BODY IMAGE IN MEN: THE IMPACT OF DRIVE FOR MUSCULARITY AND DRIVE FOR THINNESS ON DEPRESSION, SOCIAL PHYSIQUE ANXIETY, SELF-ESTEEM, AND BEHAVIOURAL FACTORS IN MALE HEALTH AND FITNESS TRAINEES

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Abstract

Recently, there has been a call for enhanced research in the field of male body image. The term "drive for muscularity" (DM) was created to capture the desire for a more muscular body type. This construct has been described as occurring on a continuum with "drive for thinness" (DT). Though many men struggle with these body image concerns, there are certain subgroups that are at a higher risk for DM and DT. Health and fitness trainees have endorsed greater body image and muscularity-related concerns than others. The current study had several objectives. The first was to determine whether DM and DT were higher in health and fitness trainees than in other males. The second was to examine changes in DM or DT as a factor of age or progression through the program. The third was to explore psychosocial variables (depression, social physique anxiety, and self-esteem), sexual orientation, and body composition measures (BMI and waist circumference) and their relationships with DM and DT. The fourth was to examine whether exercise behaviours (frequency, duration, and type of exercise) or supplement use was related to DM or DT. Finally, the fifth was to determine whether motivations for exercise played a role in the level of DM and DT endorsed. Seventy male health and fitness trainees participated in this study. Correlations, regressions, and one-way ANOVAs were calculated to examine relationships between variables. Results indicated that male health and fitness trainees were higher in DM than non-health and fitness trainees. No psychosocial variables correlated with DM, but DT was significantly correlated with social physique anxiety and body composition measures (BMI and waist circumference). Non-heterosexual orientation was endorsed at an unusually low rate.

DM, but not DT, differed significantly based on participant frequency, duration, and type of exercise, and type of supplement use. Other notable findings included participant endorsement of creatine usage, and the likelihood of using creatine to predict considering anabolic steroid use. These results contribute to the growing field of male body image literature. Directions for future research and clinical implications for practice with males with body image concerns are discussed.

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Chapter One: Introduction

1.1 Statement of the Problem

Traditionally, body image concerns have been viewed as a problem related to the female gender (e.g., Varnes et al., 2013). Research focused on the causes of body image problems in females has often identified media as the culprit, suggesting that there is a problematic discrepancy between the "ideal" and the realistic female body (e.g., Cattarin, Thompson, Thomas, & Williams, 2000). Body image disturbance in females has been linked to a number of adverse outcomes including social anxiety (Cash & Theriault, 2004), low self-esteem (Furnham, Badmin, & Sneade, 2002), depression (Stice, Hayward, Cameron, Killen, & Taylor, 2000), eating pathology (Stice, 2002), inappropriate exercise (LePage et al., 2008), substance use (Nelson et al., 2009), and risky sexual behaviour (Littletom, Breitkopf, & Berenson, 2005). Although body image disturbance is well understood in a female population, the topic of male body image has been neglected until recently. In the past two decades, researchers have acknowledged the gaps in the study of male body image, and have begun to investigate the male population further (e.g., McCreary & Sasse, 2000). For example, in the inaugural issue of the journal entitled Body Image, Cash (2004) called for more research on male body image moving forward.

As they began to study males, researchers commented upon gender differences in expression of body image concerns (e.g., McCreary & Sasse, 2000). While females generally pursued a thin body type, males were likely to have a desire to be more muscular (McCreary & Sasse, 2000). The prevalence of an "ideal" muscular body type appears to have increased substantially in the last 30 years (Pope, Phillips, & Olivardia, 2000), a finding which appears to mirror the emphasis on thinness in female media

depictions (e.g., Cattarin et al., 2000). For example, Pope, Olivardia, Gruber, and Borowiecki (1999) observed that with each passing generation of action figures, the level of muscularity has steadily increased, often far exceeding the feasible level of human attainment. Furthermore, it appears as though the muscular ideal that is marketed to men is substantially more muscular than that which is depicted for women. Frederick, Fessler, and Haselton (2005) revealed that male magazines promoted a more muscular male body type than did female magazines, creating a discrepancy between the muscularity that females actually find attractive and the muscularity that males deem as ideal. Females actually rated males who are moderately muscular as most physically attractive (Frederick & Haselton, 2007), despite the extremely muscular body type that appears to be depicted in most media directed toward males. This recent focus on a "v-shaped", muscular mesomorphic physique has led to increased body dissatisfaction in males. In order to capture this pursuit of muscularity and expand this research area, McCreary and Sasse (2000) coined the term "drive for muscularity." Drive for muscularity (DM) is a relatively new construct, and is defined as a "desire to enhance one's musculature" (McCreary & Sasse, 2000, p. 298). DM has been conceptualized as a socially constructed desire, based on social factors and the perception of muscularity as ideal (Morrison, Morrison, & McCann, 2006).

The muscular ideal is arguably the main cause of body image disturbance in males (Parent, 2013). When excessive, the muscular ideal has been related to both physical and mental health concerns (e.g., Grossbard et al., 2013; McCreary & Sasse, 2000). Pursuit of this muscular ideal can lead to engagement in risky behaviours in order to gain musculature (Thompson & Cafri, 2007). For example, research has revealed that high

levels of DM scores are associated with muscle dysmorphia, or a preoccupation with one's muscularity to the point of causing social and occupational impairment (Blouin & Goldfield, 1995; Robert, Munroe-Chandler, & Gammage, 2009); drug abuse (Parent & Moradi, 2011); exercise dependence (Hale, Roth, Delong, & Briggs, 2010); and dieting (McCreary & Sasse, 2002). High DM scores have been reported to be correlated with negative psychological outcomes as well. Elevated DM has been previously associated with depression (Grossbard, Atkins, Geisner, & Larimer, 2013), social physique anxiety (SPA; Brunet, Sabiston, Dorsch, & McCreary, 2010), low self-esteem (Smolak & Stein, 2006), body dissatisfaction (Nowell & Ricciardelli, 2008), bulimia (Hallsworth et al., 2005), and exercise dependence (Chittester & Hausenblas, 2009).

Given that recent research has begun to shed light on the numerous negative associations with pursuit of the muscular ideal in men, it is important to understand how DM manifests itself in subgroups of the male population. Recent research has shown that males entering the field of health and fitness are susceptible to greater body image concerns (e.g., Yager & O'Dea, 2009), particularly those related to muscularity (e.g., Olson, Esco, & Wilford, 2009). As these individuals will ultimately have substantial impact on vulnerable populations such as clients and students in their roles as health and fitness professionals, it is important to further understand the muscular ideal and how it manifests in a population of health and fitness trainees. These trainees will ultimately enter careers as personal trainers, physical educators, occupational therapists, and more, and may have influence on children and individuals with body image concerns. If the trainees enter careers with body image concerns, they may unintentionally pass these values on to their clients and students. Thus, the goal of the present study was to examine

the muscular ideal and its psychological and physiological correlates in a sample of male health and fitness trainees. The findings will help identify whether there is a need for interventions and education related to body image in this population.

Chapter Two: Literature Review

The intent of the literature review is to create a picture of the existing research surrounding the muscular ideal and the thin ideal. This chapter will begin with a general overview of the concept of drive for muscularity, followed by a review of the research on drive for muscularity and psychological correlates, exercise behaviors, supplement use, and exercise motivations. This process is then repeated surrounding the drive for thinness and its existing research.

2.1 Drive for Muscularity

What is drive for muscularity? Drive for muscularity (DM) is defined as the desire to increase levels of muscularity (McCreary & Sasse, 2000). This is a relatively new construct and, as such, the literature on the muscular ideal has been described as underdeveloped (Edwards, Tod, & Molnar, 2014). This construct was introduced in response to increased awareness that men as well as women seem to struggle with body image concerns, and that men's concerns appear to manifest as a desire to build a bulky, more muscular physique (Edwards et al., 2014). In addition to defining the construct, McCreary and Sasse (2000) developed the Drive for Muscularity Scale (DMS), which provided researchers with a tool to measure and examine the frequency and impact of the muscular ideal in males. The DMS (McCreary & Sasse, 2000) is a 15-item self-report questionnaire intended to assess a person's desire to enhance their muscularity. It is separated into two subscales - a 7-item muscularity-oriented body image attitudes (MBI) subscale as well as a 7-item muscularity behaviours (MB) subscale, with a fifteenth question designed to assess propensity for future anabolic steroid use (McCreary & Sasse, 2000).

The muscular ideal has been described as a social construct (Morrison, Morrison, & McCann, 2006), potentially based on exposure to media images and social comparisons (Morrison, Morrison, & Hopkins, 2003). It has been established that over time, exposure to a culture rich in muscularity-centered images actually leads to an increase in drive for muscularity (e.g., Harrison & Bond, 2007). When in the elevated range, DM scores are conceptualized as maladaptive and have been associated with risky behaviour such as drug abuse (Parent & Moradi, 2011), extreme dieting (McCreary & Sasse, 2002), poor physical health, and negative psychological outcomes (Thompson & Cafri, 2007; Grossbard et al., 2013; Brunet et al., 2010; Smolak & Stein, 2006). Given the numerous potential risks associated with the muscular ideal, it is important to understand how it manifests itself in different populations. This dissertation will enhance the field of muscular ideal research through an examination of psychosocial variables, exercise behaviours, exercise motivations, and body composition measures, and how they relate to the muscular ideal.

2.2 Drive for Muscularity and Psychosocial Correlates

Drive for muscularity and depression. Depression is defined as an acute illness characterized by a persistently saddened mood and a lack of interest or pleasure, as well as functional impairment in daily living (APA, 2013), and has been repeatedly linked with body dissatisfaction (e.g., Cafri, Thompson, Ricciardelli, Mccabe, Smolak, & Yesalis, 2005; McCreary & Sasse, 2000). More recently, symptoms of depression have been correlated with DM scores (Bergeron & Tylka, 2007; Hallsworth et al., 2005). Symptoms of depression are evaluated in the muscular ideal research through a variety of measures, including The Beck Depression Inventory-II (Beck, Steer, & Brown, 1996); the

Beck Depression Inventory-Short Form (BDI; Beck, Ward, Mendelson, & Erbaugh, 1961); the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1991); and the Center for Epidemiologic Studies Short Depression Scale (CES-D-SF: Andresen et al., 1994).

Acknowledging that little was known about the association between muscularity and symptoms of depression in men, Olivardia, Pope, Borowiecki and Cohane (2004) examined body image and depression, self-esteem, and eating disorder symptoms in 154 heterosexual male college students aged 18-30 years from a variety of disciplines (e.g., psychology, engineering, mathematics, accounting, marketing, history, and sociology). Participants underwent measures of height and weight. An estimate of body fat was obtained through a series of six skinfold measurements using a method established by Jackson and Pollock (1978), through which the fat-free mass index (FFMI), a measure of muscularity, was calculated (Kouri et al., 1995). Researchers also had participants complete demographic questions, measures of body image perceptions, a scale intended to determine their perceived and ideal body image, as well as identify the body image they believe to be average for their sex and age (Gruber, Pope, Borowiecki, & Cohane, 2000). Depression was assessed using the Beck Depression Inventory-Short Form (BDI; Beck et al., 1961) and self-esteem was measured with the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Results indicated that these American college men exhibited body dissatisfaction, and perceived themselves to be fatter than they were. There was a significant difference between their perceived and desired muscularity (Olivardia et al., 2004). As predicted, researchers also determined that body dissatisfaction was positively correlated with symptoms of depression suggesting that those with a greater discrepancy

between perceived and desired muscularity were more likely to be depressed. Finally, self-esteem was negatively correlated with higher levels of body dissatisfaction (Olivardia et al., 2004). Researchers did not directly assess DM, making their findings and the support for a relationship between DM and symptoms of depression preliminary. However, they provided some of the first evidence for the relationship between muscularity and symptoms of depression. They identified that males were aware of their level of muscularity, and that the belief that they were not sufficiently muscular was associated with symptoms of depression. This study provided important information and highlighted the need to directly examine the muscular ideal and its association with symptoms of depression.

More recently, Grossbard et al. (2013) studied the role of symptoms of depression in the relationship between the muscular ideal, drive for thinness (DT) and eating disorder symptoms. A large sample of 669 college students (230 males, 439 females) completed a confidential online survey for a $25 incentive. Researchers obtained demographic information, and measures of self-reported height and weight in order to calculate BMI. Researchers also measured symptoms of depression using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1991), DM with the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000), drive for thinness with the Drive for Thinness (DTS) subscale of the Eating Disorders Inventory (EDI; Garner, Olmstead, & Polivy, 1983) and eating disorder symptoms using the Eating Disorder Diagnostics Scale (EDDS; Stice, Telch, & Rizni, 2000). Results indicated stronger DM scores among college men compared to women, and lower overall DT, depressed mood, and eating disorder symptoms in males compared to women (Grossbard et al., 2013). However,

depressed mood and stronger DT were uniquely associated with greater risk of eating disorder symptomatology among men (Grossbard et al., 2013). Interestingly, through statistical analysis it was determined that depressed mood may be a moderator of the relationship between DM scores and eating disorder symptoms among men (Grossbard et al., 2013).

Despite the important information provided in the study conducted by Grossbard et al. (2013), it is necessary to note several limitations that may have impacted their results. First, the researchers used a self-report BMI, which is often associated with unreliable reports of weight (e.g., Ali, Minor, & Amialchuk, 2013). Thus, any information that was obtained regarding participant BMI would have been inaccurate. Secondly, the researchers neglected to assess exercise behaviour or athletic status in their sample. Given that both exercise and athletic status significantly impact DM scores (e.g., Bennett, 2010; Hallsworth, Wade, and Tiggemann, 2005), their influence should have been assessed. The current study attempts to avoid duplicating these errors by obtaining objective measures of BMI, as well as assessing exercise behaviours and motivations for exercise.

Bergeron and Tylka (2007) attempted to differentiate body dissatisfaction from pursuit of the muscular ideal. The researchers concluded that body dissatisfaction and DM were two distinct concepts (Bergeron & Tylka, 2007). In order to reach this conclusion, three dimensions of body dissatisfaction (muscularity, body fat, and height) were measured as well as three aspects of DM (body image, behaviours, and attitudes). It was hypothesized that if body dissatisfaction was unique, it would account for variance in the five measured domains of psychological well-being (including symptoms of

depression) above and beyond the variance accounted for by DM scores. In order to establish whether this was the case, both symptoms of depression and DM scores were measured in the study sample. Researchers recruited 368 predominantly Caucasian college men with a mean age of 19.11 years. Within their measures, they included the Drive for Muscularity Scale (McCreary & Sasse, 2000), The Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), and the Male Body Attitudes Scale (MBAS; Tylka et al., 2005). Participants were recruited from online sources and completed the measures on a computer in a research lab in exchange for course credit. Findings revealed that body dissatisfaction accounted for variance in psychological well-being (depression included) above and beyond the variance that was accounted for by DM scores (Bergeron & Tylka, 2007). In addition, symptoms of depression were positively correlated with the Muscularity body image subscale of the Drive for Muscularity Scale, DMS-MB, but was not correlated with the Drive for Muscularity Behaviour Subscale (McCreary & Sasse, 2000). The fact that symptoms of depression correlated with one subscale but not the other was of particular interest. However, it is possible that these findings may be due to the nature of what is being assessed within each subscale. While the DMS behaviour subscale assesses current behaviours intended to increase muscle (e.g., weightlifting, nutritional supplement use), the DMS body image attitudes subscale captures participant attitudes toward muscularity (e.g., “I wish that I were more muscular”) (McCreary & Sasse, 2000). Those individuals who score higher on the body image attitudes subscale would likely desire a more muscular physique and, by extension, have higher dissatisfaction with their current body type. As such, it would follow that these individuals would also likely report a higher level of depression given

their current body dissatisfaction. In contrast, the DMS behaviours subscale measures only behaviours that enhance muscularity, which may not capture thoughts associated with body dissatisfaction or symptoms of depression.

In addition to the research conducted on a general male sample, the muscular ideal has also been examined and associated with symptoms of depression in specific populations, such as the non-heterosexual population (Brennan, Craig, & Thompson, 2012), the adolescent population (McCreary & Sasse, 2000), and the athlete population (Hallsworth et al., 2005).

Brennan, Craig, and Thompson (2012) attempted to explore the associations between the muscular ideal and other factors in homosexual and bisexual males at the 2008 Toronto LBGT festival. Researchers recruited a total of 400 racially diverse non-heterosexual male participants varying broadly in age, who completed paper and pencil measures in exchange for $15 in compensation. Depression was measured by the Center for Epidemiologic Studies Short Depression Scale (CESD-10: Andresen et al. 1994), while DM was measured by the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000). Results indicated that higher levels of depression predicted a higher score on the Drive for Muscularity Scale, and that the two variables were significantly correlated (Brennan et al., 2012).

Although this particular study provides important information on the link between the muscular ideal and symptoms of depression in non-heterosexual males, there are several limitations worth noting. First, it failed to examine possible differences in depression scores based on subscales of the DMS, as previously reported by Bergeron and Tylka (2007). Given that these subscales measure substantially different constructs

(muscularity attitudes and behaviours), they may result in different associations with DM scores. Secondly, the Cronbach's alpha for the depression scale used was .67 in the Brennan et al. (2012) study, leading to the suggestion that all interpretations of findings associated with depression be made with caution. Finally, researchers suggested that their sample may have been biased in that they were recruited from a festival celebrating LGBT individuals. These participants may have higher self-esteem and less internalized homonegativity and be systematically different from the overall population of gay individuals (Brennan et al., 2012). The limitations of this study point to the importance of ensuring that DM is assessed based on subscales as well as through an overall mean score.

In one of the first studies examining the muscular ideal, McCreary and Sasse (2000) studied the relationship between the muscular ideal and various psychological constructs among adolescent males and females. Researchers administered a variety of measures to 197 (101 female and 96 male) high school students with an average age of 18 years. Included in these measures was the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000) and the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1991). Results indicated that the overall DM score was associated with higher levels of depression ($r=0.32$, $p<.001$) in boys, while girls did not exhibit a significant correlation between symptoms of depression and DM ($r=.00$). This study not only highlighted a difference between the sexes in the level of DM endorsed, but also served to reinforce the relationship between the muscular ideal and symptoms of depression in males (McCreary & Sasse, 2000). Similar to the research conducted by Brennan et al.

(2012), this study failed to differentiate between subscales of the DMS and their association with symptoms of depression (Bergeron & Tylka, 2007).

Given the findings of reviews of the literature (e.g., Olivardia et al., 2004, Grossbard et al., 2013), there appears to be a well-documented relationship between pursuit of the muscular ideal and symptoms of depression in males. As previous research has indicated that health and fitness trainees are at higher risk of body image concerns and muscularity-related concerns (e.g., Yager & O'Dea, 2009; Bennett, 2010), it is possible that they may also exhibit elevations in symptoms of depression relative to the general population. Thus, further evaluation of this relationship should be conducted in the field of health and fitness trainees, as there are no studies known to the researcher that evaluate the relationship between symptoms of depression and pursuit of the muscular ideal in this specific sample. Furthermore, there are few studies (e.g., Bergeron & Tylka, 2007) that have examined the subscales of the DM scale and how they are related to depression scores. Therefore, this should be studied in the current sample.

Drive for muscularity and social physique anxiety. Social physique anxiety (SPA) is defined as anxiety that individuals feel in response to a perception that others will negatively evaluate their physique (Hart, Leary, & Rejeski, 1989). It essentially describes the discomfort that individuals feel when showing their bodies in public, and the anxiety that arises when individuals feel their bodies are being negatively evaluated or devalued (McCreary & Saucier, 2009). It was believed that there would be a positive relationship between DM scores and SPA (McCreary & Saucier, 2009). Cash (2002) proposed a cognitive-behavioural model that hypothesized that body image concerns would lead to negative emotions. The majority of findings in this area have been in

support of Cash's model, and have suggested that concerns around body image lead to an increase in SPA (e.g., McCreary & Saucier, 2009; Martin, Kliber, Kulinna, & Fahlman, 2006). Several researchers have reported a positive relationship between SPA and DM scores (e.g. McCreary & Saucier, 2009; Martin et al., 2006). SPA is most commonly assessed using the 9-item Social Physique Anxiety Scale (Hart, Leary, & Rejeski, 1989). This scale has previously been evaluated and been found to be both reliable and valid (Hart et al., 1989; Petrie et al., 1996; Strong, Martin-Ginis, Mach, & Wilson, 2006).

McCreary and Saucier (2009) conducted a study examining the relationships between DM, SPA, and three aspects of body comparison among college men and women. They recruited 182 males and 201 females from an introductory psychology participant pool and invited them to complete the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000), and the Short Form Social Physique Anxiety Scale (Martin et al., 1997). In addition, they used a measure of body comparison intended to assess comparisons of weight, muscularity, and general body shape to that of others (Fisher, Dunn, & Thompson, 2002). This particular measure asks participants to rate how often they compare body parts (e.g., arm, waist) to those of their same sex peers. Scores from this measure are then grouped into one of the three comparison types described above (Fisher et al., 2002). McCreary and Saucier (2009) found significant correlation between DM and SPA in both males and females. DM was a significant predictor of all three types of body comparison, and had a strong relationship with muscularity-related comparisons (McCreary & Saucier, 2009). Furthermore, DM was found to account for 23% of variance in SPA in males, while body comparison variables increased the accounted for variance to 86.5% (McCreary & Saucier, 2009). This suggested that DM accounts for a

substantial portion of the variance in SPA, although body comparison comprised a larger portion of that variance. Essentially, higher DM scores predicted more frequent body comparison, which in turn predicted greater SPA (McCreary & Saucier, 2009). Given that research has suggested that there are higher levels of body related concerns in males in the field of health and fitness (Yager, Gray, Curry, & McLean, 2017), there is a possibility that they will be at an increased risk for body related comparisons, and in turn, higher SPA. This is particularly a concern given that these individuals will be working mainly with a group of vulnerable individuals in the future as coaches, educators, trainers, nutritionists, etc. Should they themselves exhibit high SPA and negative perceptions of their own body image, it is possible that these perceptions will be transmitted to the clients with whom they work.

Martin, Kliber, Kulinna, and Fahlman (2006) began their research with the intent of better understanding predictors of SPA. In doing so, they selected several predictors to evaluate, including muscularity-related cognitions and appearance-related cognitions. Muscularity-related cognitions were assessed using the Swansea Muscularity Attitudes Questionnaire (SMAQ) developed by Edwards and Launder (2000). This measure is an alternative to the Drive for Muscularity Scale (McCreary & Sasse, 2000). It has two subscales, one intended to evaluate Drive for Muscularity (DM), and one intended to assess the Positive Attributes of Muscularity (PAM) (Edwards & Launder, 2000). It has been demonstrated to have acceptable levels of internal consistency (Edwards & Launder, 2000), although the Drive for Muscularity Scale has shown greater internal consistency and validity in a wider range of populations (Wojtowicz & von Ranson, 2006). Appearance-related cognitions were assessed using the Multidimensional Body Self

Relations Questionnaire (Cash, 2000), a tool designed to evaluate how satisfied people are with their looks. Researchers recruited 98 college men with an average age of 22.9 years. Participants were recruited via flyers advertising free body fat and muscle mass measures, and met with researchers for a 60 to 90-minute session. Once there, researchers obtained consent and provided consenting participants with all paper and pencil measures. Results indicated that overall, males had a positive set of body image cognitions and moderate SPA (Martin et al., 2006). There was no significant correlation between the DM subscale of the SMAQ and SPA (Martin et al., 2006). Appearance and muscularity cognitions (DM and positive attributes of muscularity) accounted for 60% of the variance in SPA, with appearance cognitions predicting the majority of the variance (Martin et al., 2006). Muscularity cognitions (DM and positive attributes of muscularity) only accounted for 3 and 12% of the variance in SPA (Martin et al., 2006). Not surprisingly, those individuals who positively rated their own appearance were less prone to experiencing SPA (Martin et al., 2006).

This study has one particularly important limitation worth noting. The SMAQ, the measure of pursuit of the muscular ideal in this particular study, has shown poorer psychometrics than the Drive for Muscularity Scale (McCreary & Sasse, 2000). In particular, the SMAQ has not been well established in populations of weight-training males (Wojtowicz & von Ranson, 2006). Given that the Martin et al (2006) study is evaluating pursuit of the muscular ideal in males who may have an underlying interest of health and fitness (given that there may have been a self-selection bias at play), it would be important to evaluate these individuals using a scale such as the Drive for Muscularity Scale (McCreary & Sasse, 2000), which has acceptable psychometrics for a number of

different populations (Wojtowicz & von Ranson, 2006). Despite this being a limitation of the Martin et al. (2006) study, the findings are relevant and worth considering because this sample and the sample in the current study may have some similarities. In the Martin et al. (2006) study, males had a relatively low percentage of body fat and overall positive body image. It is possible that given that the sample in the current study has a preexisting interest in health and fitness, they may also have relatively positive body image, and therefore exhibit a non-significant correlation between DM scores and SPA.

Thomas, Tod, Edwards, and McGuigan (2014) also evaluated the relationship between SPA and DM scores. They assessed DM and SPA to determine whether they mediated the relationship between perceived muscular male ideal physique and muscle dysmorphia - a preoccupation with one's muscularity to the point of causing social and occupational impairment (e.g., Blouin & Goldfield, 1995) - in weight-training men (Thomas et al., 2014). Participants comprised 146 men (average age 22.8) regularly engaging in weight training (at least once a week for an average duration of 2.9 years) who completed a variety of paper and pencil measures. Included in these measures were the Drive for Muscularity Attitudes Questionnaire (DMAQ) (DMAQ; Morrison et al., 2004) and the Social Physique Anxiety Scale (SPAS; Hart et al., 1989). In addition, researchers assessed muscle dysmorphia through the Muscle Dysmorphia Inventory (MDI), a 27-item measure intended to measure both behavioural and psychological characteristics of muscle dysmorphia (Rhea, Lantz, & Cornelius, 2004). Also included was the Muscle Appearance Satisfaction Scale-6 (MASS-6), a brief measure of muscle dysmorphia (Mayville, Williamson, White, Netemeyer, & Drab, 2002). Finally, they measured perceived muscular male ideal physique by asking participants to rate two

visual analogue scales with statements such as “how muscular you ideally would like your body to be” (Thomas et al., 2014). Results indicated that SPA and DM scores were significantly correlated. Furthermore, researchers found that SPA and DM mediated the relationship between perceptions of the ideal male muscular physique and symptoms of muscle dysmorphia (Thomas et al., 2014). Essentially, researchers determined that SPA and DM provided indirect pathways that influence the relationship between perceived ideal physique and muscle dysmorphia. These findings provide critical information for the research base. It suggests that males who subscribe to the ideal male muscular physique report higher DM scores, and are in turn more likely to endorse muscle dysmorphia. Furthermore, it suggests that SPA plays a role in the development of muscle dysmorphia that is centered on body size and shape (Thomas et al., 2014). These findings are particularly relevant to the current study. They suggest that participants who endorse high levels of SPA and DM are likely at an elevated risk for symptoms of muscle dysmorphia. Given what is known about the adverse consequences of muscle dysmorphia itself (e.g., Cafri, Olivardia, & Thompson, 2008), it is important to understand the predisposing factors.

In summary, research indicates that the majority of findings support a positive relationship between SPA and pursuit of the muscular ideal (e.g. McCreary & Saucier, 2009; Martin et al., 2006). Given the propensity for male health and fitness trainees to have higher overall levels of body image concern (e.g., Yager & O’Dea, 2009), it is important to gain an in-depth understanding of the relationship between SPA and the muscular ideal in the current study.

Drive for muscularity and self-esteem. Global self-esteem, or "an individual's positive or negative attitude toward the self as a totality" (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995, p. 141), appears to be another psychological construct that has previously been associated with drive for muscularity (DM). However, these findings are mixed (e.g., Chittester & Hausenblas, 2009; Peterson, 2007; Olivardia et al., 2004; Hatoum & Belle, 2004).

Chittiser and Hausenblas (2009) attempted to assess psychological and anthropomorphic (e.g., BMI, body fat, and supplement use) correlates of DM scores. One of the psychological measures under examination was self-esteem. Researchers hypothesized that there would be a negative correlation between self-esteem and DM scores (Chittiser & Hausenblas, 2009). In order to evaluate their hypothesis, they recruited 113 college-aged males (average age 20.9 years) who completed the Rosenberg Self-esteem Scale (Rosenberg, 1965), as well as the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000). Supplement use was assessed through the 4-item Supplement subscale of the Muscle Dysmorphia Inventory (MDI; Lantz, Rhea, & Cornelius, 2002; Rhea et al., 2004), while exercise dependence was assessed through the 21-item Exercise Dependence Scale (EDS; Hausenblas & Symons Downs, 2002). This scale has previously demonstrated acceptable psychometric properties (Symons Downs, Hausenblas, & Nigg, 2004). Findings indicated that lower levels of self-esteem were significantly correlated with higher DM scores (Chittiser & Hausenblas, 2009). Furthermore, supplement use and exercise dependence were associated with DM scores. Supplement use and exercise dependence were also significantly correlated with low self-esteem. From these findings, the researchers speculated that men who have low self-esteem have a propensity to

gravitate toward quick solutions (e.g., supplement use). Furthermore, they believed that individuals with low self-esteem are also likely to become exercise dependent in an attempt to gain muscularity (Chittiser & Hausenblas, 2009).

A study conducted by Nowell and Ricciardelli (2008) evaluated the effect of appearance-based comments (both positive and negative) on pursuit of the muscular ideal. They also evaluated the moderating effect of self-esteem on DM scores. Researchers recruited 214 males between the ages of 18 and 30 from university (63% of sample) and general populations (37% of sample). They devised a list of 40 appearance-based comments with the assistance of male students aged 18-30 (Nowell & Ricciardelli, 2008), and then had additional assistance in classifying them as positive, negative, neither negative nor positive, or both negative and positive. Following the development of the scale, they then asked participants who completed the questionnaires to rate on a scale of one to five how frequently they had been the recipient of these sorts of comments (e.g. "you have great abs", "you need to get fit"). This then served as the measure of frequency of negative/positive comments. DM was measured by the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000), and self-esteem was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Results indicated that more frequent negative comments were moderately associated with the attitudinal aspect of DM, but were not associated with behaviours to enhance muscularity (Nowell & Ricciardelli, 2008). The attitudes about muscularity were evaluated through the attitudes subscale of the Drive for Muscularity Scale, which asked participants to rate statements such as "I wish that I were more muscular." This suggests that negative messages may be sufficient to evoke attitudes of concern about body image (e.g., wishing for a more muscular body), but do

not appear to actually alter the behaviour of the individuals receiving the negative messages by causing them to increase muscularity-enhancing behaviours (Nowell & Ricciardelli, 2008). Furthermore, results indicated that although self-esteem did not moderate the effect of verbal comments on DM, low self-esteem was associated with an overall higher DM ($r=-.26$, $p<.01$) (Nowell & Ricciardelli, 2008).

Evidence for the relationship between pursuit of the muscular ideal and self-esteem has provided further direction for interventions intended to target muscularity-related body image concerns. Given that high DM scores have previously been associated with a low level of self-esteem (e.g., Nowell & Ricciardelli, 2008; Chittiser & Hausenblas, 2009), researchers have hypothesized that promoting self-esteem may be helpful in decreasing pursuit of the muscular ideal (Brunet et al., 2010).

However, not all research on self-esteem and pursuit of the muscular ideal has identified a significant relationship. For example, Hatoum and Belle (2004) conducted a study with the intent of investigating the relationship between male media exposure, attitudes toward ideal male bodies, and behaviours initiated to improve their bodies. In doing so, researchers included a measure of self-esteem (Rosenberg Self-Esteem Scale; Rosenberg, 1965) and a revised version of a pre-existing measure of DM (Swansea Muscularity Attitudes Questionnaire (SMAQ); Edwards & Launder, 2000). Researchers recruited 89 male college students with an average age of 19.5 years. These individuals represented 31 different majors, and had completed an average 1.5 years of college. Participants completed a paper-and-pencil questionnaire with the relevant measures (Hatoum & Belle, 2004). Results indicated that the sample had relatively high levels of

self-esteem, and no relationship between self-esteem and muscularity concerns was reported (Hatoum & Belle, 2004).

The conflicting evidence on the relationship between pursuit of the muscular ideal and self-esteem could be explained by a number of factors. First, there is always the possibility of a self-selection bias. Those individuals who are recruited from a large and varied population (e.g., Hatoum & Belle, 2004) may be those who are particularly interested in the area of health and fitness and therefore more likely to participate in studies evaluating areas such as DM voluntarily. As such, they may have a greater level of fitness and therefore a higher level of self-esteem (e.g., Hamidah, Santoso, & Karyono, 2015). For example, in the case of the study conducted by Hatoum and Belle (2004), participants were sampled from 31 different majors. Given the wide range of backgrounds and the voluntary nature of participation, it is possible that only those individuals who had an interest in learning more about pursuit of the muscular ideal or overall health and fitness volunteered to participate. Given that 68.5% of participants reported they had a gym membership and worked out, on average, 5.8 hours per week, this is likely the case (Hatoum & Bell, 2004). It is also possible that exercise behaviour played a role in the conflicting evidence for the relationship between DM scores and self-esteem. Unlike the Hatoum and Bell (2004) study, many researchers who evaluated this relationship in other samples did not evaluate exercise behaviours. Thus, although it is difficult to evaluate, it is possible that where a significant relationship between DM and self-esteem existed, participants were not experiencing the protective effect of exercise on self-esteem (Hamidah et al., 2015).

In summary, research of the relationship between pursuit of the muscular ideal and self-esteem has resulted in mixed findings (e.g. Hatoum & Belle, 2004; Nowell & Ricciardelli, 2008). Given that there are many additional factors that may influence self-esteem, and by extension, mental health (e.g., amount of exercise; Daley, 2008), it will be critical to evaluate self-esteem and pursuit of the muscular ideal in the population of male health and fitness trainees.

2.3. Drive for Muscularity and Exercise Behaviours.

More recent research has focused on the impact of drive for muscularity (DM) on exercise behaviours. An increase in the amount of research in the muscular ideal field has led to the publication of one meta-analysis (Tod & Edwards, 2015) and one systematic review article (Edwards, 2014), both of which examine exercise behaviours as a correlate of pursuit of the muscular ideal.

In studies examining the relationship between behaviour and pursuit of the muscular ideal a few variables have been consistently related. Weight lifting, dieting, and sporting involvement have all previously been associated with DM (e.g., Chittiser & Hausenblaus, 2009; Morrison, Morrison, McCann, & Hopkins, 2004). Tod and Edwards (2015) conducted a meta-analysis with the intent of examining pursuit of the muscular ideal and its relationship with exercise behaviour, disordered eating, and exercise dependence. Analysis of relevant studies revealed small to moderate positive relationships between DM scores and depression and social physique anxiety (SPA), and small to moderate negative relationships between DM scores and self-esteem. However, the small to moderate nature of the relationship suggests that the connection is likely complex and affected by other factors (Tod & Edwards, 2015).

There are several factors in the field of research assessing exercise behaviour which lead to the conclusion that further evaluation of this area is necessary. For example, the majority of research focuses specifically on weight training (e.g. Litt & Dodge, 2008), and does not evaluate whether DM scores have a relationship with other types of exercise. Those that do examine more than weight lifting alone generally only include "cardiovascular exercise" and do not provide the opportunity for participants to endorse other sorts of exercise (e.g., calisthenics; Morrison et al., 2004). Further, there is little research evaluating the frequency and duration of exercise sessions and their association with DM scores. One of the few studies that assesses frequency and duration of exercise is that of Morrison et al. (2004), who conducted a study with the intention of developing a new measure related to muscularity - the Drive for Muscularity Attitudes Questionnaire (DMAQ; Morrison et al., 2004). In this particular study, researchers developed a measure of Body Image Investment in which three questions evaluate the frequency of weight lifting sessions. The remaining two questions assessed frequency and duration of cardiovascular exercise. Results indicated that both weight lifting and cardiovascular exercise were associated with the DMAQ, though weight lifting had a stronger correlation than cardio (Morrison et al., 2004).

The findings obtained by Morrison et al. (2004) provide important information regarding specific exercise behaviours and their relationship with the muscular ideal. Further evaluation of the relationship between exercise behaviours and DM scores should be conducted in the field of health and fitness trainees, as few studies thus far have provided the level of detail relating to exercise behaviours achieved in the study conducted by Morrison et al. (2004).

2.3. Drive for Muscularity and Supplement Use.

Supplement use is another factor that has previously been found to have a relationship with drive for muscularity (DM). Although this research is relatively recent, there appears to be a consistently positive correlation between supplement use and pursuit of the muscular ideal (e.g., Chittester & Hausenblas, 2009; Morrison et al., 2004; Parent, 2016). However, many studies evaluating the relationship between supplement use and DM scores (e.g. Litt & Dodge, 2008) fail to evaluate whether differences exist between pursuit of the muscular ideal and the types of supplements consumed, leading to a need for a greater level of detail in future research.

Acknowledging that supplement use played an important role in the effort to enhance muscularity, Morrison et al. (2004) included three questions relating to supplement use or protein consumption in the development of their new measure, the DMAQ (Morrison et al., 2004). They reported a positive correlation between the supplement use index and DM ($r=.40$, $p<.01$), though they did not report whether protein or supplement consumption resulted in a higher DM score (Morrison et al., 2004). However, they did include an item assessing contemplation of anabolic steroid use, and determined that this was positively correlated with DM scores as well ($r = .25$, $p<.01$; Morrison et al., 2004). This relationship is particularly noteworthy, given that anabolic steroid use has numerous negative implications for both physical and mental health (e.g., Karazsia, Crowther, & Galioto, 2013).

Chittester and Hausenblas (2009) assessed supplement use by administering the Supplement subscale of the Muscle Dysmorphia Inventory (MDI; Lantz, Rhea, & Cornelius, 2002; Rhea, Lantz, & Cornelius, 2004). Results indicated that supplement use

was significantly correlated with muscularity-related behaviours (r=.77) and muscle-oriented body-image (*r* = .35). Researchers suggested that supplement use can be perceived as a "quick fix" by men who are pursuing muscularity, and may be used as a rapid way to gain a more muscular body type (Chittester & Hausenblas, 2009). However, researchers yet again failed to distinguish the type of supplement most commonly associated with DM scores, an important point to distinguish when targeting clinical interventions and psychoeducational initiatives related to pursuit of the muscular ideal and male body image.

Finally, Parent (2016) recently evaluated the relationship between DM scores, protein supplement usage, and intention to use anabolic steroids. This research was based on the idea that protein supplementation may serve as a gateway to anabolic steroid use (Parent, 2016). Results indicated that protein supplement use was positively correlated with intention to use anabolic androgenic steroids (r=.21, p<.01; Parent, 2016). Furthermore, muscularity-related attitudes as measured by the Attitudes subscale of the Drive for Muscularity Scale (DMS-A; McCreary, Sasse, Saucier, & Dorsch, 2004) was also correlated with intention to use AAS (r=.21, p<.01; Parent, 2016). Although this study focused only on protein consumption, it provides further support for the link between supplement use and anabolic steroid use. This highlights the importance of evaluating specific type of supplement use and the association with intent to use anabolic steroids.

In summary, research appears to support a positive relationship between supplement use and DM scores (e.g., Parent, 2016; Chittester & Hausenblas, 2009). However, there is a need to gain depth in terms of understanding the impact of type of

supplement use on DM scores.

2.4 Drive for Muscularity and Exercise Motivations

Exercise motivation refers to the reasons behind an individual's decision to exercise, and is often measured with the Exercise Motivation Inventory-II (EMI-II; Markland & Ingledew, 1997). This particular measure is broken into fourteen different subscales, each representing a different motivation for exercising. The motivations are as follows: Appearance, Nimbleness, Strength and Endurance, Health Pressures, Ill-Health Avoidance, Positive Health, Weight Management, Competition, Affiliation, Social Recognition, Challenge, Enjoyment, Revitalization, and Stress Management (Markland & Ingledew, 1997). These motivations are often grouped into five main categories: psychological motives (Stress Management, Revitalization, Enjoyment, and Challenge); interpersonal motives (Social Recognition, Affiliation, and Competition), health motives (Health Pressure, Ill Health Avoidance, and Positive Health); body-related motives (Weight Management and Appearance); and Fitness Motives (Strength & Endurance and Nimbleness). Exercise motivations and their relationship with DM scores have potentially important clinical implications, as they provide insight into the reasoning behind why males may be in pursuit of a muscular body type.

Pritchard, Parker, and Nielsen (2011) are one of the few researchers who have examined the relationship between exercise motivations and pursuit of the muscular ideal. They did so in a general undergraduate population, and completed an evaluation of the relationship in both males and females. While DM was measured by the reliable and valid Drive for Muscularity Scale (McCreary & Sasse, 2000), exercise motivations were adapted from the Motivations for Marathoners Scale (MOMS; Masters, Ogles, & Jolton

1993) to reflect general exercise motivations. Given that this scale was developed for a different and specific population and adapted by the researchers, it is possible that this may not have been appropriate for use with general undergraduates, potentially affecting the findings of this study. Pritchard et al. (2011) determined that their male participants' primary motivations for exercise involved appearance orientation ($p<.001$), personal goal achievement ($p<.001$), affiliation with social groups ($p<.001$), and recognition by peers, colleagues, family or friends ($p<.001$). However, given that the scale used to assess exercise motivations were originally developed for marathoners, results should be interpreted with caution.

Although they did not specifically measure DM and its relationship to exercise motivation, Morrison, Morrison, and Hopkins (2003) attempted to evaluate the reasons for exercise in Canadian males utilizing qualitative methods. Participants were 113 males from a large Canadian University, and were obtained from a wide range of academic disciplines. Participants were given a survey which included three open ended questions intended to assess the reasoning behind their pursuit of muscularity. Using content analysis, researchers grouped these reasons into several different categories: social benefits (such as improving their chances of finding a relationship, being more attractive, gaining recognition interpersonally or professionally, or enhancing sport performance), health benefits (improving mental well-being or physical health), sociocultural pressures (based on the Western mass media), and as a way of affirming masculinity (Morrison et al., 2003). These results prove important in understanding why Canadian males exercise. However, unfortunately the researchers did not assess DM directly and how it relates to exercise motives.

Finally, Egli, Bland, Melton, and Czech (2011) assessed sex differences in motivations for exercise among students in a Physical Education college class. Though they did not assess pursuit of the muscular ideal, they assessed exercise motives through the administration of the Exercise Motivation Inventory-II to 1081 males. Based on their findings, researchers indicated that males were more motivated by intrinsic factors, such as positive health, strength, and enjoyment (Egli et al., 2011). This finding is not consistent with other researchers such as Morrison et al. (2003) who determined that males also endorsed extrinsic motives for exercise, such as appearance. However, it is arguable that in this case, "strength and endurance" was likely reflective of male's desire to enhance muscularity as well as build strength. When looking at the possible motivations offered to participants, a more muscular body was not an option. As such, men who were looking to gain a more muscular body type were likely captured through the "strength and endurance" motivation, meaning that this may not truly reflect an intrinsic motivation in this particular study, and may be more reflective of an appearance-based motive. Furthermore, given that this study was conducted with participants exclusively from a Physical Education class, it may have accessed a sample that is systematically different from those used in other studies. Individuals who are in pursuit of a career in the field of health and fitness may have motives for exercise that focus more on interest and enjoyment than those who are not in pursuit of a career in health and fitness.

In summary, the research evaluating exercise motivations in males is mixed in that some studies have found that participants exhibit extrinsic motives for exercise while others have found participants to exercise for intrinsic reasons (e.g., Egli et al., 2011;

Pritchard et al., 2011). Furthermore, there appears to be only one study thus far (Pritchard et al., 2011) that has directly evaluated pursuit of the muscular ideal and exercise motivations, though the exercise motivation scale had substantial limitations. As such, it would be valuable to evaluate this relationship in a population of male health and fitness trainees with measures that are reliable and valid.

2.5 Drive for Muscularity and Drive for Thinness

Although body dissatisfaction in men is typically expressed as a desire to be more muscular, it is possible that some males may exhibit a drive for thinness (Hunt, Gonsalkorale, & Nosek, 2012). However, the research surrounding this finding is mixed (e.g., McCreary & Sasse, 2000; Kelley, Neufeld, & Musher-Eizenman, 2010). McCreary and Sasse (2000) suggest that the only reason that men may pursue the thin ideal would be if they possessed an occupational reason for doing so. For example, males who are involved in careers as swimmers, long distance runners, or gymnasts would have an occupational benefit of pursuing a thin body type. They would likely experience improved athletic performance if they had a slim, lean build, rather than a bulky, muscular body type. McCreary and Sasse (2000) suggest that this would be one of the only instances in which males would pursue the thin ideal over the muscular ideal. However, this is conflicted in other, more recent research studies.

For example, Kelley et al. (2010) conducted a study to determine whether DM and DT can occur concurrently in a sample of late adolescents. Not only did they determine that both DM and DT can occur concurrently, they established that the presence of both DM and DT in males predicted their level of body esteem (Kelley et al., 2010). Though they established that males are more likely to exhibit DM while females

are more likely to endorse DT, they determined that these two constructs are not mutually exclusive in males. Given these findings, when evaluating the muscular ideal it is important to examine the thin ideal as well.

2.6 Drive for Thinness and Psychological Factors

Drive for thinness and depression. Although typically studied within an eating disordered population (Keski-Rahkonen et al., 2013; Wiederman & Pryor, 2000) or in females (Gilbert & Myers, 2003), pursuit of the thin ideal and its relationship with symptoms of depression have also been explored in a community sample that included males (Craine, 2008).

Craine (2008) conducted a study in which she intended to identify factors that lead to DT and binge eating among a university population. The study included 162 female and 154 male participants who were recruited from introductory psychology courses. Participants completed the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), and the Drive for Thinness subscale of the Eating Disorder Inventory-2 (EDI-2; Garner, 1991). Correlational analyses demonstrated that symptoms of depression and DT were positively associated with one another in both male and female participants, while structural equation modeling revealed that DT scores were predicted by symptoms of depression (Craine, 2008). The fact that symptoms of depression predict DT has important clinical implications. Given what is known about the risks associated with DT (e.g., eating disorders; Keski-Rahkonen et al., 2013), clinicians practicing with depressed populations should be aware of the association with DT. By having this awareness, clinicians can evaluate and potentially mitigate dangerous risk factors of an elevated DT by providing psychoeducation and interventions related to body esteem.

Building upon Craine's (2008) findings, Rodgers, Paxton, and Chabrol (2010) attempted to explore the role of depression as a moderator of sociocultural influences on eating disorder symptomatology, of which pursuit of the thin ideal was a key factor under examination. Researchers obtained a sample of 509 adolescents - 225 males and 284 females with an average age of 16.1 years. Participants completed measures of DT using the Drive for Thinness Subscale of the Eating Disorder Inventory (EDI-DT; Garner et al., 1983). Depressive symptoms were measured using the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), and BMI was calculated using a self-report height and weight. Sociocultural (e.g., family, friends, and media) influences were evaluated using The Sociocultural Influences on Body Image and Body Change Questionnaire (McCabe & Ricciardelli, 2001) and the Sociocultural Attitudes Towards Appearance Scale-3 (SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004). Results identified that depression did not contribute significantly to the variance in DT in males. However, researchers did report that males with high levels of depressive symptoms were more affected by sociocultural influences on DT. The evidence of the impact of symptoms of depression on DT in the studies by Craine (2008) and Rodgers et al. (2010) conflict, given that Craine (2008) reported a significant association where Rodgers et al. (2010) did not. This may be due to age differences or cultural differences in samples. Craine (2008) conducted her research in a North American university population, while the Rodgers et al. (2010) study was conducted within a European adolescent population.

Mixed findings indicate that the relationship between pursuit of the thin ideal and symptoms of depression is currently unclear in the male population (e.g., Craine, 2008;

Rodgers et al., 2010). However, in female populations DT scores and symptoms of depression are clearly related to each other, as well as to body dissatisfaction (e.g., Wiederman & Pryor, 2000). As such, it is important to further evaluate these variables in males, to determine whether the same relationships exist.

Drive for thinness and social physique anxiety. Similar to the relationship between drive for thinness (DT) and symptoms of depression, DT and social physique anxiety (SPA) have been primarily studied among females, eating disordered populations, and homosexual males (Thompson & Chad, 2002; Hunt et al., 2012). Very few studies have examined the relationship between pursuit of the thin ideal and SPA in heterosexual males. However, pursuit of the thin ideal and SPA have been studied among both male and female community samples in a limited number of studies (e.g., Brunet et al., 2010).

Brunet, Sabiston, Dorsch, and McCreary (2010) examined the impact of SPA on pursuit of the thin ideal in both male (n=190) and female (n=139) adolescents. In order to do so, they administered the truncated Social Physique Anxiety Scale (SPAS; Martin, Rejeski, Leary, McAuley, & Bane, 1997). This particular measure was selected over the original measure (Hart et al., 1989) as it has demonstrated better psychometric properties with an adolescent population (Martin et al., 1997). In addition, they administered the Eating Attitudes Test (EAT; Garner, Olmsted, Bohr, & Garfinkel, 1982) as a proxy intended to assess DT. This was done based on previous reports that this measure correlated highly with the DT subscale of the EDI-3 (Garner, 2004). Participants included 329 adolescents - 190 male, 139 female - with an average age of 15.4 years. Results indicated that both males and females reported low to moderate levels of SPA and low levels of DT. However, there was a significant correlation between DT and SPA.

Furthermore, SPA accounted for anywhere from 27-64% of the variance within DT. Researchers identified that the variance accounted for in males was much lower than that accounted for in females, though findings for both genders were statistically significant (Brunet et al., 2010). Based upon their findings, Brunet et al. (2010) suggested that practitioners focus interventions on coping with societal pressures in order to reduce levels of SPA, and by extension, DT.

Limited study in this area has yielded conflicting findings related to relationships between SPA and pursuit of the thin ideal in males and indicates the need for more in-depth investigation of these relationships. Many researchers believe that males are more likely to pursue the muscular ideal than the thin ideal (e.g., McCreary & Sasse, 2000), and as such, few studies have evaluated the thin ideal in men. However, given that findings suggest that DM and DT can occur simultaneously (Kelley et al., 2010), there is a need to further evaluate the manifestation of these factors in males. In particular, given that preliminary research has suggested a relationship between DT and SPA (e.g., Brunet et al., 2010), further research is warranted to support or to discredit this finding.

Drive for thinness and self-esteem. Consistent with the research on drive for thinness (DT) and SPA, there appears to be a small base of literature examining pursuit of the thin ideal and self-esteem in males. As such, it is difficult to obtain a clear picture of the relationship between the thin ideal and self-esteem in males.

Fernandez and Pritchard (2012) conducted one of the only studies on the relationship between the thin ideal and self-esteem in males. They conducted a study with the intention of exploring the relationships between social self-esteem, media influence, and DT among males and females. Social self-esteem differs from general self-esteem in

that it evaluates self-esteem in social settings (Fernandez & Pritchard, 2012). However, this appeared to be one of the only studies evaluating any form of self-esteem and DT in college men. A sample of 294 college students (172 female and 122 male) enrolled in general psychology courses were recruited and asked to complete an online survey. Measures of social self-esteem were obtained through the Texas Social Behaviour Inventory (TSBI; Helmreich & Stapp, 1974), while DT was measured using the Drive for Thinness Subscale of the Eating Disorder Inventory-3 (EDI-3; Garner, 2004). Additional measures were obtained for influence of media models and media influence (Fernandez & Pritchard, 2012). Results indicated that gender differences existed for DT, as females reported greater levels than males, but that no gender differences existed in social self-esteem. DT correlated significantly with social self-esteem in both men and women ($r=-.26$, $p<.01$), and social self-esteem made a small, significant contribution to the variation in DT in both men ($B=-.16$, $p<.05$) and women ($B=-.26$, $p<.01$). These findings suggest that there are no gender differences with respect to social self-esteem, and that social self-esteem has an impact on DT in males as well as females. However, these findings may be difficult to generalize to global self-esteem, as social self-esteem focuses only on a social setting (Fernandez & Pritchard, 2012).

The findings obtained by Fernandez and Pritchard (2012) provide important information regarding self-esteem and its relationship with DT. However, further evaluation of the relationship between global self-esteem and pursuit of the thin ideal should be conducted with males, particularly given that low global self-esteem appears to have an impact on many life outcomes including physical health, depression, job and relationship satisfaction (Orth, Robins, & Widamin, 2012).

2.7 Drive for Thinness and Exercise Behaviour.

As previously stated, research that evaluates pursuit of the thin ideal is largely conducted in a female population, while pursuit of the muscular ideal is typically regarded as the most likely body image difficulty for males (e.g., McCreary & Sasse, 2000). As such, there is far more research evaluating the relationship between DM and exercise behaviours in males than that evaluating DT and exercise behaviours in males. Many studies evaluating pursuit of the thin ideal and exercise do so in the context of eating disorders, and simply evaluate "exercise" rather than distinguishing type of exercise (e.g., cardiovascular vs. weight lifting), frequency of exercise, and duration of exercise.

However, one study allowed participants the opportunity to report "other" forms of compensatory behaviours for weight and shape control, leading to a richness of data that is absent in other studies. Anderson and Bulik (2004) attempted to evaluate gender differences in compensatory behaviour (including exercise) and DT. They evaluated DT through the Eating Disorder Inventory (Garner, Olmsted, & Polivy, 1983), while evaluating compensatory behaviour aggregately and allowing participants the opportunity to endorse their own compensatory behaviours (Anderson & Bulik, 2004). Results indicated that there were no gender differences in using exercise as a compensatory behaviour for weight and shape control, but that males often exercised for the purpose of weight loss, and in doing so, used means such as cardiovascular exercise (e.g., running). Also of note was that researchers determined that males exercised for the purposes of both weight loss and gaining muscle and bulk (Anderson & Bulik, 2004).

The findings of Anderson and Bulik (2004) suggest that males can exercise for the expressed purpose of both weight loss and weight gain. This finding is very relevant to the current study, given that much research focuses only on males and the muscular ideal (e.g., McCreary & Sasse, 2000). Although there may be a higher likelihood for males to express pursuit of the muscular ideal, they also have the capacity to pursue the thin ideal (e.g., Anderson & Bulik, 2004), making it important to understand both drives in males.

2.8 Drive for Thinness and Exercise Motivations

Exercise motivation measures play a critical role in determining why an individual may choose to exercise. By determining whether certain types of motivation are affiliated with drive for thinness (DT), researchers gain insight into why an individual may be in pursuit of a thinner body type. In the past, research on exercise motivation and pursuit of the thin ideal has suggested that DT scores are most commonly associated with body-related motives (weight management and appearance) (Nurkkala et al., 2016).

Nurkkala et al. (2016) evaluated exercise motives and DT in order to determine whether they differed based on type of disordered eating behaviour. Researchers assessed 2096 Finnish males, 145 of which had elevated scores on DT as measured by the Drive for Thinness Subscale of the EDI-3 (Garner et al., 2004). Exercise motivations were assessed using the Exercise Motivation Inventory-II (Markland & Ingledew, 1997), though questions were changed to a binary "yes/no" response format rather than a scaled response (Nurkkala et al., 2016). Results indicated that the males with elevated DT endorsed body related motivations for exercise, including body acceptance and weight loss (Nurkkala et al., 2016). This suggests that males who possess elevated DT are most likely to exercise for the purposes of losing weight and being satisfied with their bodies

(Nurkkala et al., 2016). However, given that a traditionally scaled question was altered to be a dichotomous yes/no response, it is possible that this study did not obtain the level of depth of response from participants responding to the Exercise Motivations Inventory-II (Markland & Ingledew, 1997) that was intended through the creation of the measure.

Given how little research appears to evaluate the relationship between exercise motivations and pursuit of the thin ideal in males (e.g., Nurkkala et al., 2016), it is critical to gain more knowledge in this area. Research conducted by Egli et al. (2011) determined that Physical Education students were motivated by intrinsic factors, such as positive health, strength, and enjoyment (Egli et al., 2011). Individuals who exercised for extrinsic reasons are more likely to exhibit negative psychological outcomes (e.g., depression; Boone & Brausch; 2016). Therefore, understanding the motivations for exercise in the current sample of male students may aid in gaining information about their risk for negative psychological outcomes.

2.9 Drive for Thinness, Drive for Muscularity and Body Composition.

Measures of body composition have previously been established to be related to both drive for thinness (DT) and drive for muscularity (DM). DT scores have been positively correlated with both BMI and waist circumference in a wide range of research studies in both men and women (e.g., Tazaki, 2007; Keski-Rahkonen, Bulik, Neale, Rose, Rissanen, & Kaprio, 2005). Researchers suggest that this is due to higher body dissatisfaction when individuals possess an overall larger body size, manifesting itself in a higher DT, which could possibly be explained by the societal value placed on leanness (e.g., Keski-Rahkonen et al., 2005). DM, on the other hand, has not been consistently

related with BMI (e.g., Chittester, 2007). This may be due to findings that BMI fails to differentiate whether body weight is due to muscle or fat (e.g., Brown, 2009). As such, it is important to supplement BMI with other measures of physical size (e.g., waist circumference; Brown, 2009) with the intention of determining whether a more accurate measure of physical size will correlate with DT and/or muscularity.

2.10 Population Differences within Drive for Muscularity Research

Drive for muscularity in the non-heterosexual population. Literature has previously determined that non-heterosexual men report higher overall body dissatisfaction than heterosexual men, which typically manifests itself in two particular dimensions: pursuit of the muscular ideal or pursuit of the thin ideal (Brennan, Craig, & Thompson, 2012; Hunt, Gonsalkorale, & Nosek, 2012). Brennan et al. (2012) suggests that pursuit of the muscular ideal may exist in this population in response to perceived stigmatization related to homophobia and discrimination (Meyers, 1995). It is suggested that, in response to this fear of stigmatization, men may pursue a more traditionally "masculine" body type to avoid harassment and violence that some males of a minority sexual orientation may face (Hunt et al., 2012; Kimmel & Mahalik, 2005).

Recent endorsement rates of minority sexual orientation, provided by The American College Health Association in the spring of 2016 indicated that endorsement rates of non-heterosexuality on Memorial University Campus were 18% for males.

Duggan and McCreary (2008) studied the difference between homosexual and heterosexual males with respect to DM, DT, SPA, self-esteem, and depression. Furthermore, they evaluated the impact of exposure to a variety of media images (e.g., muscle and fitness magazines as well as pornography) on variables under examination.

They hypothesized that gay men would endorse higher levels of DM and SPA than heterosexual men. Researchers recruited a total of 96 males (67 homosexual, 29 heterosexual) through the internet, who completed online questionnaires to assess the variables under examination. Measures included the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977); the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000); the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965); and the Social Physique Anxiety Scale (SPAS; Martin et al., 1997). The Eating Attitudes Test (EAT; Garner et al., 1982) was used to assess desire to be thin, as researchers indicated that higher scores represented greater DT (Duggan & McCreary, 2008). However, this is not a typical manner to assess DT and as such, results should be interpreted with caution. Results indicated that gay men reported higher desire for thinness than did heterosexual men. Correlations between DM and SPA were significant for men of both sexual orientations, though for gay men there was a stronger correlation than for heterosexual men.

In summary, Duggan and McCreary's (2008) findings contribute important information as they highlight that differences exist between gay and straight men on measures of body image. However, there continues to be limited research on this topic. Furthermore, there does not appear to be any research evaluating sexual orientation and its relationship with the muscular or the thin ideal within trainees of the field of health and fitness.

Drive for muscularity in future health professionals and athletes. Athletes comprise a particular subpopulation that has been found to demonstrate a higher drive for muscularity (DM) than their non-athlete counterparts (Bennett, 2010). Proposed

reasoning for this finding is that muscularity in an athletic setting may serve the function of improving athletic performance.

Steinfeldt, Gilchrist, Halterman, Gomory, and Steinfeldt (2011) conducted a study on pursuit of the muscular ideal within the context of sport, particularly among college football players. Researchers recruited 197 college football players from three university campuses. Participants completed measures of muscularity through the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000). Open ended questions developed by the researcher assessed reasons for being muscular. Results demonstrated that athletic identity was significantly related to DM, suggesting that identifying with the role of an athlete increases an individual's desire for muscularity (Steinfeldt et al., 2011). These findings are important for understanding why athletes may exhibit a higher DM than their non-athlete peers.

Hallsworth, Wade, and Tiggemann (2005) assessed sample differences in DM between bodybuilders, weightlifters, and non-athletic controls. Participants were 83 males who were recruited from either: 1) a bodybuilding gym, 2) a group of competitive weightlifters, or 3) a control group of psychology students who did not engage in any form of bodybuilding or weightlifting. Bodybuilders and weightlifters were classified by their training requirements. Average ages were not significantly different for any of the three groups, and ranged from 26-29 years. Participants completed a variety of measures, including measures of DM using the Drive for Muscularity Scale (McCreary & Sasse, 2000), and the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Results indicated that weightlifters and bodybuilders both endorsed higher DM than controls. Furthermore, although not reaching a level of significance, male

bodybuilders endorsed lower levels of depression than did male weightlifters, who in turn endorsed lower levels of depression than did male controls. These findings are important to note, as previous research has linked increased DM with higher levels of depression. This is not observed in this study, where individuals with the highest levels of DM actually endorsed the lowest levels of depression. Researchers hypothesized that engaging in exercise served as a protective factor from depression (Hallsworth et al., 2005), which has previously been reported in the literature (e.g. Daley, 2008). Determining whether exercise can be protective from the negative impact of an elevated DM (e.g., depression) could inform treatment and education initiatives in populations that have a higher risk for body image concerns.

Research has previously indicated that certain populations, particularly those of trainees in the field of health and fitness exhibit more body-related concerns than the general population- similar to athletes (Bennett, 2010). For example, health and physical education teacher trainees have exhibited a greater tendency toward dieting to lose weight as well as disordered eating behaviours (Yager & O'Dea, 2009). These trainees are also more likely than the general population to exhibit body image problems, such as rating the appearance of their bodies negatively, and are more likely to engage in unhealthy compensatory behaviours (e.g., unhealthy dieting) to facilitate weight loss or muscle gain (Yager & O'Dea, 2009).

A descriptive study conducted by Olson, Esco, and Willford (2009) included 60 male physical education majors who completed measures of body dissatisfaction, as well as muscle appearance satisfaction. Measures included the Body Dissatisfaction Subscale of the Eating Disorder Inventory-2 (Garner, 1991) and the Muscle Appearance

Satisfaction Scale (MASS; Mayville et al., 2002). Results suggested that male physical education students reported body image concerns specifically related to muscularity and size, and that the majority of participants preferred muscular physiques to thinner physiques. A significantly higher number of the physical education trainees endorsed marked concerns over muscularity and size compared to those from the normative data (Olson et al., 2009).

In summary, research findings highlight the importance of assessing pursuit of the muscular ideal in trainees entering the field of health and fitness, particularly given the findings that heightened DM scores are frequently associated with many concerning outcomes such as body dissatisfaction, muscle dysmorphia, exercise dependence, and anabolic steroid use (Blouin & Goldfield, 1995; Edwards et al., 2014; Robert et al., 2009). It is worth noting that these individuals will have widespread influence over a variety of vulnerable populations. Their opinions on body image, the muscular ideal, and the thin ideal, may be communicated to their clients, either deliberately or inadvertently. Given that there is research supporting elevated body image concerns in similar populations (e.g., Yager & O'Dea, 2009), and a sizeable body of literature exploring the negative correlates of an elevated DM and DT (e.g., Blouin & Goldfield, 1995; Cafri & Thompson, 2007; Fernandez & Pritchard, 2012; Grossbard et al., 2013; Keski-Rahkonen et al., 2013; McCreary & Sasse, 2000; Robert et al., 2009; Thompson & Chad, 2002), it is critical to gain further insight into body image processes in this population. Not only will any negative associations have a direct impact on the population under examination, they could also influence countless clients, students, and customers of these participants once they enter the workforce.

Chapter Three: The Current Study

3.1 Current Gaps in Literature

Though there has been an increase in literature examining body image concerns in males, the drive for muscularity (DM) research field has been described as underdeveloped (Edwards, Tod, & Molnar, 2014). Furthermore, there were mixed findings for the relationship between DM and some of the psychological variables (Edwards et al., 2014). This highlights a need for additional study of DM and its correlates, particularly those which have shown unclear associations such as self-esteem (Edwards et al., 2014).

Edwards et al. (2014) noted that the majority of research on the DM has been conducted with young white male students. However, few studies have examined DM in subpopulations of this group. Some research has determined that athletes exhibit higher DM than non-athletes, and bodybuilders and weightlifters exhibit higher DM than non-athletic controls (Bennett, 2010; Hallsworth, Wade, & Tiggemann, 2005). Others have reported the finding that trainees in the field of health and fitness exhibit more body-related concerns than the general population (e.g., Yager & O'Dea, 2009), and have even gone so far as determining that many of those body image concerns relate to muscularity (Olson, Eco, & Willford, 2009). However, no research has directly examined both DM and DT and their psychosocial correlates in a sample of health and fitness trainees. This will therefore be the goal of the present study. The current study will focus on health and fitness trainees who are enrolled in courses in the areas of Physical Education, Kinesiology, and Recreation. Such individuals are likely to enter professions where they are interacting directly with the general public including children (e.g., physical

education teacher, coach, physiotherapist, personal trainer) and other potentially vulnerable groups. Their roles will be to educate and guide their clients, many of whom may be vulnerable individuals: children, students, and those with body image concerns or injuries. If these professionals have unhealthy levels of DM or thinness or any of their associated psychological or physical factors (e.g., muscle dysmorphia), they may be unable to properly provide service to their clients. For example, they may unintentionally pass on unhelpful attitudes regarding muscularity and body image. Therefore, it is important to ascertain whether future health and fitness professionals are at risk for an elevated DM or thinness, and whether these elevations are associated with any adverse psychological outcomes.

Furthermore, there is little knowledge about how DM and DT may change across years of the program in the field of health and fitness trainees. Studies examining age and DM have produced mixed findings (e.g., Brennan, Craig, & Thompson, 2012; Schneider, C., Rollitz, L., Voracek, M., & Henning-Fast, K., 2016; Keel et al., 2007), and no studies to the author's knowledge have evaluated the relationship between DM and DT cross-sectionally across the years of the training program in this population. However, there are several noteworthy studies that indicate that societal exposure to a muscular ideal leads to an increase in drive for muscularity over time (e.g., Harrison & Bond, 2007). This is important to study because the training programs for health and fitness students are heavily focused on nutrition and exercise. Thus, it is unknown whether DM or DT are constructs that health and fitness students struggle with prior to entry to health and fitness programs, or whether a cultural or social aspect of the training program itself may somehow increase an individual's DM over time during these programs.

An additional gap in the current DM research area is the underexplored association between DM and exercise behaviours. Though some behaviours such as exercise dependence (Tod & Edwards, 2015) have been previously evaluated, few have examined exercise behaviours in detail. For example, many studies evaluating exercise have neglected to determine which type of exercise is being completed (Tod & Edwards, 2015). This lack of information makes it difficult to fully understand the nature of the relationship between type of exercise and DM, which in turn makes it difficult to ascertain whether certain exercise behaviours are associated with an increased DM.

Finally, given that the population of health and fitness trainees under examination exercises frequently, it is important to determine the motivations for exercise. These individuals may exercise for many reasons other than the pursuit of muscularity, which would be important to know. Furthermore, understanding the motivations that are associated with an increased DM would provide information as to why participants may be in pursuit of a more muscular physique. The relationship between DM and exercise motivations has only occasionally been examined (e.g., Pritchard et al., 2011) despite its potentially relevant clinical implications, such as negative psychological outcomes that can be passed on to clients, students, and other consumers of the health and fitness trainee's services once they enter the workforce.

The current study was designed to address the gaps previously identified in the DM and DT research areas. The study focused on a health and fitness training program at a midsize Atlantic Canadian university. It was designed to examine whether any changes in DM or DT occur as a factor of age or progression through the program. It assessed psychosocial variables and body composition measures in this sample in order to provide

an in-depth description of exercise behaviours and how they relate to DM and DT. Finally, it aimed to determine whether motivations for exercise play a role in the level of DM and DT endorsed. It was expected that the findings would provide an enhanced understanding of DM in a population that will likely have significant impacts on vulnerable groups in the future. Given an in-depth understanding of these factors, educators could identify specific health initiatives and information sessions for incoming as well as current students.

3.2 Research Questions

Given the previously identified gaps in the literature, the current study will address the following research questions:

1) What is the frequency of elevated DM and elevated DT within male health and fitness trainees at one mid-sized Atlantic University?

2) Are the levels of DM and DT different in students in different years (one to four) in the health and fitness training program?

3) Are levels of DM and DT in male health and fitness trainees correlated with higher ratings of depression, social physique anxiety (SPA) or low self-esteem?

4) Does sexual orientation predict scores on measures of DM, DT, depression, SPA, and self-esteem?

5) How will exercise behaviours (frequency of exercise, duration of exercise) correlate with DM, DT, depression, SPA, and self-esteem?

6) What is the relationship between supplement use and DM?

7) What is the relationship between DM, DT, and exercise motivations?

8) How will body composition measures (i.e. BMI and waist circumference) correlate with DM and DT?

3.3 Hypotheses

This study was designed to test eight hypotheses. The first hypothesis is derived from the evidence that suggests that trainees in health and fitness related fields demonstrate higher DT (Yager & O'Dea, 2009) and muscularity-related concerns (Bennett, 2010), and is as follows:

Hypothesis 1: When compared to the normative level in a university population (using norms obtained from previous research as a means of comparison), it was hypothesized that male health and fitness trainees would exhibit significantly higher levels of DM and DT.

Research findings surrounding the second hypothesis have been mixed (e.g., Edwards et al., 2014). DM has been inconsistently correlated with age (e.g., Edwards et al., 2014). While some findings indicate that DM decreases over time (e.g., Brennan & Thompson, 2012; Schneider et al., 2016), others suggest that concerns of body image increase with age (e.g., Keel et al., 2007). However, the majority of recent research surrounding DM and age in a similar population has revealed a positive relationship, particularly in males (e.g., Brennan & Thompson, 2012; Keel et al., 2007). Given these findings, it is most likely that DM will increase as a factor of age. Furthermore, the program itself has a focus on concepts such as fitness, diet, and muscle development. There are several courses that actually involve physical activity, including a course on resistance training. Research suggests that prolonged exposure to muscularity-centered attitudes and images leads to an increase in drive for muscularity over time (e.g., Harrison

& Bond, 2007). As such, it was expected that more time immersed in this culture would lead to more concern with a muscular body shape.

Research surrounding DT generally suggests that it remains unchanged as a factor of age (Garaigordobil & Maganto, 2013; Gravener, Haedt, Heatherton, & Keel, 2008). The second hypothesis is based on these findings.

Hypothesis 2: Based on the above findings, the second hypothesis was that there would be no significant change in DT across years of the health and fitness training program, and no significant relationship between DT and age. However, DM will increase over years of the program and will be positively associated with age.

The third hypothesis was derived from studies suggesting that increased DM and DT are both frequently associated with negative psychological factors (Brunet et al., 2010; Chittiser, 2007; Grossbard et al., 2013; Hunt, et al., 2006; Nowell & Ricciardelli, 2008; Smolak & Stein, 2006).

Hypothesis 3: Male health and fitness trainees who exhibit higher DM or DT scores will exhibit increased scores of depression, SPA, and lower self-esteem.

The fourth hypothesis was based on previous data suggesting that those who identify as non-heterosexual score higher than those who identify as heterosexual on measures of DM (Brennan et al., 2012).

Hypothesis 4: It was hypothesized that male health and fitness students who identified as non-heterosexual would score significantly higher on DM and DT than those who identified as heterosexual, and that they would also score higher on measures of depression, SPA, and lower on self-esteem.

The fifth hypothesis was intended to evaluate the effect of exercise behaviour on DM and DT. Previous research has revealed a small to moderate correlation between DM and the exercise behaviours under examination (Tod & Edwards, 2015). Very few studies have evaluated exercise behaviours in the level of detail designed to be achieved in the current study. However, given the research that was located, it was thought that greater investment or time commitment to exercise, or more focus on muscularity-enhancing exercises (e.g. longer/more frequent exercise sessions, and weight training) would be associated with a higher DM and that increased time commitment to exercise, and increased emphasis on cardiovascular exercise will be associated with a higher DT (e.g., Anderson & Bulik, 2004).

Hypothesis 5: It was hypothesized that participants who endorsed more investment/time commitment to exercise and more emphasis on strength-building exercises (e.g., weight lifting vs. cardio) would endorse a higher DM. Participants who endorsed more investment/time commitment to exercise and more emphasis on cardiovascular exercise will endorse a higher DT.

The sixth hypothesis was based on findings that supplement use appears to be consistently positively correlated with DM (e.g., Chittester & Hausenblas, 2009; Morrison et al., 2004; Parent, 2016). Given that supplements are largely used with the expressed purpose of enhancing muscle, this hypothesis was not extended to DT. Though few studies reviewed had broken down type of supplement and evaluated the relationship with DM, one study appeared to indicate that protein has shown association with DM, as well as propensity to use anabolic steroids.

Hypothesis 6: It was hypothesized that greater use of multiple supplements, protein, or anabolic steroids would be significantly associated with DM.

The seventh hypothesis was designed to evaluate the effect of exercise motivations on DM and DT. Though little research has evaluated the relationship between exercise motivations and DM, those which have, reported that DM is positively associated with interpersonal motivations (social recognition, affiliation, and competition), body-related motives (weight management and appearance), and fitness motives (strength and endurance), and not psychological or health motives (Pritchard et al., 2011). Research on exercise motivation and DT suggested that DT is most commonly positively associated with body-related motives (weight management and appearance), and no other motives (Nurkkala et al., 2016).

Hypothesis 7: It was hypothesized that there would be a positive relationship between DM and interpersonal, body-related, and fitness motives. It was also expected that DT would be positively associated with body-related motives.

The eighth and final hypothesis was based on the finding that BMI had not been consistently related to DM (e.g., Chittiser, 2007), potentially due to the inability of BMI to evaluate the difference between muscle mass and body fat. Waist circumference, however, has proved to be a more dependable measure of the distribution of body fat and has previously been positively associated with DM (e.g., Brown, 2009). Waist circumference is related to excess abdominal fat which is known to be related to an increase in health risk (Janssen, Katzmarzyk, & Ross, 2004). DT, on the other hand, has shown a consistently positive relationship with both BMI and waist circumference (e.g.,

Ando et al., 2007; Hu et al., 2010). Given these findings, it was thought that both waist circumference and BMI would be positively associated with DT

Hypothesis 8. It was hypothesized that DM would be positively associated with waist circumference but not BMI. It was also expected that DT would be significantly positively correlated with both BMI and waist circumference.

Chapter Four: Method

4.1 Design

The current study was cross-sectional and involved both a pilot and full-scale phase of data collection. The project goal was to determine the frequency of elevated drive for muscularity (DM) and drive for thinness (DT) and their psychosocial correlates in a sample of health and fitness trainees. These trainees were comprised of students enrolled in courses in the area of Physical Education, Kinesiology, and Recreation. Pilot participants were nine individuals recruited from a fourth year HKR course. Participants completed a series of demographic questions, questions about their exercise behaviours, and measures of psychological variables. In addition, participants underwent objective measurements of height and weight for the purpose of calculating BMI, as well as waist circumference to supplement the BMI measure. These measures were completed only once in a single data collection session.

4.2 Ethics Approval, Recruitment and Informed Consent

Ethics approval was obtained through the Health Research and Ethics Board (HREB) in March 2014 to complete the pilot portion of the study. Following completion of the pilot study, ethics approval was obtained for the full-scale project in August 2014.

A pilot project was implemented in order to test initial measures and procedures to identify the need for any changes. Participants in the pilot portion of the study were fourth-year male students in a health and fitness training program at a midsize Atlantic Canadian university. Following the pilot, the full-scale study was expanded to include male students enrolled in first, second, third and fourth years of the program. Students

were recruited from each year of the program in an attempt to study cross-sectional differences. Participants were recruited from classes within the Faculty under examination. Participation was voluntary. For each questionnaire completed, consent was sought and obtained from participating students, and students were informed that they could withdraw from the research at any time without penalty.

4.3 Measures

The following information was obtained through the demographics questions: age, year of study, marital status, ethnicity, and sexual orientation. In addition, information was gathered about individual exercise behaviour: average weekly number of workout sessions, average length of exercise sessions, and type of exercise (e.g., cardiovascular, weight lifting, etc.), and any supplement use.

A body mass index (BMI) calculation was obtained from an objective measurement of participant height and weight. In addition, trained research analysts obtained an objective waist circumference measurement, as it has been determined to predict greater variance in health risk than BMI alone (Janssen, Katzmarzyk, & Ross, 2004). Recent controversy surrounding BMI and its effectiveness as a predictor of health risk (Janssen et al., 2004) led to the conclusion that it would be beneficial to supplement the BMI measure with waist circumference, a more informative measure of health risk. The following questionnaires were also administered:

The Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000). (Appendix A). This 15-item, self-report questionnaire provides a measure of individual drive for muscularity (DM), or a "desire to enhance one's musculature" (McCreary & Sasse, 2000). The scale is divided into a 7-item muscularity-oriented body image attitudes

(MBI) subscale as well as a 7-item muscularity behaviours (MB) subscale. A fifteenth question is designed to measure the possibility of future anabolic steroid use ("I think about taking anabolic steroids; McCreary & Sasse, 2000). The DMS is particularly useful because it contains an additional level of comprehensiveness due to the existence of the two subscales assessing different aspects of muscularity (McCreary et al., 2004). All items are measured on a six point Likert scale ranging from 1 (always) to 6 (never). For the DMS behaviours subscale, respondents are asked to rate how characteristic an item is of their current behaviours (e.g., weightlifting, nutritional supplement use) to enhance muscularity (e.g., "I lift weights to build up muscle") (McCreary & Sasse, 2000). For the DMS attitudes scale, participants rate items designed to assess their attitudes toward muscularity (e.g., "I wish that I were more muscular") (McCreary & Sasse, 2000). Subscale scores are calculated by reverse coding where appropriate and averaging all items. Scores are averaged into an overall mean; with higher scores reflect a greater DM (McCreary & Sasse, 2000).

Psychometric properties of the DMS indicate strong reliability in male samples, with alpha values typically ranging from .85 to .91 (McCreary, 2007). Test-retest correlations in male samples have been found to range from .93 to .96 (Cafri & Thompson, 2007). Additionally, item-total correlations have been established as being within the range of .37 to .65 (McCreary, 2007). Tests of concurrent validity have established that the DMS is able to distinguish between theoretically-distinct groups, such as anabolic steroid users and non-anabolic steroid users (e.g., Pitts, Choi, & Grixti, 2005), weight trainers and non-weight trainers (McCreary & Sasse, 2000), and males and females (McCreary, 2007). Convergent validity has been supported, as the DMS has been

previously been established as being positively correlated with other theoretically related constructs, such as the Swansea Muscularity Attitudes Questionnaire and masculine-typed gender role socialization (Baxter & von Ranson, 2004; Mahalik et al., 2003). DMS scores in the current study exhibited acceptable internal consistency including Cronbach's alpha for the: DMS Muscularity Behaviours subscale (α = .73), DMS Muscularity Attitudes subscale (α = .88), and the DMS scale overall (α = .85).

The Drive for Thinness Subscale of the Eating Disorder Inventory-3 (EDI-3) (Garner, 2004). (Appendix B). The drive for thinness subscale of the EDI-3 is a 7-item subscale designed to measure concerns with weight gain, excessive dieting or preoccupation with weight (Garner, 2004). It consists of questions such as "I think a lot about wanting to be thinner", to which a rating of 1 (*never*) to 6 (*always*) is given on a 6-point Likert scale. Response scores are then summed for a total scale score. This subscale measure has been widely used in male and female college students (Fay et al., 2011; Sepulveda et al., 2010). This particular subscale has shown adequate internal consistency in male populations (α= .63 to .86), (Garner, 2004), and has been found to reliably predict eating disorders in men (e.g., Stanford, 2012) as well as distinguish individuals with symptoms of eating disorders from individuals without (Garner et al., 1983). Internal consistency was found to be adequate in the current study when Cronbach's alpha was calculated for the drive for thinness subscale (α = .72). The Eating Disorder Inventory-3 (Garner, 2004), has shown strong correlations with six other measures of eating disorder behaviour, suggesting acceptable convergent validity (Cumella, 2006). In addition, it's correlations with measures of general psychopathology

(e.g., the Symptom Checklist-90; Derogatis, 1977), has provided evidence for strong discriminant validity (Cumella, 2006).

The Beck Depression Inventory-II (Beck, Steer, & Brown, 1996). (Appendix C). This inventory is a 21-item questionnaire designed to assess the intensity of depression. Each of the items consists of a list of four statements about one particular symptom of depression (e.g., sadness: "I do not feel sad", "I feel sad much of the time", "I am sad all the time", or "I am so sad or unhappy that I can't stand it"), which is scored on a range of 0 to 3 (Beck, Steer, & Brown, 1996). Items are summed to obtain a total depression score ranging from 0 to 63, with higher scores being indicative of more severe depression (Beck et al., 1996). Suggestions of groupings of depression classification are as follows: 0-13: minimal depression; 14-19; mild depression; 20-28: moderate depression; 29-63 severe depression (Beck et al., 1996). The reliability of the BDI-II has been well established with a coefficient α of 0.92 (Beck et al., 1996). It has been shown to have strong intercorrelation among items (r=.28 to .63; Whisman et al., 2000), and to highly correlate with other related measures of depression such as the Center for Epidemiological Studies of Depression, (e.g., r = 0.66 to 0.86; Wang & Gorenstein, 2013). Furthermore, it has shown negative correlations with ratings of self-esteem, suggesting good discriminant validity (Fleming & Courtney, 1984). The BDI-II has demonstrated appropriate convergent validity, as it has previously correlated with other measures of depression such as the Center for Epidemiological Studies of Depression (e.g., r = .66 to .86; Wang & Gorenstein, 2013), and the State-Trait Anxiety Inventory (e.g., r=.37 to .88, Wang & Gorenstein, 2013). Internal consistency for the BDI-II in the current sample was good (α = .83).

The Social Physique Anxiety Scale (SPAS; Hart, Leary, & Rejeski, 1989). This 9-item scale was designed to measure social physique anxiety (SPA), the "anxiety that people experience in response to others' evaluation of their physiques" (Hart, Leary, & Rejeski, 1989). The SPAS assesses SPA through a series of statements concerning an individual's body physique or figure, in which the individual has to rate how characteristic each statement is of them. Statements in the SPAS include items such as "I am comfortable with the appearance of my physique or figure", or "I am comfortable with how fit my body appears to others" and are rated 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 and higher scores represent higher levels of SPA. The Social Physique Anxiety Scale has demonstrated high internal consistency in both men (α = .84) and women (α = 0.87; Strong et al., 2006). In the present study, internal consistency was lower than that in other studies of males (α = .62). This may be due to the specific subset of participants in the current study, or the relatively small overall sample size. This scale has also been established as being high in convergent validity, as it correlates with other measures that analyze an individual's concern of evaluation and public self-consciousness (e.g., Fear of Negative Evaluation Scale; Hart et al., 1989). Ratings of SPA are positively correlated with body shape concerns in men and women (convergent validity), and are negatively related to physical self-perceptions and self-worth (discriminant validity) (Petrie et al., 1996).

Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). This 10-item scale was designed to measure a person's overall sense of self-worth or personal value (Rosenberg, 1965). It consists of a series of statements that that examine an individual's

personal attitudes and beliefs toward oneself by asking for an agreement rating of 1-4 on each item. Examples of the items on the scale include "On the whole, I am satisfied with myself", and "I wish I could have more respect for myself". Scores range from 10 to 40 and high scores on this scale indicate greater global self-esteem. This measure has demonstrated good test-retest and internal reliability, with a test-retest coefficient of .82 and α of .88 in an adult sample (Fleming & Courtney, 1984). Internal consistency in the present study was acceptable (α = .75). Self-esteem scores correlate negatively with ratings of anxiety and depression (r=-.64 and -.54 respectively), suggesting good discriminant validity (Fleming & Courtney, 1984). In addition, scores on the Rosenberg Self-Esteem Scale correlate with other measures of self-esteem, like the Coopersmith Self-Esteem Inventory (r=.66; Coopersmith, 1967; Demo, 1985). These findings provide evidence for good reliability and validity of the Rosenberg Self-Esteem Scale.

The Exercise Motivation Inventory-II (EMI-II; Markland & Ingledew, 1997). Also included in the measures is the Exercise Motivation Inventory-II (EMI-II), a 51-item measure intended to determine the purpose behind individual exercise routines and exercise participation (Markland & Ingledew, 1997). This measure uses a 6-point Likert scale in which the individual has to rate how accurate each statement is for them. Statements in the EMI-II include items such as "Personally, I exercise or might exercise… to improve my health", or "Personally, I exercise or might exercise… to look more attractive" (Markland & Ingledew, 1997). Responses are rated on a scale ranging from 0 (not at all true for me) to 5 (very true for me) (Markland & Ingledew, 1997).

Upon completion of the EMI-2, scores are calculated for each of the 14 subscales. The 14 subscales each represent a different motivation for exercising, and are as follows: appearance, nimbleness, strength and endurance, health pressures, ill-health avoidance, positive health, weight management, competition, affiliation, social recognition, challenge, enjoyment, revitalization, and stress management. This measure has been previously evaluated and has exhibited acceptable estimates of internal consistency for all fourteen subscales of the EMI-2 (α= .63 to .90) (Markland & Ingledew, 1997). Internal consistency for the present study was strong (α = .95). Furthermore, the test-retest reliability coefficients over a 4-5-week period range from 0.59 to 0.88. The EMI-2 has previously demonstrated support for the factor structure across genders (Markland & Ingledew, 1997). It has shown acceptable concurrent validity through its ability to distinguish between groups that should be different in theory, such as those who exercise regularly and those who do not, as well as males and females (e.g., Ingeldew & Sullivan, 2002; Markland & Ingledew, 1997).

This particular measure was added after the completion of the pilot study, and thus was only administered to 61 individuals.

4.4 Procedure

The intended participants were male health and fitness trainees, and these individuals were recruited for participation in a variety of ways. First, for the purposes of the pilot project, individuals were recruited from a fourth year HKR course. These individuals completed the measures following the completion of their class and engaged in the same body composition measures as the full scale project participants.

For the full scale project, the researcher approached professors from the university faculty to determine whether they would be receptive to a recruitment talk in the first five minutes of their class period. For the classes of those professors who agreed, the recruiter entered at the beginning or the end of the classroom period and provided students with a brief description of the purpose of the research, what the study entailed, and what risks and benefits of participation may exist. Participants were offered a chance to be entered in a draw to win one of four $200 Visa gift cards for participating in the research. Interested individuals were asked to meet in a particular classroom within the same building following the end of their classroom period. However, there were difficulties in recruitment, which were hypothesized to have occurred for a number of reasons. First, the literature indicates that historically, recruitment of male participants is more difficult than recruitment of female participants (e.g., Patel et al., 2003). Secondly, the majority of participants were asked to participate following the end of their class rather than having the opportunity to complete the measures in class. As a result, it is likely that a number of students were unable to participate due to their class schedules or unwilling to participate outside of class time. Finally, there were instances where, given lack of availability of rooms to book, that several hours elapsed between the invitation to participate and actual data collection sessions. This was likely another cause of difficulty in participant recruitment.

Due to difficulties in initial recruitment strategies, modifications were made in an attempt to increase participation rates through an increase in the incentives offered to participants. Students who participated in the research project were provided with a $5 Tim Horton's gift card, in addition to an entry for a chance to win the one of four $200

Visa gift cards. Those individuals who had participated prior to the introduction of the $5 Tim Horton's gift card were contacted and provided with a gift card. In addition, the recruitment strategy was altered to include repeat entries to classrooms where participation was low. Finally, recruitment was extended to advertising via posters, setting up recruitment tables on campus, and forwarding e-mails to professors to have disseminated to students who may want to participate in the study outside of class time (e.g., those individuals who may have been impeded from participating due to conflicts in their class schedule). Each of these modification to the study protocol were approved by the Health Research and Ethics Board (HREB) and contributed to an increase in participant numbers. Despite these recruitment challenges, it is believed that the additional recruitment strategies led to the maximum participation that would have been obtained. At the end of the data collection period, students were inquiring about participating multiple times, or indicating that they had already completed the project. Final response rate from the total possible population from which the sample was drawn was 54%.

Participants engaged in the informed consent process prior to commencing the questionnaire portion of the study. The primary researcher was present for the full duration of each data collection session, so that individual participants had the opportunity to ask questions throughout the participation process. Following the completion of the informed consent process, and once any questions were answered, participants were asked to complete the initial demographic information questionnaire, which included information regarding their exercise behaviours. Once these questions were completed, participants completed the psychosocial measures.

Following the completion of the psychosocial measures, participants were accompanied by one of two qualified research assistants to a separate private area, where objective measures of weight, height, and waist circumference were obtained. These measures were obtained using the same equipment each time. Participants were once again reminded they were able to discontinue their participation at any time. Following the collection of the objective measures of weight, height, and waist circumference, participants were provided with a debrief form outlining the purpose of the research. This form also included contact information so that they were able to access mental health services in the event that the need arose, as well as the primary researcher to address any questions or concerns they may have had following their participation.

4.5 Statistical Analyses

First, data were screened for errors, missing values, outliers, and normality. Next, one-way ANOVAs were completed to determine whether both the pilot and full-scale phases of data collection could be included in statistical analyses. Then, descriptive statistics were obtained for both demographic variables and exercise behaviours.

To test the first hypothesis that current study participants would exhibit higher DM and DT than a general male literature comparator, one-sample t-tests were calculated to compare the mean DM and DT scores of the current sample and a similar sample of non-health and fitness trainee male undergraduates.

In order to evaluate the second hypothesis that DM would increase across years of the program (and be positively associated with age) while DT would remain unchanged (and have no association with age), one-way ANOVAs, Pearson correlations, and univariate linear regressions were calculated.

The third hypothesis stated that elevated DM or DT scores would be associated with increased depression, SPA, and lower self-esteem. In order to test this hypothesis, Pearson's correlations were used to explore relationships among variables.

To test the fourth hypothesis that male health and fitness students who were non-heterosexual would exhibit higher DM, DT, and elevated depression, SPA, and self-esteem, the intention was to conduct a series of one-way ANOVAs. However, low frequency of identification of non-heterosexual sexual orientation made it impossible to evaluate this hypothesis.

Hypothesis five stated that participants who endorsed more investment/time commitment to exercise and more emphasis on *strength-building* exercises (e.g., weight lifting vs. cardio) would endorse a higher DM, while participants who endorsed more investment/time commitment to exercise and more emphasis on *cardiovascular* exercise will endorse a higher DT. In order to test this hypothesis, Pearson's correlations were used to explore relationships between continuous variables, while one-way ANOVAs were calculated to determine mean differences between groups. For significant findings, Tukey post hoc tests were employed to determine the nature of the significant finding.

To test the sixth hypothesis stating that greater use of multiple supplements, protein, or anabolic steroid use would be significantly associated with DM, one-way ANOVAS were calculated. For significant findings, Tukey post hoc tests were employed to determine the nature of the significant finding.

The seventh hypothesis stated that there would be a positive relationship between DM and interpersonal, body-related, and fitness motives, while DT would be positively associated with body-related motives. In order to examine relationships between these

variables, Pearson's correlations were obtained. Following an examination of significant correlations, a multiple linear regression was calculated in order to determine the ability of particular exercise motivations to predict total scores of DM.

Finally, the eighth hypothesis stated that waist circumference would be significantly positively associated with DM while BMI will not, and that DT would be significantly positively correlated with both BMI and waist circumference. To test this hypothesis, Pearson's correlations were examined.

Chapter Five: Results

5.1 Recruitment

A total of 70 male health and fitness trainees agreed to take part and completed all paper and pencil and body composition measures. These 70 individuals (including pilot participants) were recruited from a total possible sample of 130 male students, resulting in a response rate of 54%. An a priori power analysis revealed that 85 participants were required to have 80% power for detecting a medium effect size when using the traditional .05 criterion of statistical significance, using the program *G*Power* (Erdfelder, Faul, & Buchner, 1996). However, difficulty with recruitment as outlined in the Procedure section created a major challenge and as a result the desired sample size was not obtained resulting in an inability to attain the optimal power level.

5.2 Data Screening and Assumption Testing

Error Screening. First, the data set was screened for errors, and any necessary corrections were made.

Missing Values. Missing values were analyzed to determine the pattern of missing values. Analyses were carried out for Likert-scale items as well as demographic and exercise variables. All exercise and demographic variables were complete, and no missing items were noted. Visual analysis of Likert-scale items suggested that any missing values were simply a result of rare skipped or missed items. No measure had more than five percent of items missing. As a manner of managing missing data points, each individual's mean score for that particular measure was used to input any missing values. This has been determined to be a reliable method of managing missing scores in Likert-style scales (Raaijmakers, 1999).

Outliers. All variables were examined for outliers. Outliers were identified for the following variables: age, drive for muscularity scores, DT scores, Beck Depression Inventory scores, Rosenberg Self-Esteem Scale scores, waist circumference, Body Mass Index, and the following subscales of the Exercise Motivation Inventory-II: enjoyment, competition, health avoidance, positive health, appearance, and strength and endurance. Extreme points were identified in age and BMI only. In each of these instances, the 5% Trimmed Mean was examined. This represents the mean with the outliers or extreme points removed, and provides a comparison to the original mean to determine whether extreme scores are significantly influencing the data (Pallant, 2013). In each of the variables under examination, the 5% Trimmed Mean was not significantly different from the Mean. Given this, the outliers and extreme points were retained within the data file (Pallant, 2013).

Normality. Histograms and stem-and-leaf plots were utilized to assess normality, examining both symmetry and peakedness of the data. Additionally, scores for skewness, kurtosis, and Kolmogorov-Smirnov statistics were assessed. A non-significant score for Kolmogorov-Smirnov statistics were obtained only in the case of the following variables: DM Attitude, DM Total, and EMI-II subscales Social Recognition and Affiliation. All other variables under examination revealed a significant result, indicating a violation of the assumptions of normality. However, research indicates that these findings are common in the field of social sciences, as it often reflects the underlying nature of the constructs being measured (Pallant, 2013). For example, we would not expect age to have a normal distribution as the age range in this particular study is between ages 18 and 37 with a higher proportion of first year students. Scores on measures of depression may be

skewed towards normal ranges, as the sample under examination is drawn from a typical university community, and as such we would expect relatively low endorsement of these symptoms. In order to assess whether data needed to be transformed, a combination of square root and logarithm transformations were completed on the variables showing non-normal distributions. Additionally, analyses completed in the study were conducted with both the original and transformed variables. Results showed minimal differences between original and transformed datasets. Further visual inspection of distributions, as well as comparison of skewness and kurtosis statistics between transformed and untransformed datasets and consultation with a statistics expert indicated that no variables were in need of transformation (Field, 2009). As such, all results presented are done so with untransformed variables.

5.3 Pilot Sample and Full-Study Sample Group Differences

The data from both the pilot and full-scale projects were assessed for significant differences in order to determine whether pilot data (which was obtained in the year prior to the full-scale data) could be included in the data analysis of the present study. This was intended to supplement the overall lower than expected sample size by increasing the total number of participants. Pilot participants were in the fourth year of the program. They completed the same measures as those individuals who participated in the full-scale project, with the exception of the Exercise Motivation Inventory-II (EMI-II), which was added to the test battery after the completion of the pilot project. Therefore, statistical analyses using the EMI - II were completed using only the 61 individuals recruited from the full-scale project. A One-Way ANOVA was utilized to compare pilot participants with non-pilot participants to determine whether any significant differences existed

between groups. Results indicated that pilot participants differed from full-scale participants at a level of statistical significance in two areas: age and self-esteem (as measured by the Rosenberg Self-Esteem Scale). As age was an expected significant difference given that pilot participants were in the fourth year of the program, a further analysis was completed comparing pilot participants to other fourth years in the full-scale project. Results revealed that fourth years in the pilot (M = 24.67, SD = 5.39) demonstrated significantly different levels only on self-esteem compared to fourth years in the full-scale project (M = 16.07, SD =3.53), t (18) = -4.880, $p < .01$. As such, all subsequent analyses involving measures of self-esteem excluded the data of the pilot project groups. Pilot participants were also excluded on the basis of exercise motivations and creatine use, given that these questions were not completed by them.

5.4 Characteristics of the Sample

Demographics. All data were analyzed using the *Statistical Package for the Social Sciences 24.0 (SPSS 24.0)*. Demographic information for the sample is provided in Table 5.4.1. Information regarding the exercise behaviours of the sample is provided in Table 5.4.2.

Of the 70 individuals that completed the study, 29 (41.4%) of these were first year students, 15 (21.4%) were second year students, 6 (8.6%) were third year students, and 20 (28.6%) were fourth year students. The mean age of students who completed the survey was 20.9 years (SD = 3.54). The majority of these participants were single, (94%); Caucasian (89%) and heterosexual (99%).

Table 5.4. 1 Demographic Characteristics of the Male Undergraduate Sample

		n	Range in years	*M* (*S.D.*)
Age		70	18-37	20.9(3.54)
		n	%	
Year of Program				-
	1	29	41.4	-
	2	15	15	-
	3	6	8.6	-
	4	20	28.6	-
Marital Status				-
	Married	2	2.9	-
	Common Law	2	2.9	-
	Never Married/Single	66	94.3	-
Sexual Orientation				-
	Heterosexual/Straight	69	98.6	-
	Homosexual/Gay	0	0.0	-
	Bi-sexual	1	1.4	-
Ethnicity				-
	Caucasian	62	88.6	-
	Asian	3	4.3	-
	Canadian African	4	5.7	-
	Other	1	1.4	-

When asked about their exercise behaviours, the majority of men responded that they: exercise between 3 and 5 times weekly (69%), exercise between one and one and a half hours per session (59%), engage in both cardiovascular and weight-based exercises (69%), and consume some sort of nutritional supplement (65.7%) or creatine (32.8%).

Table 5.4. 2. Demographic Characteristics of the Male Undergraduate Sample

		n	%
Exercise Sessions Per Week			
	1	1	1.4
	2	5	7.1
	3	14	20.0
	4	14	20.0
	5	20	28.6
	6	9	12.9
	7	2	2.9
	More than 7	5	7.1
Duration of Exercise Sessions			
	30 minutes-1 hour	10	14.3
	1 hour, 1minute – 1 hour, 30 minutes	41	58.6
	1 hour, 31 minutes – 2 hours	18	25.7
	More than 2 hours	1	1.4
Type of Exercise			
	Cardiovascular	5	7.1
	Weight-Based	13	18.6
	Both	48	68.6
	Other	4	5.7
Supplement Use			
	None	24	34.3
	Protein	21	30.0
	Multiple Supplements	22	31.4
	Other	3	4.3
Creatine Use			
	Yes	20	32.8
	No	41	67.2

5.5 Drive for Muscularity in Male Health and Fitness Trainees.

In order to test the first hypothesis that male health and fitness trainees would be significantly higher in drive for muscularity (DM) than a sample of non-health and fitness university males, a one-sample t-test was used to compare the mean score on DM in the current sample and a similar sample of male undergraduates not separated by degree type.

The comparison sample was obtained from a study by Parent & Moradi (2011) who studied 270 male college students recruited from psychology courses and a

participant pool at a university in the United States. Participants ranged in age from 18 to 29 years, and were of a Caucasian (59%) and heterosexual/straight majority (88%). This sample differs slightly from the sample recruited for the current study. The sample in the current study was comprised of a higher percentage of Caucasian and heterosexual men. Additionally, the sample in Parent and Moradi's (2011) study were American. However, the sample in Parent and Moradi's study was the most similar in terms of samples available in the literature (e.g., age, measure used), and was selected for that reason. Furthermore, Parent and Moradi (2011) concluded that their findings on DM measures were similar to those of other studies of males (Duggan & McCreary, 2004; Hallsworth et al., 2005; Morry & Staska, 2001), which provides more confidence in this sample being fairly typical.

The mean self-reported DM score among students in the current study was 2.18 (*SD* = 0.85) and the mean DM score for the comparison sample was 1.76 (*SD* = 0.79). A one-sample t-test using the Parent & Moradi (2011) study as an estimate of the population indicated that participants in the present study reported significantly higher levels of DM than those in the comparison group, t (69) = 4.150, p <0.01, *Cohen's d* = .494. Thus, the hypothesis that male health and fitness trainees would exhibit a greater DM than the general university population was supported, with the effect size suggesting that there is a large difference between groups.

Table 5.5. 1. Mean Drive for Muscularity in Current Study and Comparison Study

	n	*M*	*SD*	*t(69)*	*p*
Current Sample	70	2.18	0.85	4.150	< .01
Comparison Sample	270	1.76	0.79		

Drive for muscularity and developmental considerations. In order to test the second hypothesis that DM would: 1) increase across years of the health and fitness training program, and 2) be positively associated with age (e.g., Brennan & Thompson, 2012; Keel et al., 2007), both a one-way ANOVA and a univariate linear regression were calculated. In order to evaluate the impact of year of program on DM, a one-way ANOVA was carried out to compare the mean DM scores in Years 1, 2, 3 and 4. Results indicated that there was no significant change in DM, F (3, 66) = 1.403, p = 0.250, *eta squared* =0.060 among years of the program. Thus, this portion of the hypothesis was refuted. However, the eta squared calculation suggests a moderate effect, suggesting that the non-significant finding may be a result of a small sample size or low power.

To determine the relationship between DM and age, a univariate linear regression was calculated with DM as the dependent variable and age as the predictor variable. The results indicated that age was a significant predictor of DM, F (1, 68) = 4.442, p <0.05. However, once the only outlier for age was removed (age = 37), age was no longer a significant predictor of DM, F (1, 67) = 1.482, p = 0.228, R^2 =.022. Thus, the hypothesis that DM would be positively associated with age was not supported. These findings suggest that DM does not vary based on age or year of the program.

Drive for muscularity and psychosocial correlates. In order to test the hypothesis that DM would be associated with higher depression and SPA, and lower self-esteem, zero-order Pearson's correlations were calculated. The correlation matrix can be found in Table 5.5.2. It is noteworthy that DM was not significantly correlated with depression, SPA, or self-esteem. Therefore, the hypotheses regarding the relationships between DM and psychological correlates were not supported. However, depression and

SPA were significantly positively correlated, r (69) = .306, p <.05, suggesting that individuals who endorsed higher levels of depression tended to also endorse higher levels of SPA. This is indicative of a moderate effect.

Table 5.5. 2. Bivariate Correlations between Psychosocial Instruments and Drive for Muscularity

	DM - Attitude	DM - Behaviour	DM - Total	BDI - II	SPAS	RSES
DM - Attitude	1	.432**	.872**	.152	.214	.086
DM - Behaviour		1	.818**	.085	-.092	.113
DM - Total			1	.143	.087	.116
BDI – II Total				1	.306*	-.108
SPAS - Total					1	-.163
RSES - Total						1

Note. DM – Total = Drive for Muscularity Scale Total Score; DM – Behaviour = Drive for Muscularity Scale Behaviour Subscale Score; DM – Attitude = Drive for Muscularity Attitude Subscale Score; BDI – Total = Beck Depression Inventory-II Total Score; SPAS – Total = Social Physique Anxiety Scale Total Score; RSES – Total = Rosenberg Self-Esteem Scale Total Score.
**p<.05, **p <.01*

Drive for muscularity and exercise behaviours. To test the hypothesis that more investment/time commitment to exercise and more emphasis on strength-building exercises (e.g., weight lifting vs. cardio) would be associated with a higher DM, correlational analyses and one-way ANOVAS were completed. For those continuous variables under examination (number of exercise sessions per week), correlations were calculated. For those variables that had multiple groups per variable (type of exercise, supplement use, and creatine use), one-way ANOVAs were utilized to assess whether a statistically significant difference existed between groups. Descriptive statistics and post hoc analyses were calculated where significant differences occurred, in order to determine the nature and significance of the differences between groups.

Drive for muscularity and frequency of exercise. Zero order correlations were obtained in order to evaluate the relationship between frequency of exercise, and Drive

for Muscularity – Attitude, Drive for Muscularity – Behaviours, and Drive for Muscularity – Total. Results of these correlations can be found in Table 5.5.4. Findings indicated that frequency of exercise was not significantly associated with either of the Drive for Muscularity subscales or Drive for Muscularity Total Score.

Table 5.5. 3. Correlations Between Drive for Muscularity and Frequency of Exercise

	DM - Attitude	DM - Behaviour	DM - Total	Frequency
DM - Attitude	1	.432**	.872**	-.203
DM - Behaviour		1	.818**	.193
DM - Total			1	-.025
Frequency				1

Note. DM – Total = Drive for Muscularity Scale Total Score; DM – Behaviour = Drive for Muscularity Scale Behaviour Subscale Score; DM – Attitude = Drive for Muscularity Attitude Subscale Score; Frequency = Total Number of Exercise Sessions Per Week; Duration = Total Length of Exercise Session.
**p<.05, **p <.01*

In order to further evaluate the relationship between frequency of exercise and DM, Frequency of Exercise was split into 3 groups (<3 sessions per week, 3-5 sessions per week, >5 sessions per week). There was a significant difference between groups with respect to mean DM scores between the three groups, F (2, 67) = 3.479, p <.05. The eta squared statistic (.094) suggested a moderate-large effect. A Tukey post hoc test revealed that those who exercised between 3 and 5 times weekly (M = 3.35, SD = .823) reported the highest DM when compared to those who exercised less than 3 (M = 2.58, SD =.976) or more than 5 (M =2.91, SD =.737) times weekly (p <.05). Thus, the hypothesis that a greater time commitment to exercise would be associated with a higher DM was refuted. These findings suggest that participants who exercised between three and five times weekly tended to report the highest levels of DM.

Table 5.5. 4. Results of One-Way ANOVA on DM by Frequency of Exercise Sessions

	n	*M*	*SD*	*F* (2, 67)	*p*	*eta²*
<3 Sessions Per Week	6	2.58	.976	3.48	<.05	.094
3-5 Sessions Per Week	48	3.35	.823			
>5 Sessions Per Week	16	2.91	.737			

n = Total Number of Participants per Group; M = Mean Drive for Muscularity Score; SD = Standard Deviation.

Drive for muscularity and length of exercise session. A one-way ANOVA was conducted in order to compare the DM of groups of various length of exercise session. Results revealed no significant difference in DM based on length of exercise session, F (3, 66) = 1.56, p = .208, *eta squared* =.066. As such, the hypothesis that a greater time commitment to exercise would be associated with a greater DM was not supported. This suggests that the amount of time spent exercising does not impact the level of endorsed DM. However, the moderate effect size may be indicative of the need for higher statistical power and a larger sample size in order to detect a significant difference between groups.

Drive for muscularity and type of exercise. A one-way ANOVA was carried out in order to evaluate whether there was a significant difference in terms of mean DM scores between groups engaging in different types of exercise, F (3, 66) = 10.30, p <.01. A Tukey post hoc test revealed that those individuals who engaged in weight-based exercise only (M=4.00, SD=.676, p < .01) reported significantly higher DM than those who engaged in cardiovascular exercise (M = 2.10, SD = .987, p <.01), both cardiovascular and weight-based exercise (M = 3.11, SD = .708, p <.05), and other types of exercise (e.g., calisthenics) (M = 2.69, SD = .472, p <.01). This suggests that

individuals who invest their time in strength-based exercise tended to report the higher DM than individuals who engaged in other sorts of exercise. The eta squared statistic (.319) suggested a large effect. These results can be found in Table 5.5.6. Given these findings, the hypothesis that greater emphasis on strength-building exercises would be associated with a greater DM was supported.

Table 5.5. 5. Results of One-Way ANOVA on DM by Type of Exercise

	n	*M*	*SD*	*F* (3,66)	*p*	*eta²*
Cardiovascular Only	5	2.10	.988	10.30	<.01	.319
Other (e.g., Calisthenics)	4	2.69	.471			
Both (Cardio and Weight-Based)	48	3.11	.708			
Weight-Based Only	13	4.00	.676			

n = Total Number of Participants per Group; M = Mean Drive for Muscularity Score; SD = Standard Deviation.

Drive for muscularity and supplement use. To test the hypothesis that greater use of multiple supplements, protein, or anabolic steroids would be significantly associated with an elevated DM, a one-way ANOVA was conducted to compare scores of DM based on the type of supplement consumed. Results indicated that there was a significant difference between groups, F (4, 69) = 14.942, p <0.01. The eta squared statistic (.404) suggested a large effect. A Tukey post hoc test revealed that those who did not consume any sort of supplement (M = 2.48, SD = .660, p<.01) endorsed significantly lower DM than those who consumed protein (M = 3.38, SD = .664, p <.01) or multiple supplements (M = 3.75, SD = .701, p <.01). This suggests that individuals who take protein or multiple supplements tended to report a higher overall DM than those individuals who did not take any supplements. These results can be found in Table 5.5.7. Given these findings, the hypothesis that greater use of protein and supplements would be associated with a higher DM was supported.

Table 5.5. 6. Results of One-Way ANOVA on DM by Supplement Consumption

	n	*M*	*SD*	*F* (4,69)	*p*	*eta²*
No Supplements	24	2.48	.660	14.93	<.01	.404
Other (e.g., Vitamins, Creatine)	2	3.14	.606			
Protein	21	3.38	.644			
Multiple Supplements	23	3.75	.701			

N = Total Number of Participants per Group; M = Mean Drive for Muscularity Score; SD = Standard Deviation.

Drive for muscularity and creatine use. On the item related to supplements, 20 individuals identified that they were consuming creatine, a supplement intended to increase muscle mass. To further investigate, a separate variable was created for creatine use. Given the exploratory nature of this finding, this statistical analysis was not designed to evaluate a hypothesis. A one-way ANOVA was conducted to compare scores of drive for muscularity (DM) based on whether creatine use was endorsed or not. Results revealed a significant difference in mean scores for DM between individuals who consume creatine compared to individuals who do not, F (1, 60) = 21.02, p <0.01. The eta squared statistic (.260) suggested a large effect. Individuals who consumed creatine reported significantly higher DM (M = 3.80, SD = .703) than individuals who did not consume that particular supplement (M = 2.84, SD = .793).

Table 5.5. 7. Results of One-Way ANOVA of DM by Creatine Consumption

	n	*M*	*SD*	*F* (1, 60)	*p*	*eta²*
Consumes Creatine	20	3.80	.703	21.02	<.01	.260
Does Not Consume Creatine	41	2.84	.793			

N = Total Number of Participants per Group; M = Mean Drive for Muscularity Score; SD = Standard Deviation.

Drive for muscularity – anabolic steroid item. Given that 33% of participants were consuming creatine and previous research has identified creatine use as a significant

predictor of intent to use anabolic steroids (AAS) (Dunn, Mazanov, & Sitharthan, 2009), exploratory analyses were completed to determine the associations between considering anabolic steroid use ("I think about taking anabolic steroids"; McCreary & Sasse, 2000) and psychological variables and exercise motivations. Given that the examination of creatine use was not an original objective of this study, no specific hypotheses were developed regarding creatine or anabolic steroid use. However, zero-order correlations were calculated to explore the relationships between considering anabolic steroid use and depression, SPA, and self-esteem. These correlations revealed that consideration of anabolic steroid use was significantly correlated with the BDI-II (Beck et al, 1996), r (69) = .263, p <.05. No other significant correlations were identified. Correlations can be found in Table 5.5.9.

To further explore the relationship between consideration of anabolic steroid use and depression, a univariate linear regression analysis was conducted with considering anabolic steroid use as the dependent variable and depression as the predictor variable. This showed that BDI-II total scores significantly predicted the extent to which participants considered anabolic steroid use, with depression accounting for 6.9% of the variance in thinking about using anabolic steroids, F (1,68) =5.06, p<.05, R^2 =.069. Results from the regression analysis can be found in Table 5.5.10.

Table 5.5. 8. Correlations between Considering Anabolic Steroid Use and Psychological Variables.

	Considering Anabolic Steroid Use	BDI-II Total	SPAS Total	RSES Total
Considering Anabolic Steroid Use	1	.263*	.078	-.152
BDI-II Total		1	.305*	-.108
SPAS Total			1	-.163
RSES Total				1

*Note. DMS 10 = Drive for Muscularity Scale – Item 10; BDI –II Total = Beck Depression Inventory-II Total Score; SPAS – Total = Social Physique Anxiety Scale Total Score; RSES – Total = Rosenberg Self-Esteem Scale Total Score. *p<.05, **p <.01*

Table 5.5. 9. Summary of Regression Analysis for Psychological Correlates Predicting Consideration of Anabolic Steroid Use

	B	*SE B*	β	*t*	*p*
SPAS Total	-.004	.024	-.021	-.171	.865
RSES Total	-.031	.029	-.128	-1.071	.288
BDI-II Total Score	.056	.025	.263	2.25	.028
R^2			.069		
F (1, 68)			5.06		

Note. BDI –II Total = Beck Depression Inventory-II Total Score; SPAS – Total = Social Physique Anxiety Scale Total Score; RSES – Total = Rosenberg Self-Esteem Scale Total Score.

Finally, a One-Way ANOVA was carried out to compare individuals who consumed creatine and individuals who did not on their endorsement of considering anabolic steroid use. Results indicated that those individuals who consumed creatine were significantly different from individuals who did not consume creatine in terms of the degree to which they had thought about taking anabolic steroids, F (1, 59) = 8.164, p <.01. The eta squared statistic (.122) suggested a moderate-large effect.

A univariate linear regression analysis was conducted with considering anabolic steroid use as the dependent variable and creatine use as the predictor variable. Results indicated that creatine use accounted for 12.2 % of the variance in considering anabolic steroid use. Results from the regression equation can be found in Table 5.5.11.

Table 5.5. 10. Summary of Regression Analysis for Psychological Correlates Predicting DM Total Score.

	B	*SE B*	β	t	*p*
Considering Anabolic Steroid Use	.885	.310	.349	2.86	<.01
R^2		.122			
F (1, 60)		8.164			

Drive for muscularity and exercise motivations. In order to evaluate the hypothesis that DM would be most highly associated with interpersonal (social recognition, affiliation, and competition), body-related (weight management and appearance), and fitness motives (strength and endurance) for exercise, zero-order correlations were calculated to explore the relationship between DM and each of the motivation subscales of the Exercise Motivation Inventory - II. Results indicated a significant correlation between DM and each of the following subscales: social recognition (an interpersonal motive intended to assess gaining recognition or proving worth to others), r (60) = .307, p = 0.016, affiliation (an interpersonal motivation intended to focus on the social aspect of exercise), r (60) = -.281, p = 0.028, competition (an interpersonal motive assessing the desire to compete or win), r (60) = -0.257, p = 0.047), appearance (a body-related motive to assess the desire to improve physical appearance), r (60) = 0.428, p <0.01, strength and endurance (a fitness-related motive assessing desire to improve strength, endurance, and muscularity), r (60) = 0.352, p <0.01, and nimbleness (a fitness-related motive assessing the desire to gain or maintain speed, agility, or flexibility), r (60) = -0.351, p <0.01. A complete table of correlations associated with exercise motivations can be found in Table 5.5.12. This indicates that participants exercising to prove their worth to others, to improve their appearance, or to

build strength or endurance tended to endorse higher ratings of DM. Those participants hoping to gain the social benefits of exercise or to compete or win tended to endorse lower ratings of DM.

Table 5.5. 11. Correlations between Exercise Motivations and Drive for Muscularity

	DM – Total	DM– Attit.	DM–Behav.	Enjoy.	Soc. Rec.	Affil.	Compet.	Health Avoid.	Appear.	Str. & End.	Nimble.
DM-Total	1	.872**	.818**	.212	.307*	-.281*	-.275*	-.206	.428**	.352**	-.351**
DM-Attit.		1	.432**	.072	.209	-.161	-.287*	-.304*	.274*	.222	-.363**
DM-Behav.			1	.309*	.325*	-.332**	-.138	-.028	.472**	.394**	-.228
Enjoy.				1	-	-	-	-	-	-	-
Soc. Rec.					1	-	-	-	-	-	-
Affil.						1	-	-	-	-	-
Compet.							1	-	-	-	-
Appear.								1	-	-	-
Str. & End.									1	-	-
Nimble.										1	

Note. DM-Total = Drive for Muscularity Total Score; DM-Attit. = Drive for Muscularity – Attitude Subscale; DM – Behav. = Drive for Muscularity – Behaviour Subscale; Enjoy. = EMI-II Enjoyment Subscale; Soc. Rec. = EMI-II Social Recognition Subscale; Affil. = EMI-II Affiliation Subscale; Health Avoid. = EMI-II Health Avoidance; Compet. = EMI-II Competition Subscale; Appear. = EMI-II Appearance Subscale; Str. & End. = EMI-II Strength and Endurance Subscale; Nimble. = EMI-II Nimbleness Subscale. **p<.05 **P<.05*

Once significant correlations were identified, a multiple linear regression was calculated to further examine the relationship between DM and exercise motivations. This analysis was intended to determine whether various exercise motivations were able to predict total DM score. Since there was no a priori reason to differentiate between predictor variables, they were all entered together in a single regression analysis. Independent variables were entered simultaneously to determine whether any exercise motivations predicted DM total scores. It was determined that exercise motivations significantly predicted Total DM scores. The multiple regression model statistically significantly predicted DM total scores, F (6, 53) = 7.81, p <.01, R^2=.46, strength and endurance (β=.314, p <.01) and nimbleness (β=-.421, p <.01) were significant predictors, accounting for 34.7% of the variance in Total DM scores. The summary of this analysis can be found in Table 5.5.13. Social recognition (β =.163, p =.211), affiliation (β =-.149, p =.201), competition (β =-.174, p =.109), and appearance (β =.297, p =.068) were found to be non-significant in their prediction of DM scores. This suggests that exercising for the purpose of gaining strength or endurance, or for increasing nimbleness significantly predicted DM scores.

Table 5.5. 12. Summary of Regression Analysis for Exercise Motivations on Total DM Scores

	B	*SE B*	β	*t*	*p*
Strength/Endur.	.307	.135	.314	2.28	<.05
Nimbleness	-.271	.081	-.421	-3.35	<.01
Social Recognition	.099	.078	.163	1.26	.211
Affiliation	-.084	.065	-.149	-1.29	.201
Competition	-.104	.064	-.174	-1.63	.109
Appearance	.204	.109	.297	1.86	.068
F			7.81		

Drive for Muscularity and Body Composition. In order to test the hypothesis that waist circumference, a more dependable measure of the distribution of body fat than BMI (Brown, 2009), would be associated with DM while BMI would not, zero-order Pearson's correlations were calculated. Descriptive statistics of BMI and waist circumference in the sample under

examination can be found in Table 5.5.14, and a complete correlation matrix is shown in Table 5.5.15.

Table 5.5. 13. Means and Standard Deviations for BMI and Waist Circumference in Male Health and Fitness Students

	n	*M*	*SD*
BMI	70	23.1	3.08
Waist Circumference (cm)	70	85.5	7.44

Table 5.5. 14. Correlations between Drive for Muscularity and Body Composition Measures

	DM Behaviour	DM Attitude	DM Total	BMI	Waist Circumference
DM Behaviour	1	.432**	.818**	.214	.118
DM Attitude		1	.872**	.016	.041
DM Total			1	.126	.090
BMI				1	.907**
Waist Circumference					1

**p<.05, **p <.01*

BMI and waist circumference were highly correlated with one another, r (68) = .907, p <.01. There was no significant correlation between DM and either BMI, r (68) = .126, p >.05, or waist circumference, r (68) = .090, p > .05, suggesting that endorsement of an elevated DM did not appear to vary based on the BMI or waist circumference of the participants.

5.6 Drive for Thinness in Male Health and Fitness Undergraduates.

To test the hypothesis that drive for thinness (DT) would be more highly endorsed in male health and fitness trainees than other general undergraduate university males, an one-sample t-test was used to compare the mean score on DT in the current sample and a similar sample of male undergraduates not separated by degree type.

In the current study, the mean score on DT was M = 2.00 (SD = 2.79). These findings were compared to those of a study by Pritchard and Cramblitt (2014). A total of 105 male college students were recruited from General Psychology classes at a university in the Western United

States and DT was assessed. This sample was quite similar to that of the present study, as the majority of males were Caucasian (82.9%) and of a similar age (*M*=19.95, *SD*=1.99). Mean DT scores in this sample was 3.05 (*SD* = 3.87) in males. An one-samples t-test using Pritchard and Cramblitt (2014) as an estimate of the population revealed that the difference between the mean score on DT for the current sample and that of Pritchard and Cramblitt (2014) was significantly different, t (69) = -3.15, $p < .01$, *Cohen's d* = -.618, with the current study's sample exhibiting a lower DT than that of Pritchard and Cramblitt (2014). The effect size was classified as medium. Given these findings, the hypothesis that male health and fitness trainees will exhibit a greater DT than the general university aged population was unsupported. The mean scores for DT in both the current study and the comparison study can be found in Table 5.6.1.

Table 5.6. 1. Mean Drive for Thinness in Current Study and Comparison Study

	n	*M*	*SD*	*t(69)*	*p*
Current Sample	70	2.00	2.79	-3.15	<.01
Comparison Sample	105	3.05	3.87		

Drive for thinness and developmental considerations. To test the hypothesis that drive for thinness (DT) would remain unchanged as a factor of age (Garaigordobil & Maganto, 2013; Gravener, Haedt, Heatherton, & Keel, 2008) or progression through the program, both a one-way ANOVA and a zero-order Pearson's correlation were calculated. In order to evaluate the impact of year of program on DT, a one-way ANOVA was carried out with DT as the dependent variable and year of program as the independent variable. Results indicated that DT remained unchanged between years of the program, F (3, 66) = 1.21, p = .311, *eta squared* =.052, suggesting that individual endorsement of DT did not vary based on which year of the program participants were in. The eta squared calculation (.052) was indicative of a small-moderate effect. To determine the relationship between DT and age, a Pearson's correlation was calculated

which was not statistically significant, r (68) = .034, p = .779. As such, the hypothesis indicating that DT would remain constant as a factor of age and across years of the health and fitness training program was supported.

Drive for thinness and psychosocial correlates. It was hypothesized that higher DT scores would be associated with increased scores on measures of depression and SPA, and lower self-esteem scores. In order to evaluate this hypothesis, a series of zero-order Pearson's correlations were calculated between DT scores and scores of depression, SPA, and self-esteem. A complete correlation matrix can be found in Table 5.6.2. Results indicated that the hypothesis regarding the relationship between DT and psychological correlates was partially supported. DT significantly positively correlated with SPA, r (69) = .368, p <.01, though it was not significantly correlated with any of the other psychosocial variables under examination. This indicates that individuals who endorsed a higher DT also endorsed higher levels of SPA.

Table 5.6. 2. Correlations Between DM and Psychosocial Variables

	DT - Total	BDI - II	SPAS	RSES
DT - Total	1	.218	.368**	-.026
BDI - II		1	.286*	-.038
SPAS			1	-.169
RSES				1

Note. DT – Total = Drive for Thinness Subscale Total Score; BDI – Total = Beck Depression Inventory-II Total Score; SPAS – Total = Social Physique Anxiety Scale Total Score; RSES – Total = Rosenberg Self-Esteem Scale Total Score. **p<.05, **p <.01*

Drive for thinness and exercise behaviours. To test the hypothesis that more investment/time commitment to exercise and more emphasis on cardiovascular exercises would be associated with a higher DT, both correlational analyses and one-way ANOVAS were completed.

In order to evaluate the hypothesis that greater frequency of exercise would be associated with higher DM, zero-order Pearson's correlations were calculated. The correlation between frequency of exercise and DT – Total can be found in Table 5.6.4.

Table 5.6. 3. Correlation between Drive for Thinness and Frequency of Exercise Sessions

	DT - Total	Frequency
DT - Total	1	.029
Frequency		1

Note. DT – Total = Drive for Thinness Subscale Total Score; Frequency = Total Number of Exercise Sessions Per Week. **p<.05, **p <.01*

There was no significant difference in DT based on length of exercise session, F (3, 66) = 1.31, p = .278, *eta squared* = .056; type of exercise, F (3, 66) = .627, p = .600, *eta squared* =.028*;* type of supplement, F (3, 66) = .450, p =.718, *eta squared* = .023, or creatine use, F (1, 60) = 2.88, p = .095, *eta squared* =.046. Eta squared calculations indicated that effect sizes fell between small and moderate. As such, the hypothesis that more investment/time commitment to exercise and more emphasis on cardiovascular exercises would be associated with a higher DT was unsupported.

Drive for thinness and exercise motivations. In order to test the hypothesis that body-related motives (weight management and appearance) for exercise would be most strongly correlated with DT, a series of zero-order Pearson's correlations were calculated between DT and each of the motivation subscales of the Exercise Motivation Inventory - II. Results indicated significant positive correlations between DT and each of the following subscales: stress management (a psychological motive assessing the desire to reduce stress and tension and gain time to think), r (60) = .287, p <.01, social recognition (an interpersonal motive intended to assess gaining recognition or proving worth to others), r (60) = .384, p < .01, weight management (a body-related motive assessing the desire to burn calories and lose or control weight), r (60) = .532, p < .01, and appearance (a body-related motive to assess the desire to

improve physical appearance), r (60) = .321, p <0.05. A complete table of Pearson correlations associated with exercise motivations can be found in Table 5.6.5. Thus, the hypothesis that body-related motivations would be most significantly correlated with DT was not supported.

Table 5.6. 4. Pearson Correlations between Exercise Motivations and Drive for Muscularity

	DT - Total	Str. Mngmt.	Soc. Recog.	Wgt. Mngmt.	Appearance
DT - Total	1	.287*	.384**	.532**	.321*
Str. Mngmt.		1	.391**	.509**	.365**
Soc. Recog.			1	.465**	.607**
Wgt. Mngmt.				1	.517**
Appearance					1

Note. DT – Total = Drive for Thinness Subscale Total Scores; Str. Mngmt. = Stress Management Subscale of EMI-II; Soc. Recog. = Social Recognition Subscale of EMI-II; Wgt. Mngmt. = Weight Management Subscale of EMI-II; Appearance = Appearance Subscale of EMI-II.
**p<.05, **p <.01*

Once significant correlations were identified, a multiple linear regression was calculated to further examine the relationship between DT and exercise motivations. Given that there was no a priori reason to differentiate between predictor variables, they were all entered together in a single regression analysis. The multiple regression model statistically significantly predicted 30.8 % of the variance in DT total scores, F (4, 56) = 6.23, p <.01, R^2=.308. Only weight management was determined to significantly predict Total DT Scores (β=.466, p <.01). The summary of this analysis can be found in Table 5.6.6. Stress management (β =-.014, p =.917), social recognition (β =.191, p =.193), and appearance (β =-.031, p =.837) were all found to be non-significant in their prediction of DT scores.

Table 5.6. 5. Summary of Regression Analysis for Exercise Motivations

	B	*SE B*	β	*t*	Sig.
Wgt. Mngmt.	.724	.223	.466	3.28	.002**
F (4, 56)			6.23		

**p<.05, **p <.01*

Drive for thinness and body composition. To test the hypothesis that both waist circumference and BMI would be positively associated with DT, correlational analyses were

completed. A complete correlation matrix is available in Table 5.6.7. DT was significantly positively correlated with both BMI (r =.429, p <.01) and waist circumference (r =.399, p <.01). Therefore, the hypothesis was supported. This suggests that individuals who have an elevated BMI and waist circumference are also likely to have an elevated DT.

Table 5.6. 6. Correlations among Drive for Thinness and Body Composition Measures

	DT Total	BMI	Waist Circumference
DT Total	1	.429**	.399**
BMI		1	.907**
Waist Circumference			1

DT Total = Drive for Thinness Subscale Total Score. ** = p<.01, *=p<.05.

Chapter Six: Discussion

6.1 Summary of Findings

The current study revealed a number of findings that contribute to the field of research examining drive for muscularity (DM)/drive for thinness (DT). First, this study found evidence that DM is significantly higher in health and fitness trainees than a general, non-health and fitness trainee university comparator. Second, there was no evidence that either DM or DT changed as a factor of age or year of program. Contrary to expectations, depression, SPA, and self-esteem were not significantly associated with DM in the current study, but SPA was significantly associated with of DT. Unfortunately, low endorsement of non-heterosexual identity made it impossible to evaluate sexual orientation and its' impact on DM, DT, and psychological and physical correlates. Examination of exercise behaviours revealed that frequency of exercise, type of exercise, type of supplement consumed, and creatine use were all significantly correlated with DM. Furthermore, creatine use was found to predict participant endorsement of the Drive for Muscularity Scale (DMS) Item 10, a question designed to assess consideration of anabolic steroids. Body composition (Body Mass Index (BMI) and waist circumference) were significantly correlated with DT, but not DM. Finally, a number of exercise motivations were significantly correlated with both DM (social recognition, affiliation, competition, appearance, strength and endurance, and nimbleness) and DT (stress management, social recognition, weight management, and appearance). A more detailed examination of these findings and their interpretation can be found below.

6.2 Interpretation of Findings

Drive for muscularity and developmental considerations in male health and fitness trainees. It was hypothesized that drive for muscularity (DM) would be higher in male health

and fitness trainees than the general male undergraduate population. This hypothesis was supported, with the current study participants reporting significantly greater DM than a comparison group of demographically similar, non-health and fitness trainee male undergraduate students from the Parent and Moradi study published in 2011. One possible reason for this finding is that the students enrolled in this particular training program may have selected their field of study based on a pre-existing interest in health and fitness, resulting in a higher initial DM which is consistent with findings in the literature looking at similar student groups (e.g., Yager & O'Dea, 2009). Furthermore, given that these students began with a higher overall level of DM, there might have been a ceiling effect such that there might have been less room to show an increase based on the social and cultural aspects of the program itself. The idea that those interests may be reinforced and magnified throughout their education (e.g., Brennan & Thompson, 2012; Keel et al., 2007) was the basis for the second developmental hypothesis: that DM would increase across years of the training program. However, this finding was not supported, as there was no significant change in DM as a factor of year of the program. This suggests that the elevated DM in health and fitness trainees may be a result of a self-selection bias (e.g., Reinstein, Koszewski, Chamberlin, Smith-Johnson, 1992) rather than being attributable to the culture of the program itself (e.g., Yager et al., 2017). The health and fitness training program is designed to prepare students for careers such as "teacher, coach, recreation coordinator, rehabilitation specialist, ergonomist, human factors specialist, corporate fitness specialist, community and private sport club worker, health and fitness salesperson, and fitness evaluator" (University program webpage). Given this, it would follow that anyone in pursuit of these careers would have a pre-existing interest in the field of health and fitness, making them

systematically different from individuals who pursued a career in other areas (e.g., mental health, business).

It is also possible that individuals who were motivated to volunteer for the current study (54% of the entire population) may have a greater interest in the area of health and fitness, and by extension, a higher DM than other individuals in the program who did not volunteer to participate.

Furthermore, the presence of a moderate effect size for year of program suggests that there may not have been an adequately large sample size or statistical power to detect a difference between groups. Therefore, it may be necessary to conduct this research in the future with a larger sample in order to be confident in the non-significant finding.

The second portion of the developmental research hypothesis stated that there would be a positive correlation between DM and age. This hypothesis was not supported, as once the sole outlier for age was removed, the correlation was non-significant. The lack of expected findings may have been due to the restricted age range of participants in the current sample, as almost all participants were within a five-year age range. Thus, this range may simply not have been large enough to detect a difference.

Drive for muscularity and psychosocial correlates. The third research hypothesis stated that individuals with an elevated DM would exhibit increased scores on depression and social physique anxiety (SPA), and would have lower self-esteem (e.g., Brunet et al., 2010; Chittiser, 2007; Grossbard et al., 2013; Hunt et al., 2006; Smolak & Stein, 2006). In contrast to most reports in the literature, there were no significant correlations between DM and any of the psychosocial variables in the current study.

The lack of expected findings may have been due to systematic differences between the current study sample and the samples in the studies on which the hypothesis was based. Given that at the time of hypothesis development, no known studies had explicitly measured DM and its relationship to depression, SPA, and self-esteem in a population of health and fitness trainees, hypotheses were based on findings in other, non-health and fitness populations (e.g., undergraduate males, adolescents, homosexual males). Those populations may endorse higher overall prevalence rates of mental illness based on their age or sexual orientation (Government of Canada, 2006; Cochran & Mays, 2015), or may still be developing a sense of identity and body image (Kamps & Berman, 2011; Voelker, Reel, & Greenleaf, 2015). As such, the health and fitness students may have had overall lower levels of mental illness and a more solidified sense of identity and so were less likely to endorse items indicating depression, SPA or low self-esteem. Consistent with this thinking, the data shows that endorsement of symptoms of depression and SPA in the current study participants were reflective of a normal range of functioning.

Another possible explanation for the lack of association between DM and depression, SPA, and self-esteem is that these students are likely reaping the psychological and physical benefits of regular exercise. Current study participants are achieving or exceeding recommendations for ideal levels for physical activity (CMO, 2004). For example, ninety one percent of males in the current study exercised more than three times weekly, and eighty six percent exercised for longer than one hour each day. Interestingly, in the data collection phase of this project, the researcher noted that many study participants exhibited behaviours that appeared to suggest a high level of comfort with their bodies during the collection of the waist circumference data. Prior to being directed to a private room for the measurements, many of

them were removing their shirts in the busy public classroom. This may be explained by research that states that engagement in exercise leads to positive body image (Korn, Gonen, Shaked, & Golan, 2013). Given that these participants exercised regularly, they likely also had positive body image and were more comfortable showing their bodies in public. The body composition measurements of the participants were indicative of a lower BMI and waist circumference than the average Canadian male (Statistics Canada, 2014) which might have contributed to the comfort these students felt in removing their shirts in a public space to have their waists measured by trained male and female research assistants. It may be that these men experience not only more positive body image but also fewer physical and mental health concerns in general as a result of their regular exercise. This is consistent with previous research that supports the protective effects of exercise on mental and physical health (e.g., Daley, 2008; Fox, 2000; Faselis et al., 2012; Hallsworth et al., 2005), and suggests that males who exercise frequently may have a more positive set of body image cognitions that may protect them from mental health issues (Martin et al., 2006).

Drive for muscularity, drive for thinness, and sexual orientation. The fourth hypothesis stated that non-heterosexual men would endorse higher levels of drive for muscularity (DM) and drive for thinness (DT) than those individuals who identified as heterosexual. Only one of the seventy participants (1.4%) in the current study identified as non-heterosexual, making it impossible to evaluate this particular hypothesis. Previous research has indicated that approximately 3% of a population of male college students within a western culture (e.g., Ellis, Robb, & Burke, 2005) identifies as non-heterosexual. Research collected at Memorial University in 2016 indicates that 18% of males on campus identify as non-heterosexual (American College Health Association Memorial University Executive Summary, 2016). The considerably lower

percentage of individuals identifying as non-heterosexual in the current sample is noteworthy. Also of note is that the study of general undergraduate males used to compare DM reported 12% non-heterosexual individuals. This percentage of non-heterosexual participants, again, is substantially higher than the sample from the current study, and may point to a difference in the cultures of both samples that led to such a substantially lower recruitment of non-heterosexual individuals in the current health and fitness training program.

One possible explanation for this finding is that the health and fitness training programs may have an inherent bias so that non-heterosexual male students are either: a) uncomfortable enrolling in a program that may convey less acceptance toward individuals of a minority sexual orientation, or b) may not be willing to identify their sexual orientation for fear of negative evaluation. This is consistent with previous research that indicates that male sporting and physical education culture is often affected by attitudes consistent with traditional masculinity and homophobia (e.g., O'Brien, Shovelton, & Latner, 2013; Southall, Nagel, Anderson, Polite, & Southall, 2009; Worthen 2014). Those with traditional views of masculinity are often characterized by stronger anti-gay/bi-sexual attitudes (e.g. O'Brien et al., 2013). As such, it may be that the gay/bi-sexual university males either do not enroll in these sorts of training programs or choose not to openly identify as non-heterosexual.

Drive for muscularity and exercise behaviours. It was hypothesized that greater time commitment to exercise (i.e. greater duration and frequency of exercise sessions) and greater emphasis on strength-building exercises would be affiliated with a higher DM. The findings partially supported this hypothesis. Although there was a statistically significant relationship between number of exercise sessions per week and DM, it was individuals who were exercising between three and five times per week who exhibited the highest DM, while those who were

exercising either under three or over five times per week exhibited lower DM. One possible explanation for this finding is that the number of exercise sessions per week may actually be reflective of participant satisfaction with their physique. Males who exercise between three and five times weekly may not be completely satisfied with their body and may be in active pursuit of muscularity, while those exercising over five times weekly may have already reached and are maintaining their fitness goals, or exhibit a high DT rather than a DM. Furthermore, individuals exercising at a rate of more than five times per week may be exercising as a requirement for being a member of a sport team, rather than for the expressed purpose of building muscle. Individuals exercising less than three times weekly may not be actively pursuing a high level of muscularity or fitness. This possible explanation for these findings while logical, is tentative because to the author's knowledge, previous literature has not explored the relationship between frequency of exercise and DM in male health and fitness trainees.

Type of exercise was also significantly correlated with DM. Individuals who engaged in weight training exhibited the highest DM, while individuals who engaged in cardiovascular exercise exhibited the lowest DM. Those individuals engaging in other types of exercise (e.g., calisthenics) or both cardiovascular and weight-based exercise reported DM scores in the middle range. The most likely explanation of this finding is that those individuals in pursuit of muscularity would focus on weight training exercises in an effort to build muscle. Those individuals engaged in cardiovascular exercise may be more likely to be pursuing cardiovascular fitness, leanness, agility, or some goal other than muscularity. Similarly, those engaging in other types of exercise or a combination of cardiovascular and weight-based exercises likely have other motivations aside from building muscle. These findings are consistent with the systematic

review published by Tod and Edwards, who indicated that the effect size that DM had with weight training was significant (Tod & Edwards, 2015).

Drive for muscularity and supplement use. It was hypothesized that DM would be positively associated with the use of anabolic steroids (if endorsed), protein, or multiple supplements. This hypothesis was largely supported. Although no participants endorsed anabolic steroid use, there was a significant relationship between DM and supplement use, with individuals who were consuming multiple supplements reporting the highest DM and individuals consuming no supplements reporting the lowest drive. Individuals who reported consuming a single supplement (e.g., protein) fell between multiple and no supplements with respect to DM. One likely explanation for this finding is that individuals in pursuit of a muscular body type would be likely to use many supplements (i.e. proteins, vitamins, and/or other) in an effort to achieve what could be a challenging goal. This is consistent with previous research, as numerous studies have identified a link between supplement use and DM (e.g., Chittiser & Hausenblas, 2009; Tod & Edwards, 2015; Parent, 2016). Furthermore, in a meta-analysis it was determined that the effect size that DM had with supplement use was significant (Tod & Edwards, 2015).

Of particular interest was that while scoring the paper-and-pencil measures, the researcher identified a number of individuals who had added “creatine” to the “other” category regarding supplement use. Creatine is defined as a legal supplement most commonly used for its role in the generation of muscular energy (Schumaker, Eyers, & Cappaert, 2012), and has been described as safe and ethical (Cooper, Naclerio, Allgrove, & Jimenez, 2012). However, there is little information on the long-term effects of creatine, and as such, long-term users of the supplement are warned to exercise caution (Cooper et al., 2012). Due to the high number of individuals who had reported using this particular supplement (33% of respondents), the

researcher coded an additional variable for creatine use identifying whether or not participants reported consuming creatine. When analyzed, it was determined that those individuals who reported consuming creatine had significantly higher levels of DM than individuals who did not. This finding is likely explained by the fact that individuals pursuing a muscular body type would be willing to use supplements such as creatine, which boast enhanced muscularity as one of the benefits of usage. These findings are consistent with previous research on the relationship between creatine and muscularity, as several studies have determined that creatine is used consistently as a mechanism for enhancing muscularity (e.g., Jonnalagadda, Rosenbloom, & Skinner, 2001; Williams, Anderson, & Winett, 2004).

Interestingly, the current study also found a relationship between creatine use and an item on the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000), which asks respondents to endorse whether they "think about taking anabolic steroids" (McCreary & Sasse, 2000). Creatine use significantly predicted thinking about taking anabolic steroids, suggesting that creatine use may be a first step to more serious supplement use. This finding is possibly explained by the "gateway hypothesis", which suggests that the strongest predictor of illicit substance use for muscularity was use of legal performance-enhancers (Karazsia et al., 2013). In this case, participants in the current study may begin with the use of legal supplements (e.g., protein) and proceed to more potent (creatine) and then to more dangerous (anabolic steroids) means of enhancing their muscularity. These findings are supported by research suggesting that creatine use often precedes first anabolic steroid use (Karazsia et al., 2013). Also noteworthy are the frightening side effects of steroid use, including depression, high blood pressure, sterility, and liver issues (Daniels, Niles, & Frederick, in press).

Also of note is that effect sizes obtained for calculations of the impact of exercise behaviours on DM lend support to the findings, as many of the effect sizes were moderate to large. This provides confidence in the conclusions that DM often differed between groups based on the frequency of exercise sessions, type of exercise, type of supplement used, and whether creatine was consumed or not.

Drive for muscularity and exercise motivations (EMI-2). It was hypothesized that DM in the current study would be highly positively associated with exercise motivations related to interpersonal (social recognition, affiliation, and competition), body-related (weight management and appearance), and fitness motives (strength and endurance) (e.g., Pritchard et al., 2011). This hypothesis was largely supported, as the motivations that were significantly correlated with DM are related to interpersonal (social recognition - positive, affiliation – negative, and competition - negative), body image (appearance - positive), and fitness (strength and endurance – positive, and nimbleness - negative). However, strength and endurance, and nimbleness were the only significant predictors of DM.

The strength and endurance motivation subscale includes statements such as “To build up my strength” and “To increase my endurance” (Markland & Ingledew, 1997) and was also significantly positively associated with DM. One possible reason for this finding is that strength is an intrinsic component of muscularity, inherently linking the two concepts. The Drive for Muscularity Scale directly assesses a person’s desire to increase their strength (e.g., “I think that I would feel stronger if I gained a little more muscle mass”; McCreary & Sasse, 2000). Thus, it follows logically that this would be correlated with a motivation to enhance strength. This finding is consistent with other research studies, which found that strength and endurance was

one of the primary reasons for exercise among college students as well as a significant predictor of DM (e.g., Egli et al., 2011; Pritchard et al., 2011).

Finally, DM was negatively correlated with nimbleness, represented by items such as "To stay/become more agile" or "To maintain flexibility" (Markland & Ingledew, 1997). The likely explanation for this finding is the discrepancy between the constructs of muscularity and nimbleness. In order to gain muscularity, individuals would likely engage in strength building exercises. Nimbleness would likely be achieved by engaging in other types of exercise (e.g., cardiovascular, calisthenics). As such, individuals in pursuit of nimbleness would be unlikely to endorse the strength-based statements listed on the Drive for Muscularity Scale.

Drive for thinness and developmental considerations in male health and fitness trainees. It was hypothesized that drive for thinness (DT) would be higher in male health and fitness trainees than the general male undergraduate population. This hypothesis was not supported, as participants endorsed rates of DT that were significantly lower than those obtained for general undergraduate males in the research study conducted by Pritchard and Cramblitt (2014). One possible reason for this finding is that the manifestation of body image concerns in this sample is different from those on which the hypothesis was based. Given that there are no known research studies assessing DT specifically in a male health and fitness trainee population, the hypothesis in the current study was based on reports that health and fitness trainees exhibit higher overall levels of body dissatisfaction and body image concerns than non-health and fitness trainees (e.g., O'Dea & Abrahams, 2001; Yager & O'Dea, 2009; Yager & O'Dea, 2010). However, it is likely that the men in the current study who are entrenched in a culture of body, fitness and health-focus would be more likely to experience any body image concerns as DM. The data from the current study is consistent with this supposition, as it was found that DM was

higher in the current sample than literature comparators. Therefore, this may be the manner in which increased focus on body image in the present sample manifested itself. Furthermore, this is consistent with previous research indicating that males are most likely to experience body image issues in the form of concerns around muscularity (e.g., Field et al., 2014; McCreary & Sasse, 2000; Tucker, 1982).

A second possible reason for this finding is that the majority of men in the current study exercised regularly and had a BMI below the national average (Statistics Canada, 2014), perhaps making them less likely to endorse a DT. This is supported by the significant correlation between DT and BMI in the current study. Those individuals with a higher BMI were more likely to endorse the desire to lose weight, though overall, the majority of men in the health and fitness training faculty were fit and did not need (or want) to lose weight.

Finally, it is also possible that individuals who were motivated to volunteer for the current study (54% of the entire population) may have a strong interest in health and fitness, and by extension, a lower BMI and DT. It is possible that, had all male health and fitness trainees participated, a wider range of body compositions may have been observed, and a higher level of DT might have been endorsed.

Another related hypothesis stated that DT would remain unchanged across year in the program. This hypothesis was supported. Given that the same findings were revealed when assessing DM, this provides further support for the idea of body image concerns being present at the beginning of the program (e.g., Reinstein et al., 1992) rather than being attributable to the culture of the program (e.g., Yager et al., 2017). A second portion of the developmental hypothesis stated that DT would not be associated with age, a hypothesis which was supported. This finding is consistent with previous research suggesting that DT is a characteristic that is

often stable over time in males (Garaigordobil & Maganto, 2013; Gravener et al., 2008). Many portrayals of the "ideal" male physique focus on a lean, muscular body type (e.g., McCreary & Sasse, 2000). Thus, the males who are immersed in a culture focused on health and fitness would likely have already pursued, and possibly attained, the "lean" ideal, then turning their focus to enhancing bulk and muscle. If these men have already attained the level of leanness they desire, then their DT would be unlikely to change. However, it is noteworthy that there is a small sample in Year 3 of the current study, which is important to consider when discussing these findings. It is possible that the sample sizes in some years of the program were simply not large enough to detect whether a true difference existed. Furthermore, in order to truly determine whether a change occurred over time, research would need to be conducted in a longitudinal manner rather than through a cross sectional study.

Drive for thinness and psychosocial correlates. It was hypothesized that DT would be associated with an increase in social physique anxiety (SPA) and depression, and lower self-esteem (e.g., Brunet et al., 2010, Chittiser, 2007; Hunt et al., 2006). This hypothesis was partially supported, as DT did significantly correlate with SPA. SPA also significantly predicted the variance in DT.

The non-significant association between DT, self-esteem and depression may be accounted for by the same protective effects of exercise that may have led to the non-significant finding between DM and psychosocial variables. Given the high frequency of exercise, the well documented positive impact of exercise (Daley, 2008) may have served to maintain a relatively high level of self-esteem and protect participants from a high level of depression.

Another possible reason for this finding is that the scope of the Social Physique Anxiety Scale (Hart et al., 1989) may be better at detecting the emotional or psychological impacts of

body image concerns than the Beck Depression Inventory-II (Beck et al., 1996) or the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Depression and self-esteem are broad constructs, comprised by many more components than body image alone. SPA, on the other hand, is a type of anxiety specifically related to fear of having one's body negatively evaluated (Hart et al., 1989). Individuals who exhibited a high level of DT may have specific body image concerns that were captured through SPA, but may have other protective factors (e.g., feelings of self-worth) unrelated to body image that led to normal endorsement of depression and self-esteem.

Alternatively, a possible explanation for the significant association between DT and SPA could be the reluctance of participants with high SPA to exercise. It is possible that people with high SPA avoided exercise for fear of being negatively evaluated, leading to a higher BMI and DT. Previous research supports this explanation; indicating that individuals who endorse high levels of SPA, while potentially experiencing higher BMI or waist circumference, are still less likely to exercise in order to change their bodies despite expressing more concern over their body's appearance (Hart et al., 1989; Lofton, Bungum, Timothy, Chang & Jackson, 2000; Eklund & Crawford, 1994). It may also be important to consider the role that the culture of the health and fitness training program may have on these individuals. If other students are largely fit, healthy individuals with low BMI and waist circumference, this may further discourage individuals with higher levels of SPA from exercising. It may have also dissuaded these individuals from participating in the current research project. Given that the project required physical measurements of waist circumference and weight, individuals who were anxious about judgment based on their physical size may have deliberately chosen not to participate. This may have led to a biased sample of participants, and resulted in a "healthier" picture of the sample than if the entire population had participated. Had the entire population participated, there may

have been individuals who were not experiencing the protective effects of exercise, and as a result, significant correlations between DT and depression or SPA may have been found.

Drive for thinness and exercise behaviours. It was hypothesized that participants who endorsed more investment/time commitment to exercise and more emphasis on cardiovascular exercises would endorse a higher DT. However, this hypothesis was unsupported, as no measures of exercise behaviour correlated with DT. This finding was surprising, as previous research has revealed that males are likely to use exercise as a strategy for weight loss (e.g., Anderson & Bulik, 2004).

One possible reason for this finding is that the majority of individuals in the current study rated their DT low and thus were satisfied with their level of thinness, reducing their likelihood of using exercise with the expressed purpose of losing weight. The data from the current study indicated that most participants possessed a BMI and a waist circumference below that of the average Canadian male (Statistics Canada, 2014), and engaged in regular exercise. As such, it is possible that these males had already attained the lean physique that many Canadian men strive for. Once these men had attained the level of leanness they desired, they may have been more likely to exercise for the expressed purpose of building muscle. This is consistent with past research indicating that males are most likely to pursue a muscular body type (e.g., McCreary & Sasse, 2000; Pope et al., 1999; Morrison et al., 2006). Furthermore, data from the current study supports that exercise behaviour was more likely intended to enhance muscularity, given the numerous significant correlations between DM and exercise behaviours.

Drive for thinness and exercise motivations. The current study hypothesized that drive for thinness (DT) would be related to body-related exercise motivations (weight management and appearance), and not interpersonal, fitness, psychological, or health-related motivations (e.g.,

Nurkkala et al., 2016). This hypothesis was largely supported. DT was significantly positively correlated with two body-related motives (weight management - the desire to burn calories and lose or control weight, and appearance - the desire to improve physical appearance), one psychological motive (stress management - the desire to reduce stress and tension and gain time to think), and one interpersonal motive (social recognition – exercise for the purpose of gaining recognition or proving worth to others). However, regression analyses determined that only weight management significantly predicted DT scores.

It is most likely that this finding is due to the considerable overlap between the constructs of weight management and DT. Individuals who have a high DT are also likely to be attempting to decrease their weight through various means (e.g., exercise, diet). This is consistent with previous research, which indicates that males who express body image concerns related to thinness are likely to endorse weight loss as a motivation for exercise (Nurkkala et al., 2016; Kilpatrick, Hebert, & Bartholomew, 2005).

Drive for thinness and body composition. As previously stated, a positive correlation between BMI and waist circumference and DT was discovered. This finding is likely explained by the body satisfaction of individuals based on their physical size. Individuals who have a lower BMI and waist circumference may express more satisfaction with their current size, and as a result exhibit a lower DT. Individuals with a higher BMI or waist circumference may experience less satisfaction with their bodies and consequently a higher DT. This correlation is consistent with previous research that has reported similar findings for the relationship between DT and BMI (e.g., Tazaki, 2007), which suggests that individuals with a higher BMI are in pursuit of a thinner body type, which would result in higher scores on DT. This response would be consistent with society's prescription for weight loss in heavier individuals.

6.3 Methodological Considerations: Strengths and Limitations.

Strengths. This study had a number of strengths. First, the study examined a population that has been rarely studied (e.g., Yager & O'Dea, 2009; O'Dea & Abraham, 2001; Olson et al., 2009). Given that students who are entering the field of health and fitness are expected to ultimately have a significant influence on vulnerable populations (e.g., children, individuals with poor body image, weight loss difficulties, and injuries), when they work as physical education teachers, kinesiologists, personal trainers or recreation therapists, it is critical to fully understand the nature of body image problems in this population. To date (e.g., Yager & O'Dea, 2009), there have not been any published studies that have directly examined both drive for muscularity (DM) **and** drive for thinness (DT) in this population. Furthermore, the psychosocial variables examined in the current study and their relationship to both DM and DT do not appear to have been examined in this population to date. The current study findings provide evidence that DM likely occurs on a continuum and may be protective and health-promoting within a certain range.

A second strength of the current study is that it provides some preliminary data on the impact of year of health and fitness training program on DM and DT. Although there have been studies that have compared health and fitness trainees to other male undergraduates (e.g., Yager et al., 2017), these studies have not analyzed the differences in DM or DT across years of the program. Although the cross-sectional nature of these findings does not allow for causal or directional inferences, they do provide relevant information that contributes to understanding the mechanism behind an elevated DM in this population. Researchers have previously debated whether this elevation in DM is a result of a self-selection bias (e.g., Reinstein et al., 1992) or an impact of the culture of the programs these males are in (e.g., Yager et al., 2017). The current study provides evidence that males enrolled in this program enter with a pre-existing elevation in

DM which remains unchanged across years of the program suggesting that in spite of the fact that these programs are highly focused on health, fitness, and body factors, students' DM remains constant.

A major strength of the current study is that BMI and waist circumference were measured objectively, using trained assessors to collect these measures in a private data collection area. Use of self-report for weight and height was one of the main limitations in previous studies assessing DM and body composition (e.g., Daniel & Bridges, 2010). Given that many individuals are likely to inaccurately report their weight (e.g., Elgar, Roberts, Tudor-Smith, & Moore, 2005; Sherry, Jefferds, & Grummer-Strawn, 2007), accurate measurements of body weight and height increased the reliability of the BMI data. Furthermore, by supplementing BMI measurements with a measure of waist circumference, it was possible to ensure that the measure of health risk due to excess adipose tissue was as accurate as possible.

A final strength of the current study was use the use of well-validated measures that assessed certain details neglected by previous research. Previous research has often failed to obtain the level of comprehensiveness used in the current study (e.g., failing to distinguish the between weight training and non-weight training exercise; Tod & Edwards, 2015). Furthermore, by providing participants with additional space to write in responses not already included in the question (e.g., "other"), the researcher was able to obtain key information on the creatine consumption rates in the current sample. This provided important findings about the propensity for students consuming creatine to consider use of anabolic steroids, and provides future direction for both research and targeted interventions with this population.

Limitations. This study also had some methodological limitations. First, there was a relatively small sample size in the current study, which may have limited statistical power and

may have made it difficult to detect differences between groups. There were several instances in which non-significant findings had moderate to large effect sizes, suggesting that larger sample sizes and higher statistical power may have been required to truly detect a difference between groups. Difficulty in participant recruitment for psychological research is common, particularly with male participants (Patel et al., 2003) and this study was no exception. However, given that the entire pool to sample from was made up of only 130 individuals and the total response rate was 54% in a study with voluntary participation, it is believed that the response rate was satisfactory.

Second, the demographic characteristics of participants in the current study may limit generalizability of the findings. The sample was largely unmarried (94.3%), heterosexual (98.6%), and Caucasian (88.6%), and had a young and narrow age range. Although the lack of diversity may provide important information about the study population, it may also prove difficult to generalize findings to a more diverse group in terms of age, ethnicity, relationship status, and sexual orientation.

A third limitation, as with much of psychological research, is the use of self-report questionnaires which may be associated with social desirability (Mortel, 2008). Individuals may have been inclined to respond to questions in a manner that would be considered socially desirable. For example, some of the questionnaires evaluated topics that were relatively sensitive in nature (e.g., anabolic steroid use, depression, self-esteem). Social desirability bias would suggest that individuals would respond in a way that would negate depressive symptoms and deny anabolic steroid use. However, strategies were implemented in order to control for this bias. For example, individuals were given the option of omitting items, and were encouraged to sit

away from their peers. In addition, they were provided with a numerical identification code and questionnaires were given out and returned in thick legal envelopes to preserve confidentiality.

As with any study where participation is voluntary, there is always the possibility of a self-selection bias. Those individuals who participated may have had a greater interest in the area of health and fitness than those individuals who did not volunteer to participate (e.g., Hatoum & Belle, 2004). Those who did not agree to participate may have had less interest in health and fitness, may have experienced more body image concerns and poorer psychological health than those who completed the study.

Another limitation of the current study is that certain additional measures of psychosocial variables could have been included in the assessment. In particular, body dissatisfaction is a measure that may have provided valuable information regarding body image difficulties in the current population. It is possible that more information would have been obtained by measuring body dissatisfaction than through the measure of depression given that the current population was exercising regularly, attending class, and as a result, would arguably have had adequate vocational functioning. Previous research has linked body dissatisfaction and DM in males (e.g., Yager et al., 2017), and further information regarding the nature of this relationship likely would have been valuable to the field of research. Furthermore, it would have been beneficial to have added a question to the demographics questionnaire assessing whether the participant completing the question was an athlete and the nature of the sport played. Given that several research studies have reported a relationship between DM and athletic status (e.g., Galli, Petrie, Reel, Greenleaf, & Carter, 2015), it would have been informative to determine whether athlete status accounted for the DM endorsed.

Finally, it should be noted that the present study is correlational in nature. As such, no causal inferences can be made regarding the associations between DM and DT, and psychological, behavioural, and demographic characteristics. In addition, no conclusions can be drawn regarding the direction of the observed relationship.

Cross-sectional design is also a limitation. For example, DM, DT, depression, SPA, and self-esteem were measure at one point in time only.

6.4 Implications for Clinical Practice

Arguably one of the most important implications of the present study for clinical practice are the findings surrounding DM and psychosocial variables. Research in the field of DM generally focuses on the negative association between DM and psychological variables (e.g., Grossbard et al., 2013; Brunet et al., 2010; Smolak & Stein, 2006). However, a great deal of research has supported exercise as health promoting with respect to psychological and physiological variables (e.g., Daley, 2008; Babiss & Gangwisch, 2009). It appears intuitive, then, that when in a normative range, DM would encourage exercise and would likely have some protective effects against negative psychological outcomes. It appears as though the participants in the current study are reaping the positive psychological and physical benefits of exercise. Despite having an elevated DM, the current study participants exercised within the recommendations proposed by the CMO (CMO, 2004). They endorsed normative levels of self-esteem, SPA, and depression. Thus, it is important to consider that DM may be health promoting in some cases. This finding can have important implications for the field of sport psychology, particularly when considering whether an individual's DM is protective or problematic.

Although DM was largely associated with mental health outcomes in the normative range, DT was found to be predicted by SPA. Therefore, clinicians treating individuals with body image concerns related to thinness may want to assess and treat their SPA as well.

Also of note is that creatine consumption was predictive of whether individuals consider the use of anabolic steroids, and considering anabolic steroid use was positively correlated with depression rates. This is consistent with past research, which also suggested that creatine use predicts later anabolic steroid use (Schumaker et al., 2012; Cooper et al., 2012; Karazsia et al., 2013). As such, clinicians should assess for creatine use in individuals with muscularity-related body image concerns, and discuss with clients about the propensity to then consider anabolic steroid use. Furthermore, psychoeducation should focus on the negative psychological and behavioural results of anabolic steroid use (e.g., Karazsia et al., 2013), in order to potentially deter creatine users from commencing anabolic steroid use.

6.5 Directions for Future Research

The findings of the current study provide several interesting avenues for future research. First, although the current study suggests that DM may be health promoting, it is critical to ensure that no other risk factors may be at play. In particular, future research should focus on determining whether exercise dependence exists in health and fitness trainees given that it has been previously associated with DM (e.g., Hale et al., 2010) when combined with high frequency and duration of exercise. Other areas that would be important to examine in this population include body dissatisfaction, and the impact of athlete status and type of sport played because of their previously established relationships with DM (e.g., Steinfeldt et al., 2011; Bennett, 2010; Nowell & Ricciardelli, 2008). Furthermore, although the current study used previous literature data as comparators for DM and DT between samples, it would be beneficial to draw non-health

and fitness trainees which could be matched for demographics from the same university in order to compare variables across groups.

A second possible step for this area of research is a longitudinal study examining DM and DT as students' progress through health and fitness training programs. Due to the cross-sectional nature of the present study, it was not possible to determine conclusively whether a change in DM or DT occurred as an individual progressed through the program. Included in this longitudinal study could be research on which variables lead to an increased DM in this population. In order to be more definitive about the root causes of an elevated DM in this group, applicants of this particular program could be surveyed and tracked across the duration of the program. This could provide valuable insight into whether the elevated DM was pre-existing prior to entry into the program, or whether there are elements of the training that contribute to an elevation in DM scores.

Another important avenue for future research includes evaluating the attitudes of males in this program toward individuals of a minority sexual orientation. Less than two percent of the study sample endorsed a sexual orientation other than heterosexuality. As previous research has identified negative or biased attitudes toward LGBT individuals in athletes (Southall et al., 2009; Worthen, 2014), it should be determined whether these attitudes may exist in a health and fitness training program. This may help explain the lower than expected endorsement of a minority sexual orientation. In this case, it would be important to determine a way to manage social desirability. Few people would actually endorse a homophobic attitude in a university setting. As a result, it may be preferential to study implicit attitudes regarding sexual orientation, as it may be a more accurate reflection of the attitudes held by individuals in a health and fitness training program (Mcconnell & Leibold, 2001; Fazio & Olson, 2003). Researchers may benefit from the

use of a measure of implicit attitudes such as the Implicit Attitude Test (IAT; Mcconell & Leibold, 2001).

The present study revealed critical information about creatine use in this sample. Given that previous research has associated creatine usage with anabolic steroid use and associated negative consequences (e.g., Karazsia et al., 2013), more in-depth research about creatine use in this population should be conducted.

Finally, difficulties in recruitment yielded a sample size below that of the *a priori* power calculations, calling the statistical power into question. In some instances, non-significant findings had moderate to large effect sizes, indicating that larger sample sizes and higher statistical power may have led to a significant finding. Thus, future research conducted with a larger sample size may obtain different findings when replicating some of the same calculations.

6.6 Conclusion

Taken together, the findings of this study paint an interesting picture of drive for muscularity (DM) and drive for thinness (DT) in the context of health and fitness trainees at a mid-sized university. The studied sample had substantially higher levels of DM than a comparator group, but levels of DT that were lower, albeit not significantly. These students with higher levels of DM do not report significantly higher levels on the measures of psychological distress and are exercising at or above expert-recommended levels-perhaps benefitting from the psychological impact of regular exercise. Those high on DT are significantly more likely to report some forms of psychological distress suggesting that those students who score high on DT may be at risk and may benefit from intervention. These students endorse non-heterosexual orientation at an unusually low rate for a university population possibly related to a hetero-normative culture. Although DM within the ranges reported for this sample appear to pose no

risk, this study does reveals some concerns related to the higher levels of DM, particularly the use of supplements. The relationship between DM and supplement use and the connection between supplement use-especially creatine - and use of anabolic steroids is a concern and one that needs further study.

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Appendix A

A.1 Informed Consent

TITLE: The relationship between Drive for Muscularity and Drive for Thinness and depression, Social Physique Anxiety (SPA), and self-esteem ratings in male Human Kinetics and Recreation students in their first through fourth years of university.

INVESTIGATOR(S):

Alyssa Gruchy, Psy.D Student, B.Sc. (Hons)
Michele Neary, Ph.D., R. Psych., Assistant Professor, Counselling Center, Memorial University of Newfoundland (MUN)
Olga Heath, Ph.D., R. Psych., Associate Professor, Counselling Center, MUN

SPONSOR:

Bell Aliant Male Body Image Project

You have been invited to take part in a research study. Taking part in this study is voluntary. It is up to you to decide whether to be in the study or not. You can decide not to take part in the study. If you decide to take part, you are free to leave at any time.

Before you decide, you need to understand what the study is for, what risks you might take and what benefits you might receive. This consent form explains the study.

Please read this carefully. Take as much time as you like. Mark anything you do not understand, or want explained better. After you have read it, please ask questions about anything that is not clear.

The researchers will:

- Discuss the study with you
- Answer your questions
- Keep confidential any information which could identify you personally
- Be available during the study to deal with problems and answer questions

1. **Introduction/Background:**
   Although body dissatisfaction research is usually focused on women and girls, it has recently been shown that men also struggle with body image issues. Men often show body dissatisfaction through a drive for muscularity (DM) or a drive for thinness (DT). Both DM and DT have previously been linked to factors such as depression, social physique anxiety and self-esteem. In this study, male students of Human Kinetics and Recreation (HKR) are invited to complete a survey and have body measurements taken that will give researchers information about their body satisfaction and emotional well being. Body measurements

will be obtained in order to determine whether Body Mass Index (BMI) has an influence on any of the variables under study (DM, DT, depression, SPA or self-esteem).

2. **Purpose of study:**
   This study will look at the relationship between drive for muscularity and drive for thinness and depression, social physique anxiety and self-esteem in male HKR students.

3. **Description of the study procedures:**
   If you decide to participate, you will be asked to complete a survey that includes questions of demographics, of your eating and exercise habits, body satisfaction and emotional well being. You will also be asked to allow someone to take measurements of your height, weight and waist circumference (which you may decline if you are uncomfortable). You will be entered into a draw for a $200.00 gift certificate for completing the questionnaire measures.

4. **Length of time:**
   The questionnaires in this project should take approximately 30 minutes to complete.

5. **Possible risks and discomforts:**
   One possible risk is that you may feel uncomfortable when completing some of the items on the questionnaires, or while having measurements obtained. You have the right to refuse to answer any questions or to participate in any measurements that make you uncomfortable.

   We will ask you to share personal information with trained research staff as part of your participation in this study. There is always the possibility that someone who is not authorized might see it, though this has not happened previously. We take the following precautions to prevent any unauthorized person from having access to the information you give us:

   - Any information you give us will be kept strictly confidental. All survey data will be kept in locked files. Names will not be collected on any paperwork we get (except this consent form). An ID number will be assigned to your survey data, and only authorized staff will have access to the locked file that links your name to your ID number. Your name will never be mentioned in any publications resulting from this study.
   - We will not give information about you to anyone unless you provide a signed release or we have reason to suspect that anyone is in immediate danger of seriously hurting himself/herself or someone else. In these cases, we may have to break confidentiality and report this information to appropriate persons so that steps can be taken to protect those concerned.

   Completion of the questionnaires may show that you are experiencing difficulty with general psychological health, or are at a medical risk because of eating or exercise behaviours. If this is the case, please take advantage of the resources provided to you after you have completed the study (in the debrief form).

Participation in this study may involve unforseen risks. If any adverse events occur that might be related to the research study, you should bring them to the attention of Alyssa Gruchy, or Dr. Michele Neary, the director of the research project.

6. Benefits:

It is not known whether this study will benefit you.

Some *potential* benefits may include:

- Assessment and provision of referrals for other treatment, if that should become necessary

7. Liability statement:

Signing this form gives us your consent to be in this study. It tells us that you understand the information about the research study. When you sign this form, you do not give up your legal rights. Researchers or agencies involved in this research study still have their legal and professional responsibilities.

8. What about my privacy and confidentiality?

Protecting your privacy is an important part of this study. Every effort to protect your privacy will be made. However it cannot be guaranteed. For example we may be required by law to allow access to research records.

When you sign this consent form you give us permission to

- Collect information from you
- Share information with the people conducting the study
- Share information with the people responsible for protecting your safety

Access to records

The members of the research team will see study records that identify you by name. Other people may need to look at the study records that identify you by name. This might include the research ethics board. You may ask to see the list of these people. They can look at your records only when supervised by a member of the research team.

Use of your study information

The research team will collect and use only the information they need for this research study.

This information will include your

- Date of birth
- Gender
- Sexual orientation
- Information from surveys
- Height

- Weight
- Waist circumference

Your name and contact information will be kept secure by the research team in Newfoundland and Labrador. It will not be shared with others without your permission. Your name will not appear in any report or article published as a result of this study.

Information collected for this study will be kept for seven years.

If you decide to withdraw from the study, the information collected up to that time will continue to be used by the research team. It may not be removed. This information will only be used for the purposes of this study.

Information collected and used by the research team will be stored in a locked cabinet in the Counselling Center at Memorial University of Newfoundland. Alyssa Gruchy (under the supervision of Michele Neary) is the person responsible for keeping it secure. Coded data could be entered into computer programs for analysis, but identifying information will be removed.

Your access to records

You may ask the director of the research project to see the information that has been collected about you.

9. Questions or problems:

If you have any questions about taking part in this study, you can meet with the investigator who is in charge of the study at this institution. That person is:

Alyssa Gruchy, (709) 728-4743

Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:

Ethics Office
Health Research Ethics Authority
709-777-6974 or by email at info@hrea.ca

After signing this consent you will be given a copy.

Signature Page

Study title: The relationship between Drive for Muscularity and Drive for Thinness and depression, Social Physique Anxiety (SPA), and self-esteem ratings in male Human Kinetics and Recreation students in their first through fourth years of university.

Name of principal investigator:
Alyssa Gruchy
To be filled out and signed by the participant:

	Please check as appropriate:
I have read the consent.	Yes { } No { }
I have had the opportunity to ask questions/to discuss this study.	Yes { } No { }
I have received satisfactory answers to all of my questions.	Yes { } No { }
I have received enough information about the study.	Yes { } No { }
I have spoken to Alyssa Gruchy and she has answered my questions	Yes { } No { }
I understand that I am free to withdraw from the study	Yes { } No { }

- at any time
- without having to give a reason
- without affecting my future student status

I understand that it is my choice to be in the study and that I may not benefit. Yes { } No { }
I understand how my privacy is protected and my records kept confidential Yes { } No { }
I agree to take part in this study. Yes { } No { }

_____ _____ _____
Signature of participant Name printed Year Month Day

<u>To be signed by the investigator or person obtaining consent</u>

I have explained this study to the best of my ability. I invited questions and gave answers. I believe that the participant fully understands what is involved in being in the study, any potential risks of the study and that he or she has freely chosen to be in the study.

_____ _____ _____
Signature of investigator Name printed Year Month Day

Telephone number: _____

A.2 Questionnaires and Protocols

Male Body Image Demographics

Please fill in the blanks or circle the appropriate response for each of the following questions.

1. What is your age? _____ yrs.

2. In what year of the HKR program are you?

    a. 1st
    b. 2nd
    c. 3rd
    d. 4th

3. What is your current maritial status?

    a. Married
    b. Divorced
    c. Common Law Relationship
    d. Never Married/Single
    e. Widowed

4. What is your ethnicity?

    a. Caucasian
    b. Canadian African
    c. Canadian Indian
    d. Hispanic
    e. Asian
    f. Other (*please specify*): _____

5. What is your sexual orientation?

    a. Heterosexual
    b. Homosexual
    c. Bisexual
    d. Other (*please specify*): _____

6. A) On average, how many times a week do you exercise?

    a. 0
    b. 1
    c. 2
    d. 3
    e. 4
    f. 5
    g. 6
    h. 7
    i. more than 7

6.B) On average, how long does each exercise session last?

a. Less than 30 minutes
b. 30 mins – 59 minutes
c. 1 hour – 1 hour, 29 minutes
d. 1.5 hours – 1 hour, 59 minutes
e. More than 2 hours

7. Typically, which type of exercise do you engage in?

a. Cardiovascular
b. Weight-based
c. Both
d. Other (*please specify*): _____

8. Which of the following supplements have you used in the past month (*please circle all that apply*)

a. Protein
b. Weight-loss
c. Steroids
d. None of the above
e. Other (*please specify*): _____

Drive for Muscularity Scale **McCreary & Sasse, 2000**

Please read each item carefully then, for each one, circle the number that best applies to you.

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

_____ 1. I wish that I were more muscular.

_____ 2. I lift weights to build up muscle.

_____ 3. I use protein or energy supplements.

_____ 4. I drink weight gain or protein shakes.

_____ 5. I try to consume as many calories as I can in a day.

_____ 6. I feel guilty if I miss a weight training session.

_____ 7. I think I would feel more confident if I had more muscle mass.

_____ 8. Other people think I work out with weights too often.

_____ 9. I think that I would look better if I gained 10 pounds in bulk.

_____ 10. I think about taking anabolic steroids.

_____ 11. I think that I would feel stronger if I gained a little more muscle mass.

_____ 12. I think that my weight training schedule interferes with other aspects of my life.

_____ 13. I think that my arms are not muscular enough.

_____ 14. I think that my chest is not muscular enough.

_____ 15. I think that my legs are not muscular enough.

Drive for Thinness Subscale of EDI-3 **Garner, 2004**

Please complete the following questions by circling the **one** response which is the most indicative of your feelings.

1. I eat sweets or carbohydrates without feeling nervous.

Always True	Usually	Often	Sometimes	Rarely	Never True

7. I think about dieting.

Always True	Usually	Often	Sometimes	Rarely	Never True

11. I feel extremely guilty after overeating.

Always True	Usually	Often	Sometimes	Rarely	Never True

16. I am terrified of gaining weight.

Always True	Usually	Often	Sometimes	Rarely	Never True

25. I exaggerate or magnify the importance of weight.

Always True	Usually	Often	Sometimes	Rarely	Never True

32. I am preoccupied with the desire to be thinner.

Always True	Usually	Often	Sometimes	Rarely	Never True

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

Always True	Usually	Often	Sometimes	Rarely	Never True

Beck Depression Inventory-II **Beck, Steer, & Brown, 1996**

INSTRUCTIONS: This questionnaire consists of 21 groups of statements about how you may think, feel or behave in the last two weeks. Please read the statements carefully and then pick out the one statement in each group that best describes the way you have been feeling in the past two weeks (including today) and circle the number beside the statement. If several statements in the group seem to apply equally well, circle the highest number for each group. Please choose only one statement per group including item 16 and item 18.

1. **SADNESS**

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

2. **PESSIMISM**

0	I am discouraged about my future.
1	I feel more discouraged about my future than I used to be.
2	I do not expect things to work out for me.
3	I feel my future is hopeless and will only get worse.

3. **PAST FAILURE**

0	I do not feel like a failure.
1	I have failed more than I should have.
2	As I look back. I see lots of failures.
3	I feel I am a total failure as a person.

4. LOSS OF PLEASURE

0	I get as much pleasure as I ever did from the things I enjoy.
1	I don't enjoy things as much as I used to.
2	I get very little pleasure from the things I used to enjoy.
3	I can't get any pleasure from the things I used to enjoy.

5. GUILTY FEELING

0	I don't feel particularly guilty.
1	I feel guilty over many things I have done or should have done.
2	I feel quite guilty most of the time.
3	I feel guilty all of the time.

6. PUNISHMENT FEELING

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

7. SELF-DISLIKE

0	I feel the same about myself as ever.
1	I have lost confidence in myself.
2	I am disappointed in myself.
3	I dislike myself.

8. SELF CRITICALNESS

0	I don't criticize or blame myself

	more than usual.
1	I am more critical of myself than I used to be.
2	I criticize myself for all my faults.
3	I blame myself for everything bad that happens.

9. SUICIDAL THOUGHTS OR WISHES

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

10.CRYING

0	I don't cry any more than I used to.
1	I cry more than I used to.
2	I cry over every little thing.
3	I feel like crying, but I can't.

11.AGITATION

0	I am no more restless or wound up than usual.
1	I feel more restless or wound up than usual.
2	I am so restless or agitated that it's hard to stay still.
3	I am so restless or agitated that I have to keep moving or doing something.

12.LOSS OF INTEREST

0	I have not lost interest in other people or activities.
1	I am less interested in other people or things than before.
2	I have lost most of my interest in other people or things.
3	It's hard to get interested in anything.

13.INDECISION

0	I make decisions about as well as ever.
1	I find it more difficult to make decisions as usual.
2	I have much greater difficulty in making decisions than I used to.
3	I have trouble making any decisions.

14.WORTHLESSNESS

0	I do not feel I am worthless.
1	I don't consider myself as worthwhile and useful as I used to.
2	I feel more worthless as compared to other people.
3	I feel utterly worthless.

15.LOSS OF ENERGY

0	I have as much energy as ever.
1	I have less energy than I used to have.

2	I don't have enough energy to do very much.
3	I don't have enough energy to do anything.

16.CHANGES IN SLEEPING PATTERN

0	I have not experienced any change in my sleeping pattern.
1a	I sleep somewhat more than usual.
1b	I sleep somewhat less than usual.
2a	I sleep a lot more than usual.
2b	I sleep a lot less than usual.
3a	I sleep most of the day.
3b	I wake up 1-2 hours early and can't get back to sleep.

17.IRRITABILITY

0	I am no more irritable than usual.
1	I am more irritable than usual.
2	I am much more irritable than usual.
3	I am irritable all the time.

18.CHANGES IN APPETITE

0	I have not experienced any change in my appetite.
1a	My appetite is somewhat less than usual.
1b	My appetite is somewhat greater than usual.
2a	My appetite is much less than before.

2b	My appetite is much greater than usual.
3a	I have no appetite at all.
3b	I crave food all the time.

19.CONCENTRATION DIFFICULTY

0	I can concentrate as well as ever.
1	I can't concentrate as well as usual.
2	It's hard to keep my mind on anything for very long time.
3	I find I can't concentrate on anything.

20.TIERDNESS OR FATIGUE

0	I am no more tired or fatigued than usual.
1	I am too tired or fatigued more easily than usual.
2	I am too tired or fatigued to do a lot of the things I used to do.
3	I am too tired or fatigued to do most of the things I used to do.

21.LOSS OF INTEREST IN SEX

0	I have not noticed any recent change in my interest in sex.
1	I am less interested in sex than I used to be.
2	I am much less interested in sex now.
3	I have lost interest in sex completely.

Social Physique Anxiety Scale **Hart, Leary, & Rejeski, 1989**

The following questionnaire contains statements concerning your body physique or figure. By physique or figure we mean your body's form and structure; specifically, body fat, muscular tone, and general body proportions.

Instructions: Read each item carefully and indicate how characteristic it is of you according to the following scale.

1 = Not at all characteristic of me

2 = Slightly characteristic of me

3 = Moderately characteristic of me

4 = Very characteristic of me

5 = Extremely characteristic of me

_____1. I am comfortable with the appearance of my physique or figure.

_____2. I would never worry about wearing clothes that might make me look too thin or overweight.

_____3. I wish I wasn't so up-tight about my physique or figure.

_____4. There are times when I am bothered by thoughts that other people are evaluating my weight or muscular development negatively.

_____5. When I look in the mirror I feel good about my physique or figure.

_____6. Unattractive features of my physique or figure make me nervous in certain social settings.

_____7. In the presence of others, I feel apprehensive about my physique or figure.

_____8. I am comfortable with how fit my body appears to others.

_____9. It would make me uncomfortable to know others were evaluating my physique or figure.

_____10. When it comes to displaying my physique or figure to others, I am a shy person.

_____11. I usually feel relaxed when it's obvious that others are looking at my physique or figure.

_____12. When in a bathing suit, I often feel nervous about how well proportioned my body is.

Rosenberg Self-Esteem Scale **Rosenberg, 1965**

Below is a list of statements dealing with your general feelings about yourself. If you strongly agree, circle SA. If you agree with the statement, circle A. If you disagree, circle D. If you strongly disagree, circle SD.

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

The Exercise Motivation Inventory-2 Markland & Ingledew, 1997

The Exercise Motivations Inventory - 2 (EMI-2)

On the following pages are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not*, please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, *or would be true* for you personally if you did exercise. If you do not consider a statement to be true for you at all, circle the '0'. If you think that a statement is very true for you, circle the '5'. If you think that a statement is partly true for you, then circle the '1', '2', '3' or '4', according to how strongly you feel that it reflects why you exercise or might exercise.

Remember, we want to know why *you personally* choose to exercise or might choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

It helps us to have basic personal information about those who complete this questionnaire. We would be grateful for the following information:

Your age ..... years **Your gender ..... male/female**

		Not at all true for me					**Very true for me**
Personally, I exercise (or might exercise) ...							
1	To stay slim	0	1	2	3	4	5
2	To avoid ill-health	0	1	2	3	4	5
3	Because it makes me feel good	0	1	2	3	4	5
4	To help me look younger	0	1	2	3	4	5
5	To show my worth to others	0	1	2	3	4	5
6	To give me space to think	0	1	2	3	4	5

	Personally, I exercise (or might exercise) …	Not at all true for me					Very true for me
7	To have a healthy body	0	1	2	3	4	5
8	To build up my strength	0	1	2	3	4	5
9	Because I enjoy the feeling of exerting myself	0	1	2	3	4	5
10	To spend time with friends	0	1	2	3	4	5
11	Because my doctor advised me to exercise	0	1	2	3	4	5
12	Because I like trying to win in physical activities	0	1	2	3	4	5
13	To stay/become more agile	0	1	2	3	4	5
14	To give me goals to work towards	0	1	2	3	4	5
15	To lose weight	0	1	2	3	4	5
16	To prevent health problems	0	1	2	3	4	5
17	Because I find exercise invigorating	0	1	2	3	4	5
18	To have a good body	0	1	2	3	4	5
19	To compare my abilities with other peoples'	0	1	2	3	4	5
20	Because it helps to reduce tension	0	1	2	3	4	5
21	Because I want to maintain good health	0	1	2	3	4	5
22	To increase my endurance	0	1	2	3	4	5
23	Because I find exercising satisfying in and of itself	0	1	2	3	4	5

		Not at all true for me					Very true for me
Personally, I exercise (or might exercise) ...							
24	To enjoy the social aspects of exercising	0	1	2	3	4	5
25	To help prevent an illness that runs in my family	0	1	2	3	4	5
26	Because I enjoy competing	0	1	2	3	4	5
27	To maintain flexibility	0	1	2	3	4	5
28	To give me personal challenges to face	0	1	2	3	4	5
29	To help control my weight	0	1	2	3	4	5
30	To avoid heart disease	0	1	2	3	4	5
31	To recharge my batteries	0	1	2	3	4	5
32	To improve my appearance	0	1	2	3	4	5
33	To gain recognition for my accomplishments	0	1	2	3	4	5
34	To help manage stress	0	1	2	3	4	5
35	To feel more healthy	0	1	2	3	4	5
36	To get stronger	0	1	2	3	4	5
37	For enjoyment of the experience of exercising	0	1	2	3	4	5
38	To have fun being active with other people	0	1	2	3	4	5
39	To help recover from an illness/injury	0	1	2	3	4	5

		Not at all true for me					Very true for me
Personally, I exercise (or might exercise) …							
40	Because I enjoy physical competition	0	1	2	3	4	5
41	To stay/become flexible	0	1	2	3	4	5
42	To develop personal skills	0	1	2	3	4	5
43	Because exercise helps me to burn calories	0	1	2	3	4	5
44	To look more attractive	0	1	2	3	4	5
45	To accomplish things that others are incapable of	0	1	2	3	4	5
46	To release tension	0	1	2	3	4	5
47	To develop my muscles	0	1	2	3	4	5
48	Because I feel at my best when exercising	0	1	2	3	4	5
49	To make new friends	0	1	2	3	4	5
50	Because I find physical activities fun, especially when competition is involved	0	1	2	3	4	5
51	To measure myself against personal standards	0	1	2	3	4	5

Objective Measurement of Weight, Height, Waist Circumference

Weight: _____

Height: _____

Waist Circumference: _____

A.3 Debrief Form

Debrief Form

TITLE: The relationship between Drive for Muscularity and Drive for Thinness and depression, Social Physique Anxiety (SPA), and self-esteem ratings in male Human Kinetics and Recreation students in their first through fourth years of university.

SPONSOR:
Bell Aliant Male Body Image Project

Thank you for agreeing to take part in this research project!

Summary of Study:
Recent research has shown that males struggles with body dissatisfaction, often through a drive for muscularity (DM) or a drive for thinness (DT). The purpose of the study is to gain insight into the effects of DM and DT on psychological well-being, through examination of depression, social physique anxiety and self-esteem. The purpose of this pilot was to provide information about the effectiveness of recruitment strategies, questionnaire measures and study logistics.

If you feel that you are experiencing adverse consequences from this study:
Please contact:
University Counseling Center
5th Floor University Center, UC-5000
Memorial University of Newfoundland
St. John's, NL A1C 5S7
(709)864-8874

24-hour mental health crisis line: 737-4668 (local) or 1-888-737-4668 (province-wide).

If you are interested in learning more about the topic of this research project, please contact Alyssa Gruchy (ang060@mun.ca).

Thank you again for your participation.

Alyssa Gruchy, Psy.D Student, B.Sc. (Hons)
Michele Neary, Ph.D., R. Psych., Assistant Professor, Counseling Center, Memorial University of Newfoundland (MUN)
Olga Heath, Ph.D., R. Psych., Associate Professor, Counseling Center, MUN