

MUSCLE DYSMORPHIA AND ATTACHMENT STYLES IN MEN

ALEXANDRE VARSANEUX

Bachelor of Arts (Specialization), Concordia University, 2018

A thesis submitted
in partial fulfilment of the requirements for the degree of

MASTER OF EDUCATION

in

COUNSELLING PSYCHOLOGY

Faculty of Education
University of Lethbridge
LETHBRIDGE, ALBERTA, CANADA

© Alexandre Varsaneux, 2022

MUSCLE DYSMORPHIA AND ATTACHMENT STYLES IN MEN

ALEX VARSANEUX

Date of Defense: April 21st, 2022

Dr. Kerry Bernes Thesis Supervisor	Professor	Ph.D.
Dr. Thelma Gunn Thesis Examination Committee Member	Professor	Ph.D.
Dr. Danny Balderson Thesis Examination Committee Member	Associate Professor	Ph.D.
Dr. Michael Addis External Examiner	Professor	Ph.D.
Dr. Lorraine Beaudin Chair, Thesis Examination Committee	Associate Professor	Ph.D.

ABSTRACT

The concept of masculinity is slowly being redefined. One trait of masculinity that has proven to be inextricable is muscularity. A belief that one is insufficiently muscular is an emblematic trait of muscle dysmorphia. The etiology of this disorder is currently poorly understood. This study seeks to expand on previous research on muscle dysmorphia and attachment styles by expanding the scope to a wider population and considering domains of attachment. Statistical analysis of participants of this study ($N = 265$) demonstrated that there were significant correlations for body image concerns, but not behaviors, related to muscle dysmorphia and nearly all domains of attachment styles. Additionally, romantic relationship status, age, exercise frequency and intent to enter bodybuilding competitions all influenced the number of correlations to attachment domains. In conclusion, there may be a subset of individuals who do not have muscle dysmorphic behaviors that have been overlooked in the literature.

ACKNOWLEDGEMENTS

I would like to express my gratitude to my thesis supervisor, Dr. Kerry Bernes and supervision team, Dr. Thelma Gunn, and Dr. Danny Balderson for their continued support in this project. I would also like to thank my fellow classmates at the University of Lethbridge who supported me personally and academically throughout this endeavor. Additionally, I would like to add a special thank you to Christine Bourque, for her patient and comprehensive aid in editing my work. Finally, I would like to thank my friends and family for their ever-present support and encouragement whilst working on this study.

TABLE OF CONTENTS

Abstract.....	iii
Acknowledgements.....	iv
List of Tables.....	viii
List of Abbreviations.....	ix
Chapter 1: Introduction.....	1
Chapter 2: Literature Review.....	3
2.1 Masculinity and Muscularity.....	3
2.1.1 Media Portrayal of Men’s Bodies.....	4
2.1.2. Gender Roles and Muscularity.....	5
2.2 Muscle Dysmorphia as a Subtype of Body Dysmorphic Disorder.....	7
2.2.1 Body Dysmorphic Disorder and Attachment Styles.....	8
2.2.2 Body Dissatisfaction in Men.....	9
2.3 Adult Attachment Theory.....	11
2.3.1 Adult Attachment Styles.....	12
2.3.2 Attachment Styles and Masculine Gender Roles.....	14
2.3.3 Attachment Styles and Romantic Relationships.....	15
2.4 Muscle Dysmorphia.....	16
2.4.1 Muscle Dysmorphia and Attachment Styles.....	18
Chapter 3: Methods.....	21
3.1 Participants.....	21
3.2 Instruments.....	22
3.2.1 Sociodemographic Questionnaire.....	22
3.2.2 Experiences in Close Relationships-Revised (ECR-RS).....	23

3.2.3 Muscle Dysmorphic Disorder Inventory (MDI).....	24
3.2.4 Drive for Muscularity Scale (DMS).....	25
3.3 Procedure.....	26
Chapter 4: Analysis.....	27
4.1 Data Screening.....	27
4.2 Data Cleaning.....	28
4.3 Somers' D.....	28
Chapter 5: Results.....	29
5.1 Descriptive Statistics.....	30
5.2 Research Question 1.....	34
5.3 Research Question 2.....	36
5.4 Research Question 3.....	39
Chapter 6: Discussion.....	44
6.1 Interpretation of Results.....	44
6.1.1 Research Question 1.....	45
6.1.2 Research Question 2.....	47
6.1.3 Research Question 3.....	47
6.2 Clinical Considerations.....	49
6.3 Limitations and Future Research.....	51
6.4 Conclusion.....	52
References.....	54
Appendix A: Sociodemographic Questionnaire.....	64
Appendix B: Experiences in Close Relationships- Revised.....	67

Appendix C: Muscle Dysmorphia Inventory.....	68
Appendix D: Drive for Muscularity Scale.....	70
Appendix E: Ethics.....	71
Appendix F: Consent Form.....	88
Appendix G: Debriefing Form.....	90
Appendix H: Social Media Recruitment Posts.....	91

LIST OF TABLES

Table 1: General Demographics.....	30
Table 2: Demographics on Exercise Habits.....	32
Table 3: Somers' D analysis of the ECR-RS and DMS.....	34
Table 4: Somers' D analysis of the ECR-RS and MDI.....	36
Table 5: Somers' D analysis of the ECR-RS and DMS, with Romantic Relationship Status.....	37
Table 6: Somers' D analysis of the ECR-RS and MDI, with Romantic Relationship Status.....	38
Table 7: Somers' D analysis of the ECR-RS and MDI, with Age Groups.....	40
Table 8: Somers' D analysis of the ECR-RS and MDI, with Exercise Frequency.....	42
Table 9: Somers' D analysis of the ECR-RS and MDI, with Intent to Participate in Body.....	44
Building Competitions	

LIST OF ABBREVIATIONS

BDD	Body Dysmorphic Disorder
DMS	Drive for Muscularity Scale
DSM-V	Diagnostic and Statistical Manual, 5 th Edition
ECR-R	Experiences in Relationship Questionnaire Revised
ECR-RS	Relationship Structures Questionnaire of the Experiences in Close Relationships-Revised
MB	Muscularity-Oriented Behaviors
MBI	Muscularity-Oriented Body Image
MDI	Muscle Dysmorphia Inventory
RE	Restricted Emotionality
SCP	Success, Competition and Power

CHAPTER 1: Introduction

Muscle dysmorphia has had many names over the years, however, it has only been conceived of in its current form roughly twenty years ago, in 1997. Pope et al. (1997) were the first to coin the term muscle dysmorphia and offer the definition that is still widely used today. Muscle dysmorphia is characterized by a chronic preoccupation with being dissatisfied with one's appearance in regard to one's muscularity. Muscle dysmorphia is similar to body dysmorphic disorder (BDD) in that it involves a distorted view of the body (Pope et al., 1997). However, while BDD typically focuses on one aspect of personal physical appearance, muscle dysmorphia is a distorted view of the entire body, feeling as though there is a pervasive and concerning lack of muscularity, or largeness throughout (Pope et al., 1997). Accordingly, in 2013 muscle dysmorphia was officially classified as a subtype of body dysmorphic disorder (BDD) in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V; American Psychiatric Association, 2013).

It is currently unknown how many men suffer from muscle dysmorphia as no official epidemiological studies have been conducted up to this point (Murray et al., 2010). However, it is still considered common knowledge that muscle dysmorphia is far more common in men than it is in women, although there are some cases of women suffering from muscle dysmorphia (Murray et al., 2010; Phillips et al., 2010). Given the prevalence of muscle dysmorphia in men, it is worth investigating why they often feel compelled to increase their level of muscularity, as well as the tangential consequences thereof. This article discusses two factors that can drive men towards feeling insecure about their bodies: the portrayal of men's bodies in popular media and the pressure exerted on them by the perceived need to adhere to strict masculine gender roles. Both of these factors play a role in making men feel compelled to become muscular to adhere to

what they believe is the ideal male body type. This disparity has serious mental health implications and correlates.

Research has suggested that an insecure attachment style might be among these correlates, as was found by Fabris et al. (2018) in an Italian population. An insecure attachment style refers to a lack of perceived security in close or caregiving relationships, wherein the individual avoids or is anxious about relationships (Levy et al., 2011). Body dissatisfaction and BDD both have a well-established connection to an insecure attachment style within the literature (O’Kearney, 1996; Troisi et al., 2000; Ward, et al., 2000). However, that connection has been found primarily in women, not in men (Hui & Brown, 2013). There has only been one study up to this point directly examining the link between muscle dysmorphia and attachment styles amongst men, which was completed on an Italian population, using measures specifically altered for that population (Fabris, et al., 2018). This study found that there was indeed a significant link between attachment styles and muscle dysmorphia, with both anxious and avoidant attachment styles being significantly correlated to the likelihood of muscle dysmorphia in bodybuilders. With this in mind, it is the intent of this research to determine whether the correlation between muscle dysmorphia and insecure attachment styles persists in a diverse population, using measures that are appropriate for an English speaking population. Unlike the Italian study, this research will not be limited to only those who self-identify as bodybuilders, but rather will be expanded to include adult male gym-goers who frequent the gym at least two times per week.

CHAPTER 2: Literature Review

Masculinity and Muscularity

Masculinity and muscularity are two deeply intertwined concepts for many men. Research has shown that the more muscular a man is, the more masculine he feels, and outwardly appears to be (Grogan, & Richards, 2002; McCreary et al., 2005). This paper will discuss two factors that lead men to feel as though they might need to be at a sufficient level of muscularity to be considered attractive, powerful and masculine in modern society. These two components are the perception of the male body based on popular media and rigid masculine gender roles that some men feel they must adhere to. These components are closely linked but are nevertheless distinct from one-another. Male gender roles are, to a large extent, defined by how the media portrays men to be, and that portrayal has become one of increasing muscularity (Leit et al., 1999). This is to say that as the media portrays the ideal male body type as being increasingly muscular, gender norms shift to fit that portrayal. By contrast, rigid gender roles can be defined as adherence to strict and inflexible gender roles. These gender roles are bred out of socialization process via environmental and biological factors and result in limiting or devaluing oneself or others (O'Neil, 2008). Having rigid gender roles can make men feel as though they must maintain to a certain level of muscularity for fear of being seen as weak, or inferior (O'Neil, 2008). Similarly, if a disparity is noticed between one's own appearance and how men are portrayed in the media, it may cause significant distress as it can serve to make men feel less physically attractive (Hargreaves & Tiggemann, 2009; Liet et al, 2008). The overlap between the two components lies in the increase in body dissatisfaction (Mishkind et al., 1986). However, the portrayal of men in popular media more often makes men feel less attractive, while adherence to gender roles makes men feel comparatively weak and inferior (Mishkind et al., 1986; O'Neil,

2008). In both cases, there is a drive towards becoming more muscular, either to increase their physical attractiveness, or to appear stronger and more masculine.

Media Portrayal of Men's Bodies.

Traditionally, body image has been assumed to be a primarily female concern, under the belief that beauty plays a central role in femininity (Mishkind et al., 1986). However, over the years, men have joined women in their preoccupation with their own body image (Hargreaves & Tiggemann, 2009). This has been linked to an increase in the number of advertisements geared towards men, with men often being portrayed with lean, highly muscular physiques (Hargreaves & Tiggemann, 2009; Leit, et al., 1999; Mishkind et al., 1986). Liet et al. (1999) found that the cultural norms regarding male physique have become dramatically more muscular over the years. Advertisements have reflected this trend, with products that were typically marketed to a solely female demographic, such as cosmetics, plastic surgery and dietary products, now being targeted at men as well (Davis & Vernon, 2002; Mishkind, et al., 1986).

In a study completed by Hargreaves and Tiggemann (2009), men were exposed to television commercials that depicted an ideal level of muscularity. In response to this, there was an immediate and significant drop in how the men felt about their own levels of physical attractiveness and about the size and shape of their muscles. This was particularly relevant for men who were heavily cognitively and behaviourally invested in their own physical appearance (Hargreaves & Tiggemann, 2009). Interestingly, the level of investment was only significant when male participants were comparing themselves to men they considered to be more attractive than themselves. The amount of investment was not, as it is with women, a meaningful predictor of change in body satisfaction (Hargreaves & Tiggemann, 2009). The idealized depictions of the male physique did not have an effect on how men perceived their weight or strength levels. This

suggests that the primary concern for men, as it relates to their physical appearance, is their level of muscularity, as opposed to other factors like weight or their tangible physical prowess (Hargreaves & Tiggemann, 2009; Olivardia et al., 2004).

Gender Roles and Muscularity.

The idea of having a muscular physique is deeply ingrained in modern ideals of masculinity. According to O'Neil (2008) maintaining strict male gender roles can affect men in several ways. For the purposes of this paper, striving for success, competition and power (SCP) and restricted emotionality (RE) will be discussed. While O'Neil (2008) refers to other factors of masculinity, SCP and RE are two main factors that are related to the male's perception of their own body image (McCreary et al., 2005). SCP refers to the notion that men must be successful in order to be seen as masculine (O'Neil, 2008). Success, according to typical male stereotypes, must be achieved through power, and competition. RE is defined as feeling restricted in and fearful of one's ability to express feelings, coupled with language restrictions in their expression (O'Neil, 2008). For example, a man might feel provoked and humiliated, but only be able to express those feelings verbally as anger. The restriction in language and expression can be linked to a fear of being labelled weak or unmanly. Of all aspects of adherence to strict gender roles, RE has been most associated with global psychological distress. Indeed, high levels of RE have been shown to lead to depression, paranoia and interpersonal sensitivity (Fisher & Good, 1998). Furthermore, Schwartz et al (2004) offer an interesting explanation; adherence to gender stereotypes with regard to expressing emotions may be due to men fearing being seen as overly feminine, if certain emotions are overtly expressed. RE can increase the likelihood that men will become overly focused on SCP to counteract their perceived femininity (Schwartz et al, 2004). This fear to express emotions due to their perceived consequences has been strongly correlated with

problematic attachment styles. Individuals who displayed higher levels of RE struggle with appropriate self-disclosure, intimacy and reliance on others (Bartholomew & Horowitz, 1991). Similarly, individuals who displayed higher scores on SCP were less likely to have secure attachment styles (Schwartz et al., 2004). Taken together, this implies that a continued failure to express emotions leads to insecure attachments. Thus, creating a self-perpetuating cycle, where insecure attachment and gender role conflict self-sustain and reinforce one another (Schwartz et al., 2004).

Men who internalize and adhere to strict gender norms often experience lowered self-esteem if they feel their bodies do not match the idealized body type (McCreary et al., 2005; Schwartz & Tylka, 2008). In one study conducted on male college students, it was found that roughly 70% of participants rated their own body type as not being aligned with their ideal body type (Mishkind et al., 1986). Even boys aged as young as five or six felt that their bodies were insufficiently muscular by their own standards (Mishkind et al., 1986). Other studies have found that men associated feelings of social power and confidence to their levels of muscularity, implying that a lack of muscularity leads to feeling less powerful and confident (Grogan & Richards, 2002; McCreary et al., 2005). It has also been found that men who do not display traits that are typically male, such as lacking in SCP, report having lowered body-related self-esteem as compared to men who scored highly in SCP (Schwartz & Tylka, 2008). Furthermore, having greater gender role conflict with SCP is closely linked to interest in being more muscular (McCreary, et al., 2005). Men who reported high RE have also been linked to lowered body-related self-esteem (Schwartz & Tylka, 2008). Thus, a strong connection can be drawn between feelings of being insufficiently muscular and adherence to male gender roles. The need to appear

masculine to oneself and to others can have a profoundly detrimental impact on one's own body image.

Muscle Dysmorphia as a Subtype of Body Dysmorphic Disorder

It is important to draw a connection between muscle dysmorphia and BDD, as muscle dysmorphia is a subtype of BDD in the DSM-V. Muscle dysmorphia must be understood through the lens of BDD before it can be explored on its own, due to the striking number of similarities that are present between the diagnoses. Interestingly, muscle dysmorphia is often a comorbid diagnosis when males have BDD (Philips et al., 2010). According to the DSM-V, the diagnostic criteria for BDD include a preoccupation with perceived flaws in physical appearance, not present or apparent to others, engaging in repetitive behaviours in response to concerns about physical appearance, clinically significant distress and the manifestation of symptoms that are not the result of an eating disorder (American Psychiatric Association, 2013). All of these symptoms have analogues in muscle dysmorphia.

The preoccupation with physical appearance in muscle dysmorphia comes in the form of feeling physically small or insufficiently muscular (Pope et al., 1997). This is typically not reflective of how the individual actually looks. In fact, the opposite is often true, with most men with muscle dysmorphia appearing average or above average in their musculature (Phillips et al., 2010). This idea is mirrored in women, as they are prone to dissatisfaction with their bodies, regardless of body size (Hardit & Hannum, 2012). Repetitive behaviours for muscle dysmorphia take the form of maintaining a strict diet and a rigorous and time-consuming workout routine. These behaviours are done to excess to the point of potentially causing permanent bodily damage through extreme exercising and weightlifting or through the use of anabolic steroids (Mitchell, et al., 2017; Phillips et al., 2010; Pope et al., 1997). Often, even when the individual is injured, they

will continue engaging in rigorous physical exercise despite their injury, commonly leading to more serious injuries (Pope et al., 1997; Pope et al., 2005). Clinically significant distress is also well documented in muscle dysmorphia. Pope et al, (2005) found that compared to individuals with BDD, those with muscle dysmorphia reported having significantly poorer quality of life. Additionally, they found that these men were significantly more likely to commit suicide, with roughly half of the participants who had muscle dysmorphia in one study having attempted suicide (Pope et al., 2005). Furthermore, it was found that individuals suffering from muscle dysmorphia were more likely to engage in substance abuse and abuse of anabolic steroids (Mitchell, et al., 2017; Pope et al., 2005). Having been originally referred to as ‘reverse anorexia’, muscle dysmorphia has a significant overlap with eating disorders and often occurs comorbidly (Badenes-Ribera et al., 2019; Mitchell et al., 2007; Pope et al., 1997; Rhea et al., 2004). However, in contrast to eating disorders, diet is a secondary concern for those with muscle dysmorphia, as it is repetitive behaviors such as exercise and checking that act as a primary concern (American Psychiatric Association, 2013; Pope et al., 1997). Therefore, there is a strong rationale for classifying muscle dysmorphia as a subtype of BDD. Although there are a large number of similarities between the two disorders, there is still enough to distinguish muscle dysmorphia as its own separate disorder.

Body Dysmorphic Disorder and Attachment Styles.

Though many parallels exist between BDD and muscle dysmorphia, there are yet still more comparisons to be drawn. It has been found on several occasions that body dissatisfaction is closely linked to insecure attachment styles. While body dissatisfaction does not encompass all of the elements of BDD, it is a necessary and central component of the disorder (Rosen & Reiter, 1996). There is a large amount of research demonstrating a significant correlation between a high

level of body dissatisfaction and an insecure attachment style in women of all ages (O’Kearney, 1996; Troisi et al., 2000; Ward, et al., 2000). Mckinley and Randa (2005) found that anxious attachment, but not avoidant attachment, was a strong predictor of body dissatisfaction in women. Hardit and Hannum (2012) found similar results, linking only anxious attachment to body image concerns in women. These results were extended, in the finding that media’s portrayal of idealized female bodies, but not parental criticism, played an important role in body dissatisfaction for women. Interestingly, Troisi et al. (2000) suggested that it is highly probable that insecure attachment styles cause body dissatisfaction in both genders, as consistent attachment styles develop much earlier in life than body dissatisfaction does. However, due to the limited nature of the study, no causal connection could be drawn.

Body Dissatisfaction in Men.

Despite there being a large body of research linking insecure attachment styles and body dissatisfaction in women, there is virtually no research investigating whether this association holds true for men as well. This is potentially due to the fact that women report being more invested in their appearance as compared to men (Cash et al., 2004). However, it was found that nearly all (95%) college aged men in one study were dissatisfied with at least one aspect of their bodies (Mishkind et al., 1986). Even boys at the age of 5 or 6 frequently report being dissatisfied with their bodies, stating that their body types are different from what they would prefer. This becomes highly problematic for men when they begin to believe that others with their ideal body type can reap benefits that they do not have access to (Mishkind et al., 1986). A belief that, in fact, has been proven to be well founded. Men with an ideal body type were more likely to be described with positive attributes such as polite, happy, smart, brave. By contrast, men with unideal body types were ascribed to be lazy, quiet, lonely, stupid and sad (Mishkind et al, 1986).

The disproportionate amount of research on body dissatisfaction in men versus women may have several causes. In one study, where men and women were assessed for body dissatisfaction, it was found that there was a strong negative association between anxious attachment styles and body satisfaction in women, although no such connection was found for men (Hui & Brown, 2013). One possible explanation for this lack of correlation in men is that, compared to women, men are much less likely to verbalize their feelings regarding their bodies (Hui & Brown, 2013; O'Neil, 2008). As such, it is possible that common methods for measuring body satisfaction may be insensitive to men. Furthermore, these methods may be entirely insufficient for male studies due to the fact that many measures of body dissatisfaction have focused on the desire to lose weight (Cafri et al., 2002; Segura-Garcia, 2010). Instances of men wanting to lose weight are not uncommon. However, contrary to the drive for thinness common amongst women, men are typically looking to gain weight (Cafri, et al., 2002; Hargreaves & Tiggemann, 2009; Olivardia, et al., 2004). In nearly all cases, men looking to gain weight were also looking to increase their level of muscularity (Cafri, et al., 2002; Olivardia, et al., 2004). The desire to lose weight goes against the central tenet of muscle dysmorphia, where the primary goal for individuals with the disorder is to gain muscle mass (Pope et al., 1997). Muscle dissatisfaction in men can cause impairments in psychological functioning, such as depressive symptoms, lowered self-esteem and less overall satisfaction with their lives (Cafri, et al., 2002). Similar results were found in another study, wherein poor conceptualizations of men's own body image led to low levels of self-esteem and high levels of depression (McCreary & Sasse, 2000). To counteract this, men often resort to dieting and engaging in weightlifting in order to improve their self-concept (McCreary & Sasse, 2000). As previously mentioned, increasing muscularity is rarely an effective solution to ameliorating one's self-concept.

Adult Attachment Theory

Attachment styles were originally conceptualized by John Bowlby (1969) and Mary Ainsworth (1978). One's attachment style refers to how one relates in intimate, care giving and care receiving relationships (Levy et al., 2011). They are determined by how confident an individual is that their romantic partner, parents, or friends will be available to them for support, protection and comfort when in distress (Levy et al., 2011). Expanding on the work of Bowlby (1969), Ainsworth (1978) created three categories of attachment styles, which are secure, avoidant, and anxious. The three types of attachment styles can be classified into two groups: secure attachment and insecure attachment (comprised of both avoidant and anxious attachment styles). Both Bowlby and Ainsworth conducted their research primarily on infants, with little attention given to how attachment styles evolve over the course of one's lifetime. In the 1980s their work was adapted to adult behaviour and personality by Hazan and Shaver (1987). Attachment styles in infants and adults differ in several important ways. Adult attachment is typically bi-directional, wherein both partners may at times require or be able to offer security and care, or both. Adult attachment also involves sexual attraction (Hazan & Shaver, 1987). Infant attachment obviously does not have a sexual component, nor are infants able to offer emotional support. Furthermore, infants are typically constrained to a single attachment style, as they typically only have one or two individuals that they become deeply attached to. Adults, by contrast, can revise mental models of attachment through different experiences and relationships (Hazan & Shaver, 1987). For the purposes of this research, adult attachment styles will always refer to the adapted conceptualization by Hazan and Shaver (1987; 1990). More specifically, adult attachments as they relate to a variety of different relationship styles- romantic, paternal, maternal and friendly- as well as their consequences will be addressed.

To a large extent, Hazan and Shaver (1987) found that attachment styles present in infants continued throughout life into adulthood. Despite the differences between infant and adult relationships, the core of Bowlby's original theory remained consistent. Thus, the categories of attachment styles laid out by Ainsworth (1978) of secure, anxious and avoidant can be applied to adults.

Adult Attachment Styles.

The one attachment style that remains consistent among infant and adult attachment styles, as well as across different conceptualizations of attachment styles, is that of secure attachment (Levy et al., 2011). Having a healthy amount of confidence in one's support network is referred to as having a secure base (Ainsworth, 1978). A secure base is a necessary component of a secure attachment style. It offers space for the individual to freely explore the world, relationships and their own internal experiences, without having to worry about whether or not they will receive support should the need arise (Ainsworth, 1978). In adults, a secure attachment style leads to self-confidence, the ability to trust others and a belief in enduring love (Hazan & Shaver, 1987). A secure attachment style for adults also leads to greater work-related success and satisfaction, as well as less work-related fears, and healthy work-related habits (Hazan & Shaver, 1990).

Anxious attachment style can be seen in infants whose mothers respond inconsistently to their child's signals, at times being supportive, sometimes acting unavailable and other times displaying overprotective or intrusive behaviours (Ainsworth, 1978). As a result, these infants typically become highly concerned with their mother's availability and less willing to explore the external world. In adulthood, those with an anxious attachment style commonly have less ability to problem solve effectively in relationships, and are more easily overwhelmed (Pascuzzo et al.,

2013). In romantic relationships for adults, an anxious attachment style presents as an excessive and preoccupying eagerness to find a partner, coupled with a persistent fear of partner abandonment (Hazan & Shaver, 1987; Pascuzzo et al., 2013). Anxiously attached individuals also causes adults to be more fearful of rejection for poor performance and unable to properly balance their personal romantic lives with their work (Hazan & Shaver, 1990). Additionally, in a work setting, those with an anxious attachment style also were largely motivated by a drive to gain respect and admiration from others (Hazan & Shaver, 1990). It is also expected that those with a high level of attachment anxiety will attempt to stave off rejection by increasing their physical attractiveness (Davis & Vernon, 2002).

Finally, avoidant attachment styles occurs when mothers deny their children's attempts at closeness, especially in regard to close physical contact (Ainsworth, 1978). This results in children who are less likely to seek out physical affection, even at times when it would be appropriate and expected. Instead, these children sought comfort from their toys as opposed to looking to their mothers for affection, eventually avoiding affection altogether. For adult romantic relationships, an avoidant attachment style causes the individual to fear closeness and have a deep lack of trust of others (Hazan & Shaver, 1987). Individuals with this attachment style also reported feelings of being distant from others, but not lonely, possibly due to defensive avoidance. This is evidenced with another study that found that adults with an avoidant attachment style struggled with their mental health due to a failure to create an effective support network (Kafetsios & Sideridis, 2006). Additionally, individuals who have an avoidant attachment style are reluctant to stop working and regularly avoid finishing projects or working with others in an attempt to avoid change (Hazan & Shaver, 1990). They also frequently use

work as an excuse to avoid socializing, and feel anxious when not working, typically at the cost of their personal lives and health.

Attachment Styles and Masculine Gender Roles.

With the attachment styles for adults now clearly defined, it is important to discuss how they relate to rigid masculine gender roles. In a meta-analysis looking at male gender roles through 25 years of research, it was found that attachment styles were repeatedly and significantly correlated to rigid male gender roles (O'Neil, 2008). To expand on this, a study done by Schwartz, Waldo and Higgins, (2004) found that a secure attachment style was associated with a lower need to adhere to the SCP components of rigid masculinity. Similarly, several studies have shown that secure attachment is linked to lowered RE (Blazina & Watkins, 2000; Fisher & Good, 1998; Schwartz et al., 2004). In an earlier study conducted by Fischer and Good (1998), it was found that a secure attachment style raised the need for SCP, findings which contradict those of Schwartz et al. (2004). In response, they offered the explanation that this discrepancy is due to the different measurement tools used and SCP being healthy and appropriate for the participants of their study, who were first year college students. Thus, while SCP was increased for those with a secure attachment style in the study conducted by Fischer and Good (1998), that increase is not necessarily related to male gender roles, given the context. The same study found that having a secure attachment to one's parents was significantly related to a reduced amount of stress associated with one's masculinity (Fischer and Good, 1998). Having a secure attachment lead to men feeling less concerned about being intellectually inadequate, having females as superiors and, most importantly for the purposes of this paper, less concern with being physically inadequate as a function of masculinity. Blazina and Watkins (2000) found that men who had insecure attachment styles also experienced

significantly more relationship issues and were more likely to be uncomfortable with displaying any degree of femininity. Similarly, DeFranc and Mahalik (2002) found that men who had an insecure attachment to their parents felt a greater degree of gender role stress.

Attachment Styles and Romantic Relationships.

Another important aspect of adult attachment is how individuals connect within romantic relationships. When males are insecurely attached to the significant figures in their lives, a greater degree of masculine gender role conflict often occurs. This conflict continues into romantic relationships as males who have rigid beliefs about masculinity tend to experience poorer quality romantic relationships (Feeney & Noller, 1992; Simpson, 1990). When their rigid beliefs are challenged, such as when their partner is more financially successful, men expressed feeling less trust, empathy, affection and comfort in their romantic relationships (Coughlin & Wade, 2012). Furthermore, as one might expect, those who have insecure attachment styles also struggle with romantically. Individuals of all genders who have insecure attachment styles experience fewer positive emotions and a greater frequency of negative emotions while in romantic relationships (Feeney & Noller, 1992; Simpson, 1990). Additionally, those who are insecurely attached to their partner often have more difficulty in maintaining and establishing romantic relationships due to a lack of trust, commitment, and satisfaction towards their partners (Simpson, 1990). Furthermore, men with an insecure attachment and muscle dysmorphia were also found to display high levels of emotional dependence and emotional instability towards their partners when romantically involved. (Olave et al., 2021). This finding was furthered in the idea that those with muscle dysmorphia often have attachment styles that significantly impair their decision making in romantic relationships. This manifests through a lack of commitment and difficulty with appropriate emotional expression (Olave et al., 2021). Therefore, it seems that

those who have strong beliefs about masculine gender roles, insecure attachment styles and muscle dysmorphia all struggle to find and maintain positive romantic relationships. When taken together, it appears likely that individuals who have these factors may struggle greatly in romantic relationships and may be less likely to actively be in positive romantic relationships as a result.

Muscle Dysmorphia

Muscle Dysmorphia, as previously defined, is a preoccupation that one is insufficiently muscular (Pope et al, 1997). Males are disproportionately affected by muscle dysmorphia, as compared to females. Some have suggested that muscle dysmorphia appears almost exclusively in males, with female cases of the disorder being highly uncommon (Phillips, 2010). Pope et al (1997), who were the first to label the disorder as ‘muscle dysmorphia’, outlined several traits commonly present traits in the disorder.

Firstly, it is important to distinguish those with an enthusiasm for resistance training from those with muscle dysmorphia. It is not uncommon for those who engage in bodybuilding and other physical activities to overlook other opportunities in the pursuit of their sport (Pope et al., 1997). What differentiates muscle dysmorphia is the associated profound body dissatisfaction, negative symptoms, impaired social and occupational functioning, among other traits that will be discussed. Normal interest in sports is not associated with a significant degree of body dissatisfaction, as is common in muscle dysmorphia (Pope et al., 1997).

Bodybuilding, especially competitive bodybuilding, has repeatedly been established as the most common form of exercise to be associated with those who have muscle dysmorphia (Fabris et al., 2019; Mitchell et al., 2017; Pope et al., 1997; Selvi & Bozo, 2019). For the purpose of this study, bodybuilding is characterized as any resistance training activity where the main

goal is to increase muscle mass (Denham, 2008). However, not all resistance training is classified as bodybuilding, and therefore one must identify as a bodybuilder to be considered as such (Mitchell et al., 2017). In comparison to other forms of training, those who engage in bodybuilding are significantly more likely to abuse anabolic steroids (Denham, 2008; Mitchell et al., 2017) and have a higher body mass index, while maintaining leaner bodies (Mitchell et al., 2017). Furthermore, bodybuilders when contrasted with other forms of training, also scored the highest on measures of muscle dysmorphia and body dissatisfaction, indicating that they consistently have more impactful symptomology resulting from the disorder (Mitchell, et al., 2017; Pope et al., 1997).

Muscle dysmorphia involves individuals being ashamed of their bodies to the point of significant impairment. This can manifest as a reluctance to show their bodies in a public setting, resorting to wearing baggy clothing and avoiding situations that would require them to disrobe (Pope et al., 1997). During instances where revealing their bodies is unavoidable, individuals with muscle dysmorphia might experience a considerable psychological distress. Pope et al (1997) go further, suggesting that this embarrassment can permeate into romantic settings as well, with sufferers being unwilling to enter into intimate experiences that require them to expose themselves.

Individuals who suffer from muscle dysmorphia also engage in what some authors suggest are compulsive behaviours (Murray et al., 2010; Phillips et al., 2010; Pope et al., 2005). As a result, both muscle dysmorphia and BDD fall within the broader category of obsessive-compulsive disorders in the DSM-V. In muscle dysmorphia, these compulsions take the form of excessive exercising, as well as scheduled and meticulous dieting (Pope et al., 1997). In some cases, the compulsions come at the cost of other aspects of the individual's life, such as romantic

relationships and occupational opportunities. Deviating from their patterns for even a single day can cause significant distress for the individual. When this occurs, Pope et al (1997) suggests compensatory actions are taken to reduce anxiety, such as adding a supplementary workout session to their schedule. For some, these compulsions can also take the form of frequent self-evaluation in the mirror, bodyweight verification and reassurance seeking behaviours. (Pope et al., 1997).

Muscle dysmorphia has also been strongly linked to anabolic steroid use (Fabris et al., 2018; Mitchell, et al., 2017; Pope et al., 1997; Pope et al., 2005). Due to its commonality, some have suggested that the use of anabolic steroids be included in the diagnostic criteria for muscle dysmorphia. However, it is currently unclear whether the use of anabolic steroids is a cause, or an effect, of muscle dysmorphia (Mitchell, et al., 2017). One meta-analysis found that despite the resulting increase in muscle mass, the use of anabolic steroids does not appear to have any effect in reducing the symptoms of muscle dysmorphia (Mitchell, et al., 2017). Discontinuing the use of anabolic steroids also had no effect in triggering a relapse into muscle dysmorphia. Therefore, it can be assumed that the performance enhancing drug is not necessarily an effective coping mechanism.

Individuals with muscle dysmorphia are at risk of serious repercussions on their mental health. Studies have shown that those with severe muscle dysmorphia symptoms frequently report having comorbid conditions of anxiety, depression, and neuroticism (Mitchell et al., 2017). They also commonly had perfectionist tendencies and lowered self-esteem. Finally, there have also been several studies linking muscle dysmorphia with eating disorders (Mitchell et al., 2017; Olivardia et al., 2004; Selvi & Bozo, 2019).

Muscle Dysmorphia and Attachment Styles.

Currently, there is only one study linking muscle dysmorphia directly to attachment styles. This study was done by Fabris et al, (2018), on an Italian population composed exclusively of male bodybuilders. Fabris et al (2018) found that the risk of developing muscle dysmorphia was significantly associated with an insecure attachment style in an Italian population. Therefore, those who were at higher risk of developing muscle dysmorphia were associated with insecure attachment, as compared to those with a low chance of developing muscle dysmorphia. This association was especially pronounced in those who had an avoidant attachment style (Fabris et al., 2018). Individuals at high risk of developing muscle dysmorphia, as compared to normative data on the Italian population, were more likely to report a discomfort with intimacy and devaluing intimate relationships with others. Discomfort with intimacy can be ascribed to those who distance themselves from romantic relationships and avoid social situations in an attempt at self-preservation (Hazan and Shaver, 1994). Similarly, devaluing intimate relationships with others is marked by an internal overreliance. These individuals deny the importance of external relationships, in an attempt to protect themselves from feeling vulnerable. Both of these characteristics are central to the avoidant attachment style (Fabris et al., 2018). The authors suggest that building a muscular body may be an attempt to shield themselves from feelings of inadequacy, rejection and vulnerability, which are fundamental to avoidant attachment (Fabris et al., 2018). For these individuals, muscles act as symbols of masculinity, whereby the individuals can feel more secure in themselves (Fabris et al., 2018; McCreary & Sasse, 2000; Mishkind et al., 1986). By contrast, those who were more confident in their attachment styles, embodying secure attachment, were at much less risk of developing muscle dysmorphia.

Media-influenced male body image as well as men's conceptualizations of masculinity have been directly and indirectly linked to a drive to increase muscularity many times in the literature. The similarities between muscle dysmorphia, BDD and body dissatisfaction might be what bridge the gap between muscle dysmorphia and attachment styles. Furthermore, insecure attachment styles have also been heavily associated with rigid masculine gender roles and the image that men have of their own bodies particularly with regard to their level of muscularity. Therefore, this paper posits several hypotheses based on the notion that a relationship exists between muscle dysmorphia and insecure attachment styles. The first hypothesis is that a significant correlation will exist between muscle dysmorphia and each of the domains of insecure attachment styles in a diverse population. The second hypothesis is that this relationship will occur across a greater number of domains for those not involved in romantic relationships. The third and final hypothesis is that other correlates for muscle dysmorphia will also increase the number of relationship domains that correlate to insecure attachment styles. More specifically, a correlation will exist for individuals in specific age groups, as well as those who exercise more frequently and have intentions to enter into bodybuilding competitions. This study will expand on previous research completed by Fabris et al (2018) by using a diverse population by recruiting participants from different parts of the world. It also expands the scope from only men who self-categorize as bodybuilders to include all male gym-goers.

Currently, research on how to help individuals diagnosed with muscle dysmorphia is extremely scarce (Tod et al., 2016), with the etiology of muscle dysmorphia currently being poorly understood (Grieve et al., 2009). One reason for this is that many of the associated behaviours such as exercise and dieting are seen as positive practices and the disorder often goes ignored by health care professionals (Tod et al., 2016). It has also been found that those with

insecure attachment styles are likely to have relational issues with their therapist as well. This makes these men more likely to terminate treatment early, or not seek mental health support at all (Blazina & Watkins, 2000). In order to address these issues, psychologists can begin noting excessive healthy behaviours as possible signs of pathology and giving power dynamics in therapeutic relationships appropriate attention. It is the hope of this research that by highlighting and gaining a deeper understanding of the associated conditions to muscle dysmorphia, more attention will be drawn to this disorder and the extremely harmful effects it can have. Ultimately, this study aims to produce results that will serve to inform, and direct future therapeutic treatments of muscles dysmorphia.

CHAPTER 3: Methods

Participants

Participants were recruited simultaneously via several methods. Several posts were made to online forums such as Reddit, and online communities that focus exclusively on bodybuilding and muscle growth. Additionally, Facebook and Twitter were used to reach prospective participants. Finally, participants were recruited via several Discord channels that focused on muscle growth and bodybuilding. Posts were made to each form and social media outlet, explaining the details of the study, as well as its ethical considerations (see Appendix G). All methods of recruitment specified that this study is solely looking for men aged 18 or older, who consistently go to the gym at least twice per week. Defining gym goers as those who frequent the gym at least twice a week is in line with the inclusion requirements for bodybuilders laid out by Selvi and Bozo (2019).

All methods of recruitment directed participants to an anonymous online survey in which they were prompted to complete four different measures on a single questionnaire. Each method

of recruitment also emphasized that by participating in this study, they would be eligible for a modest financial compensation of an Amazon gift card valued at 100\$ Canadian, regardless of whether they qualify for the study or not. At no point were the participants required to provide their name. Email addresses were requested in order to participate in the chance to win the financial compensation, however this was optional and not be a requirement for proceeding with the study.

All participants had to meet the following inclusion criteria: Participants must (a) identify as a male; (b) be ages 18 or older; and (c) exercise with weights at the gym at least twice a week consistently; (d) have spoken English for a minimum period of one year.

Participants must identify as male, as muscle dysmorphia predominantly affects males, and this study is specifically looking at male attachment styles as it relates to muscle dysmorphia. Therefore, individuals who identify as other genders are outside the purview of this study. Participants must be at or above the age of 18, as this study is only concerned in looking at an adult population. Finally, participants must exercise regularly at the gym as this is an essential component of muscle dysmorphia, and those who do not engage in regular exercise would likely not meet the diagnostic criteria for muscle dysmorphia. Other studies on muscle dysmorphia have had similar requirements for frequency of gym use (Fabris et al., 2018; Selvi & Bozo, 2019).

Instruments

An online anonymous questionnaire was used to examine the relationship between muscle dysmorphia and attachment styles. Items for each instrument can be observed in the appendices.

Sociodemographic Questionnaire. The sociodemographic questionnaire (see Appendix A) asked participants to provide several pieces of information, including their age and gender. Age was important because the study was looking for adults, and anyone who does not meet that criterion was excluded from the study. Also, as the study was looking exclusively for individuals who identify as male, asking about one's gender was important as an exclusionary criterion. Participants were then asked where they are currently living, as this information could have distinguished them from others based on geographic locations. The sociodemographic questionnaire then asked if the participant was currently in a romantic relationship, as it pertains heavily to attachment style, and may provide interesting information. The questionnaire also asked about frequency of gym use, in order to better understand healthy or unhealthy gym habits. Similarly, how long the participants had been going to the gym was measured, as an indication of how long certain participants could have been struggling with muscle dysmorphia. Next, primary motivation to go to the gym was asked to ascertain whether the participant is trying to improve physical appearance, which is an important part of muscle dysmorphia, or going to the gym for other reasons, such as to become healthier, or to lose weight. The secondary motivation for going to the gym was also asked, in case the participant is trying to improve their physical appearance as a secondary concern to another issue. Finally, the last question on the sociodemographic questionnaire asked what the participant's primary form of physical activity was. The intent of this question was to ascertain whether the trend in the literature of muscle dysmorphia being primarily present in self-identified bodybuilders remains consistent.

Relationship Structures Questionnaire of the Experiences in Close Relationships-Revised. Relationship Structures Questionnaire of the Experiences in Close Relationships-Revised (ECR-RS) was developed by Fraley, Heffernan, Vicary & Brumbaugh (2011), and is a

measure to assess the attachment styles of individuals (See Appendix B). The measure attempts to determine whether the individual has anxious, avoidant or secure attachment styles. The ECR-RS is based off of a modified version of the Experiences in Relationship Questionnaire Revised (ECR-R) developed 11 years earlier by Fraley, Waller, & Brennan, (2000), which itself is based off of the Experiences in Relationships Questionnaire developed by Brennen, Clark and Shaver (1998). The ECR-RS was created to address four concerns present in the ECR-R (Fraley et al., 2011). These issues were ambiguity in the type of relationship being assessed, inability to make meaningful comparisons across relationship types (romantic and non-romantic), the length of the questionnaire and the insensitivity of the instrument to measure within-person variability. To address these issues, the questionnaire was split into four relationship domains with nine items per domain, for a total of 36 items. These domains are mother, father, romantic partner, and best friend. The authors noted that the scale is similar in reliability as compared to longer, more detailed measures, with the lowest alpha score for each of the questions, across all four domains being 0.85 (Fraley et al., 2011). As is similar to other measures, there is a moderate correlation between the questions. For example, if an individual has an avoidant attachment style to their mother, they are likely to have some degree of an avoidant attachment style with a romantic partner. Another study verified the scores found by Fraley et al (2011) and found that the anxiety and avoidance measures had strong internal reliability with alpha scores of >0.86 and >0.81 respectively (Donbaek, & Elklit, 2014). Donbaek and Elklit (2004) also found that the ECR-RS had good convergent and divergent validity. Beyond the reasons previously discussed, the ECR-RS was specifically chosen due to how commonly the ECR-R was used in the literature, its usefulness on global populations and its built-in flexibility (Fraley et al., 2011).

Muscle Dystormphia Inventory. The Muscle Dystormphia Inventory (MDI), created by Rhea, Lantz and Cornelius (2004), is a widely used scale that measures characteristics associated with muscle dystormphia to determine the likelihood of a diagnosis (See Appendix C). In one meta-analysis on muscle dystormphia looking at over 30 different studies, it was the most commonly used scale for muscle dystormphia (Mitchell, et al., 2017). The MDI is comprised of 27 items, that are rated on a 6-point Likert scale ranging from never to always, where a score of 6 is likely symptomatic and a score of 1 is likely asymptomatic (Rhea et al., 2004). There are six subscales within the MDI which are size/symmetry, physique protection, exercise dependence, supplement use, dietary behaviour and pharmacological use. Some examples of questions that appear on the MDI include ‘I wear bulky clothing to hide my muscular physique from others’ (Physique protection), ‘It bothers me to miss a scheduled workout’ (Exercise dependence) and ‘I am concerned with losing muscle mass’ (Size/Symmetry) (Rhea et al., 2004). Reliability for each subscale was measured and Cronbach’s alpha scores varied between 0.72 and 0.94, with exercise dependence being the least reliable at 0.72, and dietary behaviour, physique protection and supplement use all being tied for the most reliable at 0.94. One study echoed these findings, with physique protection having the highest reliability at 0.82, and exercise dependence scoring the lowest at 0.57 (Baghurst & Lirgg, 2009). Convergent validity was checked against three different scales, each of which was found to be significantly positively correlated to the MDI (Rhea et al., 2004). Due to the exercise dependence subscale consistently scoring the lowest, it is prudent to supplement the MDI with another measure that directly gauges behaviours and attitudes towards exercise and muscularity, the Drive for Muscularity Scale (DMS).

Drive for Muscularity Scale. The Drive for Muscularity Scale (DMS) was created by McCreary and Sasse (2000) to measure attitudes and behaviours reflecting one’s desire to

increase their level of muscularity (See Appendix D). The DMS was specifically chosen for several reasons, primary among which is its predominant use in the literature, and it is the only drive for muscularity scale that takes behaviours into account (Tod et al., 2012). It also has been the most heavily validated, showing high reliability and test-retest scores, as compared to other measures of drive for muscularity (Tod et al., 2012). The DMS is comprised of a 15-item scale in which participants are asked to rate how much they related to each statement presented on a six-point Likert scale ranging from never (1) to always (6). The DMS is subdivided into two subscales, Muscularity-Oriented Body Image (MBI), which contains seven items and Muscularity-Oriented Behaviors (MB), which contains eight items. A high score on either subscale is indicative of a stronger drive to become more muscular. The test overall has a high reliability score with an alpha of 0.84 (McCreary and Sasse, 2000). The individual subscales had similar levels of reliability with the alpha score for the MBI being between 0.81 and 0.91 the MB alpha score being between 0.82 and 0.89 (Litt, & Dodge, 2008; Tod, Morrison & Edwards, 2012). The DMS was also tested for divergent validity as compared to the drive for thinness, to ensure it was not simply an opposite measure. It was found that while there was a small amount of correlation with some drive for thinness measures, none of them were significant, and thus it was deemed that the measure is sufficiently independent of the others (McCreary and Sasse, 2000). Convergent validity showed a higher DMS score was associated with more frequent weight training, higher levels of depression, lowered self-esteem as well as an increased desire to gain weight in the form of muscle (McCreary and Sasse, 2000). Finally, test-retest reliability was found to be acceptable across several studies, with an average of $r > 0.7$ on the MBI, MB and total scores (Litt & Dodge, 2008; Tod, et al., 2012).

Procedures

The questionnaire was created on the online survey hosting service, Qualtrics. Each participant completed the survey entirely online which took in approximately 15 minutes. Participants were able to complete the survey anywhere that they had access to a device that connects to the internet. Participants completed the questionnaire in the following order: Consent form, sociodemographic questionnaire, ECR-RS, MDI and DMS. If, after completing the sociodemographic questionnaire, the participant did not meet the inclusion criteria, the participant was redirected to the end of the study and thanked for their time. Under the circumstance that the individual did meet the inclusion criteria, they proceeded with the questionnaire as expected. Whether the participant completed the study or not, as soon as the consent form was submitted, they gained a single entry to win the modest cash prize, as per the involved ethics board. This entry was gained by clicking on a link to a separate questionnaire, which was also hosted by Qualtrics, wherein participants were given the option to submit their email addresses. A separate questionnaire was used to maintain appropriate anonymity as it would be difficult to link participants responses in the main questionnaire to their email addresses. After the desired number of participants had responded, the questionnaire was disabled, and the data was exported from Qualtrics to IBM SPSS Statistics (Version 27) (SPSS) for statistical analysis.

CHAPTER 4: Analysis

Data Screening

Data was downloaded into from Qualtrics to SPSS and Microsoft Excel. The data was checked in Excel to ensure no errors were present. To ensure all data was downloaded correctly, data was compared between SPSS, Excel and Qualtrics versions for discrepancies. Analysis of the data was conducted using SPSS.

Data Cleaning

Prior to data analysis, a total of 130 participants were excluded from the study. Participants were excluded if they did not meet the entry requirements for the study listed above, as well as if they completed the entire study in under 2 minutes or if they did not complete a minimum of 85% of the survey.

Somers' D

To analyze the data, non-parametric, ordinal tests have been used as the results were based off Likert scales for each of the measures taken. Specifically, the test of Somers' Delta (Somers' D) was chosen, as it is a measure of prediction and association that provides insight into how well two measures are in agreement (Metsämuuronen, 2020; Somers, 1962). Put another way, Somers' D is a measure of agreement that demonstrates how concordant, or moving in a similar direction, two variables are. Somers' D also has two assumptions which must be met by the data set (Somers, 1962). These assumptions are a need to be a single independent and dependent variable, both of which are ordinal, and that the data must be monotonic. The data set used for the purposes of this study met both of these conditions. Additionally, Somers' D is a more conservative test, as compared to similar statistical measures such as Goodman and Kruskal's gamma and Kendall's Tau (Agresti, 2010; Metsämuuronen 2020; Newson, 2002). Scores on attachment styles, as provided by the ECR-RS were used as the independent variable, while scores that shed light on muscle dysmorphia indicators from both the MDI and DMS were used as the dependent variables. As such, a strong positive relationship would predict that those with, for example, highly anxious attachment styles to their mothers would also have significant indications of muscle dysmorphia, based on the criteria set out by the MDI or DMS. This would

support the primary hypothesis of this paper, which is that those with insecure attachment styles also have strong indicators of muscle dysmorphia.

Chapter 5: Results

The primary purpose of this study was to identify a correlation between muscle dysmorphia symptomology and insecure attachment styles. The findings are described and used to address the research questions using the non-parametric test of Somers' D. Non-parametric tests were also used to analyze the descriptive variables, categorical frequency analysis. The following research questions were tested:

- 1) Will the established correlation between muscle dysmorphia and insecure attachment styles persist across all domains of attachment styles in a diverse population?
 - a. Hypothesis: There will be a significant correlation between muscle dysmorphia symptoms and all domains of insecure attachment styles in the diverse population.
- 2) Will those who were not in a romantic relationship be insecure in more relationship domains than those who were?
 - a. Hypothesis: The correlation between muscle dysmorphia symptoms and insecure attachment styles will occur across more relationship domains amongst those who were not actively in a romantic relationship.
- 3) Other areas that are common risk factors amongst those diagnosed with muscle dysmorphia will also be associated more insecure attachment domains.
 - a. Hypothesis: The correlation between muscle dysmorphia symptoms and insecure attachment styles will occur across more domains for younger age

groups, greater exercise frequency, and interest in bodybuilding competitions in accordance with the literature.

Descriptive Statistics

The responses of 265 participants met the requirements for this study and were analyzed. All participants identified as male, with ages ranging from 18 to 72 years old. The majority of participants were quite young ($M = 23.56$), with half being between the ages of 18 and 20 ($n = 125, 47.17\%$), and a quarter being between the ages of 21 and 25 ($n = 66, 24.91\%$). The remaining quarter of the participants were between the ages of 26 and 30 ($n = 38, 14.34\%$) and over 31 ($n = 36, 13.58\%$). Roughly three fourths of the participants resided in North America (46.04%), and Europe (33.96%), with the remaining participants residing in Asia (10.94%), South America (4.53%), Australia (3.77%) and Africa (0.75%). The majority of participants reported not being currently involved in a romantic relationship ($n = 159, 60\%$), with nearly all romantic relationships being established for a period exceeding one month ($n = 103, 97.17\%$).

Table 1.
General Demographics

		Participants ($N= 265$)	
		<i>N</i>	%
Gender			
	Male	265	100.00%
	Female	0	0.00%
	Non-Binary	0	0.00%
Age			
	Under 20	125	47.20%
	21 to 25	66	24.90%
	26 to 30	38	14.30%
	31+	36	13.60%
Residing Continent			
	North America	122	46.00%
	South America	12	4.50%
	Europe	90	34.00%
	Africa	2	0.08%

	Asia	29	10.90%
	Australia	10	3.80%
Ethnicity ¹			
	Caucasian Heritage	187	65.16%
	Black or African Heritage	11	3.83%
	Hispanic or Latin Heritage	27	9.41%
	Asian Heritage	41	14.29%
	Indigenous Heritage	3	1.05%
	Pacific Islander Heritage	0	0.00%
	Middle Eastern	9	3.14%
	Other	9	3.14%
Currently in a romantic relationship			
	Yes	106	40.00%
	No	159	60.00%
Romantic relationship longer than a month			
	Yes	103	97.17%
	No	3	2.83%

¹ Participants were given the option to respond more than once

Most participants had been exercising with weights regularly for over a year with 28 (10.57%) having exercised for under six months and 57 (21.51%) having exercised for six months to a year. Additionally, nearly all participants exercised in excess of three times per week ($n = 241$, 90.95%), with just under half exercising with weights nearly every day ($n = 119$, 44.91%). Despite this, few participants had entered into bodybuilding competitions ($n = 16$, 6.04%), however many more had intentions of doing so ($n = 71$, 26.79%). When prompted about their primary reason for exercising, most participants reported that improving their physical appearance ($n = 159$, 60%) was most important to them. Other participants reported that increasing strength ($n = 39$, 14.72%), improving health ($n = 27$, 10.19%), sport-related activities ($n = 17$, 6.42%) and losing weight ($n = 11$, 4.15%) were also important. Amongst those who indicated that improving physical appearance was not a primary motivation, roughly a quarter ($n = 71$, 26.8%) indicated that it was a secondary motivation. Taken together, nearly all ($n = 230$,

86.79%) participants saw improving their physical appearance as important motivation for exercising.

As was expected when at the gym, most participants either engaged in weightlifting ($n = 121, 45.7\%$) or bodybuilding (91, 34.3%) as their primary fitness activity. Interestingly, few participants ($n = 45, 17\%$) felt like exercising had a negative impact on their careers or jobs. When the impact was present, it was rarely meaningful with a very small percentage of participants indicating that the negative impact was moderate ($n = 4, 1.51\%$) or large ($n = 2, 0.75\%$), such as missing a day of work or being fired, respectively. Missing out on social functions was a more common occurrence, with 164 (61.9%) reporting that they had issues attending social functions due to exercising. Amongst those who reported this issue a small percentage said this occurred several times per week ($n = 26, 9.8\%$), while others reported the issue occurring once a week ($n = 41, 15.5\%$), once a month ($n = 65, 24.5\%$) or once every few months ($n = 32, 12.1\%$). Additionally, there were no differences in the correlation between muscle dysmorphia and all domains of attachment styles found for those who reported their exercise habits negatively impacted either their social or professional lives.

Table 2.
Demographics on Exercise Habits

	Participants ($N=265$)	
	<i>N</i>	%
Length of Time Exercising with Weights		
Under six months	28	10.57%
Six months to a year	57	21.51%
One to two years	72	27.17%
Three to five years	68	25.66%
Greater than five years	40	15.09%
Exercise Frequency		
Two times per week	24	9.06%

Three to four times per week	122	46.04%
Nearly everyday	119	44.91%
History of Bodybuilding Competitions		
Yes	16	6.04%
No	249	93.96%
Intent to enter Bodybuilding Competitions		
Yes	71	26.79%
No	194	73.21%
Primary Reason for Exercising		
Improve Physical Appearance	159	60.00%
Lose Weight	11	4.15%
Improve Health	27	10.19%
Increase Strength	39	14.72%
Sport-Related Activities	17	6.42%
Other	12	4.53%
Secondary Reason for Exercising		
Improve Physical Appearance	71	26.79%
Lose Weight	19	7.17%
Improve Health	50	18.87%
Increase Strength	92	34.72%
Sport-Related Activities	18	6.79%
Other	15	5.66%
Primary Fitness Activity		
Running/ Cardio	8	3.02%
Weightlifting	121	45.66%
Bodybuilding	91	34.34%
CrossFit	5	1.89%
Powerlifting	23	8.68%
Other	17	6.42%
Exercising Impact on Career or Job		
Yes	45	16.98%
Barely or not at all	14	5.28%
Small Impact	25	9.43%
Moderate Impact	4	1.51%
Large Impact	2	0.75%
No	220	83.02%
Exercising Impact on Social Events		
Yes	164	61.89%

	Several times per week	26	9.81%
	Once a week	41	15.47%
	Once a month	65	24.53%
	Once every few months	32	12.08%
No		101	38.11%

Research Question 1

Table 3. compared the scores from the ECR-RS to those on the DMS. A significant positive correlation was found between those who have an anxious relationship with their romantic partners and all three domains of the DMS, overall score ($d = .135, p < 0.01$), MB ($d = .09, p < 0.05$), and MBI ($d = 0.143, p < 0.01$). Additionally, it was found those with anxious attachment styles to their best friends had a significant positive correlation to overall muscle dysmorphia ($d = .096, p < 0.05$) and MBI ($d = .114, p < 0.01$). This was mirrored to those with an anxious attachment style to their fathers, wherein a significant positive correlation was also found with overall muscle dysmorphia ($d = .12, p < 0.05$) and MBI ($d = .12, p < 0.05$). Finally, those with an anxious attachment style to their mothers were significantly more likely to have increased MBI scores ($d = .066, p < 0.05$), but not overall muscle dysmorphia or MB scores. These trends are of significant note, as it appears as though those with anxious attachment styles across all four domains are much more likely than those with avoidant attachment styles to suffer from muscle dysmorphic body image concerns, but not behavioral issues. While Somers' D does allow for the suggestion of the predictive relationships, none of the predictive relationships within this table were strong enough to be indicative of greater meaning.

Table 3.

Somers' Delta analysis of the ECR-RS and DMS

ECR-RS	DMS Overall		DMS Behavioral		DMS Body Image	
	Value	Approx. Sig.	Value	Approx. Sig.	Value	Approx. Sig.
Mother Avoidant	0.025	0.596	-0.036	0.432	0.066	0.136
Mother Anxious	0.074	0.139	0.014	0.787	0.108	0.032*
Father Avoidant	0.072	0.11	0.021	0.632	0.082	0.057
Father Anxious	0.12	0.015*	0.075	0.129	0.12	0.011*
Partner Avoidant	0.067	0.128	0.073	0.108	0.057	0.186
Partner Anxious	0.135	0.003**	0.09	0.041*	0.143	0.002**
Best Friend Avoidant	-0.021	0.622	0.003	0.947	-0.028	0.515
Best Friend Anxious	0.096	0.028*	0.045	0.286	0.114	0.01*

Note. All values are asymmetric in nature, with the ECR-RS used as the independent value

* $p < 0.05$

** $p < 0.01$

When comparing the scores from the ECR-RS and the MDI (See Table 4) a similar narrative appears. While most of the MDI scores did not positively correlate with insecure attachment styles, there was a very strong positive correlation between physique protection and nearly all domains of attachment styles, including mother anxious ($d = .227, p < 0.001$), father avoidant ($d = .104, p < 0.005$), father anxious ($d = .199, p < 0.001$), partner avoidant ($d = .179, p < 0.001$), partner anxious ($d = .188, p < 0.001$), and best friend anxious ($d = .134, p < 0.01$). The exceptions to this being with avoidant relationships with mothers and avoidant relationships with best friends. There was also a significant positive correlation found between the size and symmetry scale on the MDI and an anxious attachment style to a father figure ($d = .162, p <$

0.001), and a romantic partner ($d = .128, p < 0.01$). Finally, a significant positive correlation was found between avoidant attachment styles with a mother figure and use of pharmacological enhancements ($d = .066, p < 0.05$) as well as with anxious romantic partners ($d = .116, p < 0.05$) on the supplement scale. Similar to the previous table, none of the predictions with the exceptions of anxious attachments to mothers for physique protection exceeded a value of 0.2, and thus were deemed to not be of relevance for this study.

Table 4.
Somers' D analysis of the ECR-RS and MDI

ERC-RS	MDI Diet		MDI Supplement		MDI Physique Prot		DI Exercise De		DI Size/Symme		DI Pharmacolo		Sig.
	Value	Approx	Value	Approx.	Value	Approx. S	Value	Approx	Value	Approx	Value	Approx.	
Mother Avoidant	-0.03	0.594	-0.04	0.385	0.026	0.551	-0.03	0.474	0.026	0.568	0.066	0.037*	
Mother Anxious	0.019	0.717	0.018	0.735	0.227	0**	-0.04	0.475	0.108	0.033*	0.072	0.059	
Father Avoidant	0.024	0.61	-0.04	0.413	0.104	0.012*	0.031	0.479	0.064	0.144	0.018	0.551	
Father Anxious	0.062	0.216	0.027	0.588	0.199	0**	0.047	0.356	0.162	.001**	0.036	0.347	
Partner Avoidant	0.07	0.132	0.038	0.392	0.179	0**	0.055	0.246	0.071	0.1	0.052	0.119	
Partner Anxious	0.065	0.155	0.116	0.011*	0.188	0**	0.067	0.145	0.128	.005**	0.026	0.451	
Best Friend Avoidant	-0.02	0.58	-0.05	0.268	0.048	0.272	-0.02	0.594	-0.01	0.793	-0	0.933	
Best Friend Anxious	-0.04	0.408	-0.01	0.758	0.134	0.005**	-0.04	0.419	0.075	0.103	0.04	0.21	

Note. All values are asymmetric in nature, with the ERC-RS used as the independent value

* $p < 0.05$

** $p < 0.01$

Research Question 2

When taking romantic relationships into account in Table 5, individuals were found to be more likely to experience insecure attachment styles when not in romantic relationships for several relationship domains. For the DMS overall measure, participants were significantly more likely to experience insecure relationships with their romantic partners when not currently in a romantic relationship with both anxious ($d = .224, p < 0.01$) and avoidant attachment styles ($d = .113, p < 0.05$), as well as their fathers with anxious attachment styles ($d = .171, p < 0.01$). Similarly, the MB scores on the DMS reflected the same trend with romantic relationships being significantly more likely to be insecure for both anxious ($d = .157, p < 0.01$) and avoidant styles

($d = .121, p < 0.05$) and for anxious paternal relationships ($d = .134, p < 0.05$). Insecurity in attachment styles was most prominent in the MBI scores when not in a romantic relationship. Both parental and romantic partners were found to be significantly correlated to anxious ($d = .165, p < 0.01$; $d = .0241, p < 0.01$) and avoidant attachment styles ($d = .013, p < 0.05$; $d = .107, p < 0.05$), with best friends being significantly correlated to anxious attachment styles ($d = .14, p < 0.05$) when not participants were not actively in a romantic relationship. Interestingly, anxious attachments to romantic partners had the strongest predictive ability for DMS overall ($d = .224, p < 0.01$) and DMS body image concerns ($d = .241, p < 0.01$).

Table 5.
Somers' D analysis of the ECR-RS and DMS, with romantic relationship status

ECR-RS	Relationship Involvement	DMS Overall		DMS Behavioral		DMS Body Image	
		Value	Approx. Sig.	Value	Approx. Sig.	Value	Approx. Sig.
Mother Avoidant	Yes	-0.023	0.77	-0.053	0.474	0.034	0.649
	No	0.043	0.453	-0.034	0.581	0.081	0.136
Mother Anxious	Yes	-0.003	0.974	-0.088	0.274	0.068	0.382
	No	0.12	0.069	0.088	0.178	0.122	0.068
Father Avoidant	Yes	0.038	0.59	0.055	0.425	0.006	0.933
	No	0.089	0.134	0.007	0.906	0.13	0.022*
Father Anxious	Yes	0.035	0.662	-0.019	0.818	0.034	0.658
	No	0.171	0.006**	0.134	0.028*	0.165	0.007**
Partner Avoidant	Yes	0.02	0.77	0.022	0.753	0.001	0.987
	No	0.113	0.042*	0.121	0.035*	0.107	0.047*
Partner Anxious	Yes	0.038	0.604	0.021	0.777	0.027	0.714
	No	0.224	0**	0.157	0.004**	0.241	0**
Best Friend Avoidant	Yes	0.041	0.567	0.079	0.265	0.003	0.962
	No	-0.071	0.175	-0.063	0.24	-0.054	0.32
Best Friend Anxious	Yes	0.099	0.138	0.077	0.248	0.083	0.237
	No	0.106	0.055	0.041	0.453	0.14	0.012*

Note. All values are asymmetric in nature, with the ECR-RS used as the independent value

* $p < 0.05$

** $p < 0.01$

When romantic relationships were taken into account for the MDI scores, similar, but more nuanced results were found for physique protection and size and symmetry (See Table 6). For those who were not in romantic relationships physique protection scores were significantly correlated to anxious attachment styles for mother ($d = .25, p < 0.01$), father ($d = .191, p < 0.01$) and romantic partner ($d = .204, p < 0.01$) and for avoidant attachment style for father ($d = .119, p < 0.05$) and romantic partner ($d = .201, p < 0.01$), nearly all of which were meaningful predictive relationships. Interestingly, those who reported being in romantic relationships also had correlations between insecure attachment styles and physique protection scores in anxious attachments to mothers ($d = .195, p < 0.05$), fathers ($d = .207, p < 0.01$) and best friends ($d = .19, p < 0.05$), which were also meaningful predictions. Additionally, there was a significant correlation for participants not in a romantic relationship for size and symmetry scores for those who had an anxious attachment to their mother ($d = .143, p < 0.05$), father ($d = .209, p < 0.01$) and romantic partners ($d = .185, p < 0.01$) as well individuals who had an avoidant attachment to their romantic partners ($d = .136, p < 0.01$).

Table 6.
Somers' D analysis of the ECR-RS and MDI, with romantic relationship status

ECR-RS	Relationship Involvement	Physique Protection		Size/Symmetry	
		Value	Approx. Sig.	Value	Approx. Sig.
Mother Avoidant	Yes	-0.037	0.578	-0.083	0.296
	No	0.071	0.213	0.079	0.138
Mother Anxious	Yes	0.195	0.022*	0.057	0.474
	No	0.25	0**	0.143	0.03*
Father Avoidant	Yes	0.089	0.17	-0.008	0.906
	No	0.119	0.03*	0.108	0.055
Father Anxious	Yes	0.207	0.008**	0.097	0.214
	No	0.191	0.002**	0.209	0.001*
Partner Avoidant	Yes	0.138	0.05	-0.013	0.851

	No	0.201	0**	0.136	0.009*
Partner Anxious	Yes	0.129	0.101	0.042	0.587
	No	0.204	0**	0.185	0.001*
Best Friend Avoidant	Yes	0.022	0.746	0.02	0.782
	No	0.072	0.207	-0.046	0.373
Best Friend Anxious	Yes	0.19	0.011*	0.045	0.55
	No	0.087	0.163	0.096	0.097

Note. All values are asymmetric in nature, with the ECR-RS used as the independent value

* $p < 0.05$

** $p < 0.01$

Research Question 3

For age groups (See Table 7), the correlations between muscle dysmorphic symptoms and attachment styles seemed to occur across more attachment domains for younger individuals. For those aged 18 to 20, there was a significant correlation between physique protection for anxious relationships to mothers ($d = .2, p < 0.05$), fathers ($d = .159, p < 0.05$), friends ($d = .145, p < 0.05$) and romantic partners ($d = .147, p < 0.05$) and avoidant relationships for fathers ($d = .144, p < 0.05$) and romantic partners ($d = .152, p < 0.05$). For those aged 21 to 25 the strong correlation for physique protection was found for anxious relationships to mothers ($d = .301, p < 0.01$), fathers ($d = .338, p < 0.01$), and romantic partners ($d = .361, p < 0.01$) and avoidant relationships for romantic partners ($d = .214, p < 0.05$). Finally, for those aged 26 to 30, the only correlations for physique protection were found for anxious attachment to mothers ($d = .295, p < 0.05$), and avoidant attachments to romantic partners ($d = .284, p < 0.05$). No correlations were found between those aged 31 and older and physique protection scores. For size and symmetry scores, correlations were found for those aged 21 to 25 in the domains of anxious attachments to mothers ($d = .207, p < 0.05$), fathers ($d = .233, p < 0.05$), and romantic

partners ($d = .203, p < 0.05$). Based on these scores, meaningful predictions could be made regarding significant correlations for physique protection and size and symmetry scores for those above the age of 21. No other significant correlations were found for size and symmetry, or other MDI subscales across age groups.

Table 7.
Somers' D analysis of the ECR-RS and MDI, with age groups

ECR-RS	Age Groups	Physique Protection		Size/Symmetry	
		Value	Approx. Sig.	Value	Approx. Sig.
Mother Avoidant	18 to 20	0.024	0.722	-0.007	0.924
	21 to 25	-0.012	0.892	0.003	0.973
	26 to 30	0.031	0.792	0.179	0.171
	Over 31	0.136	0.202	-0.008	0.947
Mother Anxious	18 to 20	0.2	0.011*	0.035	0.63
	21 to 25	0.301	0.003**	0.207	0.033*
	26 to 30	0.295	0.03*	0.273	0.067
	Over 31	0.115	0.435	0.024	0.866
Father Avoidant	18 to 20	0.144	0.014*	0.079	0.227
	21 to 25	0.023	0.807	0.047	0.595
	26 to 30	0.009	0.939	-0.029	0.822
	Over 31	0.214	0.066	0.109	0.305
Father Anxious	18 to 20	0.159	0.022*	0.124	0.067
	21 to 25	0.338	0.001**	0.233	0.022*
	26 to 30	0.112	0.445	0.182	0.222
	Over 31	0.21	0.104	0.212	0.135
Partner Avoidant	18 to 20	0.152	0.02*	0.121	0.072
	21 to 25	0.214	0.011*	0.073	0.379
	26 to 30	0.284	0.025*	0.009	0.941
	Over 31	0.135	0.209	-0.013	0.91
Partner Anxious	18 to 20	0.147	0.021*	0.124	0.069
	21 to 25	0.361	0**	0.203	0.013*
	26 to 30	0.072	0.586	0.04	0.783
	Over 31	0.034	0.804	0.092	0.438
Best Friend Avoidant	18 to 20	0.005	0.942	-0.023	0.715
	21 to 25	0.089	0.303	-0.09	0.314
	26 to 30	0.111	0.42	0.053	0.67

	Over 31	0.016	0.874	0.131	0.254
Best Friend Anxious	18 to 20	0.145	0.041*	0.11	0.108
	21 to 25	0.155	0.094	0.112	0.219
	26 to 30	0.202	0.206	-0.044	0.769
	Over 31	0.051	0.7	0.114	0.333

Note. All values are asymmetric in nature, with the ECR-RS used as the independent value

* $p < 0.05$

** $p < 0.01$

When exercise frequency was considered, the correlations between muscle dysmorphic indicators and attachment styles seemed to occur in less relationship domains for those who exercised twice per week. For the physique protection scores of the MDI, those that exercised twice per week on average only had a significant correlation for an anxious attachment to their mothers ($d = .427, p < 0.01$) and best friends ($d = .383, p < 0.05$), both of which were strongly predictive. By contrast, those that exercised three to four times per week had many more relationship domains that significant correlations. These individuals had significant correlations for anxious attachments to their mothers ($d = .197, p < 0.05$), fathers ($d = .252, p < 0.01$), romantic partners ($d = .257, p < 0.01$), and best friends ($d = .151, p < 0.05$), as well as avoidant attachments to their romantic partners ($d = .255, p < 0.01$). Similarly, those that exercised greater than four times per week also had more significantly correlated relationship domains with anxious attachments to their mothers ($d = .252, p < 0.01$) and fathers ($d = .197, p < 0.01$) and avoidant attachments to fathers ($d = .125, p < 0.05$) and best friends ($d = .158, p < 0.01$).

Similar results were found for the size and symmetry scores of the MDI and exercise frequency with those who exercised twice per week having no significant positive correlations to insecure attachment styles. Interestingly, this exercise frequency group did have a significant negative correlation and prediction to avoidant attachments to their best friends ($d = -.355, p < 0.05$), suggesting that the men might have a more secure attachment to their best friend when size and symmetry concerns are present. However, participants that exercised three to four times

per week had significant correlations for anxious attachments to mothers ($d = .15, p < 0.05$), fathers ($d = .158, p < 0.05$), and romantic partners ($d = .195, p < 0.01$) as well as avoidant attachments to their romantic partners ($d = .162, p < 0.05$). For the group that exercised greater than four times per week, there was only one significantly correlated relationship domain, which was anxious attachments to fathers ($d = .151, p < 0.05$).

Table 8.
Somers' D analysis of the ECR-RS and MDI, with exercise frequency

ECR-RS	Weekly Exercise Frequency	Physique Protection		Size/Symmetry	
		Value	Approx. Sig.	Value	Approx. Sig.
Mother Avoidant	Twice	-0.106	0.527	0	1
	Three to Four	0.003	0.961	0.029	0.662
	<u>Greater than Four</u>	0.094	0.158	0.053	0.436
Mother Anxious	Twice	0.427	0.009**	0.218	0.247
	Three to Four	0.197	0.011*	0.15	0.047*
	<u>Greater than Four</u>	0.252	0.001**	0.08	0.301
Father Avoidant	Twice	0.11	0.488	0.027	0.875
	Three to Four	0.088	0.136	-0.007	0.919
	<u>Greater than Four</u>	0.125	0.047*	0.123	0.064
Father Anxious	Twice	0.264	0.143	0.278	0.137
	Three to Four	0.21	0.003**	0.158	0.029*
	<u>Greater than Four</u>	0.197	0.006**	0.151	0.038*
Partner Avoidant	Twice	0.096	0.493	-0.149	0.243
	Three to Four	0.255	0**	0.162	0.013*
	<u>Greater than Four</u>	0.117	0.07	0.018	0.777
Partner Anxious	Twice	0.102	0.504	-0.055	0.749
	Three to Four	0.257	0**	0.195	0.009**
	<u>Greater than Four</u>	0.111	0.088	0.06	0.345
Best Friend Avoidant	Twice	0.023	0.887	-0.355	0.011**
	Three to Four	-0.039	0.532	-0.049	0.438
	<u>Greater than Four</u>	0.158	0.009**	0.093	0.117
Best Friend Anxious	Twice	0.383	0.027*	0.125	0.464
	Three to Four	0.151	0.031*	0.129	0.076
	<u>Greater than Four</u>	0.099	0.174	0.008	0.903

Note. All values are asymmetric in nature, with the ECR-RS used as the independent value

* $p < 0.05$

** $p < 0.01$

Contrary to both age groups and exercise frequency, intent to enter into bodybuilding competitions correlated with attachment styles in unexpected ways (See Table 9). For physique protection scores on the MDI, those who were not intending to enter bodybuilding competitions exhibited a correlation across more domains of attachment styles as compared to those who did. For those that were not looking to enter, significant correlations were found for anxious attachments to mothers ($d = .225, p < 0.01$), fathers ($d = .194, p < 0.01$), romantic partners ($d = .23, p < 0.01$), and best friends ($d = .149, p < 0.05$) as well avoidant attachments to fathers ($d = .12, p < 0.05$) and romantic partners ($d = .177, p < 0.01$). For those who were looking to enter, significant correlations were found for anxious attachments to mothers ($d = .241, p < 0.05$), fathers ($d = .235, p < 0.05$) as well as avoidant attachments to mothers ($d = .209, p < 0.05$) and romantic partners ($d = .194, p < 0.05$).

For size and symmetry scores on the MDI and attachment styles this trend is more apparent, with there being no significant correlations amongst those who were intending to enter bodybuilding competitions. Those who were not intending to enter did have many significant correlations between the two variables with correlations for anxious attachment styles being found for relationships with mothers ($d = .134, p < 0.05$), fathers ($d = .216, p < 0.01$), and romantic relationships ($d = .197, p < 0.05$). Additionally, correlations between size and symmetry scores and avoidant attachments styles were found for relationships for fathers ($d = .099, p < 0.05$) and romantic partners ($d = .01, p < 0.05$).

Table 9.
Somers' D analysis of the ECR-RS and MDI, with intent to participate in bodybuilding competitions

ECR-RS	Bodybuilding Competition Intent	Physique Protection		Size/Symmetry	
		Value	Approx. Sig.	Value	Approx. Sig.
Mother Avoidant	Yes	0.209	0.008*	0.025	0.769
	No	-0.036	0.473	0.042	0.423
Mother Anxious	Yes	0.241	0.011*	0.055	0.548
	No	0.225	0**	0.134	0.03*
Father Avoidant	Yes	0.084	0.335	0.013	0.876
	No	0.12	0.012*	0.099	0.045*
Father Anxious	Yes	0.235	0.02*	0.088	0.37
	No	0.192	0**	0.216	0**
Partner Avoidant	Yes	0.194	0.033*	0.009	0.922
	No	0.177	0**	0.1	0.039*
Partner Anxious	Yes	0.128	0.143	0.056	0.497
	No	0.23	0**	0.197	0**
Best Friend Avoidant	Yes	0.132	0.108	0.052	0.508
	No	0.019	0.714	0.029	0.56
Best Friend Anxious	Yes	0.133	0.161	0.104	0.217
	No	0.149	0.008*	0.09	0.102

Note. All values are asymmetric in nature, with the ECR-RS used as the independent value

*p < 0.05

**p < 0.01

Chapter 6: Discussion

Interpretation of Results

Throughout all the results found in this study, one aspect remained consistent. The significant correlations between muscle dysmorphia, as measured by the DMS and MDI, and insecure attachment styles, as measured by the ECR-RS, were found for body image concerns related to muscle dysmorphia as opposed to related behaviors. For scores on the DMS, it was consistently attachment domains as they related to MBI scores that were significantly correlated, as opposed to scores on the MB. Similarly, MDI subscales that were related to body image

concerns, physique protection and size and symmetry, were consistently found to be significantly correlated to multiple domains of insecure attachments. Other subscales of the MDI are related to behaviors associated with muscle dysmorphia, such as dieting habits, use of supplements and performance enhancing drugs and adherence to a workout schedule. Therefore, it appears as though the first research question is supported. There was a significant correlation across nearly all attachment domains with muscle dysmorphia indicators, however the correlations were only present for indicators that relate to associated body image concerns.

Research Question 1

This study expands on the research completed by Fabris et al. (2018) that established the relationship between muscle dysmorphic indicators and attachment styles. The present study found similar results in a diverse population with significant correlations between nearly all domains of insecure attachment styles being found for muscle dysmorphic indicators that related to body image concerns. Previous research has also found that those suffering from muscle dysmorphia were distinguished from normal weightlifters based on concerns about appearance, body checking behaviors, and high anxiety as opposed to behavioral indicators (Cafri et al., 2008). However, many other sources suggest that behavioral indicators are an important part of muscle dysmorphia (American Psychiatric Association, 2013; Mitchell et al., 2017; Olave et al., 2021; Pope et al., 1997). One possible explanation for this is that there may be an overlooked subset of individuals who meet with psychological criteria for muscle dysmorphia, but not the behavioral criteria. Effectively, these individuals may not engage in compulsive behaviors regarding use of supplements, dieting, or frequency of gym use, however they do suffer from bodily insecurity due to a lack of perceived size or musculature.

The only instances where correlations were found for behavioral scales of muscle dysmorphia were for anxious attachments to romantic partners and avoidant attachments to mothers. While the relationship between men and their romantic partners will be examined more closely in the next research question, the correlation is unsurprising given the difficulty that men with muscle dysmorphia often face in romantic relationships, as previously mentioned. In the case of avoidant attachment to mothers having a significant correlation to muscle dysmorphia behaviors, it was on the pharmacological scale of the MDI. This may be due to a strong correlation existing between substance abuse issues, and insecure attachments to parental figures (Schindler & Bröning, 2015). Use of pharmacological substances in this context may be used in place of, or in conjunction with other abusive substances. Additionally, avoidant attachment to mothers and best friends were two domain of attachment that did not significantly correlate with body image concerns. This may suggest that these avoidant attachments may not be related at all to muscle dysmorphia. Due to their avoidant nature, especially in the case of best friends, this finding may be due to individuals not interacting in these types of relationships. Further research is needed to fully understand this phenomenon.

Overall, these findings are in line with the work done by Fabris et al. (2018) who similarly found a significant correlation between anxious and avoidant attachment styles and muscle dysmorphia. However, the results differ in several important ways. Fabris et al. (2018) found a stronger correlation for avoidant attachment styles, whereas in this study the stronger correlation was found for anxious attachments. Additionally, this study differs in that the significant correlations were only found for body image concerns, as opposed to overall muscle dysmorphia. It is possible the same effect was present in the sample examined by Fabris et al. (2018), however only overall muscle dysmorphia symptoms were analyzed.

Research Question 2

The second research question examined whether those who were not actively in romantic relationships were insecure in more relationship domains than those who were. This did appear to be the case across the scores for both the MBI scores on the DMS as well as physique protection and size and symmetry scores on the MDI. The correlations for individuals not in romantic relationships seemed to be particularly pronounced across insecure relationships with fathers and romantic partners, with some evidence for anxious attachments to mothers. Comparatively, those who were in a romantic relationship reported a correlation between muscle dysmorphia and anxious attachments to mothers, fathers, and best friends for MDI physique protection. As previously mentioned, insecurely attached individuals often struggle in romantic relationships (Coughlin & Wade, 2012; Olave et al., 2021; Simpson 1990). Thus, the presence of a significant correlation for romantic partners was expected in the present study. For insecure attachment to parental figures, Olave et al. (2021) suggested that those with muscle dysmorphia exhibit greater emotional dependence, which may lead to insecure attachments in interpersonal relationships, and specifically parental relationships due to a need for increased parental interference. Hardit and Hannum (2012) had similar findings in that anxious attachment to both mothers and fathers were linked to significant body image concerns. This finding may also explain why those who were in romantic relationships still exhibited anxious attachments to domains outside of the relationship. The body image concerns related to physique protection might be present regardless of whether the individual is in a secure romantic relationship or not.

Research Question 3

The final research question examined whether common correlates to muscle dysmorphia also increased the number of domains insecure attachment style. More specifically, trends that

are present in age groups, exercise frequency and intent to compete in bodybuilding competitions.

Previous research has shown that individuals aged 18 to 20 often exhibit a greater frequency of muscle dysmorphia symptoms (Cafri et al., 2008; Mitchell et al., 2017; Olivardia 2001). This was also the case in the present study wherein body image concerns significantly correlated with a greater number of insecure attachment domains for individuals aged 18 to 20 as well as 21 to 25. Only two correlations out of a possible 16 were found for those aged between 25 and 30, with none being found for individuals over the age of 30.

With exercise addiction being a diagnostic trait of muscle dysmorphia, one could easily assume that individuals with muscle dysmorphia exercise quite frequently (Phillips et al., 2010; Pope et al., 2005). This also seems to be true of participants of this study, with the greatest number of correlations existing for individuals who exercised at least three to four times per week. Interestingly, there were fewer correlations for individuals who exercised in excess of four times per week. This may be the case due to muscle dysmorphia symptoms typically present as a need to maintain a strict workout routine and anxiety when deviating from it, as opposed to high frequency of gym use.

Similarly, given the criteria for muscle dysmorphia and its commonality amongst competitive body builders, it would be logical to assume that the trend would persist for those who intended to enter bodybuilding competitions (Cella et al., 2012; Mitchell et al., 2017; Pope et al., 1997). Despite this, there were more correlations amongst those who were not intending to enter bodybuilding competitions, especially for the size and symmetry subscale. Several other papers had similar findings in that those who intended to enter bodybuilding competitions did not show increased signs of muscle dysmorphia and insecure attachments (Baghurst & Lirgg, 2009;

Fabris et al., 2018). Fabris et al. (2018) offer the explanation that an important component of muscle dysmorphia is a fear of publicly exposing one's body. Thus, competitively displaying one's physique in an extreme public setting may be unappealing for those with muscle dysmorphia. It is likely that further research will be required to explain why a significant divide in the literature exists as to whether competitive body builders are at higher risk of muscle dysmorphia.

Clinical Considerations

Individuals who have muscle dysmorphia symptoms and insecure attachment styles are more likely to engage in body image anxieties related to muscle dysmorphia as opposed to related behaviors such as excessive exercising or dietary supplements. One possible implication of this is that therapists might overlook individuals who only have the cognitions related to muscle dysmorphia. Screening for muscle dysmorphia should therefore be focused more heavily on body image concerns. This would be as opposed to behavioral cues such as dieting, substance abuse and compulsively exercising. While most clinicians might assume that those with muscle dysmorphia symptoms would actively engage in behaviors related to muscle dysmorphia such as going to the gym and engaging in rigorous diets, it appears as though there may be a subset of individuals who have muscle dysmorphic symptoms with insecure attachment styles who only have the cognitive symptoms related to muscle dysmorphia. Additionally, this research is important for those wishing to establish a strong therapeutic alliance with those who have muscle dysmorphia as several research papers have shown that individuals with insecure attachment styles can struggle to connect with their therapist (Gelso & Carter, 1985; Gysin-Maillart et al., 2017). Therefore, once a diagnosis of muscle dysmorphia has been established, it may prove prudent to specifically attend to the therapeutic relationship and overall attachment styles.

Mahalik (1999) suggests the use of nonconventional responses once a rapport as been built in order to encourage the client to question their behavior. An example of this would be to respond with warmth when presented with hostility or displaying appropriate emotion when presented with a lack of empathy.

As is suggested by Olave et al. (2021), the use of cognitive behavioral therapy, and metacognitive therapy with a specific focus on exploring and working on attachment styles might prove more effective for individuals with muscle dysmorphia. Another method that might be effective to approach clients with muscle dysmorphia and insecure attachment styles is by tending specifically to rigid masculine beliefs, should they be present. One method of doing this would be to work to empower the men to explore feelings of vulnerability and focus on building healthy and secure relationships with others. This could be achieved through the encouraging the men to become more in tune with their emotions (Fischer & Good, 1997). Additionally, it may prove fruitful to gain an understanding of how adhering to these roles benefits men and finding more adaptive ways to achieve similar results (Mahalik et al., 2003). One example for men who value themselves based solely offer their ability to look physically large and dominant would be to aid them in finding alternative means of increasing self-worth and confidence.

Limitations

While many steps were taken to avoid as many limitations to this study as possible, there were several limitations which were unavoidable. First, one major limitation of this study is that the participants were recruited during the Covid-19 pandemic. This may have changed participants' responses as many gyms across the world were closed at the time of recruiting. As such, participants were asked to reflect upon their pre-Covid-19 behaviors, assuming they were not actively going to the gym. Being that it is likely that many participants had to consider how

they had felt about their behaviors from several months prior, it is possible that their responses might have been less accurate. Second, the information collected is based entirely off self-reported data. Due to this, compounded with the anonymity of data collection, it is possible that participants did not answer truthfully, or did not fully consider each of the questions. Third, participants were recruited from forums and communities that discuss bodybuilding activities. This may have led to participants feeling more supported and being more knowledgeable than the average gym-goer. Additionally, those who have greater body image concerns might have been less likely to respond to a study regarding muscle dysmorphia and attachment styles. (Olivardia et al., 2004). Fourth, high scores on each of the measures used are indicative of a high risk of their respective disorder being present, as opposed to actual diagnosis. Therefore, while still valuable, the conclusions drawn are of limited applicability to those diagnosed with muscle dysmorphia or insecure attachment styles. Additionally, use of social media could have influenced the results, as it may have impacted how the men viewed their own bodies, which was not measured in the present study. Sexual orientation was also not measured, which may have provided further insights into the participants. Another limitation of the study was the low overall predictive relationships within the significant correlations. While there were many significant correlations in the data, the number of correlations that had a strong predictive ability were quite low, and thus it is possible that replications of this study might result in slightly different results. Finally, due to the correlational nature of the study, cause-and-effect relationships cannot be drawn between the constructs.

Future Research

Should future research be done on this topic, there are several possible avenues that might prove illuminating. Firstly, using a sample that has been clinically diagnosed with muscle

dysmorphia would likely provide results that would be more directly applicable for that population for treatment purposes. Secondly, future research can look to gain more of an understanding as to why attitudes related to body image, but not related behaviours, are linked to insecure attachment styles. Further research may also examine why there appears to be a divide in the literature as to the level of risk for developing muscle dysmorphia for individuals who engage in bodybuilding competitions. Additionally, future research could look at the correlation between insecure attachments and muscle dysmorphia in a longitudinal format, which would likely allow more conclusive correlations to be found and might provide a greater understanding of the etiology of muscle dysmorphia. Furthermore, future research could include other variables that may influence the correlation between muscle dysmorphia and attachments styles, such as social media engagement, and measuring men's level of adherence to strict masculine gender roles. Finally, research linking the developmental aspects of both muscle dysmorphia and attachment styles could be instrumental in gaining a fuller understanding of the complex interplay between the disorders as well as what leads to the development of muscle dysmorphia.

Conclusion

In conclusion, there are several important findings that can be discussed. Firstly, the finding that men with body image concerns related to muscle dysmorphia correlated to issues with nearly all domains of insecure attachment. This finding is interesting in that it may highlight a subset of individuals who may not meet the diagnostic criteria for muscle dysmorphia but may in fact be struggle with their mental health in equal or greater proportions. This finding is also interesting in that insecure attachments may be restrict men with muscle dysmorphia from frequenting the gym. This theory is based on the notion that frequenting the gym initially requires overcoming a great deal of vulnerability. Starting off at the gym is often a daunting experience for a myriad of reasons including assumptions regarding physical size and strength

comparisons, a lack of knowledge about equipment and exercises as well as the risk of injury, amongst others. Not having a secure base may thus dissuade men from feeling comfortable putting themselves into vulnerable situations by going to the gym and engaging in exercise behaviors despite their muscle dysmorphic cognitions. Further research is needed to confirm this theory.

These findings also suggest that men who are not in romantic relationships may be at a greater level of risk for muscle dysmorphia. While this finding is unsurprising, it does emphasize a possible risk factor for men with insecure attachments to the significant people in their lives. Finally, other risk factors for those with insecure attachments are being between the ages of 18 and 25, exercising three to four times per week and not having any intentions to enter bodybuilding competitions. Despite the importance of all these findings, further research is required to establish a causal relationship between the variables and gain a better understanding of which may be considered etiological factors of muscle dysmorphia. Ultimately, it is the hope of this study to aid in the treatment of those with muscle dysmorphia by informing clinicians regarding possible risk factors and underlying causes.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington, DC: Author <https://doi.org/10.1176/appi.books.9780890425596>
- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Hillsdale, NJ: Erlbaum.
<https://doi.org/10.4324/9780203758045>
- Agresti, A. (2010). *Analysis of ordinal categorical data* (Vol. 656). John Wiley & Sons.
<https://doi.org/10.1002/9780470594001>
- Badenes-Ribera, L., Rubio-Aparicio, M., Sánchez-Meca, J., Fabris, M. A., & Longobardi, C. (2019). The association between muscle dysmorphia and eating disorder symptomatology: A systematic review and meta-analysis. *Journal of behavioral addictions*, 8(3), 351-371. <https://doi.org/10.1556/2006.8.2019.44>
- Bartholomew, K., & Horowitz, L. M. (1991). Attachment styles among young adults: a test of a four-category model. *Journal of personality and social psychology*, 61(2), 226-244.
<https://doi.org/10.1037/0022-3514.61.2.226>
- Baghurst, T., & Lirgg, C. (2009). Characteristics of muscle dysmorphia in male football, weight training, and competitive natural and non-natural bodybuilding samples. *Body Image*, 6(3), 221–227. <https://doi.org/10.1016/j.bodyim.2009.03.002>
- Blazina, C., & Watkins, C. E. (2000). Separation/individuation, parental attachment, and male gender role conflict: Attitudes toward the feminine and the fragile masculine self. *Psychology of Men & Masculinity*, 1(2), 126–132. <https://doi.org/10.1037/1524-9220.1.2.126>
- Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. New York: Basic Books.

- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp.46–76). New York, NY: Guilford Press.
<https://doi.org/10.1111/j.1475-6811.2000.tb00002.x>
- Cafri, G., Olivardia, R., & Thompson, J. K. (2008). Symptom characteristics and psychiatric comorbidity among males with muscle dysmorphia. *Comprehensive psychiatry*, 49(4), 374-379. <https://doi.org/10.1016/j.comppsy.2008.01.003>
- Cafri, G., Strauss, J., & Thompson, J. (2002). Male Body Image: Satisfaction and Its Relationship to Well-Being Using the Somatomorphic Matrix. *International Journal of Men's Health*, 1(2), 215–231. <https://doi.org/10.3149/jmh.0102.215>
- Cash, T. F., Melnyk, S. E., & Hrabosky, J. I. (2004). The assessment of body image investment: An extensive revision of the appearance schemas inventory. *International Journal of Eating Disorders*, 35(3), 305–316. <https://doi.org/10.1002/eat.10264>
- Cella, S., Iannaccone, M., & Cotrufo, P. (2012). Muscle dysmorphia: A comparison between competitive bodybuilders and fitness practitioners. *Journal of Nutritional Therapeutics*, 1(1), 12-18. <https://doi.org/10.6000/1929-5634.2012.01.01.2>
- Coughlin, P., & Wade, J. C. (2012). Masculinity ideology, income disparity, and romantic relationship quality among men with higher earning female partners. *Sex roles*, 67(5/6), 311-322. <https://doi.org/10.1007/s11199-012-0187-6>
- Davis, D., & Vernon, M. L. (2002). Sculpting the Body Beautiful: Attachment Style, Neuroticism, and Use of Cosmetic Surgeries. *Sex Roles*, 47(3/4), 129-138.
<https://doi.org/10.1023/a:1021043021624>

- DeFranc, W., & Mahalik, J. R. (2002). Masculine Gender Role Conflict and Stress in Relation to Parental Attachment and Separation. *Psychology of Men & Masculinity*, 3(1), 51–60. <https://doi.org/0.1037//1524-9220.3.1.51>
- Denham, B. E. (2008). Masculinities in Hardcore Bodybuilding. *Men and Masculinities*, 11(2), 234–242. <https://doi.org/10.1177/1097184X07304809>
- Donbaek, D., & Elklit, A. (2014). A validation of the Experiences in Close Relationships-Relationship Structures scale (ECR-RS) in adolescents. *Attachment & Human Development*, 16(1), 58–76. <https://doi.org/10.1080/14616734.2013.850103>
- Fabris, M. A., Longobardi, C., Prino, L. E., & Settanni, M. (2018). Attachment style and risk of muscle dysmorphia in a sample of male bodybuilders. *Psychology of Men & Masculinity*, 19(2), 273–281. <https://doi.org/10.1037/men0000096>
- Feeney, J. A., & Noller, P. (1992). Attachment style and romantic love: Relationship dissolution. *Australian Journal of Psychology*, 44(2), 69-74. <https://doi.org/10.1080/00049539208260145>
- Fischer, A. R., & Good, G. E. (1997). Men and psychotherapy: An investigation of alexithymia, intimacy, and masculine gender roles. *Psychotherapy: Theory, Research, Practice, Training*, 34(2), 160-170. <https://doi.org/10.1037/h0087646>
- Fischer, A. R., & Good, G. E. (1998). Perceptions of parent–child relationships and masculine role conflicts of college men. *Journal of Counseling Psychology*, 45(3), 346-352. <https://doi.org/10.1037/0022-0167.45.3.346>
- Fraley, R. C., Waller, N. G., & Brennan, K. A. (2000). An item response theory analysis of self-report measures of adult attachment. *Journal of Personality and Social Psychology*, 78(2), 350–365. <https://doi.org/10.1037/0022-3514.78.2.350>

- Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in close relationships—Relationship Structures Questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment, 23*(3), 615–625. <https://doi.org/10.1037/a0022898>
- Gelso, C. J., & Carter, J. A. (1985). The relationship in counseling and psychotherapy: Components, consequences, and theoretical antecedents. *The Counseling Psychologist, 13*(2), 155–244. <https://doi.org/10.1177/0011000085132001>
- Grogan, S., & Richards, H. (2002). Body Image: Focus Groups with Boys and Men. *Men and Masculinities, 4*(3), 219–232. <https://doi.org/10.1177/1097184X02004003001>
- Gysin-Maillart, A. C., Soravia, L. M., Gemperli, A., & Michel, K. (2017). Suicide Ideation Is Related to Therapeutic Alliance in a Brief Therapy for Attempted Suicide. *Archives of Suicide Research, 21*(1), 113–126. <https://doi.org/10.1080/13811118.2016.1162242>
- Hardit, S. K., & Hannum, J. W. (2012). Attachment, the tripartite influence model, and the development of body dissatisfaction. *Body Image, 9*(4), 469–475. <https://doi.org/10.1016/j.bodyim.2012.06.003>
- Hargreaves, D. A., & Tiggemann, M. (2009). Muscular ideal media images and men's body image: Social comparison processing and individual vulnerability. *Psychology of Men & Masculinity, 10*(2), 109–119. <https://doi.org/10.1037/a0014691>
- Hazan, C., & Shaver, P. R. (1987). Romantic Love Conceptualized as an Attachment Process. *Journal of Personality and Social Psychology, 52*(3), 511–524. <http://dx.doi.org/10.1037/0022-3514.52.3.511>

- Hazan, C., & Shaver, P. R. (1994). Attachment as an Organizational Framework for Research on Close Relationships. *Psychological Inquiry*, 5(1), 1–22.
https://doi.org/10.1207/s15327965pli0501_1
- Hui, M., & Brown, J. (2013). Factors that Influence Body Dissatisfaction: Comparisons across Culture and Gender. *Journal of Human Behavior in the Social Environment*, 23(3), 312–329. <https://doi.org/10.1080/10911359.2013.763710>
- Kafetsios, K., & Sideridis, G. D. (2006). Attachment, social support and well-being in young and older adults. *Journal of health psychology*, 11(6), 863-875.
<https://doi.org/10.1177/1359105306069084>
- Leit, R. A., Gray, J. J., & Pope, H. G. (2001). Cultural expectations of muscularity in men: The evolution of the Playgirl centerfolds. *International Journal of Eating Disorders*, 29(1), 90–93. [https://doi.org/10.1002/1098-108x\(200101\)29:1<90::aid-eat15>3.0.co;2-f](https://doi.org/10.1002/1098-108x(200101)29:1<90::aid-eat15>3.0.co;2-f)
- Levy, K. N., Ellison, W. D., Scott, L. N., & Bernecker, S. L. (2011). Attachment style. *Journal of Clinical Psychology*, 67(2), 193–203. <https://doi.org/10.1002/jclp.20756>
- Litt, D., & Dodge, T. (2008). A longitudinal investigation of the Drive for Muscularity Scale: Predicting use of performance enhancing substances and weightlifting among males. *Body Image*, 5(4), 346–351. <https://doi.org/10.1016/j.bodyim.2008.04.002>
- Mahalik, J. R. (1999). Interpersonal psychotherapy with men who experience gender role conflict. *Professional Psychology: Research and Practice*, 30(1), 5-13.
<https://doi.org/10.1037/0735-7028.30.1.5>
- Mahalik, J. R., Good, G. E., & Englar-Carlson, M. (2003). Masculinity scripts, presenting concerns, and help seeking: Implications for practice and training. *Professional Psychology: Research and Practice*, 34(2), 123-131. <https://doi.org/10.1037/0735-7028.34.2.123>

- McCreary, D. R., & Sasse, D. K. (2000). An Exploration of the Drive for Muscularity in Adolescent Boys and Girls. *Journal of American College Health*, 48(6), 297–304. <https://doi.org/10.1080/07448480009596271>
- McCreary, D. R., Saucier, D. M., & Courtenay, W. H. (2005). The Drive for Muscularity and Masculinity: Testing the Associations Among Gender-Role Traits, Behaviors, Attitudes, and Conflict. *Psychology of Men & Masculinity*, 6(2), 83–94. <https://doi.org/10.1037/1524-9220.6.2.83>
- McKinley, N. M., & Randa, L. A. (2005). Adult attachment and body satisfaction. *Body Image*, 2(3), 209–218. <https://doi.org/10.1016/j.bodyim.2005.04.003>
- Metsämuuronen, J. (2021). Directional nature of Goodman–Kruskal gamma and some consequences: identity of Goodman–Kruskal gamma and Somers delta, and their connection to Jonckheere–Terpstra test statistic. *Behaviormetrika*, 48, 283–307. <https://doi.org/10.1007/s41237-021-00138-8>
- Mishkind, M. E., Rodin, J., Silberstein, L. R., & Striegel-Moore, R. H. (1986). The embodiment of masculinity: Cultural, psychological, and behavioral dimensions. *American Behavioral Scientist*, 29(5), 545–562. <https://doi.org/10.1177/000276486029005004>
- Mitchell, L., Murray, S. B., Coble, S., Hackett, D., Gifford, J., Capling, L., & O’Connor, H. (2017). Muscle Dysmorphia Symptomatology and Associated Psychological Features in Bodybuilders and Non-Bodybuilder Resistance Trainers: A Systematic Review and Meta-Analysis. *Sports Medicine*, 47(2), 233–259. <https://doi.org/10.1007/s40279-016-0564-3>

- Murray, S. B., Rieger, E., Touyz, S. W., & Lic, Y. (2010). Muscle dysmorphia and the DSM-V conundrum: Where does it belong? A review paper. *International Journal of Eating Disorders*, 43(6), 483–491. <https://doi.org/10.1002/eat.20828>
- Newson, R. (2002). Parameters behind “nonparametric” statistics: Kendall's tau, Somers' D and median differences. *The Stata Journal*, 2(1), 45-64.
<https://doi.org/10.1177/1536867x0200200103>
- O'Neil, J. M. (2008). Summarizing 25 Years of Research on Men's Gender Role Conflict Using the Gender Role Conflict Scale: New Research Paradigms and Clinical Implications. *The Counseling Psychologist*, 36(3), 358–445.
<https://doi.org/10.1177/0011000008317057>
- O'Kearney, R. (1996). Attachment disruption in anorexia nervosa and bulimia nervosa: A review of theory and empirical research. *International Journal of Eating Disorders*, 20(2), 115–127. [https://doi.org/10.1002/\(sici\)1098-108x\(199609\)20:2<115::aid-eat1>3.0.co;2-j](https://doi.org/10.1002/(sici)1098-108x(199609)20:2<115::aid-eat1>3.0.co;2-j)
- Olave, L., Estévez, A., Momeñe, J., Muñoz-Navarro, R., Gómez-Romero, M. J., Boticario, M. J., & Iruarrizaga, I. (2021). Exercise addiction and muscle dysmorphia: The role of emotional dependence and attachment. *Frontiers in Psychology*, 12, 1-12.
<https://doi.org/10.3389/fpsyg.2021.681808>
- Olivardia, R., Pope, H. G., Borowiecki, J. J., & Cohane, G. H. (2004). Biceps and Body Image: The Relationship Between Muscularity and Self-Esteem, Depression, and Eating Disorder Symptoms. *Psychology of Men & Masculinity*, 5(2), 112–120.
<https://doi.org/10.1037/1524-9220.5.2.112>

- Pascuzzo, K., Moss, E., & Cyr, C. (2013). Attachment and emotion regulation strategies in predicting adult psychopathology. *Attachment & Human Development, 15*(1), 83-103. <https://doi.org/10.1080/14616734.2013.745713>
- Phillips, K. A., Wilhelm, S., Koran, L. M., Didie, E. R., Fallon, B. A., Feusner, J., & Stein, D. J. (2010). Body dysmorphic disorder: Some key issues for DSM-V. *Depression and Anxiety, 27*(6), 573–591. <https://doi.org/10.1002/da.20709>
- Pope, H. G., Gruber, A. J., Choi, P., Olivardia, R., & Phillips, K. A. (1997). Muscle Dysmorphia: An Underrecognized Form of Body Dysmorphic Disorder. *Psychosomatics, 38*(6), 548–557. [https://doi.org/10.1016/S0033-3182\(97\)71400-2](https://doi.org/10.1016/S0033-3182(97)71400-2)
- Pope, C. G., Pope, H. G., Menard, W., Fay, C., Olivardia, R., & Phillips, K. A. (2005). Clinical features of muscle dysmorphia among males with body dysmorphic disorder. *Body Image, 2*(4), 395–400. <https://doi.org/10.1016/j.bodyim.2005.09.001>
- Rhea, D. J., Lantz, C. D., & Cornelius, A. E. (2004). Development of the muscle dysmorphia inventory (MDI). *Journal of Sports Medicine and Physical Fitness, 44*(4), 428-435.
- Rosen, J. C., Reiter, J. (1996) Development of the Body Dysmorphic Disorder Examination, *Behaviour Research and Therapy, 34*(9), 755-766. [https://doi.org/10.1016/0005-7967\(96\)00024-1](https://doi.org/10.1016/0005-7967(96)00024-1).
- Schindler, A., & Bröning, S. (2015). A review on attachment and adolescent substance abuse: empirical evidence and implications for prevention and treatment. *Substance Abuse, 36*(3), 304-313. <https://doi.org/10.1080/08897077.2014.983586>
- Schwartz, J. P., & Tylka, T. L. (2008). Exploring entitlement as a moderator and mediator of the relationship between masculine gender role conflict and men's body esteem.

Psychology of Men & Masculinity, 9(2), 67–81. <https://doi.org/10.1037/1524-9220.9.2.67>

Schwartz, J. P., Waldo, M., & Higgins, A. J. (2004). Attachment Styles: Relationship to Masculine Gender Role Conflict in College Men. *Psychology of Men & Masculinity*, 5(2), 143–146. <https://doi.org/10.1037/1524-9220.5.2.143>

Segura-Garcia, C., Ammendolia, A., Procopio, L., Papaianni, M. C., Sinopoli, F., Bianco, C., Capranica, L. (2010). Body uneasiness, eating disorders, and muscle dysmorphia in individuals who overexercise. *Journal of Strength and Conditioning Research*, 24(11), 3098–3104. 10.1519/JSC.0b013e3181d0a575

Selvi, K., & Bozo, Ö. (2019). The dark side of bodybuilding: The role of bodybuilding activities in compensation of frustrated basic psychological needs. *Motivation and Emotion*. 44(2), 190-208. <https://doi.org/10.1007/s11031-019-09805-6>

Simpson, J. A. (1990). Influence of attachment styles on romantic relationships. *Journal of personality and social psychology*, 59(5), 971-980. <https://doi.org/10.1037/0022-3514.59.5.971>

Somers, R. H. (1962). A new asymmetric measure of association for ordinal variables. *American sociological review*, 27(6), 799-811. <https://doi.org/10.2307/2090408>

Tod, D., Morrison, T. G., & Edwards, C. (2012). Evaluating validity and test–retest reliability in four drive for muscularity questionnaires. *Body Image*, 9(3), 425–428. <https://doi.org/10.1016/j.bodyim.2012.02.001>

Tod, D., Edwards, C., & Cranswick, I. (2016). Muscle dysmorphia: current insights. *Psychology research and behavior management*, 9, 179-188. <https://doi.org/10.2147/prbm.s97404>

Troisi, A., Di Lorenzo, G., Alcini, S., Nanni, R. C., Di Pasquale, C., & Siracusano, A. (2006).

Body Dissatisfaction in Women with Eating Disorders: Relationship to Early Separation

Anxiety and Insecure Attachment: *Psychosomatic Medicine*, 68(3), 449–453.

<https://doi.org/10.1097/01.psy.0000204923.09390.5b>

Ward, A., Ramsay, R., & Treasure, J. (2000). Attachment research in eating disorders. *British*

Journal of Medical Psychology, 73(1), 35–51.

<https://doi.org/10.1348/000711200160282>

Appendix A:

Sociodemographic Questionnaire.

1. Gender: Male / Female / Other, Please specify_____/Choose not to Answer
2. Age: Please specify _____
3. Which country do you currently live in? _____
4. What is your race/ethnicity? (Please select all that apply)
White Black or African heritage Hispanic or Latinx heritage
Asian heritage Indigenous/Native People heritage (e.g., Inuit, First People)
Middle Eastern heritage Pacific Islander heritage Other, please specify_____
5. My native language is: English_____ French_____ Other, please specify_____
6. If English is not your first language how old were you when you began learning it? _____
7. Are you currently involved in a romantic relationship?
Yes / No
8. Has your current romantic relationship lasted longer than one month?
Yes/No

Please answer the following questions (Questions 9-20) based on your current physical exercise activities if you are actively going to a gym (including home gyms). **If you are not currently going to a gym because of the quarantine**, please respond based on your pre-quarantine gym-going behaviours.

9. On average, how frequently do you exercise with weights each week?
Rarely or Not at all
One time per week
Two times per week
Three to four times per week
Nearly everyday
10. How long have you been regularly (at least once a week) exercising with weights? Under six months
Six months to a year
One to two years
Three to five years
Greater than five years
11. What is your primary motivation for exercising with weights?
Improve Physical Appearance
Lose Weight
Improve Health

Increase Strength
Sport-Related Activities
Other, Please Specify _____

12. What is your secondary motivation for exercising with weights (If any)?

Improve Physical Appearance
Lose Weight
Improve Health
Increase Strength
Sport-Related Activities
Other, Please Specify _____

13. What type of exercise do you primarily engage in at the gym, or when engaging with fitness activities?

Running/ Cardio
Weightlifting
Bodybuilding
CrossFit
Powerlifting
Stretching
Yoga
Other, Please specify _____

14. What other forms of exercise do you engage in? (Select all that apply)

Running/ Cardio
Weightlifting
Bodybuilding
CrossFit
Powerlifting
Stretching
Yoga
Other, Please specify _____

15. Have you ever entered into a weightlifting/bodybuilding competition?

Yes/No

16. Do you actively engage in competitive weightlifting/bodybuilding?

Yes / No

17. Do you ever find yourself choosing to exercise instead of going to social functions (spending time with friends, parties etc.)

Yes / No

18. If yes, approximately how often do you choose to exercise instead of going to social functions?

Once every few months

Once a month
Once a week
Several times per week

19. Have your exercise habits ever negatively impacted on your career or job?

Yes / No

20. If yes, how severely has exercising impacted your career or job?

Barely or not at all (e.g., Came to work fatigued or sore from exercise)

Small Impact (e.g., Arrived to work late)

Moderate Impact (e.g., Missed day at work)

Large Impact (e.g., Lost position at work)

Appendix B:

Relationship Structures questionnaire of the Experiences in Close Relationships—Revised (ECR-RS)

1. I usually discuss my problems and concerns with this person.
2. I talk things over with this person.
3. It helps to turn to this person in times of need.
4. I find it easy to depend on this person.
5. I prefer not to show this person how I feel deep down.
6. I don't feel comfortable opening up to this person.
7. I'm afraid this person may abandon me.
8. I worry that this person won't care about me as much as I care about him or her.
9. I often worry that this person doesn't really care for me.

Note: Each of the questions is asked once per domain (Mother, Father, Partner and Best Friend), for a total of 36 questions asked. Each set of nine questions was prompted with one of the following phrases “Please answer the following 9 questions about your [Mother / Father / Dating or Martial Partner / Best Friend]” (Fraley et al., 2011).

Appendix C:

MDI INSTRUCTIONS

This scale measures a variety of attitudes, feelings, and behaviours. Read each item (1-27) carefully and then indicate the degree to which the item is characteristic or true of you by circling the appropriate number corresponding to each statement. There are no right or wrong answers so please respond as honestly as possible. The anonymity of your responses is guaranteed.

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

1. I regulate my caloric intake to maximize muscle development.
2. Before a workout, I consume energy supplements.
3. I maintain a strict workout schedule.
4. I monitor my diet closely to limit my fat intake.
5. I wear bulky clothing to hide my muscular physique from others.
6. I am concerned with losing muscle mass.
7. I use supplements to help me recuperate from strenuous workouts.
8. I control the intake of proteins, carbohydrates, and fats to maximize my muscular development.
9. I use supplements to increase my lifting performance.
10. My workouts are designed to develop the maximum amount of muscle mass.
11. I am preoccupied that I look small.
12. I use nutritional supplements to help me train through injuries.
13. It bothers me to miss a scheduled workout.
14. I prefer to work out when no one else can see me.
15. Developing large muscle mass is important to me.
16. My diet is regimented to the point that I eat the same foods several days in a row.
17. I will benefit from having large muscles.

Go on to next page

18. I have a hard time taking a scheduled day off from training.
19. I avoid foods high in sodium.
20. I am preoccupied with a desire to be larger.
21. I avoid situations where other weightlifters may see my muscle development.
22. I wear clothes that help conceal the size of my physique.
23. It is important that other weight trainers see how muscular I am.
24. I would rather keep others from seeing my level of muscle development.
25. I use steroids.
26. I use laxatives.
27. I use diuretics.

Thank-you

Appendix D:

The Drive for Muscularity Scale

The Drive for Muscularity Scale

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

	1	2	3	4	5	6		
	Always	Very Often	Often	Sometimes	Rarely	Never		
1. I wish that I were more muscular.			1	2	3	4	5	6
2. I lift weights to build up muscle.			1	2	3	4	5	6
3. I use protein or energy supplements.			1	2	3	4	5	6
4. I drink weight gain or protein shakes.			1	2	3	4	5	6
5. I try to consume as many calories as I can in a day.			1	2	3	4	5	6
6. I feel guilty if I miss a weight training session.			1	2	3	4	5	6
7. I think I would feel more confident if I had more muscle mass.			1	2	3	4	5	6
8. Other people think I work out with weights too often.			1	2	3	4	5	6
9. I think that I would look better if I gained 10 pounds in bulk.			1	2	3	4	5	6
10. I think about taking anabolic steroids.			1	2	3	4	5	6
11. I think that I would feel stronger if I gained a little more muscle mass.			1	2	3	4	5	6
12. I think that my weight training schedule interferes with other aspects of my life.			1	2	3	4	5	6
13. I think that my arms are not muscular enough.			1	2	3	4	5	6
14. I think that my chest is not muscular enough.			1	2	3	4	5	6
15. I think that my legs are not muscular enough.			1	2	3	4	5	6

Appendix E:

Ethics

UNIVERSITY OF LETHBRIDGE

APPLICATION FOR ETHICAL REVIEW OF HUMAN PARTICIPANT RESEARCH

The Human Subject Research Committee is mandated by University policy to examine and approve research proposals to ensure that ethical principles and standards respecting the personal welfare and rights of participants have been recognized and accommodated. The Committee follows the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. This Policy Statement is available at: <http://www.pre.ethics.gc.ca/eng/resources-ressources/news-nouvelles/nr-cp/2010-12-07/>. Other guidelines may be used when appropriate to the research in question.

You are encouraged to speak with the Office of Research Ethics about any outstanding issues, and seek the advice of the Committee when appropriate.

You are asked to respond to the following items and **to submit your application and all supporting documents electronically to Susan Entz, Office of Research Ethics (susan.entz@uleth.ca)**. If possible, please use a different font for your responses, and submit your application as one document including the supporting documentation (e.g., letters of introduction, interview questions, questionnaires, telephone survey scripts, letters of consent, etc.). Please note that this form is meant to accommodate many different types of research and thus some questions may not be applicable in your case. If a question clearly does not apply to your research, please simply mark it with a N/A or explain why it is not relevant/appropriate. If you are not sure if it applies, please feel free to ask.

The Committee deals with applications as expeditiously as possible. **Please allow up to one month from the date of receipt for Committee review.**

Following approval of your protocol, any changes in procedures relevant to the ethical issues involved in the treatment of human participants are to be reported immediately to the Office of Research Ethics.

If the research involves invasive procedures, a Hazard Assessment Report (available from Risk and Safety Services or on-line at: <http://www.uleth.ca/risk-and-safety-services/hazard-assessment-1>) must be completed and submitted to Risk and Safety Services for review. Review and approval by the Biosafety Committee may also be required.

SECTION A: GENERAL - This information is collected under the authority of the Alberta Post-secondary Learning Act and will be used for administrative purposes associated with the ethical review of your human participant research protocol. It will be treated in accordance with the privacy protection provisions of Part 2 of the Alberta Freedom of Information and Protection of Privacy Act (<http://foip.alberta.ca/legislation/act/index.cfm>). Questions about the collection, use or disclosure of your personal information collected on this form can be directed to Susan Entz, Ethics Officer, Office of Research Ethics, University of Lethbridge, Lethbridge, Alberta T1K 3M4, Phone: (403) 329-2747 and Email: susan.entz@uleth.ca.

A1. Researcher/Applicant Information

Name: Alex Varsaneux

Department: Education

Telephone Number: 514-824-7326

Email address: A.varsaneux@uleth.ca

Are you: Faculty Staff Doctoral Student

Graduate Student Undergraduate Student

Other:

A2. Co-Investigator's Information

Name: N/A

Department: N/A

Telephone Number N/A

Email address: N/A

Are you: Faculty Staff Graduate Student

Graduate Student Undergraduate Student

Other: N/A

The protection of human participants will be assured in accordance with the Tri-Council Policy Statement or with other guidelines if these have been agreed upon as more appropriate.

Signature of Researcher/Applicant

Date

When the Researcher/Applicant is a student, the supervisor must sign the following statement:

“I have reviewed this application and I deem it ready to submit to the Human Subject Research Committee for review.”

Signature of Supervisor

Date

A3. Student Thesis/Project Committee

a) Is this research for an undergraduate or graduate thesis/project or applied/independent study?

Yes No

b) If applicable, please provide the names, departments and phone numbers of your Committee members.

Name:	Department:	Email or telephone:
1. Kerry Bernes	Education	kerry.bernes@uleth.ca
2. Thelma Gunn	Education	thelma.gunn@uleth.ca
3. Danny Balderson	Education	daniel.balderson@uleth.ca

A4. Title of Project:

Indicate the title of your project. If this project is funded, the title should be the same as the title of your funded research.

Muscle Dymorphism and Attachment Styles in Men

A5. Location of Research

a) Indicate where the research will be conducted.

The study was created in a Master of Education Research Course, EDUC 5712, and will be conducted via a survey hosting website. As this is an online study, participants are free to complete it anywhere they like as long as they have access to a computer or mobile device connected to the internet.

b) Does this project involve other centers, jurisdictions or countries? If so, please provide a list of the other groups who will be reviewing this protocol. (For example, the Lethbridge College Research Ethics Board must approve all posters to be posted on their campus.)

Permission will be requested as is appropriate to post on online forums, Facebook and chatrooms. Requesting permission to post an explanation and link for the survey on online forums, Facebook and chatrooms will be handled in accordance to the rules associated with each domain. This will likely involve contacting a moderator or administrator of the group and requesting access through them.

c) Will this study involve schools located in Zone 6? Yes No

Note: If this study will involve schools within Zone 6, once HSRC approval has been granted, district/school approval will be coordinated through Research and Placement Services in the Faculty of Education prior to the start of the study. You will be notified upon receipt of district/school approval. If the study involves schools outside of Zone 6, it is the responsibility of the researcher to ensure that the appropriate district/school approval is obtained prior to the start of the research; a copy of the approval must be submitted to the Office of Research Ethics.

d) Is this a class project (i.e., not an applied or independent study)? Yes No

If so, specify the course number and title:

A6. Start/End Dates of Research Involving Human Participants

Please state the proposed start and end dates of the research involving human participants.

NOTE: Research involving human participants cannot begin until Human Subject Research Committee approval has been received.

Start date: As soon as ethics approval is received.

End date: December 31st, 2020

A7. Scholarly Review

Some research projects may require scholarly review. What type of scholarly review has this research undergone?

None

External Peer Review (e.g., granting agency)

Supervisory Committee (e.g., student research projects)

Special Review (please provide details)

A8. Funding

a) Is the project funded? Yes No

Funding approved – please specify source(s):

1. N/A
2. N/A
3. N/A

Funding pending – please specify source(s):

1. N/A
 2. N/A
 3. N/A
-

A9. Conflict of Interest

a) Are any of the investigators or their immediate family receiving any personal remuneration (including investigator payments and recruitment incentives but excluding trainee remuneration or graduate student stipends from the funding of this study that is not accounted for in the study budget)?

Yes No

b) Do any of the investigators or their immediate family have any proprietary interests in the product under study or the outcome of the research including patents, trademarks, copyrights, and licensing agreements?

Yes No

c) Is there any compensation for this study that is affected by the study outcome?

Yes No

- d) Do any of the investigators or their immediate family receive payments of other sorts from the funder for this study (i.e., grants, compensation in the form of equipment or supplies, retainers for ongoing consultation and honoraria)?
 Yes No
- e) Are any of the investigators or their immediate family, members of the funder's Board of Directors, Scientific Advisory Panel or comparable body?
 Yes No
- f) Do you have any other relationship, financial or non-financial, that, if not disclosed, could be construed as a conflict of interest?
 Yes No

Please explain if the answer to any of the above questions is Yes.

SECTION B: DETAILS ABOUT THE PROJECT

B1. Purpose of Project

Muscle dysmorphia has had many names over the years, however, it has only been conceived of in its current form roughly twenty years ago, in 1997. Pope, Gruber, Choi, Olivardia, and Phillips (1997) were the first to coin the term muscle dysmorphia and offer the definition that is still widely used today. Muscle dysmorphia is characterized by a chronic preoccupation with being dissatisfied with one's appearance in regard to one's muscularity. Muscle dysmorphia is similar to body dysmorphic disorder (BDD) in that it involves a distorted view of the body (Pope et al, 1997). However, while BDD typically focuses on one aspect of personal physical appearance, muscle dysmorphia is a distorted view of the entire body, feeling as though there is a pervasive and concerning lack of muscularity, or largeness throughout (Pope et al, 1997). Accordingly, in 2013 muscle dysmorphia was officially classified as a subtype of body dysmorphic disorder (BDD) in the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-V; American Psychiatric Association, 2013).

It is currently unknown how many men suffer from muscle dysmorphia as no official epidemiological studies have been conducted up to this point (Murray, Rieger, Touyz, & Lic, 2010). However, it is still considered common knowledge that muscle dysmorphia is far more common in men than it is in women, although there are rare cases of women suffering from muscle dysmorphia (Murray et al., 2010; Phillips et al., 2010). Given the prevalence of muscle

dysmorphia in men, it is worth investigating why they often feel a great need to increase their level of muscularity, as well as the tangential consequences of that need. This article discusses two factors that can drive men towards feeling insecure about their bodies. The portrayal of men's bodies in popular media and the pressure exerted on them by the perceived need to adhere to strict masculine gender roles. Both of these factors play a role in making men feel compelled to become muscular to adhere to what they believe is the ideal male body type. This disparity has serious mental health implications and correlates.

Among these correlates, an insecure attachment style might be one of them, as was found by Fabris, Longobardi, Prino, & Settanni (2018) in an Italian population. An insecure attachment style refers to a lack of perceived security in close or caregiving relationships, wherein the individual avoids or is anxious about relationships (Levy, Ellison, Scott & Bernecker, 2011). Body dissatisfaction and BDD both have a well-established connection to an insecure attachment style within the literature (O'Kearney, 1996; Troisi et al., 2000; Ward, et al., 2000). However, that connection has been found primarily in women, not in men (Hui & Brown, 2013). There has only been one study up to this point directly examining the link between muscle dysmorphia and attachment styles amongst men, which was completed on an Italian population, using measures specifically altered for that population (Fabris, et al., 2018). This study found that there was indeed a significant link between attachment styles and muscle dysmorphia, with both anxious and avoidant attachment styles being significantly correlated to the likelihood of muscle dysmorphia in bodybuilders.

It is the intent of this research to determine whether the correlation between muscle dysmorphia and insecure attachment styles persists in a global, English speaking population.

B2. Description of Participants

a) Indicate who you will recruit as potential participants in this study (e.g., undergraduates, school children, seniors) including any inclusion or exclusion criteria (e.g., over 65 years of age, self-identified as gay, speaks Blackfoot, speaks English), and the number of participants required.

Participants will be recruited online via social media such as Twitter and Facebook as well as through online bodybuilding forums and chatrooms. Where applicable, such as on Twitter and Facebook, an account will be created with the specific purpose of recruiting participants. All participants must meet the following inclusion criteria: Participants must (a) identify as a male; (b) be at or above the age of 18; (c) Exercise with weights at the gym at least twice a week consistently; and (d) must be able to understand English. Ideally, a minimum of 170 participants will be recruited.

b) If the participants or facilities will be offered compensation or incentive for participating in the research, provide details. Specify the amount, what the compensation/incentive is for, and how payment will be determined for participants who do not complete the study.

Participants will gain a single entry to win a prize of a 100\$ Canadian Amazon gift card. As soon as participants complete the survey, or skip through the questions, they will be presented with a link to a second, unrelated survey. Once this link has been clicked on, participants will be given the option to provide their email address to gain a single entry to the prize drawing. This entry will not be revoked once it has been gained, even if the participant should choose to skip past the questions in the study at any point. All of the entries will be assigned a number, and then a random number generator will randomly select one of the entries to win a gift card. The winning participant will then be contacted via their provided email address and given the monetary prize of an Amazon gift card valued at 100\$ Canadian. In order to be eligible to win the gift card, participants must answer a skill testing question. The odds of winning the gift card will vary based on the number of participants that enter but will be estimated at approximately 1 in 200.

B3. Recruitment of Participants

a) Briefly describe how participants will be recruited (e.g., letter, phone, poster, third party) and who will do the recruiting. Describe any existing position of authority or power between the recruiter and the participant. Researchers should avoid recruiting their own students. If this is unavoidable, researchers should provide the name of a research assistant, not associated with the course, who will do the recruiting and obtain consent when the researcher is not present.

If posters, newspaper advertisements, radio announcements or letters of invitation are being used, append these to this application. If recruiting through a third party, attach confirmation of permission from the organization if available.

Participants will be recruited through two methods. Participants will also be recruited through Twitter and Facebook via accounts created for the purpose of recruitment (not personal accounts). On both these platforms, there will be a brief description of the study, as well as the requirements for entry clearly stated. Finally, there will be a direct link to the online survey itself, where participants will be able to complete the survey at their leisure.

Participants will also be recruited via online bodybuilding forums and chatrooms for example but not limited to bodybuilding.com, and <https://discord.gg/picturefit>. All rules laid out by the forums will be adhered to. There will be a brief description of the study, as well as the requirements for entry clearly stated. Finally, there will be a direct link to the online survey itself, where participants will be able to complete the survey at their leisure.

- b) When and how will people be informed of the right to withdraw from the study? What procedures will be followed for people who wish to withdraw at any point during the study? What happens to the information contributed to the point of withdrawal?

Participants will be presented with a consent form before starting the study that will clearly indicate to them that they are allowed to withdraw from the study at any point, without repercussion. Should an individual decide that they want to withdraw from the study, they may simply close the relevant webpage. If the study is not completed in full, the results will be stored, but will not be included in any data analysis. Furthermore, the data provided will remain completely anonymous and will not be linked to any personal information, including their email address, if they have chosen to provide it.

- c) Indicate how participants can obtain feedback on the research findings.

Participants will be made aware that they can contact the primary researcher by June 31st, 2021 via email if they wish to a brief summary of the research findings.

Does the research specifically involve Aboriginal groups or communities? If so, please answer the following questions.

- d) If you will be obtaining consent from Elders, leaders, or other community representatives, provide details: N/A
- e) If leaders of the community will be involved in the identification of potential participants, provide details: N/A
- f) Provide details if:
- Property or private information belonging to the community as a whole is studied or used;
 - The research is designed to analyze or describe characteristics of the community; or
 - Individuals are selected to speak on behalf of, or otherwise represent the community
- g) Provide information regarding consent agreements, including access, ownership and sharing of research data with communities.
N/A
- h) Provide information on how final results of the study will be shared with the participating community (e.g., via band office, special presentation, deposit in community school, etc.).
N/A
- i) Describe how you have engaged the community. For additional information on research involving the First Nations, Inuit and Métis Peoples of Canada, please refer to [Chapter 9 of the TCPS2](#).

N/A

- j) Is there a formal research agreement with the community? Yes No
Provide details about the agreement or why an agreement is not in place, not required, etc.

N/A

B4. Description of Research Procedures

Provide a summary of the design and procedures of the research. Provide details of data collection (instrument, location, use of recording, etc.), and time commitment for the participants, etc. If applicable, identify any special training or qualifications that may be required for data gatherers. *NOTE: all study measures (e.g., questionnaires, interview guides, surveys, rating scales, etc.) must be appended to this application. If the procedures include a blind, indicate under what conditions the code will be broken, what provisions have been made for this occurrence, and who will have the code.*

Participants will have to complete an online questionnaire, wherein several measures will be used. First, participants will have to agree to the consent form before gaining access to the survey. If participants choose not to agree to the consent form, they will automatically be sent to the end of the survey, without being able to complete any questions. After agreeing to the consent form, participants will be asked to complete a sociodemographic questionnaire, where they will provide basic information such as their age, and gender (See Appendix A). More detailed information will also be requested as it relates to their gym-related behaviours, such as their motivation for exercising, what types of exercise do they engage in, and how frequently they exercise. Next, participants will be asked to complete the Relationship Structures Questionnaire of the Experiences in Close Relationships- Revised (ECR-RS), which is a measure of attachment styles (See Appendix B). Specifically, this measure looks if respondents have anxious or avoidant attachment styles in the domains of parental, friendly and romantic relationships. Participants will then complete the Muscle Dysmorphia Inventory (MDI), which will determine the likelihood that they can be diagnosed with muscle dysmorphia (See Appendix C). Finally, participants will complete the Drive for Muscularity Scale (DMS) which measure attitudes and behaviours reflecting one's desires to increase their level of muscularity (See Appendix D). It is expected that completing all parts of this questionnaire will take roughly 20-25 minutes. No special training or requirements are needed for data collection.

B5. Privacy Protection

The next set of questions deals with anonymity and confidentiality. Refer to the brief descriptions below to assist you in answering these questions.

a) Anonymity refers to the protection of the identity of participants. Anonymity protection can be provided along a continuum, from “complete” to “no” protection, where complete protection means that no identifying information will be collected. We remind applicants that university researchers should treat any personal information in accordance with the privacy protection provisions of Part 2 of the Alberta Freedom of Information and Protection of Privacy Act (<http://foip.alberta.ca/legislation/act/index.cfm>). If you have any questions about the collection, use, or disclosure of personal information under the Act, please contact the FOIP Coordinator, The University of Lethbridge, 4401 University Drive, Lethbridge, Alberta T1K 3M4, Email: foip@uleth.ca.

1. Will the anonymity of the participants be protected?

Yes (completely)

Yes (partially)

No

2. If “yes”, explain how anonymity will be protected, and describe how this will be explained in the consent process.

The questionnaire does not require participants to provide their name or identifying information. Participants will have the option to provide their email addresses in a second separate survey that will only be used to collect information for the gift card draw, but at no point will this information be linked in any way to their responses.

3. If “no”, justify why loss of anonymity is appropriate, and describe how this will be explained in the consent process.

b) Confidentiality refers to the protection, access, control and security of the data and personal information. Confidentiality or non-disclosure agreements are recommended for all the individuals involved with the project (e.g., transcriptionists, research assistants, co-investigators, etc.). Append a copy of the confidentiality template if available.

1. How will confidentiality be protected and how will this be explained in the consent process? Specify which personnel will have access to the listing of names and study ID numbers as well as other study information collected (use job titles rather than individual names.) Provide details on the location, manner of storage, and the proposed retention period of the information collected.

No personal or identifying information will be collected with the questionnaire. As such, anonymity will be fully respected, as participants will not be asked to provide any information that might identify them. Participants will be given the option to give their email addresses to enter into the prize draw, however this information will not be linked to survey results in anyway. A second, unrelated survey will be used to collect email addresses. Only the primary researchers and his committee members on this study will have access to the data itself. This includes myself, Dr. Kerry Bernes, my thesis supervisor and my thesis committee, Dr. Thelma Gunn and Dr. Danny Balderson. All data will be stored on a password protected computer. Once the data has been fully analyzed, the data will undergo an encryption process where it will be stored for up to 7 years after publication and then destroyed. Participants will be made aware of all the previously stated information in the consent form, that must be agreed to before proceeding with the study itself.

B6. Potential Risks and Benefits

To facilitate Human Subject Research Committee review and to determine whether the study involves more than minimal risk, please respond to the following questions. Does this project involve...	Check those that apply
1. Collection of data through invasive clinical procedures that are not required for normal patient care.	N/A
2. Collection of data through noninvasive clinical procedures involving imaging or microwaves that are not required for normal patient care.	N/A
3. Any other non-therapeutic risks that arise from procedures not directly related to patient care.	N/A
4. Collection, use, or disclosure of health information or biological samples where the researcher is requesting that the requirement for informed consent be waived.	N/A
5. Any procedures involving deception or incomplete disclosure of the nature of the research for purposes of informed consent.	N/A
6. Any possibility that a breach of confidentiality could place participants at risk of criminal or civil liability or be damaging to participants' financial standing, employability or reputation.	N/A
7. Research questions or procedures that might be expected to cause participant psychological distress, discomfort or anxiety beyond what a reasonable person might expect in day to day social interactions (e.g., questions that raise painful memories or unresolved emotional issues).	N/A

8. Investigations in which there is a previous or existing relationship between the investigator and participants (e.g., manager/employee, therapist/client, teacher/student).	N/A
--	-----

- a) Outline any risks of potential physical or emotional harm or discomfort to the participants, and describe the measures that will be put in place to mitigate these risks. If there are no anticipated risks, explain why the research is important and the benefits of participating (compensation paid to participants is not considered a benefit).

There are no anticipated risks of potential physical or emotional harm or discomfort involved in this study. However, contact information for counselling services for will be provided in the debrief, as a precautionary measure. There are also no direct benefits to the participants for engaging in this study. This research is important because it will serve to raise awareness to a disorder that often goes overlooked. It will also potentially have clinical implications in the treatment of muscle dysmorphia, should there be a connection be made to attachment styles.

- b) Describe the anticipated dissemination of the study findings.

Once this research is completed, it is possible that it will be published as a Master's project through the University of Lethbridge Faculty of Education. The results of the research may also be presented at conferences and may be published through other means.

- c) Indicate the steps taken to inform participants of the possible consequences of releasing information in the public domain and describe how participants will be given an opportunity to review material where appropriate.

As the information gathered will not be linked to individuals in any way, there are no anticipated concerns with releasing information in the public domain. However, if the study is published, it will be available for viewing to the public upon request. The chance of the study being published into a public domain is indicated in the consent form.

- d) Outline the exit strategy for termination of the study. Some types of research involve intense or lengthy contact between a researcher and the study participant(s), which may result in a close personal relationship, especially if the research itself involves matters close to the heart of participants. For this section, applicants should consider the possibility that a strategy may be required for participants who have difficulty in disengaging from the project after their role is completed or the project has terminated. If this does not apply to your research, please indicate N/A. If the research involves vulnerable populations, carefully clarify the boundaries between the researcher and participants.

N/A

B7. Obtaining Consent

Advise the Committee how informed consent will be obtained. The Tri-Council Policy Statement ensures that informed consent be obtained in writing from all participants or, when appropriate from parents or legal guardians, unless there is a good reason for not doing so. If a consent form will be used, attach copies for the Committee. The Human Participant Research - Sample Letter of Consent is available at: <http://www.uleth.ca/research/human-participant-research-guidelines-forms>. Please ensure that the reading level of the consent form is appropriate to the population involved.

a) Clearly detail who will be obtaining consent and the procedures for doing so. If appropriate, specify whether participants will be randomly assigned to groups before or after consent has been attained.

There will be no random assignments made for the purposes of this study. The consent information will be the first page that the participant sees after clicking on the survey link. Consent will be indicated by the participant selecting a button to agree to participate in the survey.

b) If the participants are not able/competent to give fully informed consent (cognitive impairment, age, etc.), or if there are significant power differences in operation (professor/student, employer/employee, political or economic minorities, etc.), please specify, and describe steps you will take to obtain free and informed consent. If participants are not competent to consent, specify who will consent on their behalf.

N/A

c) Do any of the procedures include the use of deception or partial disclosure of information to participants? If yes, provide a rationale for the deception or partial disclosure. Describe the procedures for debriefing the participants.

Upon completion of the study, participants will encounter a brief debriefing form outlining contact information for the primary researcher and ethics committee as well as mental health resources, should such a need arise. The debriefing form also briefly describes the study and offers related further readings for the participant, should they be interested. No deception or partial disclosure will be used.

d) **For the letter of consent/consent form:**

1. Extend an invitation to participate in the research project.
2. Provide a brief description of the project, including the purpose of the research, and a description of what is expected of the participant (e.g, the time commitment and the frequency of contact).
3. Describe the risks and discomforts (e.g., distress, inconvenience, psychological or social discomforts, fatigue, or physical safety issues). If the research project has the potential to identify upset, distressed or disturbed individuals, describe what arrangements will be made to assist these individuals, if need be.
4. Describe the benefits, including an explicit statement if there are no potential benefits to the participants (e.g., “You will not benefit directly from participation in this research”).
5. Provide assurance of anonymity and confidentiality – this statement should describe the steps taken to ensure anonymity and confidentiality, and should include information regarding who will have access to the data collected. **NOTE: Participants should be advised that their privacy cannot be guaranteed when electronic surveys are used.**
6. Outline compensation for participation in the research project, if applicable.
7. Provide a non-coercive disclaimer – this statement should indicate that participation is voluntary, and that refusal to participate will not initiate prejudice, penalty or loss of benefits to which the participant is otherwise entitled.
8. Provide an option to withdraw – this statement should indicate that participants may discontinue participation at any time without prejudice, penalty or loss of benefits. The process for withdrawal, in addition to information on the participant’s right to request the withdrawal of data, should be clearly explained along with an explanation of the conditions under which researchers would not be able to remove a participant’s data from the study. Where appropriate, participants who choose to withdraw should be consulted on the fate of their data.
9. Indicate the instances when the researcher may be obligated by law to report, to law enforcement or another agency, information revealed as a result of the research. **NOTE: Questions likely to result in reportable activities must be flagged for the respondent, and the respondent must be given the option to skip these questions.**
10. Provide a brief description of the anticipated use of the data.

11. Provide information on how participants will be informed of the results of the research.

12. Provide the name of the researcher, along with their institutional affiliation, and contact information for questions/clarification about the research project. Also include the following statement: “Questions regarding your rights as a participant in this research may be addressed to the Office of Research Ethics, University of Lethbridge (Phone: 403-329-2747 or Email: research.services@uleth.ca).”

e) **For telephone surveys**, informed consent should take place in the form of a verbal explanation of the above points. Append the script for this explanation to this application.

f) **For anonymous questionnaires**, include a cover letter that includes all the information normally provided in a consent form. Append a copy of this cover letter to this application.

See Appendix F.

B8. Reporting Requirements

Research is subject to continuing research ethics review from the date of initial ethics approval, throughout the life of the project by submission of the required report. Continuing research ethics review shall consist of an annual progress report (multi-year research projects), and an end-of-study report (projects lasting less than one year). Select the appropriate reporting requirement for the study:

Annual renewal report (due on or before annual term date)

End-of-study report (for projects shorter than one year in duration)

Appendix F:

Consent Form

INFORMATION AND CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Study Title: Muscle Dysmorphia and Attachment Styles

This is an invitation to participate in a research study being conducted by Alex Varsaneux of the Faculty of Education at the University of Lethbridge.

Purpose

I understand that the purpose of this research is to determine whether there is an association between individuals with muscle dysmorphia and insecure attachment styles. Muscle dysmorphia is a form of body dysmorphic disorder in which individuals feel a deep insecurity displaying their bodies in public settings, specifically due to a perceived lack of muscularity. Attachment styles refers to whether an individual feels secure in the relationships, including parental, friend and romantic relationships.

About the Survey

I understand that this study involves answering a questionnaire. I am aware that the questionnaire will ask about my background and history of gym use. I will then answer questions that will determine the level of risk that I am at for having muscle dysmorphia. Following this, I will respond to questions that will assess my attachment styles. The entire session is expected to last approximately 20-25 minutes. As a research participant, my responsibilities are to perform all the assigned tasks described above honestly, conscientiously, and to the best of my ability.

Risks and Benefits

I understand that participation is voluntary and there is no anticipated risk involved with participating in this research. I will not directly benefit from participation in this research. However, I will have the option to enter into a draw to potentially win an Amazon gift card valued at 100\$ Canadian. The chance of winning is estimated to be 1 in 200. Each participant will have an equal chance of winning. If I choose to withdraw from the survey and still wish to enter the draw, I must proceed to the end of the survey in order to find the link to participate in the prize draw.

Confidentiality and Privacy

The survey is entirely voluntary, and it is possible to skip questions in the questionnaire. In addition, all responses will be kept as confidential as possible. However, due to the online nature of the study anonymity and confidentiality cannot be fully guaranteed.

For more information regarding the policies of [Survey host], please visit: [Link to privacy policy on survey site used]

Withdrawal from the Study

Only aggregate data will be reported. I am free to withdraw from the survey any time up until the submission of the responses. Because answers are anonymous once submitted, specific data is impossible to retrieve and remove.

Use of the Collected Data

The findings from this study will be presented in a thesis submitted in partial fulfillment of the requirements for a Master of Education degree at the University of Lethbridge. The research might also be published or presented at conferences. However, it will not be possible to identify any specific participant in the publications or conferences as only aggregate data will be shown.

After the project is complete, the primary researcher will protect the information by keeping it for up to seven years in digital form. After seven years, the materials will be destroyed.

For more information on this study, you may contact me at A.Varsaneux@Uleth.ca or my faculty supervisor Dr. Kerry Bernes at Kerry.Bernes@Uleth.ca.

If you wish to obtain information regarding the results of the study, please contact A.Varsaneux@uleth.ca by June 31st, 2021.

This study has been reviewed and granted ethics approval by the University of Lethbridge Human Participant Research Committee.

Questions regarding your rights as a participant in this research may be addressed to the Office of Research Ethics, University of Lethbridge (Phone: 403-329-2747 or Email: research.services@uleth.ca).

I have read and understood this form. I agree to participate in this research under the conditions described.

***I FREELY CONSENT AND AGREE TO PARTICIPATE IN THIS STUDY. Yes / No**

Appendix G:
Debriefing Form

Debriefing Form

Title of project: Muscle Dysmorphia and Attachment Styles in Men

Principal Researcher: Alex Varsaneux

Description of the study

The aim of this study is to explore the relationship between muscle dysmorphia and attachment styles. Previous research has found that there is a link between insecure attachment styles, specifically anxious and avoidant attachment, and muscle dysmorphia in an Italian population. This study seeks to extend that research by looking at where similar results will be found in a global population. One measure will determine the attachment style, while the other two measures combined will determine the likelihood of having muscle dysmorphia related symptoms.

Please follow the link to a separate survey where you have the option to enter your email address to be entered for a chance to an Amazon gift card valued at 100\$ Canadian. Should you win the prize draw, you must answer a simple skill testing question to receive the gift card. The likelihood of winning will depend on the number of participants in the study.

[Second Survey Link]

(Note: This is entirely optional, and you may proceed without entering your email address. If you do provide your email address, it will not be linked to your responses in this survey in anyway.)

If you experience any distress in the completion of this survey and live in Canada, please contact Crisis Services Canada by phone at 1-833-456-4566 or text 45645. If you live in the U.S., please contact Mental Health America by phone at 1-800-273-8255 or text 741741. If you do not reside in Canada or the U.S., please contact your local mental health services.

If you have any specific questions regarding the study or would like a summary of the results once the study has been completed, please contact Alex Varsaneux via email at **A.Varsaneux@uleth.ca**.

Questions regarding your rights as a participant in this research may be addressed to the Office of Research Ethics, University of Lethbridge (Phone: 403-329-2747 or Email: research.services@uleth.ca).

For further reading:

Fabris, M. A., Longobardi, C., Prino, L. E., & Settanni, M. (2018). Attachment style and risk of muscle dysmorphia in a sample of male bodybuilders. *Psychology of Men & Masculinity, 19*(2), 273–281. <https://doi.org/10.1037/men0000096>

Appendix H:
Social Media Recruitment Posts

Twitter:

Looking for male participants over the age of 18 to participate in a study on muscle dysmorphia and adult attachment styles. A survey must be completed which will take approximately 20-25 minutes. Participation will grant you eligibility to win a 100\$ Amazon Gift Card. (1/2)

To be eligible, you must actively (or pre-quarantine) exercise with weights at least twice per week, identify as male and understand English. [Survey link]. For more information, please contact Alex Varsaneux at A.Varsaneux@uleth.ca (2/2)

Facebook/Online Forums:

Looking for male participants over the age of 18 to participate in a study on muscle dysmorphia and adult attachment styles. You will be asked to complete a survey which will take approximately 20-25 minutes to complete. To be eligible, you must actively or had active pre-quarantine exercised with weights at least twice per week, identify as male, be at or above the age of 18 and understand English.

Participation in this study will grant you one entry to win an Amazon gift card valued at 100\$ Canadian. Should you wish to enter to win, you will be directed to a second, unrelated survey wherein you will be asked to provide your email address when upon completing the study. Your email address will not be linked to your responses in any way. The link is provided on the debriefing form.

The purpose of this study is to determine whether there is an association between individuals with muscle dysmorphia and insecure attachment styles. Muscle dysmorphia is a form of body dysmorphic disorder in which individuals feel a deep insecurity displaying their bodies in public settings, specifically due to a perceived lack of muscularity. Attachment styles refers to whether an individual feels secure in their relationships, including parental, friend and romantic relationships.

All information will be kept strictly confidential. There will be no consequences if you decide to withdraw from the study at any point.

If you wish to participate in this study, please click here: [Survey Link].

Should any questions arise, please contact Alex Varsaneux at A.Varsaneux@uleth.ca