** do you complete when you when you weight train? _____
30. How **often do you complete** (i.e., frequency) cardiovascular exercise? _____ (times/week)
31. How **long** (i.e., duration) are your cardiovascular workouts? _____ (minutes)
32. Please indicate your desire to become more muscular (by marking an 'X' on the scale within the thermometer):

not *extreme*

at all *desire*

0 10 20 30 40 50 60 70 80 90 100

Appendix K

Rosenberg Self-Esteem Scale (RSE)

In this questionnaire, we would like to know *how strongly you agree* with each of the following statements using the following scale:

Strongly agree 1	Agree 2	Disagree 3	Strongly Disagree 4
------------------------	------------	---------------	---------------------------

- | | | | | |
|---|---|---|---|---|
| 1. On the whole, I am satisfied with myself. | 1 | 2 | 3 | 4 |
| 2. All in all, I am inclined to think I am a failure. | 1 | 2 | 3 | 4 |
| 3. I feel I have a number of good qualities. | 1 | 2 | 3 | 4 |
| 4. I feel I do not have much to be proud of. | 1 | 2 | 3 | 4 |
| 5. I am able to do things as well as most other people. | 1 | 2 | 3 | 4 |
| 6. At times, I think I am no good at all. | 1 | 2 | 3 | 4 |
| 7. I certainly feel useless at times. | 1 | 2 | 3 | 4 |
| 8. I feel that I am a person of worth, or at least on an equal plane with others. | 1 | 2 | 3 | 4 |
| 9. I wish I could have more respect for myself. | 1 | 2 | 3 | 4 |
| 10. I take a positive attitude toward myself. | 1 | 2 | 3 | 4 |

Appendix L

Center for Epidemiologic Studies Depression Scale (CES-D)

Below is a list of the ways you might have felt or behaved. Please tell me *how often you have felt this way* during the past week.

	During the Past Week			
	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I did not feel like eating; my appetite was poor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. I felt that I could not shake off the blues even with help from my family or friends.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I felt I was just as good as other people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I had trouble keeping my mind on what I was doing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I felt depressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I felt that everything I did was an effort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I felt hopeful about the future.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I thought my life had been a failure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I felt fearful.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. My sleep was restless.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I was happy.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I talked less than usual.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I felt lonely.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. People were unfriendly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. I enjoyed life.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. I had crying spells.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. I felt sad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. I felt that people dislike me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. I could not get "going."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix M

Social Physique Anxiety Scale (SPAS)

Instructions: On this page are listed a number of statements. Please read each item carefully and indicate ***the degree to which you agree*** with the statements using the following scale:

Not at all like me	A little like me	Sort of like me	Like me a fair bit	Like me a lot
1	2	3	4	5

- | | | | | | |
|--|---|---|---|---|---|
| 1. I wish I wasn't so uptight about my physique/figure. | 1 | 2 | 3 | 4 | 5 |
| 2. There are times when I am bothered by thoughts that other people are evaluating my weight or muscular development negatively. | 1 | 2 | 3 | 4 | 5 |
| 3. Unattractive features of my physique/figure make me nervous in certain social settings. | 1 | 2 | 3 | 4 | 5 |
| 4. In the presence of others, I feel apprehensive about my physique/figure. | 1 | 2 | 3 | 4 | 5 |
| 5. I am comfortable with how fit my body appears to others. | 1 | 2 | 3 | 4 | 5 |
| 6. It would make me uncomfortable to know that others were evaluating my physique/figure. | 1 | 2 | 3 | 4 | 5 |
| 7. When it comes to displaying my physique/figure to others, I am a shy person. | 1 | 2 | 3 | 4 | 5 |
| 8. I usually feel relaxed when it is obvious that others are looking at my physique/figure. | 1 | 2 | 3 | 4 | 5 |
| 9. When in a bathing suit, I often feel nervous about the shape of my body. | 1 | 2 | 3 | 4 | 5 |

Appendix N

Penn State Worry Questionnaire (PSWQ)

Instructions: On this page are listed a number of statements. Please read each item carefully and indicate *the degree to which you agree* with the statements using the following scale:

	Not at all typical of me 1	Slightly not typical of me 2	Unsure 3	Slightly typical of me 4	Very typical of me 5
1. If I do not have time to do everything, I do not worry about it.	1	2	3	4	5
2. My worries overwhelm me.	1	2	3	4	5
3. I do not tend to worry about things.	1	2	3	4	5
4. Many situations make me worry.	1	2	3	4	5
5. I know I should not worry about things, but I just cannot help it.	1	2	3	4	5
6. When I am under pressure I worry a lot.	1	2	3	4	5
7. I am always worrying about something.	1	2	3	4	5
8. I find it easy to dismiss worrisome thoughts.	1	2	3	4	5
9. As soon as I finish one task, I start to worry about everything else I have to do.	1	2	3	4	5
10. I never worry about anything	1	2	3	4	5
11. When there is nothing more I can do about a concern, I do not worry about it anymore.	1	2	3	4	5
12. I have been a worrier all my life.	1	2	3	4	5
13. I notice that I have been worrying about things.	1	2	3	4	5
14. Once I start worrying, I cannot stop.	1	2	3	4	5
15. I worry all the time.	1	2	3	4	5
16. I worry about projects until they are done.	1	2	3	4	5

Appendix O

Muscle Appearance Satisfaction Scale (MASS)

Instructions: On this page are listed a number of statements. Please read each item carefully and **indicate the degree to which you agree** with the statements using the following scale:

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

- | | | | | | |
|---|---|---|---|---|---|
| 1. When I look at my muscles in the mirror, I often feel satisfied with my current muscle size. | 1 | 2 | 3 | 4 | 5 |
| 2. If my schedule forces me to miss a day of working out with weights, I feel very upset. | 1 | 2 | 3 | 4 | 5 |
| 3. I often ask friends and/or relatives if I look big. | 1 | 2 | 3 | 4 | 5 |
| 4. I am satisfied with the size of my muscles. | 1 | 2 | 3 | 4 | 5 |
| 5. I often spend money on muscle-building supplements | 1 | 2 | 3 | 4 | 5 |
| 6. It is OK to use steroids to add muscle mass. | 1 | 2 | 3 | 4 | 5 |
| 7. I often feel like I am addicted to working out with weights. | 1 | 2 | 3 | 4 | 5 |
| 8. If I have a bad workout, it is likely to have a negative effect on the rest of my day. | 1 | 2 | 3 | 4 | 5 |
| 9. I would try anything to get my muscles to grow. | 1 | 2 | 3 | 4 | 5 |
| 10. I often keep working out even when my muscles or joints are sore from previous workouts. | 1 | 2 | 3 | 4 | 5 |
| 11. I often spend a lot of time looking at my muscles in the mirror. | 1 | 2 | 3 | 4 | 5 |
| 12. I spend more time in the gym working out than most others who work out. | 1 | 2 | 3 | 4 | 5 |
| 13. To get big, one must be able to ignore a lot of pain. | 1 | 2 | 3 | 4 | 5 |
| 14. I am satisfied with my muscle tone/definition. | 1 | 2 | 3 | 4 | 5 |
| 15. My self-worth is very focused on how my muscles look. | 1 | 2 | 3 | 4 | 5 |
| 16. I often ignore a lot of physical pain while I am lifting to get bigger. | 1 | 2 | 3 | 4 | 5 |
| 17. I must get bigger muscles by any means necessary. | 1 | 2 | 3 | 4 | 5 |
| 18. I often seek reassurance from others that my muscles are big enough. | 1 | 2 | 3 | 4 | 5 |
| 19. I often find it difficult to resist checking the size of my muscles. | 1 | 2 | 3 | 4 | 5 |

Appendix P

UNIVERSITY OF SASKATCHEWAN
BEHAVIOURAL RESEARCH ETHICS BOARD
<http://www.usask.ca/research/ethics.shtml>

NAME: Michael MacGregor (Cherie Peterson)
Psychology

Beh #05-208

DATE: Sept 12, 2005

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the Application for Ethics Approval for your study "Comprehensive Examination of the Drive for Muscularity" (05-208).

1. Your study has been **APPROVED SUBJECT TO THE FOLLOWING MINOR MODIFICATION(S):**
 - Please submit the required signatures; student researcher, research supervisor, and department head.
 - Please revise the consent form to include the correct contact information for the research ethics office (306.966.2084).
 - Please revise the consent form to include a statement that acknowledges that participants will be given a copy of the consent form for their own records.
2. Please send one copy of your revisions to the Ethics Office for our records. **Please highlight or underline any changes made when resubmitting.**
3. The term of this approval is for 5 years.
4. This letter serves as your certificate of approval, **effective as of the time that the requested modifications are received by the Ethics Office.** If you require a letter of unconditional approval, please so indicate on your reply, and one will be issued to you.

Consent Form – Psychology Undergraduates

Title

Comprehensive examination of the drive for muscularity.

Name of primary investigators

Michael Wm. MacGregor, Ph.D.
Department of Psychology
University of Saskatchewan

Cherie Peterson
Department of Psychology
University of Saskatchewan
1-306-966-6665
cherie.peterson@usask.ca

Purpose

The purpose of this investigation is to determine important theoretical and practical variables that are related to the desire to attain a muscular physique. It will also examine how the desire to be muscular affects how men feel about themselves and their bodies, and how men invest in their bodies.

Benefits

Your participation in this investigation will contribute to a better understanding of how aspiring to obtain a specific physique affects several aspects of the way males feel about themselves and their bodies. In the future, this information may be helpful in constructing psychological interventions to assist those with body image concerns. As a psychology student you will receive partial academic credit towards your introductory psychology grade for your participation.

Procedures

In this study you will be asked to complete a demographic and body image investment questionnaire and 13 short questionnaires inquiring about how you feel about yourself and your body. The demographic and investment questionnaire will ask you about your age, area of study, height, weight, and dieting and exercising behaviours. The other measures will ask you about your satisfaction with your body, your desire to attain a specific body shape, your feelings towards yourself, media influences on body image, and how you feel when others evaluate your body. All information provided on the questionnaires will be kept strictly confidential.

Risks and ability to withdraw

There are no known risks or discomforts associated with this investigation. However, if for any reason you wish to stop taking part in the study you may do so without any penalty and without loss of credit.

Confidentiality

Data collected by questionnaire will be kept on computer and participants will be identified by research identification numbers. Paper copies of questionnaires will be kept in boxes in a secure and locked room. Only the principle investigators and students or research assistants under his direction will have access to the collected data. All data will be stored for a minimum of 5 years. Every effort will be made to ensure that participants are not individually identifiable (e.g., by social insurance number, student identification number, name, etc.). Please do not put any identifying marks on the questionnaires. Consent forms will be stored separately from data and will not be linked to the data. You will be provided a copy of the consent form for your records.

Use of data and dissemination of results

Data collected will be disseminated in journal articles, conference presentations and posters, and in a doctoral thesis. Data will be presented in aggregate form such that individual participants are not identifiable.

Additional information

If any new information comes to light during this investigation that might influence your decision to continue in this investigation, you will be informed of the information and asked whether or not you want to continue with the investigation.

Debriefing

Following participation you will again be told the purpose of the investigation and how the results will be disseminated. You will also again be informed that the data will not be used in a way that you can be personally identified and that all data will be kept in a secure environment only available to the primary researcher and his identified students and research assistants. Any questions you might have will be answered at this time. If you are interested, your name will be taken and a copy of the results will be mailed to you when the study is complete.

Contact person

If you have any questions about this study you may contact Cherie Peterson at (306) 966-6665 or Michael MacGregor at (306) 966-2525 in the department of psychology at the University of Saskatchewan. You may contact the Office of Research Services at (306) 966-2084 if you have any questions or concerns regarding your rights as a participant.

Signature and consent form

I have read and understood the description of this investigation and I agree to participate. By signing below I acknowledge that I am willing to participate in this investigation on the drive for muscularity.

Name of participant (please print)

Signature of participant

Date

Researchers

Consent Form – University of Saskatchewan Undergraduates

Title

Comprehensive examination of the drive for muscularity.

Name of primary investigators

Michael Wm. MacGregor, Ph.D.
Department of Psychology
University of Saskatchewan

Cherie Peterson
Department of Psychology
University of Saskatchewan
1-306-966-6665
cherie.peterson@usask.ca

Purpose

The purpose of this investigation is to determine important theoretical and practical variables that are related to the desire to attain a muscular physique. It will also examine how the desire to be muscular affects how men feel about themselves and their bodies, and how men invest in their bodies.

Benefits

Your participation in this investigation will contribute to a better understanding of how aspiring to obtain a specific physique affects several aspects of the way males feel about themselves and their bodies. In the future, this information may be helpful in constructing psychological interventions to assist those with body image concerns. As a University of Saskatchewan undergraduate, you will receive \$10 for your participation.

Procedures

In this study you will be asked to complete a demographic and body image investment questionnaire and 13 short questionnaires inquiring about how you feel about yourself and your body. The demographic and investment questionnaire will ask you about your age, area of study, height, weight, and dieting and exercising behaviours. The other measures will ask you about your satisfaction with your body, your desire to attain a specific body shape, your feelings towards yourself, media influences on body image, and how you feel when others evaluate your body. All information provided on the questionnaires will be kept strictly confidential.

Risks and ability to withdraw

There are no known risks or discomforts associated with this investigation. However, if for any reason you wish to stop taking part in the study you may do so at any time without loss of credit.

Confidentiality

Data collected by questionnaire will be kept on computer and participants will be identified by research identification numbers. Paper copies of questionnaires will be kept in boxes in a secure and locked room. Only the principle investigators and students or research assistants under his direction will have access to the collected data. All data will be stored for a minimum of 5 years. Every effort will be made to ensure that participants are not individually identifiable (e.g., by social insurance number, student identification number, name, etc.). Please do not put any identifying marks on the questionnaires. Consent forms will be stored separately from data and will not be linked to the data. You will be provided a copy of the consent form for your records.

Use of data and dissemination of results

Data collected will be disseminated in journal articles, conference presentations and posters, and in doctoral thesis. Data will be presented in aggregate form such that individual participants are not identifiable.

Additional information

If any new information comes to light during this investigation that might influence your decision to continue in this investigation, you will be informed of the information and asked whether or not you want to continue with the investigation.

Debriefing

Following participation you will again be told the purpose of the investigation and how the results will be disseminated. You will also again be informed that the data will not be used in a way that you can be personally identified and that all data will be kept in a secure environment only available to the primary researcher and his identified students and research assistants. Any questions you might have will be answered at this time. If you are interested, your name will be taken and a copy of the results will be mailed to you when the study is complete.

Contact person

If you have any questions about this study you may contact Cherie Peterson at (306) 966-6665 or Michael MacGregor at (306) 966-2525 in the department of psychology at the University of Saskatchewan. You may contact the Office of Research Services at (306) 966-2084 if you have any questions or concerns regarding your rights as a participant.

Signature and consent form

I have read and understood the description of this investigation and I agree to participate. By signing below I acknowledge that I am willing to participate in this investigation on the drive for muscularity.

Name of participant (please print)

Signature of participant

Date

Researchers

Debriefing Form

(Body Image in Men)

Thank you for your participation in this study! The purpose of this investigation is to determine important theoretical variables that are related to the desire to attain a muscular physique. It will also examine how the desire to be muscular affects how men feel about themselves and their bodies, and the strategies men use to change their bodies. Recent studies suggest that an increasing number of males are experiencing body image dissatisfaction and this dissatisfaction may have important consequences for men's psychological and physical health. This research hopes to add to the growing body of literature on male body image and identify key variables that may be important to the treatment of body image concerns in men. The results of this study will be disseminated in journal articles, conference presentations and posters, and a doctoral thesis. Data will be presented in aggregate form. Individual participants are not identifiable. Collected data will be stored in a secure environment and will only be available to the primary researchers and identified research assistants. If you would like a copy of the results mailed to you, your name and address will be recorded and a copy of the results will be mailed to you upon completion of the study. If you have any questions or should you wish to discuss the study in further detail, please do not hesitate to call Cherie Peterson at (306) 966-6665 or Dr. Michael MacGregor at (306) 966-2525. As well, you may contact the Office of Research Services at (306) 966-4053 if you have any questions regarding your rights as a participant.

Appendix Q

Assumption Testing for Regression Examining Theory and the Drive for Muscularity

With the use of a $p < .001$ criterion for Mahalanobis Distance, one multivariate outlier was identified. The regression analysis was rerun with the case excluded, however, there was no change in the outcome. Therefore, the statistics reported include the full data set ($N = 214$). Examination of the histogram, normal probability plot, residual plot (standardized residuals against predicted values), and partial regression plot revealed that the assumptions of normality, linearity, and homoscedasticity were met for the regression. The Durbin-Watson statistic was 1.97 for the regression, signifying that the assumption of independence of errors was met.

Multicollinearity was assessed using collinearity statistics. Although the correlation between internalization and universalistic social comparison was quite high ($r = .78$), tolerance levels were all above .2 and no VIF values were greater than 10 (Field, 2005), indicating there was no multicollinearity between variables. Casewise diagnostics revealed one case with a standard residual above an absolute value of 2.5. Examination of Mahalanobis distance, Cook's distance, and leverage values were within acceptable range, indicating that this case did not unduly influence the regression model.

Appendix R

Assumption Testing for Regression Examining Body Image and Investment and the Drive for Muscularity

The results revealed one multivariate outlier with the use of a $p < .001$ criterion for Mahalanobis Distance. The regression analysis was rerun with the case excluded, however, there was no impact on the outcome. Therefore the results reported include the full data set ($N = 214$). Examination of the histogram, normal probability plot, residual plot (standardized residuals against predicted values), and partial regression plot revealed that the assumptions of normality, linearity, and homoscedasticity were met for the regression. The Durbin-Watson statistic for the regression was 1.98, signifying that the assumption of independence errors was met.

Multicollinearity was assessed using collinearity statistics. All tolerance levels were below .2 and no VIF values were greater than 10 (Field, 2005), indicating that there was no multicollinearity between variables. Casewise diagnostics identified two cases with standard residuals above an absolute value of 2.5. Examination of Mahalanobis distance, Cook's distance, and leverage values for these two cases were within acceptable range, indicating that they did not unduly influence the regression model.

Appendix S

Assumption Testing for Regression Examining Psychological Well-Being and the Drive for Muscularity

With the use of a $p < .001$ criterion for Mahalanobis Distance, no multivariate outliers were identified. Examination of the histogram, normal probability plot, residual plot (standardized residuals against predicted values), and partial regression plot revealed that the assumptions of normality, linearity, and homoscedasticity were met for the regression. The Durbin-Watson statistic was 2.13, signifying that the assumption of independence of errors was met.

Multicollinearity was assessed using collinearity statistics. The correlation between depression and self-esteem was quite high ($r = -.63$), however, tolerance levels were all above .2 and no VIF values were greater than 10 (Field, 2005), which is indicative of no multicollinearity between variables. Casewise diagnostics revealed three cases with standard residuals above an absolute value of 2.5. Examination of Mahalanobis distance, Cook's distance, and leverage values for the three cases were within acceptable range, indicating that they did not unduly influence the regression model.

Appendix T

Items on the Body Investment Inventory (BII) were analyzed using principal component analysis (PCA) with oblique rotation. Separate analyses were completed for the BII current use and BII future use scales of the measure. Oblique rotation, which allows for components to be intercorrelated in a multi-component solution, was selected in the event that several components emerged in the analysis (Field, 2005; Tabachnick & Fidell, 2001).

To assess the appropriateness of the data for PCA, Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) were calculated. Bartlett's test of sphericity was significant for both the Current Use and Future Use scales ($ps < .001$). The KMO values were .73 and .77 for the Current Use and Future Use scales, respectively, indicating that the data in the current sample were appropriate for analysis. For the Current Use scale, this procedure yielded a five-factor solution that accounted for 62.41% of the variance. Visual inspection of the scree plot confirmed this five-factor solution. All five factors evidenced eigenvalues greater than 1 (Field, 2005). All items factor loadings were greater than .40. Of note, item 17 on the BII Current Use scale, cosmetic procedures to increase muscularity, was removed from the PCA as it evidenced a correlation with steroid use that was greater than .90 (Field, 1995).

Factor one, labeled Low Risk Strategies, consisted of six items that accounted for 24.17% of the total variance. Items on this factor reflected low risk strategies to change body image including wearing clothes to look larger and/or more muscular and lifting weights to gain muscle mass. Factor two, labeled High Risk Strategies, consisted of four items that accounted for 13.04% of the total variance. Items on this factor reflected body change strategies associated with some risk to emotional or physical health, such as cosmetic procedures to look leaner and ephedrine use. Factor three, labeled Exercise, consisted of three items that accounted for 9.94% of the total variance. Items on this factor reflected body change strategies related to cardiovascular exercise and sport to increase leanness and muscularity. Factor four, labeled Unhealthy Eating Strategies, consisted of two items that accounted for 8.88% of the total variance. Items on this factor reflected unhealthy eating behaviour such as bingeing or consuming high

fat/caloric food. Factor five, labeled Miscellaneous, consisted of two items that accounted for 6.38% of the total variance. These items included prohormone use and dieting to lose weight. See Table T1 within this appendix for the item numbers and factor loadings for the BII Current Use scale.

For the Future Use scale, this procedure yielded a five-factor solution that accounted for 62.40% of the variance. Visual inspection of the scree plot confirmed this five-factor solution. The five factors demonstrated eigenvalues greater than 1 (Field, 2005). All 18 items were included in the analysis and evidenced factor loadings greater than .40. Factor one, labeled Low Risk Strategies, consisted of six items that accounted for 24.72% of the total variance. Items on this factor reflected low risk strategies to change body image including wearing clothes to look larger and/or more muscular and lifting weights to gain muscle mass. Factor two, labeled High Risk Strategies, consisted of three items that accounted for 12.45% of the total variance. Items on this factor reflected body change strategies associated with some risk to emotional or physical health, such as cosmetic procedures to look leaner or more muscular. Factor three, labeled Unhealthy Eating, consisted of two items that accounted for 9.47% of the total variance. Items on this factor reflected unhealthy eating behaviour such as bingeing or consuming high fat/caloric food. Factor four, labeled Exercise Strategies, consisted of three items that accounted for 8.60% of the total variance. Items on this factor reflected body change strategies related to cardiovascular exercise and sport to increase leanness and muscularity. Factor five, labeled Substance Use, consisted of four items that accounted for 7.17% of the total variance. These items included prohormone use and dieting to lose weight. See Table T2 within this appendix for the item numbers and factor loadings for the BII Future Use scale.

Table T1

Factor Loadings of the Body Investment Inventory Current Use Scale – Principal Components Analysis

BII Current Use Scale Items	1	2	3	4	5
6. Protein Consumption	.83				
7. Special Diet (eat 5 - times per day)	.86				
8. 2 Phase Diet	.65				
9. Wear Clothes	.42				
10. Lift Weights	.63				
12. Creatine Use	.53				
1. Steroid Use		.92			
3. Ephedrine Use		.47			
16. Vomiting, Diet Pills, Laxatives		.66			
18. Cosmetic Procedures - Leanness		.93			
11. Cardiovascular - Leanness			.61		
13. Sport - Muscle Mass			.85		
14. Sport - Leanness			.88		
5. High Fat/Caloric Foods				.80	
15. Binging				.78	
2. Prohormone Use					.70
4. Dieting - Leanness					.43

Note. Total $N = 214$. BII = Body Investment Inventory.

Table T2

Factor Loadings of the Body Investment Inventory Future Use Scale – Principal Components Analysis

BII Future Use Scale Items	1	2	3	4	5
4. Dieting - Leanness	.57				
6. Protein Consumption	.61				
7. Special Diet (eat 5 - times per day)	.63				
8. 2 Phase Diet	.76				
9. Wear Clothes	.56				
10. Lift Weights	.44				
16. Vomiting, Diet Pills, Laxatives		.74			
17. Cosmetic Procedure - Muscularity		.83			
18. Cosmetic Procedure - Leanness		.81			
5. High Fat/Caloric Foods			.71		
15. Binging			.71		
11. Cardiovascular - Leanness				.54	
13. Sport - Muscle Mass				.81	
14. Sport - Leanness				.88	
1. Steroid Use					.77
2. Prohormone Use					.77
3. Ephedrine Use					.52
12. Creatine					.64

Note. Total $N = 214$. BII = Body Investment Inventory.