GENERALIZED ANXIETY DISORDER (GAD) AMONG CANADIAN MEN: DOES MEN'S ALIGNMENT WITH TRADITIONAL MASCULINE NORMS PLAY A ROLE IN THE DEVELOPMENT OF GAD?

NIKK LEAVITT
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NIKK LEAVITT

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Dr. P. Kellett Thesis Supervisor	Assistant Professor	Ph.D.
Dr. C. Currie Thesis Examination Committee Member	Associate Professor	Ph.D.
Dr. R. Larouche Thesis Examination Committee Member	Associate Professor	Ph.D.
Dr. L. Vogelsang Chair, Thesis Examination Committee	Assistant Professor	Ph.D.

ABSTRACT

This thesis explored the association between masculinity and generalized anxiety disorder (GAD) among men used two measures of masculinity: the Male Role Norms Inventory Short-Form (MRNI-SF) and participants' self-rated masculinity scores. The GAD-7 was used to assess participants' GAD symptoms, while the effects of covariates and racialization were also examined. Results showed that traditional masculinity was positively associated with increased anxiety scores, whereas self-rated masculinity was negatively associated. Covariates such as pre-existing mental health conditions, age, and socioeconomic status (SES) also influenced the association between masculinity and GAD. Moreover, being African-Canadian had a significant moderating effect, suggesting that the impact of masculinity on mental health outcomes may differ across racialized groups. These findings highlighted the importance of redefining masculinity and exploring new ways to measure it in research, and the need to consider intersecting factors that contribute to men's mental health outcomes.

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LIST OF ABBREVIATIONS

CBT	Cognitive-Behavioural Therapy
DALYs	Disability Adjusted Life Years
GAD	Generalized Anxiety Disorder
GAD-7	Generalized Anxiety Disorder – 7 Scale
MDD	Major Depressive Disorder
MRNI-SF	Male Role Norms Inventory – Short Form
SES	Socioeconomic Status
STROBE	Strengthening and Reporting of Observational Studies in Epidemiology

CHAPTER 1: INTRODUCTION

Generalized anxiety disorder (GAD) is a concerning problem as it contributes to multiple societal problems. Examples of these problems include its negative effect on an individual's functional and occupational well-being; their quality of life; and the substantial economic cost associated with greater use of health care services and decreased work productivity (Katzman et al., 2014). A significant issue associated with GAD is its association with increased mortality rates (Pratt et al., 2016). A 60% higher premature mortality rate exists in those with anxiety and depressive disorders (Pratt et al., 2016). Socioeconomic status (SES), unhealthy lifestyle behaviours, and high rates of comorbid physical illness are just a few factors that could be on the causal pathway between anxiety and mortality which might explain this higher premature mortality rate (Pratt et al., 2016). GAD is a pervasive problem that requires further exploration.

One gap identified within the literature is the role masculinity potentially plays as a risk factor for GAD. Many studies have been conducted that have looked at the effects of masculinity on the development of different mental illnesses (Affleck et al., 2018; Apesoa-Varano et al., 2018; Mincey et al., 2014). However, the association between masculinity and generalized anxiety disorder has largely been unexplored. The lack of research conducted on this subject is surprising given the connections that that been found between masculinity and other mental illnesses such as depression (Apesoa-Varano et al., 2018; Lin et al., 2021; Parent et al., 2019). Also, the majority of current health research studies that have explored the relationship between masculinity and mental health chose a qualitative approach to answer their research questions (Affleck et al., 2018; Mckenzie et al., 2016; Mincey et al., 2014).

For my thesis, I set out to address this gap. My first study applied a quasi-mixed methods approach to examine two research questions: (1) Is there an association between alignment to traditional masculine ideology and GAD in Canadian men between the ages of 18 and 65?; and

(2) Is there an association between a man's own view of his masculinity and GAD in the same demographic of men? The research questions explored in my second study were: (1) How do covariates affect the association between alignment to traditional masculine ideology and GAD in Canadian men between the ages of 18 and 65?; and (2) Is the association between alignment to traditional masculine ideology and GAD moderated by racialization within the same demographic of men? The knowledge gained from these two studies may be used to acquire better understanding of the effect masculinity has on men's mental health while further addressing the stigma surrounding masculinity and mental health.

These studies were conducted in accordance with the Tri-Council Policy Statement: Ethical Conduct for research Involving Humans and obtained approval from the Health Research Ethics Board at the University of Alberta (Pro00118469). Prior to starting the investigation, electronic informed consent that provided details of the study, the length of the survey, and any potential risks was obtained from all participants (see Appendix A). All participants remained anonymous to the researcher.

CHAPTER 2: LITERATURE REVIEW

There appears to be a steady rise in the incidence of anxiety disorders worldwide and growing awareness of this trend has been covered in the media (Bandelow & Michaelis, 2015). The US has demonstrated a 1.6% increased prevalence of anxiety disorders between 2008 and 2018 in young adults aged 18-25-years-old (Goodwin et al., 2020). Similar increases in anxiety have been found in Canada with data from the Canadian Community Health Survey indicating that anxiety disorders have been increasing in Canada at a rate of approximately 0.26% to 0.55% per year since 2007 (Dobson et al., 2020). This rise in the prevalence of anxiety disorders may be explained by the increased prevalence of social isolation and concurrent decreases in social support and financial stability, and/or individuals' growing comfort with seeking out a diagnosis and acquiring help for their anxiety disorders (Goodwin et al., 2020). Although anxiety disorders appear to have increased over the past few years, it is difficult to reliably say whether the rates of GAD are actually increasing or not due to the unreliable evidence that is available on prevalence trends (Bandelow & Michaelis, 2015).

2.1 Comorbidity

GAD is highly comorbid with several mental health disorders such as other anxiety disorders, depression, and substance abuse (Ruscio et al., 2017; Stein & Sareen, 2015). Physical complications such as headaches, gastrointestinal symptoms, muscle tension, insomnia, and back pain can also be found in patients suffering from GAD, with further evidence showing that it can increase the risk of mortality for patients with chronic illnesses (Stein & Sareen, 2015). One nationally representative survey found that those who have comorbid anxiety disorder and chronic diseases such as cancer and heart disease, died significantly earlier than those who only had chronic diseases (Pratt et al., 2016)

Anxiety disorders like GAD have been found to be associated with increased disability adjusted life years (DALYs), with depressive disorders being the only mental illnesses responsible for more DALYs globally (Whiteford et al., 2013). GAD can also hinder one's quality of life due to reductions in physical health and social functioning, and increases in bodily pain and emotional difficulties (Revicki et al., 2012). GAD has also been found to have played a role in increased individual medical care costs (Revicki et al., 2012).

2.2 Risk Factors

Many risk factors are associated with the development of GAD in men. One risk factor seems to be young age, as those most at risk for developing GAD are under the age of thirty-four, while no relationship has been found between age and the onset of GAD in individuals over the age of sixty-five (Moreno-Peral et al., 2014). However, it is difficult to determine if this pattern is related to age alone, or whether differences in other variables related to age that have been reported to increase the risk of GAD, such as exposure to work stress; growing up with a parent with a substance abuse disorder; being neglected; experiencing physical or sexual abuse; having divorced parents; and other stressful childhood (Moreno-Peral et al., 2014). Being widowed or divorced are also risk factors for GAD when compared with being married or having never married (Moreno-Peral et al., 2014). These findings could be explained by the potentially different levels of social support available to individuals based on their marital status. Other determinants that increase the risk of GAD include workplace factors such as emotional demands, tension with customers or colleagues, and lack of job security (Zimmermann et al., 2020). Individuals who have personality disorders, major depression, other anxiety disorders, or other mental health disorders are also more likely to develop GAD at some point in their life (Moreno-Peral et al., 2014). Lastly, loneliness has been deemed as the strongest predictor for the development of GAD (Flensborg-Madsen et al., 2012).

Multiple factors protect against the development of GAD. Among these identified factors, the most effective protective factor against GAD is social support (Maheux & Price, 2016). There

are many different forms of support systems that one encounters during their life, such as support found within the individual, their microsystem of friends and family, and their exosystem which includes their neighbours and community (Maheux & Price, 2016). One study looking at the influence social support exerts on GAD emphasized the importance of evaluating the effect that these multiple forms of support have on GAD development instead of just relying on a broad conceptualization of support (Schaefer et al., 2018).

2.3 Masculinity

Masculine ideology can be defined by societal beliefs about the way men should think, feel, and behave (Levant, Joel Wong, et al., 2015) While there are many conceptualizations and performances of masculinity that exist, in Western cultures, the most pervasive masculine ideology is the dominant form that is characterized by traditional and stereotypical masculine norms (Giaccardi et al., 2017). This predominant form of masculine ideology, which exists within Canada, emphasizes adhering to hegemonic masculine norms such as being tough, dominant, having power over women, restricting emotions, and avoiding all things perceived as feminine (Levant, Parent, et al., 2015; Thébaud, 2010). The form of masculine ideology that a man chooses to align with is likely to influence their behaviour, with those with traditional hegemonic masculine beliefs being more likely to participate in risky masculine behaviours such as smoking, maintaining an unhealthy diet, and being more likely to experience physical injuries from an accident (Garfield et al., 2008). Being masculine is not something one achieves solely from being born a male. Instead, it is associated with socio-cultural constructs, which have multiple culturally situated definitions of what it means to be a man (Berke et al., 2018). While many different conceptualizations of masculinity exist, common patterns of values and performances, which cross these conceptualizations include being courageous, assertive, aggressive, and stoic (McVittie et al., 2017). Sexuality, health, SES, and race appear to be the predominant factors that influence the views of men's masculinity in the Western world (McVittie et al., 2017).

A man's chosen masculine ideology influences how he demonstrates his masculinity, and has been found to influence the development of mental illnesses, with studies finding that both high and low masculine status can be associated with poor mental health outcomes (Apesoa-Varano et al., 2018; Neilson et al., 2020; Valkonen & Hänninen, 2013). One way this is exemplified is in how realized and unattained masculine goals have been associated with the development of depression (Valkonen & Hänninen, 2013). Men's perception that they have failed to meet what they perceive as their masculine requirements has also been associated with increased risk for suicide (Apesoa-Varano et al., 2018). One study conducted by Neilson et al., (2020) found that adherence to traditional masculine norms was positively associated with the severity of PTSD in veterans and was negatively associated with seeking out treatment. These findings have partially contributed to the negative connotations surrounding masculinity and the development and use of the term "toxic masculinity" in health literature as a possible contributor to the development of mental illness (Gordon, 2019; Parent et al., 2019). However, contrary to these findings is evidence that adhering to certain masculine ideologies may contribute to men's positive mental health with results from one systematic review suggesting a moderate and significant negative association between masculinity and depression (Lin et al., 2021). This is an area of research where more attention is needed.

Depression and anxiety are highly comorbid with epidemiological data showing that as many as 59% of patients who are diagnosed with GAD also meet the diagnostic criteria for major depressive disorder (MDD) (Zhou et al., 2017). Possible explanations for the comorbidity of depression and anxiety include familial and genetic predisposition, different manifestations of a shared neurobiological vulnerability, and influences from environmental factors, but an exact explanation is unclear (Pollack, 2005). Due to the strong associations that have been found between adherence to certain masculine ideologies and depression (Apesoa-Varano et al., 2018; Valkonen & Hänninen, 2013), it is reasonable to assume that a similar psychological connection could exist between masculinity and GAD. One possible reason for a connection between

masculinity and GAD could be related to masculinity's uncertain nature. Earning and then maintaining the status of being a "real man" is expected of men, and failing to do so can create anxious feelings, which in turn influence men to overcompensate for these feelings and motivate them to exaggerate their masculinity through a performance of protest masculinities (Cheryan et al., 2015; Connell, 1995; DiMuccio & Knowles, 2020).

2.4 Role of Racialization

A moderating variable is a variable that affects the strength and possibly the direction of the effect that an independent variable has on a dependent variable (Judd, 2001). An implied interaction is present between the moderating and independent variable when moderation is present (Judd, 2001). Characteristics of people is one example of a potential moderator.

Racialization is one social factor that could moderate the association between adherence to traditional masculine ideology and GAD. Race is a categorization of people into groups based on either shared physical or social qualities, such as skin colour or hair texture, that are generally viewed as distinct (Phelan et al., 2014). However, there does not exist any clear biological foundation for the concept of race, and it is often used to disadvantage certain groups within society (Berger & Sarnyai, 2014). A few reasons for why racialization could moderate the association between masculinity and GAD is that masculinity is significantly associated with race, as several studies have found that men's endorsement of masculine ideals differs among racial backgrounds (Levant et al., 2003). Hegemonic masculinities which include the subordination of both women and marginalized men of colour are the dominant forms of masculine ideology in the Western world and are primarily held by White men and possibly internalized by racialized men (David, 2014; Levant, et al., 2015). Men of colour are unlikely to achieve this masculine ideal, due to their status as racialized minorities, meaning they must develop their own culturally situated masculine ideologies (Harris et al., 2015; Levant, et al., 2015).

Racialization can also influence the development of GAD as racial discrimination can increase the anxiety levels of Canadian men of colour (Budhwani et al., 2015). Racial discrimination is the unequal distribution of power in societies from either phenomenological, ancestral, or cultural differences, and it can take the form of stereotyping and lower median income many among other things (Berger & Sarnyai, 2014). This is one possible explanation for why the association of men's masculine ideology and GAD may be moderated by racialization.

The immigration status of racial minorities might also explain why racialization could be a moderator for this association. Conforming to hegemonic masculine ideals can be an impossible task for immigrants as they also try to overcome racial stereotypes. One study found that stereotyping and marginalization of immigrant men lead to increases in stress and anxiety (Lu et al., 2013). However, another study reported contrasting results and showed a healthy immigrant effect was present with regard to immigrants and anxiety disorders (Salas-Wright et al., 2014).

CHAPTER 3: THE ASSOCIATION BETWEEN ALIGMENT TO TRADITIONAL MASCULINE IDEOLOGY AND GAD

3.1 INTRODUCTION

3.1.1 Background and significance

Compared to other diseases, mental health disorders have only obtained attention as a global health concern in the last few decades (Stuart, 2008). Mental health disorders are viewed as common and debilitating conditions that can lead to significant increases in healthcare utilization and cost (Watterson et al., 2017; World Health Organization, 2019). Anxiety disorders are the most prominent of these disorders, with GAD being the most common (Zimmermann et al., 2020). In Canada, the 12-month prevalence of GAD among men is 2.0% (95% CI, 1.6% to 2.3%), which is on the high end of international estimates (Watterson et al., 2017).

Anxiety is a normal part of life that can be beneficial (Coltrera, 2018). As a protective response to danger, anxiety can boost heartrate and breathing, which increases the flow of oxygenated blood to the muscles in preparation to fight or flee (Coltrera, 2018). Experiencing a little anxiety can be motivating to get to work on time, study hard, or finish projects in a timely manner. This normal anxiety is much different than the anxiety someone with GAD experiences. Common symptoms of GAD include elevated levels of anxiety which causes significant distress in social settings, being restless or irritable, and the inability to attribute these symptoms to substance abuse or other medical disorders (American Psychiatric Association, 2013).

GAD can contribute to societal problems by negatively affecting people's functional and occupational well-being and quality of life. This can lead to substantial economic cost that leads to greater use of health care services and decreased work productivity (Katzman et al., 2014). In the US, a nationally representative study found those with anxiety and depressive disorder had a

60% higher premature mortality rate than those without these illnesses (Pratt et al., 2016). This higher rate of premature mortality could be explained by potential factors on the causal pathway between anxiety and mortality including SES, high rates of comorbid physical illness, and unhealthy behaviours like substance abuse and low rates of exercise (Pratt et al., 2016).

There appears to be a steady rise in the incidence of anxiety disorders worldwide (Bandelow & Michaelis, 2015). The prevalence of anxiety disorders in the US alone increased from 5.12% in 2008 to 6.68% in 2018 with the largest increases of anxiety being found in the 18-25-year-old demographic (Goodwin et al., 2020). Similar increases have been found in Canada, with data from the Canadian Community Health Survey finding that anxiety disorders have been rising in Canada at a rate of approximately 0.26% - 0.55% per year since 2007 (Dobson et al., 2020). This increased prevalence of anxiety could be related to the corresponding increases in social isolation and decreases in social support and financial stability (Goodwin et al., 2020). Another explanation is that people are not actually experiencing higher rates of anxiety, but instead are more willing to seek out a diagnosis and treatment for their anxiety disorders than they used to be (Goodwin et al., 2020).

GAD is highly comorbid with other mental health disorders such as panic disorder, major depressive disorder (MDD), and substance abuse (Ruscio et al., 2017; Stein & Sareen, 2015). Headaches, muscle tension, gastrointestinal symptoms, back pain, and insomnia are physical complications that can also be found in patients suffering from GAD (Stein & Sareen, 2015). Further evidence shows that it can even increase the risk of mortality for patients with chronic illnesses (Stein & Sareen, 2015). Pratt et al., (2016) found that among people who died from cancer, heart disease, lung disease, and infection, those who were diagnosed with some form of anxiety disorder died significantly earlier than those who did not have an anxiety disorder. These authors suggest that the increased physical illness and unhealthy behaviours associated with anxiety and other mental disorders, contribute to these excess mortality rates.

GAD is also significantly associated with higher DALYs (Whiteford et al., 2013). Among mental disorders, anxiety disorders accounted for more global DALYs than drug use disorders, alcohol use disorders, eating disorders, childhood behavioural disorders, and pervasive developmental disorders (Whiteford et al., 2013). Studies have found that GAD also plays a part in the reduction of individuals' quality of life (Neilson et al., 2020; Revicki et al., 2012). Reduced health-related quality of life is reported in those suffering from GAD in the areas of general health, physical health, vitality, bodily pain, role functioning due to physical and emotional difficulties, and social functioning (Revicki et al., 2012). GAD has also been found to significantly increase average individual medical care cost. This can be seen in North America and Europe where patients in 2011 with GAD had a median medical care cost of $2,375 annually compared to an annual cost of $1,448 for those without GAD (Revicki et al., 2012).

GAD is often a chronic condition that people live with throughout their life. Different combinations of psychological and pharmacological treatments have shown to be effective in treating some cases of GAD (Katzman et al., 2014). The most common treatment used to treat GAD is cognitive-behavioural therapy (CBT), which involves efforts to help change the thinking patterns of patients (Borza, 2017). The length of CBT treatment for GAD varies from person to person, but most patients see great improvements within 6 months (Hofmann et al., 2012). Epidemiological studies in the US show that people living with GAD and other anxiety disorders die an average of eight years earlier than those without them (Pratt et al., 2016). Suicide is one plausible reason for earlier death as large surveys have found those with GAD and other related disorders were at 1.7-2.5 times higher odds of suicide attempts than those without them (Katzman et al., 2014). Another study found that having GAD and other anxiety disorders also increased the risk of mortality from accidents, homicide, digestive conditions, and cardiovascular disease (Meier et al., 2016).

3.1.2 Masculine ideology

Masculine ideology is defined by societal beliefs about the way men should think, feel, and behave (Levant, Joel Wong, et al., 2015). Multiple conceptualizations of masculinity exist, with the dominant form of masculine ideology in Western cultures being characterized by stereotypical and traditional masculine norms (Giaccardi et al., 2017). Traditional masculine ideology in Canada and the US include the beliefs regarding the importance of adhering to hegemonic masculine norms like power over women, bread-winning, toughness, brutality, and emotional inexpressiveness, among other things, with these ideas of masculinity also extending to Asia and Europe (Levant, Parent, et al., 2015; Thébaud, 2010). The masculine ideology that men hold is likely to influence their behaviour. For example, men that embrace traditional masculine beliefs are more likely to participate in risky masculine behaviours, including smoking, engaging in a poor diet, and having a higher risk for physical injury from an accident (Garfield et al., 2008). Being masculine is not something achieved solely from being male. It is a socio-cultural construct with different definitions of what being masculine means that vary from culture to culture (Berke et al., 2018). Common characteristics of masculinity that can be found worldwide include being assertive, aggressive, courageous, invulnerable to forms of threat, and stoic (McVittie et al., 2017). In the Western world, a man's view of their masculinity is influenced by sexuality, health, SES, and race (McVittie et al., 2017).

3.1.3 Anxiety and masculinity

Masculine ideology, and how a man demonstrates his masculinity, can influence the development of mental illnesses. Both high and low masculine status have been associated with poor mental health outcomes (Apesoa-Varano et al., 2018; Neilson et al., 2020; Valkonen & Hänninen, 2013). An example of this is how depression has been associated with realized and unattained masculinity goals (Valkonen & Hänninen, 2013). There is also a possible association between masculinity and suicide due to men feeling like they have failed in meeting their desired masculine requirements (Apesoa-Varano et al., 2018). Further evidence suggests that following

traditional masculine norms is positively associated with veterans' PTSD severity and negatively associated with treatment engagement (Neilson et al., 2020). This has all led to negative connotation around masculinity, with "toxic masculinity" often being referenced in health literature as a contributor to mental illness (Gordon, 2019; Parent et al., 2019; Waling, 2019). Contrarily, there is also evidence that masculinity can positively affect men's mental health which is an area of research that requires more focus. One systematic review found a moderate and significant negative association between masculinity and depression (Lin et al., 2021).

A high comorbidity exists between depression and anxiety, with epidemiological data showing that 59% of patients who are diagnosed with GAD also meet the criteria to be diagnosed with MDD (Zhou et al., 2017). While it is not entirely clear why comorbid depression and anxiety is so common, familial and genetic predisposition, different manifestations of a shared neurobiological vulnerability, and the influence of environmental factors have all been considered (Pollack, 2005). As there are associations found between masculinity and depression, it would be reasonable to assume that there would be a similar psychological connection that exists between GAD and masculinity. One explanation for this connection between GAD and masculinity could be due to the precarious nature of masculinity. Men are expected to earn and continuously maintain their status as a "real man" and failing to reach the cultural expectations of masculinity can create feelings of anxiety, which in turn may trigger men to overcompensate for these feelings by motivating them to over exaggerate their masculinity (Cheryan et al., 2015; DiMuccio & Knowles, 2020).

Despite what is known about how masculinity affects different mental health outcomes, to date few studies have examined the association between masculinity and GAD. This lack of evidence is surprising given the connections that that been found between masculinity and other mental illnesses (Apesoa-Varano et al., 2018; Lin et al., 2021; Parent et al., 2019). Additionally, most current health research studies that have looked at the effects that masculinity plays on the

mental health of men have taken a qualitative approach (Affleck et al., 2018; Mckenzie et al., 2016; Mincey et al., 2014). This study uses a quantitative approach, which is beneficial for quantifying the association between masculinity and GAD. Knowledge gained from this study can be used to help better explain the effect masculinity has on men's mental health and further change the stigma surrounding it. The aim of this study is to examine the following questions: (1) Is there an association between alignment to traditional masculine ideology and GAD in Canadian men between the ages of 18 and 65? (2) Qualitatively, how do men self-define their own masculinity? (3) Is there an association between a man's own view of his masculinity and GAD in Canadian men between the ages of 18 and 65?

3.2 METHODS

3.2.1 Research ethics approval

This study was conducted in accordance with the Tri-Council Policy Statement: Ethical Conduct for research Involving Humans. Prior to starting the study, electronic informed consent forms were provided to all participants with details of the study, the length of the survey, and any potential risks to the participants. All participants and their responses remained anonymous throughout.

3.2.2 Study design

A cross-sectional study was chosen to assess the prevalence of GAD in the sample at a given point in time, while also allowing for the exploration of the strength and direction of the association between adherence to traditional masculine norms and GAD while controlling for potential covariates. The study was conducted using the Strengthening and Reporting of Observational studies in Epidemiology (STROBE) guidelines for cross-sectional studies to ensure that it was the highest possible quality (Vandenbroucke et al., 2007).

3.2.3 Setting

The study was based at the University of Lethbridge, and 1,200 adults were recruited from across Canada. Data were collected using an online questionnaire that was distributed through Leger, which is the largest survey, market research, and analytic company in Canada (Leger, 2019). Data collection took place from July 22nd – August 9th, 2022. The survey took participants approximately 15-20 minutes to complete.

3.2.4 Participants

The inclusion criteria for this study were (1) participants must be between the ages of 18 and 65 and living in Canada, (2) participants must not be currently living in the northern territories, and (3) participants also had to report being heterosexual and identify exclusively as male. Participants who did not meet the inclusion criteria were excluded from the study. Participants for the study were collected through a volunteer convenience sample. The sample was collected with the help of Leger, which has a panel of over 400,000 members across the country (Leger, 2019). Once the potential participants received their survey, they filled out a screening form that determined their eligibility to take part in the study.

3.2.5 Data collection

Between July 22nd and August 9th, Leger distributed a link to all their members who met the inclusion criteria for the study, which directed them to the study's survey on the online survey platform, Qualtrics. The survey took approximately 20 minutes for participants to complete. Missing data was avoided by participants not being allowed to move on in the survey until they had answered every question. Participants were incentivized to complete it by receiving Leger Opinion (LEO) points that can be redeemed for cash, gift cards, Aeroplan points, or AIR MILES reward miles. Data collection ended once 1,200 participants had responded to the survey.

3.2.6 Measures

Outcome: GAD

The Generalized Anxiety Disorder – 7 (GAD-7) was used to assess GAD among participants (Spitzer et al., 2006). The scale examines the frequency of GAD symptoms over the previous 2 weeks (Rutter & Brown, 2016). Examples of GAD symptoms include "Feeling nervous, anxious, or on edge" and "Trouble relaxing" (Rutter & Brown, 2016). Participants responded on a unipolar scale, which measures the absence or presence of an attribute that ranges from 0 (never) to 3 (nearly every day), with a final score up to 21 being given (Kroenke et al., 2010). Higher scores equate to higher levels of anxiety symptoms (Kroenke et al., 2010).

This scale was chosen to measure the probable cases of GAD because it has only seven questions, requires less than three minutes to complete, and has good psychometric properties (Mossman et al., 2017; Rutter & Brown, 2016). The GAD-7 shows strong reliability and concurrent validity when measuring for anxiety when compared to several similar scales such as the Depression Anxiety Stress Scales and the Penn State Worry Questionnaire (Rutter & Brown, 2016). The Cronbach's alpha of the scale has been found to range from 0.79-0.91 (Williams, 2014). Cronbach's alpha is a measure ranging from zero to one that assess the internal consistency of a scale (Taber, 2018). The closer to one the Cronbach's alpha is the more the items in the scale have a shared covariance and likely measure the same underlying concept (Taber, 2018). Through a criterion-standard study performed in 15 primary care clinics in the US of 2,740 female and male patients, as well as from data of a multi-site randomized clinical trial of 622 patients from eight universities throughout Germany, this scale was shown to have high sensitivity (89%) and specificity (82%), with no difference in cut-off scores between males and females (Spitzer et al., 2006; Toussaint et al., 2020). The sensitivity and specificity for the scale comes from comparisons to the Medical Outcomes Study Short-Form General Health Survey, the 12-item anxiety subscale from the Symptom Checklist-90, and the Beck Anxiety Inventory (Spitzer et al., 2006).

Exposure: Traditional Masculinity

Participant's alignment to traditional masculine norms was measured using the Male Role Norms Inventory-Short Form (MRNI-SF). The MRNI-SF includes seven sections with three questions in each section for a total of 21 questions (Levant et al., 2013). These seven sections include the avoidance of femininity, negativity towards sexual minorities, self-reliance through mechanical skills, toughness, dominance, importance of sex, and restrictive emotionality (Levant et al., 2013). Items for the MRNI-SF were chosen to best capture the specific construct of masculinity and to avoid any redundancy (Levant et al., 2013). Sample questions from the scale include "Men should be the leader in any group" and "Men should have home improvement skills" which are then followed with a Likert scale that ranges from 1 (strongly disagree) to 7 (strongly agree), with the final scores of the MRNI-SF ranging from 21 to 147 (Levant et al., 2013). Participants who have a final score of 84 or higher are deemed to conform to traditional Western masculine norms (Levant et al., 2013).

Numerous studies have utilized the MRNI scales, allowing for a broad perspective on reliability (McCurdy et al., 2019). The MRNI-SF has been found to have a strong Cronbach's Alpha ranging from 0.92-0.96 (McCurdy et al., 2019). Due to these psychometric properties, the MRNI, and its different versions like the MRNI-SF, are the most commonly used scales to measure traditional masculinity (Gerdes et al., 2018; Levant, Joel Wong, et al., 2015; Thompson et al., 2015).

Exposure: Self-Rated Masculinity

While the MRNI-SF is frequently used in research to assess masculinity, it solely evaluates the traditional form of masculinity. Since there are various constructs of masculinity, it was deemed necessary for participants to offer their own interpretation of masculinity during the survey. This allowed them to rate their masculinity based on their personal definition of the construct. Consequently, participants received a score reflecting both the traditional form of

masculinity and their own self-evaluated masculinity, allowing for a nuanced understanding of how different forms of masculinity might be associated with GAD.

3.2.7 Sample size

Alignment to traditional masculine norms and GAD are both continuous variables due to the scales that were used to measure them. A correlation coefficient was used to conduct a power calculation. There was an expectation of a medium effect size between adherence to traditional masculine norms and GAD of $r = 0.3$. This correlation was determined from a systematic review that found a negative correlation of 0.27 between masculinity and depression (Lin et al., 2021). Given that multiple studies have found depression and anxiety to be strongly correlated (Lin et al., 2021; Ruscio et al., 2017), a similarly sized correlation to masculinity and depression was expected to be found between masculinity and GAD. With this information, a total sample size of 85 adults was determined to be needed to achieve a two-tailed $\alpha = 0.05$, $\beta = .20$, and an estimated Cohen's d effect size of 0.3 (Hulley et al., 2013; Kang, 2021; Lin et al., 2021). With the help of Leger, this study achieved a larger sample size of 1,200 participants, which allowed for controlling of a range of potential confounders.

3.2.8 Data management and control

The survey used for the present study was created using the University of Lethbridge's Qualtrics survey platform. Qualtrics' servers are protected by firewall systems with scans being regularly performed to find and correct any vulnerabilities, and access to systems are restricted to only those who need-to-know such information and who are bound by confidentiality obligations (Qualtrics, 2021). The survey was distributed by Leger which uses cloud-based security and utilizes System and Organization Controls certified data centres which comply with many physical and logistical security certifications (Leger, 2022). Data were then stored on Leger's servers, and on the researcher's secure Qualtrics account.

3.2.9 Bias

Participation bias needed to be considered for this study as participants volunteered for this study, meaning that those who chose to take part may have shared similar characteristics, differentiating them from those who did not volunteer to take part (i.e., similar socio-economic statuses) (Institute for Work & Health, n.d.). This means that the sample could not be considered a true random representation of the Canadian population. This is exemplified in Quebec making up only 2.9% of the sample, likely due to Leger excluding their pane participants who prefer to respond to surveys in French. Attempts were made to mitigate this by collecting data using Leger, which allowed access to a national and diverse sample of Canadian men who had varying demographic characteristics. Having a large sample size further mitigated the risk of error brought in from a non-random sample (Institute for Work & Health, n.d.).

The subject matter of the survey could also have made some participants uncomfortable. Participants may thus have been influenced by social desirability bias, leading them to respond in a manner that reflects societal expectations rather than their true feelings. This form of bias was minimized in this study, as the participants were able to answer the questions anonymously through an online Leger survey and were never in direct contact with the researcher. Leger members are also required to complete an online survey every three months in order to keep their account active, which means they would be accustomed to completing surveys which may provoke varying levels of discomfort (Leger, 2019). However, bias was still possible as participants may have chosen to answer in a way that did not reflect their actual beliefs.

Response bias may also have played a role within this study. This form of bias occurs if participants provide responses to the survey based on the structure and language of the questions, which do not match their true beliefs (Qualtrics, n.d.). This includes extreme response bias (choosing an extreme value to answer a question with a scale), neutral response bias (participants picking a neutral position on a Likert scale), and acquiescence bias (the

tendency for participants to agree with the survey questions). An attempt was made to reduce this bias as Leger was able to flag and remove any members who frequently complete surveys quicker than expected, or who have contradictory survey responses.

3.3.10 Statistical Analysis

To determine the prevalence of probable cases of generalized anxiety disorder (GAD), a cut-off value of 10 from the Generalized Anxiety Disorder-7 (GAD-7) was used. Histograms were also created to visually show the distribution of participants' GAD-7 and Male Role Norms Inventory-Short Form (MRNI-SF) scores. A simple linear regression analysis was then conducted to examine the association between MRNI-SF score and GAD-7 score. The correlation between these two variables was further represented visually using a scatterplot and a fitted line graph. To understand how specific male role norms correlated with GAD symptom severity among Canadian men, a simple linear regression analysis of anxiety score was conducted with each subscale of the MRNI.

The second phase of this study involved using a multiple linear regression model to identify the association between participants' alignment to traditional masculine norms and GAD symptoms. Potential confounding variables including age, employment status, immigrant status, income category, education, marital status, military status, and other mental health conditions were controlled for. Nonlinearity was addressed using a quadratic term, nonnormality was determined using a kernel density estimate, and then addressed by adding a bootstrap model. A residual versus fitted plot was used to demonstrate that there was not constant variance, which was then managed using robust standard errors. Outliers were detected using DFBETA statistics, and the greatest outliers were omitted. The model was stratified into different age groups for analyses.

When exploring the association between participants' self-rated masculinity and GAD, their responses for how they defined masculinity were analyzed using a thematic analysis

approach. The researcher manually went through the participants' definitions of masculinity to code relevant excerpts to eventually create collective categories and themes that articulated the respondents' common understanding of masculinity. Participants were then asked to rate how masculine they were based on their own definition on a scale from 1-10. A simple linear regression analysis was then conducted to measure the association between participants' self-masculinity rating and their anxiety score. Age, employment status, immigrant status, income category, education, marital status, military status, and other mental health diagnoses were added to the model, and a multiple linear regression was conducted. This allowed for a comprehensive understanding of how different forms of masculinity may impact anxiety.

3.3 RESULTS

3.3.1 Overall

As shown in **Table 1**, over half of the participants lived in Ontario, followed by British Columbia, and then Alberta. The majority were Caucasian, followed by Asian or South Asian. Most participants reported being married, not being immigrants, and being employed.

Table 1

Characteristics of Study Participants

Variable	Sample M (SD)/ *n* (%)
MRNI-SF score	67.8 (22.9)
Self-reliance through mechanical skills	4.41 (1.37)
Toughness	3.81 (1.47)
Importance of sex	3.24 (1.52)
Avoidance of femininity	3.24 (1.59)
Restrictive Emotionality	2.84 (1.30)
Negativity towards sexual minorities	2.73 (1.77)
Dominance	2.34 (1.48)
GAD-7 score	4.3 (4.9)
Age range (years)	44.3 (12.6)

Provincial location	
Ontario	614 (51.2%)
British Columbia	187 (15.6%)
Alberta	180 (15.0%)
Manitoba	49 (4.1%)
New Brunswick	38 (3.2%)
Saskatchewan	37 (3.1%)
Nova Scotia	35 (2.9%)
Quebec	35 (2.9%)
Newfoundland and Labrador	22 (1.8%)
Prince Edward Island	3 (0.3%)
Income category	
Upper income	30 (2.5%)
Upper-middle income	202 (16.8%)
Middle income	602 (50.2%)
Lower-middle income	226 (18.8%)
Lower income	140 (11.7%)
Education	
Some high school	21 (1.8%)
High school diploma	162 (13.5%)
Some university/college	195 (16.3%)
University or college degree/diploma	598 (49.8%)
Some graduate school	55 (4.6%)
Graduate school degree	169 (14.1%)
Racialization status	
White	798 (66.5%)
Asian	187 (15.6%)
South Asian	83 (6.9%)
Mixed Race/Ethnicity	24 (2.0%)
African-Canadian	24 (2.0%)
Middle Eastern	20 (1.7%)

Latino	18 (1.5%)
Indigenous	18 (1.5%)
Other	28 (2.3%)
Marital status	
Married	648 (54.0%)
Single and never married	345 (28.8%)
Living common law	116 (9.7%)
Divorced/separated	80 (6.7%)
Widowed	11 (0.9%)
Employment	
Employed	976 (81.3%)
Unemployed	224 (18.67%)
Immigrant	
No	922 (76.8%)
Yes	278 (23.2%)
Language	
English	975 (81.3%)
French	46 (3.8%)
Other	179 (14.9%)
Served in the military	
No	1118 (93.2%)
Yes	82 (6.8%)

The mean (SD) GAD-7 score was 4.3 (4.9) out of 21. This mean score was approximately four points lower than similar studies that have used the GAD-7 (Dhira et al., 2021; Johnson et al., 2019; Lee et al., 2022). The prevalence of probable cases of GAD was 14.6% (n = 175) (Williams, 2014). The mean (SD) total score of the MRNI-SF was 67.8 (22.9) out of 147. When examining each subcategory of the MRNI-SF, each of these scores were similar to mean scores from other similar studies that used the MRNI-SF to measure masculinity (George & Loosemore, 2019; Lease et al., 2019; Levant et al., 2013). **Figures 1 and 2** show histograms

that provide more information on the distribution of participants' GAD-7 and MRNI-SF scores. The GAD-7 score is highly skewed to the right demonstrating lower overall GAD-7 scores. This tendency for participants' answers to accumulate in the lower rating categories was typical in other studies that used the GAD-7 (García-Campayo et al., 2010; Li et al., 2020; Mousa et al., 2016).

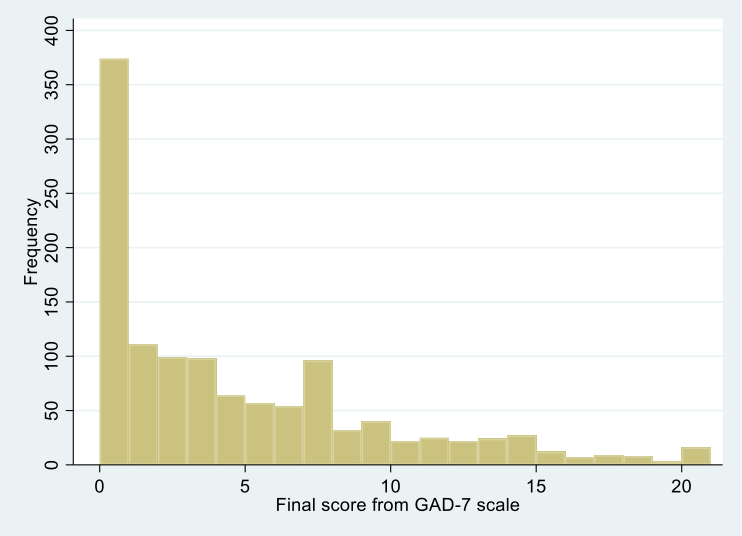

Figure 1: Distribution of GAD-7 Scores

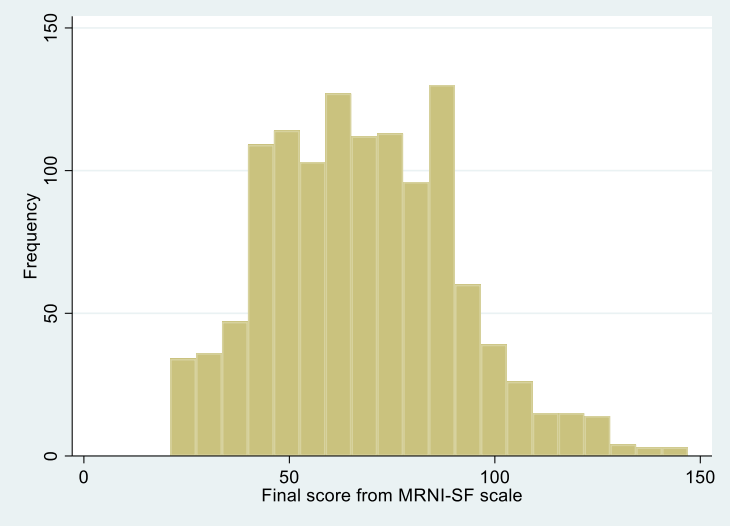

Figure 2: Distribution of MRNI-SF Scores

3.3.2 Simple linear regression analysis of anxiety

As shown in **Table 2**, a simple linear regression analysis examined the association between masculinity score, as measured by the MRNI-SF, and anxiety score, as measured by the GAD-7. The first objective was to assess the association between participants' masculinity score and anxiety scores. A weak but statistically significant positive correlation was found (β = 0.01, 95% CI: 0.00 – 0.02). **Figure 3** shows a visual representation of this correlation using a scatterplot and a fitted line. To further understand how specific male role norms correlated to GAD symptom severity among Canadian men, a simple linear regression analysis of anxiety score was done with each subscale of the MRNI. Restrictive emotionality (β = 0.26, 95% CI: 0.05 – 0.47), dominance (β = 0.29, 95% CI: 0.10 – 0.47), and toughness (β = 0.24, 95% CI: 0.06 – 0.43) were all statistically significant, with a weak positive correlation to anxiety score. Self-reliance through mechanical skills (β = 0.11, 95% CI: -0.09 – 0.32), negativity towards sexual minorities (β = 0.08, 95% CI: -0.08 – 0.24), avoidance of femininity (β = 0.01, 95% CI: -0.16 – 0.19), and importance of sex (β = 0.04, 95% CI: -0.15 – 0.22) were positively but not significantly correlated with GAD-7 score. Participants' age, provincial location, income category, racialization, and marital status were also significantly associated with participants' anxiety score.

Table 2

Independent Predictors for GAD-7 Score

Sociodemographic Characteristics	GAD-7 Score				
				95% CI	
	Adj R^2	SE	β	Lower	Upper
MRNI-SF score	< 0.01	0.01	**0.01**	< 0.01	0.02
Restrictive emotionality		0.11	**0.26**	0.05	0.47
Self-reliance through mechanical skills		0.10	0.11	-0.09	0.32

Negativity towards sexual minorities		0.08	0.08	-0.08	0.24
Avoidance of femininity		0.09	0.01	-0.16	0.19
Importance of sex		0.09	0.04	-0.15	0.22
Toughness		0.10	**0.24**	0.06	0.43
Dominance		0.10	**0.29**	0.10	0.47
Age	-0.20	0.11	**-0.08**	-0.10	-0.06
Provincial location	< -0.01				
Ontario		-	-	-	-
Alberta		0.41	-0.38	-1.19	0.43
British Columbia		0.41	-0.04	-0.84	0.77
Manitoba		0.73	0.34	-1.09	1.76
New Brunswick		0.82	-0.77	-2.37	0.84
Newfoundland and Labrador		1.1	0.43	-1.65	2.51
Nova Scotia		0.85	-0.11	-1.78	1.56
Prince Edward Island		2.83	-3.48	-9.04	2.08
Quebec		0.85	**-1.96**	-3.63	-0.30
Saskatchewan		0.83	-0.88	-2.51	0.74
Income category	0.04				
Middle income		-	-	-	-
Lower income		0.45	**2.68**	1.80	3.56
Lower-middle income		0.37	**0.81**	0.07	1.54
Upper-middle income		0.39	**-0.97**	-1.74	-2.09

Upper income		0.90	-0.67	-2.43	1.09
Education	0.01				
University/college diploma		-	-	-	-
Some high school		1.08	0.43	-1.70	2.55
High school diploma		0.43	**0.91**	0.06	1.76
Some university/college		0.40	0.61	-0.18	1.40
Some graduate school		0.69	**2.22**	0.87	3.57
Graduate school degree		0.42	0.58	-0.25	1.41
Racialization status	0.01				
White		-	-	-	-
Asian		0.40	0.49	-0.28	1.27
South Asian		0.56	**1.46**	0.36	2.56
Indigenous		1.16	2.26	-0.02	4.53
African-Canadian		1.01	**2.52**	0.54	4.50
Middle Eastern		1.10	-0.77	-2.93	1.39
Latino		-1.24	-1.24	-3.52	1.03
Mixed Race/Ethnicity		1.01	1.02	-0.96	3.00
Other		0.94	**1.98**	0.14	3.82
Marital status	0.01				
Married		-	-	-	-
Living common law		0.49	0.18	-0.78	1.14
Single and never married		0.32	**1.32**	0.68	1.95

Divorced/separated		0.58	0.80	-0.33	1.93
Widowed		1.48	0.78	-2.13	3.68
Immigrant	< -0.01				
Yes		-	-	-	-
No		0.34	-0.12	-0.77	0.54
Employment status	< -0.01				
Employed		-	-	-	-
Unemployed		0.36	0.24	-0.48	0.95
First Language	< -0.01				
English		-	-	-	-
French		0.74	-0.53	-1.98	0.92
Other		0.40	-0.29	-1.07	0.49
Served in the military	< -0.01				
No		-	-	-	-
Yes		0.56	0.14	-0.96	1.24

Note. β unstandardized beta weight; CI confidence interval; SE standard error.

Statistically significant variables presented in bold.

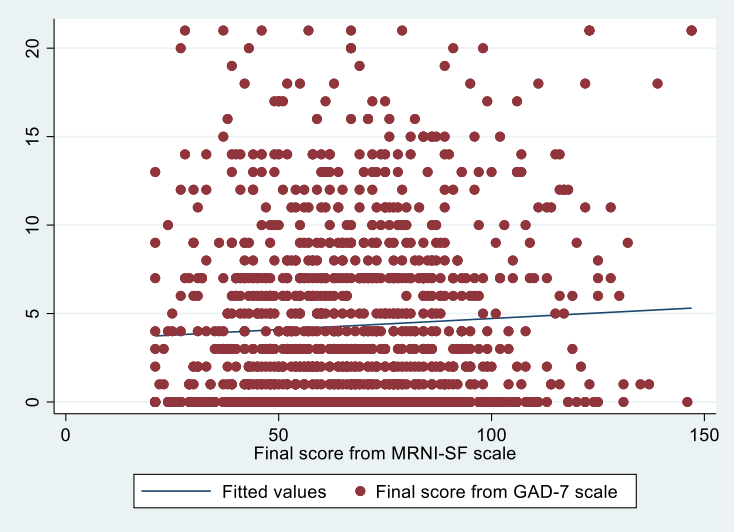

Figure 3: Unadjusted Association Between MRNI-SF Score and GAD-7 Score

3.3.3 Adjusted association between traditional masculinity and anxiety score

The second phase of this study involved using a multiple linear regression model to identify the association between participants' alignment to traditional masculine norms and GAD symptoms. Potential confounding variables controlled for included age, employment status, immigrant status, income category, education, marital status, military status, and other mental health conditions. It should be noted that only age, employment status, and immigration status were identified as potential confounding variables when directed acyclic graphs were used to determine which variables needed to be controlled for in the model (see Appendix B). Age was also the only variable that met Greenland's rule for confounding. This means that the other included confounding variables likely exerted little effect on this association. As shown in **Table 3**, the MRNI masculinity score was weakly and positively associated with the anxiety score in a model adjusted for covariates.

Table 3

Association Between MRNI-SF Score (or Covariates) and GAD-7 Score Estimated by Multiple Linear Regression

Sociodemographic Characteristics	GAD-7 Score				
				95% CI	
	Adj R^2	SE	β	Lower	Upper
Full sample	0.22				
MRNI-SF score		0.01	**0.02**	0.01	0.03
Age		0.01	**-0.07**	-0.09	-0.04
Employment status					
Employed		-	-	-	-
Unemployed		0.35	-0.66	-1.36	0.03
Immigrant					
No		-	-	-	-
Yes		0.31	-0.09	-0.70	0.53
Income					
Middle income		-	-	-	-
Lower income		0.45	1.89	1.00	2.78
Lower-middle income		0.34	0.66	-0.02	1.33
Upper-middle income		0.36	-0.94	-1.64	-0.24
Upper income		0.82	-0.93	-2.54	0.68
Education					
University/college diploma		-	-	-	-

Some high school	0.98	-0.55	-2.46	1.37
High school diploma	0.40	<-0.01	-0.79	0.78
Some university/college	0.37	-0.20	-0.92	0.52
Some graduate school	0.62	**1.28**	0.08	2.49
Graduate school degree	0.39	**0.86**	0.11	1.62
Marital status				
Married	-	-	-	-
Living common law	0.45	-0.01	-0.89	0.86
Single and never married	0.32	0.07	-0.56	0.71
Divorced/separated	0.53	0.09	-0.94	1.13
Widowed	1.33	<-0.01	-2.61	2.60
Served in the military				
No	-	-	-	-
Yes	0.51	0.17	-0.82	1.16
Other mental health conditions				
No	-	-	-	-
Yes	0.34	**4.87**	4.20	5.54

Note. β unstandardized beta weight; CI confidence interval; SE standard error.

Statistically significant variables presented in bold.

Nonlinearity was observed using a LOWESS curve as seen in **Figure 4**. Following recommendations for dealing with nonlinearity (Garson, 2012), a quadratic term was added to the model and all analyses were conducted with transformed and untransformed data.

Nonnormality was determined using a kernel density estimate, and then was addressed by adding a bootstrap to the model. A residual versus fitted plot was then used to demonstrate that there is not constant variance in the model. This was managed using robust standard errors. Lastly, outliers were also detected using DFBETA statistics. By omitting the greatest outliers, a sample of 1,163 was left. Addressing nonlinearity, nonnormality, nonconstant variance, and outliers increased the adjusted R^2 of the model from 0.22 to 0.25. After these changes were added to the model, it still showed a weak but significant positive association existed between participants' masculinity score and GAD-7 score (β = 0.01, 95% CI: 0.00 – 0.02).

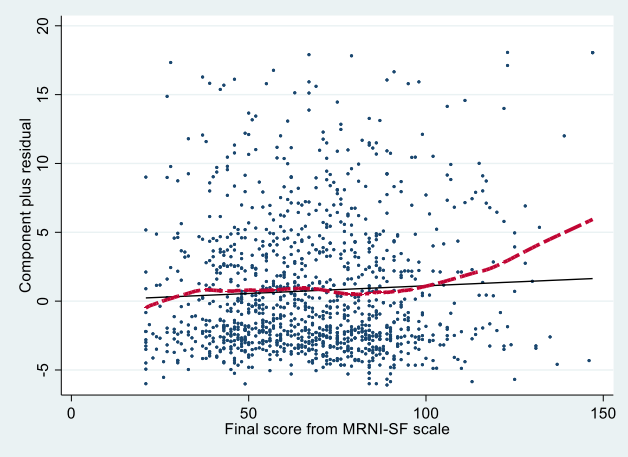

Figure 4: Lowess Curve for Association Between MRNI-SF Score and GAD-7 Score

Table 4 then shows the results from each MRNI-SF subcategory being included in the multiple regression in place of the total masculinity score. When each MRNI-SF subscale was included individually into multiple linear regression, every subscale other than avoidance of femininity were found to have a weak but significant correlation to GAD. Restrictive emotionality (β = 0.29, 95% CI: 0.10 – 0.48), toughness (β = 0.24, 95% CI: 0.07 – 0.41), and dominance (β = 0.30, 95% CI: 0.13 – 0.47) were the most correlated.

Table 4

Association Between MRNI-SF Subscales and GAD-7 Estimated by Multiple Linear Regression

MRNI Subcategory	GAD-7 Score				
				95% CI	
	Adj R^2	SE	β	Lower	Upper
Restrictive emotionality	0.22	0.10	**0.29**	0.10	0.48
Self-reliance through mechanical skills	0.21	0.09	**0.22**	0.04	0.41
Negativity toward sexual minorities	0.21	0.07	**0.15**	<0.01	0.29
Avoidance of femininity	0.21	0.08	0.13	-0.03	0.28
Importance of sex	0.21	0.08	**0.20**	0.04	0.37
Toughness	0.22	0.09	**0.24**	0.07	0.41
Dominance	0.22	0.09	**0.30**	0.13	0.47

Note. Age, employment status, immigration status, income category, education, marital status, military status, and other mental health conditions are included in each regression. β unstandardized beta weight; CI confidence interval; SE standard error.

Statistically significant variables presented in bold.

The model was then split into different age groups for analysis. **Table 5** shows that only participants between the ages of 46 and 55 had statistically significant results, with a weak correlation between their masculinity and anxiety scores (β = 0.04, 95% CI: 0.02 – 0.06). The adjusted R^2 for this age group was 0.25, which means that the model was able to explain 25% of the variation in participants' anxiety scores, while the remaining 75% was attributed to other factors.

Table 5

Results of Multiple Linear Regression Analysis for GAD-7 Stratified by Age Groups

Age Category	Sociodemographic Characteristics	GAD-7 Score				
					95% CI	
		Adj R^2	SE	β	Lower	Upper
18-25	Full sample	0.10				

	MRNI-SF score		0.02	0.03	-0.01	0.07
	Employment status		1.07	**2.21**	0.08	4.35
	Immigrant		1.22	1.33	-1.08	3.75
	Income		0.50	0.56	-0.43	1.55
	Education		0.47	0.91	-0.03	1.84
	Marital status		0.77	0.77	-1.93	1.13
	Military		2.22	-0.31	-4.72	4.09
	Other mental health diagnosis		1.29	**-3.07**	-5.63	-0.51
26-35	Full sample	0.18				
	MRNI-SF score		0.01	<0.01	-0.02	0.03
	Employment status		1.11	0.91	-1.28	3.09
	Immigrant		0.67	<0.01	-1.32	1.32
	Income		0.33	**1.22**	0.56	1.87
	Education		0.26	-0.13	-0.65	0.39
	Marital status		0.29	**0.64**	0.06	1.22
	Military		1.56	1.85	-1.22	4.91
	Other mental health diagnosis		0.75	**-4.48**	-5.96	-3.00
36-45	Full sample	0.27				
	MRNI-SF score		0.01	0.02	<-0.01	0.04
	Employment status		1.08	-1.47	-3.59	0.65
	Immigrant		0.60	-0.11	-1.28	1.06

	Income		0.33	**0.88**	0.23	1.54
	Education		0.25	**0.64**	0.15	1.13
	Marital status		0.28	0.30	-0.24	0.85
	Military		1.48	**-4.04**	-6.96	-1.12
	Other mental health diagnosis		0.73	**-5.48**	-6.91	-4.05
46-55	Full sample	0.25				
	MRNI-SF score		0.01	**0.04**	0.02	0.06
	Employment status		0.76	1.06	-0.43	2.55
	Immigrant		0.64	-0.71	-1.97	0.54
	Income		0.30	**0.69**	0.11	1.27
	Education		0.22	0.31	-0.13	0.75
	Marital status		0.22	-0.35	-0.79	0.09
	Military		0.88	0.14	-1.58	1.86
	Other mental health diagnosis		0.66	**-6.23**	-7.52	-4.93
56-65	Full sample	0.14				
	MRNI-SF score		0.01	0.01	-0.02	0.03
	Employment status		0.48	0.24	-0.71	1.20
	Immigrant		0.64	0.17	-1.08	1.43
	Income		0.28	0.54	-0.01	1.09
	Education		0.20	0.07	-0.33	0.47

	Marital status	0.22	-0.09	-0.53	0.36
	Military	0.73	0.26	-1.18	1.70
	Other mental health diagnosis	0.69	**-4.12**	-5.48	-2.77

Note. β unstandardized beta weight; CI confidence interval; SE standard error.
Statistically significant variables presented in bold.

3.3.4 Participants' self masculinity rating

Within the survey, participants were also asked to provide their own definition of how they considered their masculinity should be measured. Some of the participants' definitions of what it meant to be masculine aligned with the ideas of traditional masculine norms that are present within the MRNI-SF, while others departed from these norms. The most prevalent theme that emerged that aligned with traditional masculine norms was that men are leaders (9.3%). Men being leaders is related to the MRNI-SF subcategory of dominance which includes the ideas of the President of the US always being a man, that men should be the leader in any group, and that a man should always be the boss (Levant et al., 2013). The second most prevalent theme that emerged that aligned with traditional masculine norms and the beliefs of the MRNI-SF was being tough (4.7%). The MRNI-SF subcategory of toughness involves the beliefs that men should take risks, that men should remain tough through hard times, and that young men should be physically tough regardless of their size (Levant et al., 2013). The third most prevalent theme relating to traditional masculine norms that emerged was simply that men should conform to societal views of masculinity (4.0%). Further themes aligned with traditional masculine norms, along with a quote provided by a participant related to that theme, are shown in **Table 6**.

Table 6

Themes of Masculinity That Align With Traditional Masculine Norms

Number	%	Theme and Supporting Quotations
Theme 1	9.3%	**Leadership** "A man is a leader and smart. He weighs out all his options and makes an informed decision and will never back down when the going gets tough…a man finds a way to succeed."
Theme 2	4.7%	**Toughness** "He should be tough and handle anything that comes at him."
Theme 3	4.0%	**Conforming to societal views of masculinity** "Masculinity (also called manhood or manliness) is a set of attributes, behaviors, and roles associated with men and boys."
Theme 4	3.7%	**Brashness** "Someone who can stand up for himself, think what he says, and says what he thinks…"
Theme 5	3.4%	**Hard working** "Someone who takes care of physical duties and dirty/tough jobs."
Theme 6	2.8%	**Emotional control** "Hiding feelings around others when feelings are hurt…"
Theme 7	2.3%	**Desires/desired by women** "Men should be physically attracted to women."
Theme 8	1.5%	**Competitiveness** "…I think participating in sports/competition also plays a role in the idea of masculinity."

A higher prevalence of themes were found that departed from how traditional masculinity was measured using the MRNI-SF. The most prominent of these being that men should be caring (12.1%). This was followed by men should be themselves (11.4%) and that they should be physically healthy (9.4%). Further themes and participant's quotes are shown in **Table 7**. There were also 241 (20.1%) of participants who either chose not to answer this question or did not provide a clear response to the question.

Table 7

Themes of Masculinity that Depart from Traditional Masculine Norms

Number	%	Theme and Supporting Quotations
Theme 1	12.1%	**Caring** "Being caring, empathetic and sincere."
Theme 2	11.4%	**Being yourself** "He stays true to himself and lives his life the way he honestly is compelled to live."
Theme 3	9.4%	**Physically healthy** "He needs to be fit and healthy."
Theme 4	6.7%	**Responsible for family** "A man cares for his family. It does not matter how that man does this or what he likes or dislikes as long as he cares and respects his family and friends."
Theme 5	5.6%	**Biologically a man** "Genetically it is the presence or absence of particular chromosomes if categorization is necessary."
Theme 6	5.5%	**Dependable** "A man should be solid and dependable and always be willing to be available."
Theme 7	4.8%	**Emotional strength** "In touch with his feelings and the feelings of those around him, emotionally available and responsive."
Theme 8	3.7%	**Faces Challenges** "Being a strong role model, being able to handle tough situations, willing to step up when needed."
Theme 9	3.3%	**Responsible** "More like being an adult, take responsible for your actions and have the courage to act on your intuition."
Theme 10	3.3%	**Confident** "Confident in themselves but not overbearing as that tends to come off as arrogant."
Theme 11	2.1%	**Intelligent** "He should be smart, willing and able to help but know his limitations."
Theme 12	1.4%	**Independent** "For a man to be masculine I feel that he should be strong and independent…"
Theme 13	1.1%	**Strive for self-improvement**

"A man is continually improving himself to be able to provide for himself physically emotionally and financially and then to be able to provide for others."

The mean (SD) of participants' self-rated masculine scale was 7.24 (2.04). The distribution of this score can be found in **Figure 5**. A simple linear regression analysis was then conducted to measure the association between participants' self-masculinity rating and their anxiety score. This model produced a statistically significant moderate negative association (β = -0.24, 95% CI: -0.38 – -0.11). This means that for every one-point increase in participants' self-rated masculine score resulted in a 0.24 decrease in their anxiety scores. The R^2 of this correlation was 0.01. **Figure 6** uses a scatterplot and fitted line to show this association.

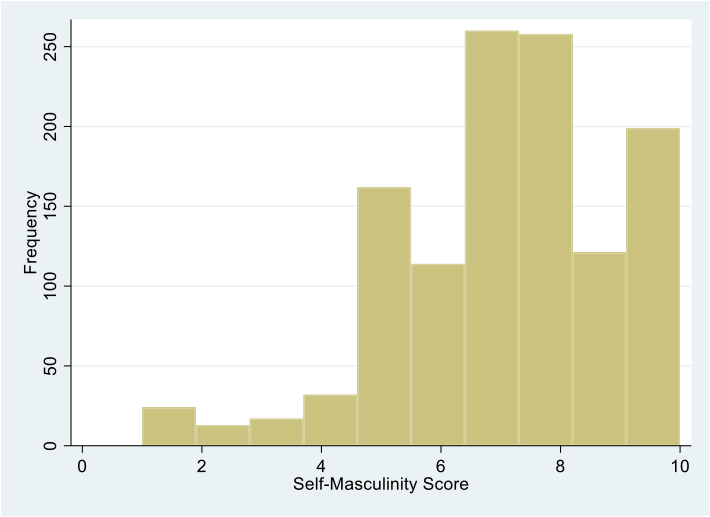

Figure 5: Distribution of Self-Masculine Score

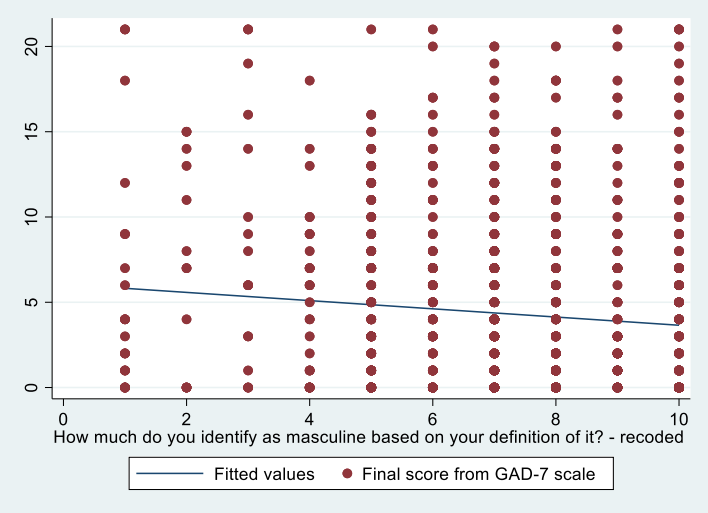

Figure 6: Unadjusted Association Between Self-Masculine Score and GAD-7 Score

Age, employment status, immigrant status, income category, education, marital status, military status, and other mental health diagnosis were then added to the model and a multiple linear regression was conducted. **Table 8** shows the results from this regression. This model produced a weak but significant negative correlation between anxiety score and participants' self-masculinity rating (β = -0.13, 95% CI: -0.25 – -0.01). This means that every one-point increase in participants' self-masculinity rating, results in an average decrease of 0.13 in their anxiety scores. As a GAD-7 score of only ten can be considered a probable case of GAD, an increase of decrease of 0.13 can be considered relevant (Williams, 2014). These findings suggest that men who have increased perceptions of their own masculinity could potentially have a decreased risk for GAD. This model was also stratified by age to see how different age groups influenced the association between men's self-rated masculinity and GAD. Within this model, there was no significant association between the anxiety score and self-masculine score among any of the age groups. The adjusted R^2 of the model was 0.21.

Table 8

Association Between Participants' Self-Masculine Score (or Covariates) and GAD-7 Score Estimated by Multiple Linear Regression

Sociodemographic Characteristics	GAD-7 Score				
				95% CI	
	Adj R^2	SE	β	Lower	Upper
Full sample	0.21				
Self-masculine score		0.06	**-0.13**	-0.25	-0.01
Age		0.01	**-0.06**	-0.09	-0.04
Employment status					
Employed		-	-	-	-
Unemployed		0.35	-0.64	-1.33	0.06
Immigrant					
No		-	-	-	-
Yes		0.31	0.01	-0.60	0.62
Income					
Middle income		-	-	-	-
Lower income		0.45	**1.80**	0.91	2.69
Lower-middle income		0.35	0.63	-0.05	1.30
Upper-middle income		0.36	**-0.90**	-1.60	-0.19

Upper income	0.82	-0.91	-2.52	0.71
Education				
University/college diploma	-	-	-	-
Some high school	0.98	-0.50	-2.42	1.42
High school diploma	0.40	0.12	-0.67	0.90
Some university/college	0.37	-0.13	-0.85	0.59
Some graduate school	0.62	**1.33**	0.12	2.54
Graduate school degree	0.39	**0.85**	0.09	1.61
Marital status				
Married	-	-	-	-
Living common law	0.45	-0.03	-0.91	0.84
Single and never married	0.32	0.09	-0.54	0.73
Divorced/separated	0.53	0.10	-0.94	1.14
Widowed	1.33	0.21	-2.41	2.82
Military				
No	-	-	-	-
Yes	0.51	0.29	-0.71	1.28

Other mental health diagnosis				
No	-	-	-	-
Yes	0.34	**4.74**	4.07	5.41

Note. β unstandardized beta weight; CI confidence interval; SE standard error.
Statistically significant variables presented in bold.

Using a LOWESS curve, nonlinearity was observed within the model. This was addressed by adding a quadratic term to the model with transformed and untransformed data being used for all further analyses. A kernel density estimate was then used to determine nonnormality within the model. A bootstrap was used to address this. Nonconstant variance in the model was then determined using residual versus fitted plots and was addressed using robust standard errors. Finally, DFBETA statistics were used to determine if any outliers were present. The greatest outliers were then admitted from the model, leaving a sample of 1,159. Once nonlinearity, nonnormality, nonconstant variance, and outliers were addressed, there was a slight increase in the adjusted R^2 from 0.21 to 0.26. Results from the model still showed a weak but significant negative correlation between anxiety score and participants' self-masculinity rating (β = -0.16, 95% CI: -0.28 – -0.04).

3.4 DISCUSSION

For this study I set out to explore if there was an association between aligning to traditional masculine ideology and GAD in Canadian men, how men self-defined their masculinity, and if alignment to self-defined masculinity was associated with GAD. Click or tap here to enter text. The results from this study indicate that having traditional masculine beliefs, like those demonstrated within the MRNI-SF, appears to be weakly but positively associated with the development of GAD in men. The MRNI-SF subcategories of dominance and restrictive

emotionality had the highest correlation with GAD. Every one-point increase in participants' dominance subcategory score resulted in an average increase of 0.30 in their anxiety score, while a one-point increase in their restrictive emotionality score resulted in an average increase of 0.29. The stronger correlation between these subcategories of the MRNI-SF with anxiety score could be explained because these subcategories captured a more nuanced aspect of the construct of masculinity that may be more relevant to GAD. For example, men who practice restricting their emotions may reflect a broader tendency towards the avoidance of seeking help and discussing their problems with others, which could contribute to the development and maintenance of GAD symptoms. These findings build on the existing evidence of how alignment to traditional masculine beliefs may contribute to negative mental health outcomes (Apesoa-Varano et al., 2018; Gilbar et al., 2021).

Qualitative data was collected to allow participants to offer their personal interpretation of masculinity, which was then analyzed and categorized utilizing thematic analysis (Braun & Clarke, 2006). These findings revealed that some traditional norms associated with masculinity, such as dominance, toughness, and emotional control, were present in participants' definitions. However, other themes, including being caring, being oneself, physical health, and emotional strength, departed from the traditional masculine norms captured with the MRNI-SF. These non-traditional themes were more prevalent than those which aligned with subcategories of the MRNI-SF, suggesting that men's interpretation of masculinity is not solely aligned with traditional masculine norms, and that they also value other qualities of masculinity in the course of self-evaluating their masculinity.

The self-rated masculine score participants gave themselves was negatively correlated with symptoms of GAD. This suggests that as participants' self-rated masculine scores increased their average anxiety score decreased. This is a significant finding as the literature shows that perceived social status has a greater influence on health outcomes than absolute social standing

does (Shaked et al., 2016). This means that an individual's perception of their position in the social hierarchy, represented here as a man's view of how masculine he is, has been found to predict physical health, mental health, and mortality (Shaked et al., 2016). So, it is understandable that a higher self-perception of masculinity is correlated with lower GAD symptoms in men, as one explanation for the correlation between masculinity and GAD is that men who feel they have not met their desired masculine standards believe they have failed as a man (Apesoa-Varano et al., 2018; DiMuccio & Knowles, 2020).

Results from my study suggest that a dose-response relationship exists between how closely one adheres to certain forms of masculinity and GAD. These results indicate that individuals who had higher traditional masculine scores tended to have higher levels of anxiety on average. In contrast, higher self-rated masculinity scores produced lower levels of anxiety on average. This indicates that the extent to which individuals identify with masculine norms can have an affect on their anxiety.

When stratified by age group, only the stratum aged 46-55 had a significant correlation between their masculinity and anxiety scores. A hypothetical explanation for this finding could be the potential for shifting feelings surrounding masculinity among men as they age. Men may also be experiencing enhanced feelings of inadequacy in their mid-life, related to the collision of aging with responsibility and multiple life demands, which could then cause them to experience more stress and anxiety. Men in mid-life may have greater responsibilities regarding childcare, parent care, or work responsibility. These results are also important since this age group of men also face high rates of depression and the highest rate of suicide compared to any other age group (Statistics Canada, 2017; Villarroel & Terlizzi, 2019). It should also be noted that a significant correlation does not exist in any of the age stratums when comparing participants' self-masculine score and GAD, which may suggest that positive self-perception of masculinity may be protective against GAD regardless of age.

3.4.1 Limitations and suggestions for future research

One limitation of this study is the weak association found between traditional masculinity and GAD. Although a statistically significant positive correlation was found between adherence to traditional masculine ideology and GAD symptoms, this association was weak and decreased further when covariates were included in the analysis. On the other hand, a moderate associate was found between self-rated masculinity and GAD. However, it is important to note that the moderate association still falls within the weak range of correlation coefficients, indicating that other factors may be contributing to the relationship between masculinity and GAD.

Another limitation from the study was that data was collected using a cross-sectional study design. This type of study design facilitated rapid assessment of the correlation between masculinity and GAD. However, these data only represent information at a single time. Consequently, it would be inappropriate to draw causal conclusions from these findings surrounding the relationship of masculinity and GAD in Canadian men.

Future studies should be replicated in countries outside of Canada to acquire a better understanding of the correlation between masculinity and GAD. Specific attention should be directed toward men aged 46-55 in order to better understand why a correlation exists primarily within this stratum. Longitudinal research or prospective controlled studies will also be needed to test the direction and causality of this relationship over time.

3.4.2 Conclusion

To our knowledge, this study is the first to investigate the correlation between different measures of masculinity and the development of GAD. The potential for a correlation between masculinity and GAD is relevant given that GAD is one of the most prevalent mental disorders (Plummer et al., 2016), and contributes to reduced quality of life and negative functional and occupational well-being (Katzman et al., 2014). GAD can also increase mortality rates, with a

dose-response relationship being found between comorbid anxiety disorders and mortality risk (Meier et al., 2016). Many risk factors have been found that contribute to the development of GAD, with many remaining to be discovered (Martin, 2022). By identifying traditional masculinity as one potential risk factor for GAD, steps can be taken to improve treatment methods for GAD, and perhaps intervention related to this risk factor may result in some men avoiding it altogether. Future interventions in this area may have greatest impact if they focus on men aged 46-55. While masculinity is often viewed as being both "toxic" and damaging to the mental health status of men (Gordon, 2019), this study provides some evidence that one's alignment to self-defined masculinity could be a potential protective factor against GAD. This finding challenges preconceived notion's that masculinity and one's alignment to it, are universally negative in terms of mental health outcomes.

CHAPTER 4: EXPLORING COVARIATES IN THE ASSOCIATION BETWEEN ALIGMENT TO TRADITIONAL MASCULINE IDEOLOGY AND GAD, INCLUDING THE POTENTIAL ROLE OF RACIALIZATION AS A MODERATOR

4.1 INTRODUCTION

4.1.1 Background and significance

Mental health disorders have not historically been viewed as a global health priority (Whiteford et al., 2013). However, they are now understood as debilitating conditions that affect approximately one in eight people (World Health Organization, 2019). Mental disorders are characterized by significant disturbance in one's cognition, emotional regulation, and behaviour (World Health Organization, 2019), with anxiety disorders being among the most frequent (Bandelow & Michaelis, 2015). Lifetime prevalence of anxiety disorders has been reported to be as high as 31%, with the true prevalence likely being higher since these disorders are often under reported (Katzman et al., 2014). Anxiety disorders present as fear and worry that is severe enough to result in significant distress and impaired daily functioning (World Health Organization, 2019). In Canada, anxiety disorders account for approximately 2% of health-related disability, with GAD being the most pervasive (Watterson et al., 2017). The 12-month prevalence of GAD in Canadian men is estimated to be 2%, placing Canada on the high end of international estimates (Watterson et al., 2017). These rates of GAD are concerning as it is associated with high comorbidity, impairment, disability, and contributes to increased healthcare utilization and costs (Watterson et al., 2017).

Anxiety is experienced by everyone; however, anxiety symptoms vary widely and can take the form of uncontrollable worrying, problems sleeping, and an increased heartrate. Anxiety can be a beneficial protective biological response to danger which prepares the body to fight or flee (Coltrera, 2018). However, what differentiates normal anxiety from GAD related anxiety are the severity of the symptoms (Katzman et al., 2014). Symptoms of GAD may include

the presence of excessive worry that is disproportional to the actual risk, uncontrollable anxiety which persists for at least six months, restlessness, impaired concentration, and the presence of physical symptoms such as increased muscle aches, soreness, or dizziness (American Psychiatric Association, 2013). Experiencing constant anxiety can exact a toll on one's body in the form of increased levels of cortisol and raised blood pressure, putting someone at increased risk of heart problems and stroke (Coltrera, 2018).

Anxiety disorders are the sixth leading contributor to disability worldwide, as they are linked to reduction in quality of life, work functioning, and loss of productivity (Zimmermann et al., 2020). They are also associated with increased mortality rates. One U.S. study with a nationally representative sample indicated that those with anxiety or depressive disorders had a 60% higher chance of mortality rate and died an average of 8 years earlier than those without these conditions (Pratt et al., 2016). This higher rate of mortality could be explained by a variety of factors including GAD being linked to 2.5 times greater risk of self-harm and suicide (Katzman et al., 2014; Stein & Sareen, 2015). GAD also increases the risk of mortality from accidents, homicide, digestive conditions, and cardiovascular disease (Katzman et al., 2014; Meier et al., 2016). Factors located on the causal pathway between anxiety and mortality, that could explain this higher rate of premature mortality, include income, education, comorbid physical illness, and unhealthy behaviours like substance abuse (Goodwin et al., 2020; Pratt et al., 2016). One study found an estimated 88,000 deaths/year are attributable to either anxiety or depression in the US (Pratt et al., 2016).

Findings from the National Survey on Drug Use and Health show that anxiety increased from 5.12% in 2008 to 6.68% in 2018 among American adults (Goodwin et al., 2020). Data from the Canadian Community Health Survey have also found that anxiety disorders are rising at a rate of approximately 0.26% to 0.55% every year since 2007 (Dobson et al., 2020). This increasing rate could be explained by increases in social isolation and decreases in social

support and financial stability (Goodwin et al., 2020). It is also possible that anxiety disorders are not actually increasing but rather that, the rate of treatment-seeking has increased, which has concurrently led to higher rates of diagnosis (Bandelow & Michaelis, 2015).

It is estimated that 80% - 92.1% of people diagnosed with GAD have another comorbid psychiatric disorder (Revicki et al., 2012; Ruscio et al., 2017). Mental disorders, which are often comorbid with GAD include depressive disorders, alcohol use disorder, bipolar disorder, and ADHD (Katzman et al., 2014; Watterson et al., 2017). GAD is also highly comorbid with other anxiety disorders. Approximately half of patients diagnosed with an anxiety disorder have at least one other anxiety disorder, and nearly 30% have two or more comorbid anxiety disorders (Katzman et al., 2014). GAD is also often comorbid with physical health conditions such as hypertension, gastrointestinal disease, respiratory disease, chronic pain syndrome, and asthma (Katzman et al., 2014; Stein & Sareen, 2015).

Anxiety disorders like GAD are also significantly associated with increased DALYs. Among all the mental illness disorders, only depressive disorders account for more overall DALYs (Whiteford et al., 2013). They also impact quality of life due to intrusive thoughts, dread of panic, intense self-consciousness, and fear of rejection (Coltrera, 2018). This negatively impacts relationships, work, and school performance as people may instead choose to isolate themselves (Coltrera, 2018). Reports of impairments to physical functioning, emotional role, general health, and social functioning have been made in individuals with GAD (Revicki et al., 2012). GAD also significantly increases average individual medical care cost due to higher usage of healthcare resources (Revicki et al., 2012). One study found that individuals with GAD in the US and Europe in 2011 had an average yearly healthcare cost that was approximately 60% higher than those without it (Revicki et al., 2012).

GAD is a chronic condition and can last for decades (Bandelow & Michaelis, 2015). GAD can often be present for years before a diagnosis is made (Bandelow & Michaelis, 2015). Once

diagnosed, treatments include encouraging lifestyle changes, mind-body approaches, psychotherapy, and medication (Coltrera, 2018). CBT has been most effective for treating GAD (Borza, 2017; Hofmann et al., 2012). CBT holds the basic premise that mental disorders are maintained by cognitive factors, and its aim is to help patients take a step back from their automatic thoughts and worries (Borza, 2017; Hofmann et al., 2012). One meta-analysis found that CBT was most effective when combined with pharmacotherapy (Katzman et al., 2014). Effective pharmacologic treatments for GAD include benzodiazepines, buspirone, and pregabalin (Stein & Sareen, 2015).

4.1.2 Risk factors for GAD in men

Many risk factors for GAD in men exist. Younger age is one example as those who are under the age of thirty-four tend to be most at risk of developing GAD, while there has been no relationship found between age and the onset of GAD in persons over sixty-five (Moreno-Peral et al., 2014). However, it is difficult to determine if this pattern is related to actual age or differences in other variables related to age, such as exposure to work stress (Moreno-Peral et al., 2014). Marital status also seems to affect the development of GAD, as being divorced or widowed puts someone at higher risk of developing GAD compared to being married or never having married (Moreno-Peral et al., 2014). This pattern is likely related to the differential degree of social support available to individuals related to their marital status. Stressful events from childhood, such as the child's parents having a substance disorder, childhood adversity or neglect, physical abuse, sexual abuse, divorce of parents, and neuroticism, as well as recent stressful life events lead to increased risk of GAD as well (Moreno-Peral et al., 2014). The presence of other mental health disorders can also increase the risk of developing GAD with personality disorders, bipolar disorder, major depression, sleep disturbance, and other anxiety disorders like panic attacks all linked to increased risk of GAD (Moreno-Peral et al., 2014). Factors from the workplace, including lack of decision-making opportunities, emotional demands, role conflict, ethical conflict, tension with customers or colleagues, and job security,

can also lead to increased risk of GAD (Zimmermann et al., 2020). Finally, one of the strongest predictors found for the development of GAD is loneliness (Flensborg-Madsen et al., 2012).

Several protective factors for GAD also exist. Social support has been found to be the most beneficial (Maheux & Price, 2016). There are multiple types of support systems that one may encounter in their life including support that can be found within the individual, their microsystem such as friends and family, and their exosystem such as their neighbours and community (Maheux & Price, 2016). One study looking at how social support influences GAD found that it was important to evaluate the effect that these multiple forms of support have on GAD development instead of solely relying on a broad conceptualization of support (Schaefer et al., 2018).

4.1.3 Masculine ideology

Masculine ideology is the beliefs around the different traits and behaviours associated with being a man (Giaccardi et al., 2017). Multiple masculine ideologies exist as masculinity is set by cultural beliefs and varies depending on historical context (Neilson et al., 2020). Masculine ideals are thus socially-defined, meaning they are created through cultural practices (e.g., childcare practices) and institutions (e.g., schools) using basic operant learning processes like reinforcement and punishment (Berke et al., 2018).

Due to the socially constructive nature of masculinity, there are many masculinities, with hegemonic masculinities being accepted as the dominant traditional forms in most Western cultures. The central belief of traditional, or hegemonic, masculinity is that the adoption of anything perceived as feminine is a direct threat to one's masculinity (Mincey et al., 2014; Neilson et al., 2020). Standard feminine traits include being caring, sensitive, dependent, and emotional (Neilson et al., 2020), whereas someone embracing traditional masculinity would demonstrate traits of restrictive emotionality, toughness, dominance, and aggressiveness (Gerdes & Levant, 2018; Giaccardi et al., 2017). Traditional masculinity may present itself in the

form of homophobia, casual attitudes about sexuality, negative health behaviours (e.g., smoking), and participation in risky behaviours (e.g., engaging in unprotected sex) (Berke et al., 2018; Giaccardi et al., 2017).

Men who violate their culture's socially-created gendered expectations may experience societal backlash in the form of being perceived as weak. To avoid this, men may choose to hide their gender atypical behaviour and instead fully embrace stereotypical masculinity (Cheryan et al., 2015). Men who fear that their masculinity could be compromised may try to re-establish it by disavowing femininity, displaying aggressiveness, being derogatory towards other non-masculine or homosexual men, or overexaggerating their athleticism and strength (Cheryan et al., 2015; DiMuccio & Knowles, 2020).

The media is a key source of input that both encourages this traditional form of masculinity and demonstrates what it should look like. Evidence shows that within TV and movies, male characters often outnumber female characters, and the characteristics of being dominant or aggressive are usually positioned as desirable (Giaccardi et al., 2017). One report found that youth in the US spend an average of 4-6 hours/day consuming media (Twenge et al., 2018); therefore, it is understandable that this would serve as a major influencing factor that promotes the adoption of traditional masculine beliefs.

Recently, traditional masculinity has been increasingly referred to as 'toxic' (Parent et al., 2019). The idea of something being toxic suggests that it is hazardous to health and that it needs to be controlled. However, it is not masculinity itself that is necessarily toxic, but instead how some men choose to use their performance of masculinity to oppress other men, women, trans, and gender diverse people's experience (Waling, 2019). Its toxicity is also evident in its encouragement of men to suppress their emotions, engage in physical or political violence, practice homophobia, and predatory heterosexual behaviour (Waling, 2019). As traditional masculinity is not the only form that exists, men must take responsibility for what masculine

ideology they choose to practice. A healthier form of masculinity might include engaging with one's emotions, maintaining positive relationships with other men and women, and rejecting behaviour that causes harm to others (Waling, 2019).

4.1.4 Anxiety and masculinity

The manner in which men choose to practice their masculinity is a strong contributor to the development of mental illness (Apesoa-Varano et al., 2018). Examples of mental illnesses associated with traditional masculine ideology include PTSD in veterans, alcohol use disorder, depression, and psychological stress (Garfield et al., 2008; Giaccardi et al., 2017; Neilson et al., 2020). Traditional masculine attitudes, beliefs, and behaviours are also linked to higher rates of suicide (Apesoa-Varano et al., 2018). Traditional masculinity's association with mental illness may be related to the stress men feel to constantly maintain their status of manhood (Mckenzie et al., 2016). Beyond its association with the development of mental illness, traditional masculine beliefs also hinder men from seeking help for their psychological issues. Adhering to traditional masculinity suggests that seeking help for health concerns can make a man appear weak, so men may choose to mask their mental illness instead and self-medicate through alcohol or substance use (Apesoa-Varano et al., 2018; Gordon, 2019). One area of research that requires additional exploration is the contrary results from some studies that have found masculinity to be both a risk factor and a potential protective factor against mental illness. One meta-analysis found a moderately significant and negative association between depression and embracing certain masculine traits (Lin et al., 2021). This finding supports the idea that it is not masculinity itself that is toxic, but instead the way men choose to practice it.

A strong association has been found between masculinity and major depressive disorder, which is likely due to realized and unattained masculinity goals (Valkonen & Hänninen, 2013). Major depressive disorder has also been found in approximately 53%-59% of GAD patients and is the most common comorbid disorder of GAD (Ruscio et al., 2017; Zhou et al., 2017). The

reason for the high prevalence of comorbid GAD and MDD is not completely understood but can likely be explained by the common neurobiological mechanisms underlying both anxiety and depression (Zhou et al., 2017). Since there have been associations found between depression and masculinity (Apesoa-Varano et al., 2018; Valkonen & Hänninen, 2013), it could be expected that a similar association exists between GAD and masculinity due to their high comorbidity. A case for the possible association between GAD and masculinity could be made on the precarious nature of masculinity. Men are expected to actively achieve and maintain their status of masculinity and failing to do so might mean losing their status as a 'real man' (DiMuccio & Knowles, 2020). This pressure to earn and consistently prove their masculinity may then trigger feelings of anxiety within men.

4.1.5 Racialization

A moderating variable is a variable that changes the magnitude of the effect, or the direction of the effect an independent variable has on a dependent variable (Judd, 2001). An interaction between the moderator and independent variable is implied with moderation (Judd, 2001). Examples of potential moderators include characteristics of people or situations.

One potential social factor that could moderate the association between men's alignment to traditional masculine norms and GAD is racialization. Race is a social construct associated with sharing distinctive physical traits, such as skin colour or hair texture (Phelan et al., 2014). There is no clear foundation for a biological concept of race, and racial dominance is often used to disadvantage certain groups in society (Berger & Sarnyai, 2014). There are several reasons to suggest that racialization may moderate the association between masculinity and GAD. Masculinity has been significantly associated with racialization with several studies finding that men's endorsement of masculine ideals varies among different racialized groups (Levant et al., 2003). The dominant masculine ideology, which includes the sociological construct of hegemonic masculinity and the subordination of women and marginalized men of colour, is

largely occupied by White men in the Western world (R. F. Levant et al., 2015). Since men of colour are unlikely to achieve this dominant masculine ideal because of their status as racialized minorities, they must develop their own cultural masculine ideology (Harris et al., 2015; R. Levant, et al., 2015). GAD may also be influenced by racialization as racial discrimination has been shown to influence increased levels of anxiety in Canadian men of colour (Budhwani et al., 2015). Racial discrimination refers to the unequal distribution of power in societies due to phenomenological, ancestral, or cultural difference (Berger & Sarnyai, 2014). Examples of racial discrimination include: stereotyping a racialized group; the manner in which minority racialized groups often find themselves limited to neighbourhoods having a greater number of minorities, lower home value, and lower median income; and discrimination affecting their employment opportunities (Ahmed et al., 2007). Thus, the association of men's masculine ideology and GAD could be moderated by how a man is racialized by society.

The effect of immigration status might also explain why racialization could be a moderator for this association. Trying to conform to hegemonic masculine norms can prove to be an almost impossible task for immigrant men, who are also trying to overcome racial stereotypes. Some studies have shown that stereotypes and marginalization of immigrant men can lead to increased stress and anxiety (Lu et al., 2013), while others have shown a healthy immigrant effect when it comes to anxiety disorders (Salas-Wright et al., 2014).

4.1.6 Study rationale

Despite what is known about how masculinity affects different mental health outcomes, few studies have examined the association between masculinity and GAD. The present study will use an intersectionality framework to explore how racialization possibly intersects with masculinity to influence GAD. Intersectionality refers to the concept of the interaction between systems of oppression (Mcbride & Mazur, 2008). An intersectionality framework proposes that multiple social dimensions intersect at the individual level and exposes the various connecting

systems of power and oppression at the structural level that maintains health inequalities (Shaharyar et al., 2021).

Most current health research studies that have looked at the effects that masculinity plays on the mental health of men have taken a qualitative approach (Affleck et al., 2018; Mckenzie et al., 2016; Mincey et al., 2014). This study uses a quantitative approach, which is beneficial for quantifying the association between masculinity and GAD. Knowledge gained from this study can be used to help better explain the effect masculinity has on men's mental health and further change the stigma surrounding it. The aim of this study is to examine the following questions: (1) What is the role covariates have in the association between alignment to traditional masculine ideology and GAD in Canadian men between the ages of 18 and 65? (2) Is the association between alignment to traditional masculine ideology and GAD moderated by racialization within Canadian men between the ages of 18 and 65?

4.2 METHODS

4.2.1 Research ethics approval

This study was conducted in accordance with the Tri-Council Policy Statement: Ethical Conduct for research Involving Humans. Ethical approval was obtained from the Health Research Ethics Board at the University of Alberta prior to data collection. Consent was assumed based on completing the survey questions. Prior to starting the study, electronic informed consent forms were provided to the participants that informed them that their participation was voluntary and that they could withdraw from the study at any point. They were also informed about the length of the survey and all potential risks they may encounter while completing it. Participants' confidentiality was maintained as no identifying information was collected.

4.2.2 Study design and setting

This cross-sectional survey was conducted from July 22nd to August 9th, 2022. A descriptive, cross-sectional, correlational design was chosen as the most appropriate design to explore this study's research questions. A cross-sectional design can assess the prevalence of GAD within the study sample at a single point in time, while also exploring the strength and direction of the association between adherence to traditional masculinity and GAD. This design also allows for the efficient comparison of many different variables at the same time. This study was based at the University of Lethbridge with a total of 1,200 men being recruited from across Canada to take part in the study. Data were collected using an online questionnaire that was distributed by the market research and analytic company, Leger. Completion of the survey took participants approximately 15-20 minutes. STROBE guidelines for cross-sectional studies were used to ensure the study was of the highest quality (Vandenbroucke et al., 2007).

4.2.3 Participants

Males between the ages of 18 and 65 living in Canada, who gave consent to participate were included in the study. Exclusion criteria included: (1) anyone from the northern territories (making up approximately 0.3% of the Canadian population (Statistics Canada, 2021)); (2) anyone who did not identify as heterosexual; and (3) anyone who did not identify exclusively as male. Participants who did not meet all inclusion criteria was excluded. A volunteer convenience sample was used to gather participants. The sample was collected using Leger's panel of over 400,000 members from across Canada (Leger, 2019).

4.2.4 Data collection

Leger distributed a link in July 2022, to all of its members who met inclusion criteria, which directed them to the survey. The survey contained three parts: the first part contained questions on participants' sociodemographic characteristics, the second part contained questions regarding participants' alignment to traditional masculine ideology; and the third part

contained the seven items of the GAD-7 scale. To prevent missing data, participants were required to answer every question before proceeding to the next one in the survey. The estimated time for participants to complete the survey was approximately 20 minutes. LEO points were used as an incentive which could be redeemed for cash, gift cares, Aeroplan points, and AIR MILES reward miles. Once the required 1,200 participants had responded to the survey, data collection ended.

4.2.5 Measures

Outcome: GAD

The GAD-7 was chosen to measure participants' anxiety levels. The GAD-7 is a self-rated scale which was developed to screen for symptoms of GAD severity in 2006 (Spitzer et al., 2006). Items on the scale are rated on a scale from zero (not at all) to three (nearly everyday) (Rutter & Brown, 2016). The final score from the GAD-7 ranges from zero to twenty-one, with five, ten, and fifteen being the cut-off scores to represent mild, moderate, and severe levels of anxiety symptoms (Kroenke et al., 2010). The scale measures features of GAD including feeling nervous, anxious, and worrying too much about different things (Rutter & Brown, 2016).

The GAD-7 was chosen for this study as it contains only seven questions and takes no more than three minutes to complete (Mossman et al., 2017). It has also been found that the scale is not influenced by characteristics like age, sex, or race (Kroenke et al., 2010). Gold standard instruments like the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (DSM) exist that can better diagnose individuals that have GAD (Toussaint et al., 2020), but they are more time-consuming and must be administered by a trained interviewer. This makes the GAD-7 more practical to use in this setting. The GAD-7 scale should not be used to offer a clinical diagnosis of GAD as it inquires about symptoms from the past two weeks, while a criterion for the diagnosis of GAD is symptoms of at least a six-month duration; however, the GAD-7 is reported to offer good reliability and procedural validity

(Rutter & Brown, 2016). When using a cut-off value of ten to identify possible cases of GAD, the GAD-7 has also been found to have high sensitivity (89%) and specificity (82%) (Williams, 2014). The GAD-7 has also been found to have greater sensitivity in detecting changes in GAD status when compared to other similar scales/questionnaires such as the Penn State Worry Questionnaire for Measuring Response (Williams, 2014). The Cronbach's alpha of the GAD-7 ranges from 0.79-0.91 (Williams, 2014). Cronbach's alpha is used to assess the reliability of a scale. It ranges from zero to one with a higher number indicating higher covariance among scale items (University of Virginia Library, 2022). It is generally accepted that a scale's Cronbach's alpha must be a minimum of 0.65 to 0.80 to be considered valid (University of Virginia Library, 2022). Because of its reliability and validity, the GAD-7 is one of the most commonly used anxiety measures in research (Toussaint et al., 2020).

Exposure: Masculinity

Measuring participants' alignment to traditional masculine norms was done using the MRNI-SF. The scale contains twenty-one items with responses that are made from a seven-point Likert scale ranging from one (strongly disagree) to seven (strongly agree) (Levant et al., 2013). The scale then produces a final score ranging from 21-147, with higher scores indicating greater endorsement of traditional masculinity (Levant et al., 2013). The scale includes seven sections with three questions within each section. The sections include avoidance of femininity, negativity towards sexual minorities, self-reliance through mechanical skills, toughness, dominance, importance of sex, and restrictive emotionality (Levant et al., 2013). Sample questions within the scale include "A man should never admit when others hurt his feelings," "A man should know how to repair his car if it should break down," and "Boys should prefer to play with trucks rather than dolls" (Levant et al., 2013).

The MRNI-SF was chosen as the best scale to use for this study since it is the most commonly used scale to measure masculinity due to its psychometric properties (Gerdes &

Levant, 2018). The MRNI-SF and all related versions of the scale have been used in at least ninety-one studies as of 2019, with over 30,000 participants (McCurdy et al., 2019). One reason for its popularity comes from its high Cronbach's alpha that ranges from 0.92 to 0.96 (McCurdy et al., 2019).

As masculinity is a social-construct with many different forms existing, participants were also given the opportunity within the survey to provide their own definition of what they thought being masculine meant. Participants were given space to write as much as they wanted on what this meant to them. After they provided a definition, participants were asked to provide a self-rated masculinity score based on their own definition of masculinity on a scale from one to ten. Participants' self-defined masculinity answers were then reviewed and categorized.

Covariates

Age, SES, marital status, employment status, immigration status, military status, and current mental health conditions other than GAD were explored as potential confounders. Participants were asked to provide information on these variables through demographic questions in the survey.

Age. Age was considered as a potential confounding variable as it can affect a man's perceived masculinity. Older age can prevent a man from performing youth-related masculinity such as aggressive physical exercise and sexual assertion (Calasanti et al., 2013). Age can also influence GAD as it has a late average age of onset at around 35 years, and past this age the risk of GAD gradually decreases as one gets older (De Lijster et al., 2017; Moreno-Peral et al., 2014). Age was defined as the age in years as reported by the participant at time of response and was measured as a continuous variable.

SES. SES is a person's economic and social position in relation to others and can be based on a variety of factors including income (Worthy et al., n.d.). Studies have shown that women prefer men occupying a higher SES, and the ability to be desired by women is a key

influence in men's masculine ideology (de Bruine et al., 2011). Research has also identified that having high SES, and being able to provide for one's family, is a key component of hegemonic masculine ideals (Munsch, 2015; Thébaud, 2010). Studies have also shown that high SES lowers the risk of GAD (Watterson et al., 2017). SES was operationalized by the income category that the participants identify themselves to be in, as well as their level of education. The income categories that participants could identify themselves as were *upper income, upper-middle income, middle income, lower-middle income,* and *lower income*. Educational categories included were some *high school, high school diploma, some university/college, university/college diploma, some graduate school,* and *graduate school degree*.

Marital status. There have been many studies that have shown marital status to be associated with masculinity. Heterosexual marriage is one way that men can demonstrate their hegemonic masculine performance while also binding them to social expectations that encourage them to work hard and earn money (Ganesh & Ganesh, 2014; Jewkes et al., 2015; Randles, 2013; Zaider et al., 2012). The association between stressful life events and an increased risk of mental disorders has been thoroughly studied for decades, with many of these stressful events being linked in some way to one's marital status. For example, most cases of anxiety disorder onset were preceded by adverse events including death of a spouse or divorce (Miloyan et al., 2018; Pankiewicz et al., 2012). Marital status was operationalized as *married, living common law, single and never married, divorced or separated,* and *widowed.*

Employment status. Employment status can be viewed as a potential covariate as studies show that men's employment plays a large role in their sense of masculinity (Randles, 2013). The literature also identifies the role unemployment plays in the development of GAD, as employment is a fundamental component of quality of life (Himle et al., 2014; Hiswåls et al., 2017). Employment status was operationalized as *unemployed, on leave but still employed,*

part-time, fulltime, and *going to school*. If a participant was currently employed, they were given the option to include what they do for work.

Military status. Military training emphasizes a certain type of hyper-masculinity that can be seen in how soldiers are expected to detach themselves from emotional and physiological responses, and to train to continually push on, fight, and "suck it up, and soldier on" (Shields et al., 2017). Unfortunately, this kind of training and the traumatic experiences associated with deployment and combat also negatively influence soldiers' mental health with the number of deployments experienced being positively correlated with bipolar disorder, PTSD, and GAD (Lazar, 2014). Military status was simply operationalized as whether or not a participant served in the military (*yes* or *no*).

Current mental health conditions. Current mental health conditions were explored as a potential confounding variable as masculinity has also been associated with depression, PTSD, and suicide (Apesoa-Varano et al., 2018; Neilson et al., 2020; Valkonen & Hänninen, 2013). Comorbid anxiety is also quite common with a variety of other mental health conditions including depressive disorders, bipolar disorder, PTSD, and eating disorders to name just a few (Spinhoven et al., 2014; Spoorthy et al., 2019; Swinbourne et al., 2012; Wu & Fang, 2014). Current mental health conditions were operationalized by whether or not a participant has a mental health condition outside of GAD (*yes* or *no*). If participants reported any mental health conditions, they were able to state the conditions they had if they wished.

Racialization. Finally, the racialization status of the participants was operationalized as whether a participant identified as *White, Asian, South Asian, Indigenous, African-Canadian, Middle Eastern, Latino, being of a mixed race,* or *identifying as another race.*

4.2.6 Sample size

As both alignment to traditional masculine norms and GAD are continuous variables, a correlation coefficient was used to conduct a power calculation. A correlation of r = 0.3 was

expected between these two variables, which was determined based on a systematic review that found a correlation of 0.27 between masculinity and depression (Lin et al., 2021). As the literature shows a strong correlation exists between depression and anxiety (Lin et al., 2021; Ruscio et al., 2017), it can be assumed that a similar correlation will exist between masculinity and GAD. With this information, it was determined that a sample size of eighty-five was needed to fulfill our objectives at a 95% confidence level. This sample size was calculated using a two-tailed $\alpha = 0.05$ and a $\beta = .20$, along with the estimated Cohen's d effect size of 0.3 (Hulley et al., 2013; Kang, 2021; Lin et al., 2021). This study was able to achieve a sample size of 1,200 participants, which allowed controlling for a variety of potential confounders, and examining interactions.

4.2.7 Data management and control

The survey used for the present study was created using the University of Lethbridge's Qualtrics survey platform. Qualtrics' servers are protected by firewall systems with scans being regularly performed to find and correct any vulnerabilities, and access to systems are restricted to only those who need-to-know such information and who are bound by confidentiality obligations (Qualtrics, 2021). The survey was distributed by Leger which uses cloud-based security and utilizes System and Organization Controls certified data centres which comply with many physical and logistical security certifications (Leger, 2022). Data were then stored on Leger's servers, and on the researcher's secure Qualtrics account.

4.2.8 Bias

When conducting this study, it was important to consider participation bias because the participants were volunteers, which means they may share similar characteristics that distinguish them from those who did not participate. As a result, the sample cannot be considered a completely random representation of the Canadian population. To mitigate this, data was collected using Leger, which provided access to a diverse sample of Canadian men with

varying demographic characteristics. The large sample size also helped to reduce the risk of error caused by a non-random sample.

It's possible that some participants may have felt uncomfortable answering questions on the sensitive topic of masculinity and anxiety, leading to social desirability bias. This occurs when participants respond in a way that aligns with social norms instead of their true beliefs. To mitigate this, the study was conducted using an anonymous online survey through Leger, which reduced direct contact with the researcher and potential discomfort. Additionally, Leger panel members regularly complete surveys and are likely familiar with the process. Despite these measures, bias may still be present as participants may have provided answers that did not reflect their true beliefs.

In this study, response bias could also have affected the results. This happens when participants provide answers that do not align with their actual beliefs because of the way the questions are structured or worded. This can take different forms such as extreme response bias (choosing an extreme value on a scale), neutral response bias (selecting a neutral position on a Likert scale), and acquiescence bias (tending to agree with survey questions). To minimize this bias, Leger identified and eliminated members who often completed surveys too quickly or had conflicting survey responses.

4.2.9 Statistical Analysis

To examine the effects of covariates on the relationship between masculinity and GAD, a simple linear regression was conducted with participants' GAD-7 and MRNI-SF scores. The R^2 value of this model was observed, and then a single covariate was added at a time to explore how each covariate influenced the model's R^2. The same process was then repeated with the MRNI-SF score exchanged for participant's self-rated masculinity scores.

To examine the moderating role of racialization in the relationship between masculinity and GAD, a regression model was created. This model included participants' MRNI-SF and

GAD-7 scores and the inclusion of racialization. Several potential confounding variables such as age, employment status, immigration status, income category, education, marital status, military status, and other mental health conditions were controlled for within the model. An interaction term was also fit between racialization and participants' MRNI-SF scores to test the moderating effect of racialization.

Within the model, nonlinearity, nonnormality, nonconstant variance, and outliers were observed. These were addressed using a quadratic term, bootstrapping, robust standard error, and the omission of outliers. Further multiple linear regression analysis was carried out with each MRNI-SF subscale being substituted into the model for the MRNI score. This process was then repeated with self-rated masculinity replacing MRNI-SF in the model.

4.3. RESULTS

4.3.1 Effects of Covariates on the Relationship Between Masculinity and GAD

The R^2 of a simple linear regression for GAD-7 score and MRNI-SF score was 0.003. This suggested that participants' MRNI-SF score only accounted for 0.3% of the variance in their overall GAD-7 score. A single covariate was then added to the model at a time to explore how the different covariates influenced the model's R^2, which is depicted in **Table 9**. The only variables that had a significant impact on the R^2 of the model were being diagnosed with a mental health condition other than GAD ($\Delta R^2 = 0.166$), age ($\Delta R^2 = 0.031$), and SES ($\Delta R^2 = 0.021$). The final R^2 of the model was 0.218.

Table 9

R^2 Change Analysis for the Association Between MRNI-SF and GAD-7 Score

Regression Models	Adj R^2	$\Delta R2$
Model 1 (Self-masculine score)	0.003	-
Model 2 (Model 1 + Mental health diagnoses)	0.169	0.166

Model 3 (Model 2 + Age)	0.200	0.031
Model 4 (Model 3 + SES)	0.221	0.021
Model 5 (Model 4 + Employment status)	0.223	0.002
Model 6 (Model 5 + Military status)	0.222	-0.001
Model 7 (Model 6 + Immigration status)	0.221	-0.001
Model 8 (Model 7 + Marital status)	0.219	-0.002

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The R^2 of a simple linear regression analysis of self-rated masculinity and GAD-7 score was 0.009. **Table 10** shows the changes to the overall R^2 as one covariate was added to the model at a time. Once again, being diagnosed with a mental health condition other than GAD (ΔR^2 =0.156), age (ΔR^2 =0.030), and SES (ΔR^2 = 0.019) were the only variables that had a significant impact on the ΔR^2 of the model. The final R^2 was 0.214, suggesting that 21.4% of the variance in participants' GAD-7 score could be explained by the model while the remaining 78.6% is explained by other factors.

Table 10

R^2 Change Analysis for the Association Between Self-Rated Masculinity and GAD-7 Scores

Regression Models	Adj R^2	$\Delta R2$
Model 1 (Self-masculine score)	0.009	-
Model 2 (Model 1 + Mental health diagnoses)	0.167	0.156
Model 3 (Model 2 + Age)	0.197	0.030
Model 4 (Model 3 + SES)	0.216	0.019

Model 5 (Model 4 + Employment status)	0.217	0.001
Model 6 (Model 5 + Military status)	0.217	0.000
Model 7 (Model 6 + Immigration status)	0.216	-0.001
Model 8 (Model 7 + Marital status)	0.214	-0.002

4.3.2 Racialization as a moderator

My second research question was that among Canadian men, does racialization moderate the association between masculinity and GAD? The distribution of participants' GAD-7 and MRNI-SF scores by their racialization status can be found in **Figures 7 and 8**. A regression model was created to examine the association between participants' MRNI-SF and GAD-7 scores with the inclusion of racialization. Age, employment status, immigration status, income category, education, marital status, military status, and other mental health conditions were controlled for within the model. Results from this model showed a positive correlation existed between MRNI-SF score and GAD-7 score ($\beta = 0.02$, 95% CI: 0.01 – 0.03). There also existed a significant correlation between GAD-7 score and being African-Canadian ($\beta = 2.34$, 95% CI: 0.53 – 4.15) and identifying as another race ($\beta = 1.68$, 95% CI: 0.04 – 3.32) when compared to White participants. An interaction term was then fit between racialization and participants' MRNI-SF scores to test the moderating effect of racialization which can be found in **Table 11**. This model showed a weak but significant positive association between participants' MRNI-SF and GAD-7 scores ($\beta = 0.02$, 95% CI: 0.00 – 0.03), with a significant positive moderating effect still being present between MRNI-SF score and being African-Canadian ($\beta = 0.14$, 95% CI: 0.08 – 0.20). However, it must be noted that only 24 (2.0%) of the participants included in the study considered themselves to be African-Canadian.

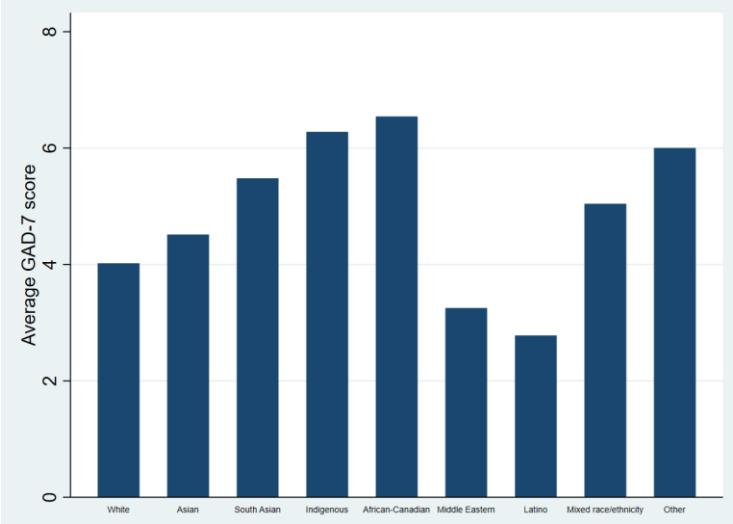

Figure 7: Average GAD-7 Score by Racialization Status

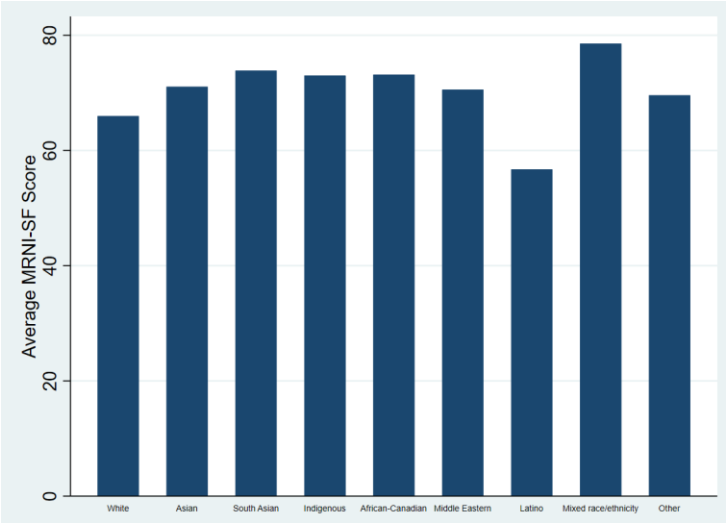

Figure 8: Average MRNI-SF Score by Racialization Status

Table 11

Results of Multiple Linear Regression Analysis Between MRNI-SF and GAD-7 Scores with the Inclusion of Racialization as a Potential Moderating Variable

Sociodemographic Characteristics	GAD-7 Score				
				95% CI	
	Adj R^2	SE	β	Lower	Upper
Full sample	0.24				

MRNI-SF score	0.01	**0.02**	<0.01	0.03
Racialization status				
White	-	-	-	-
Asian	1.17	1.79	-0.51	4.09
South Asian	1.59	1.51	-1.61	4.63
Indigenous	3.31	5.04	-1.45	11.54
African-Canadian	2.39	**-8.08**	-12.77	-3.38
Middle Eastern	3.23	-1.26	-7.60	5.07
Latino	4.69	0.49	-8.71	9.69
Mixed race	2.89	4.56	-1.12	10.24
Other	2.52	1.94	-3.00	6.89
MRNI-SF score and racialization status				
MRNI-SF score x White	-	-	-	-
MRNI-SF score x Asian	0.02	-0.02	-0.05	0.01
MRNI-SF score x South Asian	0.02	-0.01	-0.05	0.03
MRNI-SF score x Indigenous	0.04	-0.05	-0.14	0.03
MRNI-SF score x African-Canadian	0.03	**0.14**	0.08	0.20
MRNI-SF score x Middle Eastern	0.04	<-0.01	-0.09	0.08
MRNI-SF score x Latino	0.08	-0.02	-0.18	0.14
MRNI-SF score x mixed race	0.04	-0.06	-0.13	0.01

MRNI-SF score x other	0.03	<-0.01	-0.07	0.06
Age	0.01	**-0.06**	-0.08	-0.04
Employment status				
Employed	-	-	-	-
Unemployed	0.35	-0.58	-1.26	0.11
Immigrant				
No	-	-	-	-
Yes	0.37	-0.30	-1.02	0.43
Income				
Middle income	-	-	-	-
Lower income	0.45	**1.85**	0.96	2.73
Lower-middle income	0.34	0.62	-0.05	1.29
Upper-middle income	0.36	**-0.92**	-1.62	-0.22
Upper income	0.82	-0.63	-2.24	0.97
Education				
University/college diploma	-	-	-	-
Some high school	0.97	-0.48	-2.38	1.42
High school diploma	0.40	-0.02	-0.80	0.76
Some university/college	0.36	-0.16	-0.87	0.55
Some graduate school	0.61	**1.21**	0.01	2.41

Graduate school degree	0.39	0.66	-0.10	1.41
Marital status				
Married	-	-	-	-
Living common law	0.44	0.16	-0.71	1.03
Single and never married	0.32	0.07	-0.56	0.70
Divorced/separated	0.52	0.10	-0.93	1.12
Widowed	1.31	0.03	-2.55	2.61
Military				
No	-	-	-	-
Yes	0.50	0.33	-0.65	1.32
Other mental health conditions				
No	-	-	-	-
Yes	0.34	**4.85**	4.18	5.51

Note. β unstandardized beta weight; CI confidence interval; SE standard error. Statistically significant variables presented in bold.

Within the model, nonlinearity, nonnormality, nonconstant variance, and outliers were all observed. These were dealt with using a quadratic term, bootstrapping, robust standard error, and the omission of outliers, which produced a final sample of 1,141. This resulted in the adjusted R^2 of the model increasing from 0.244 to 0.309. This model also shows a nonsignificant association between MRNI-SF and GAD-7 scores with the addition of racialization added as a potential moderating variable (β = 0.01, 95% CI: -0.00 – 0.02).

Table 12 shows the regression results of each MRNI-SF subscale substituted into the model for MRNI score. Restrictive emotionality (β = 0.29, 95% CI: 0.05 – 0.53) and self-reliance through mechanical skills (β = 0.29, 95% CI: 0.07 – 0.51) subcategories were statistically significant. A significant moderating effect was also present between: restrictive emotionality and African-Canadians (β = 1.87, 95% CI: 0.86-2.87); self-reliance through mechanical skills and African-Canadians (β = 3.01, 95% CI: 1.58 – 4.44); avoidance of femininity and African-Canadians (β = 2.07, 95% CI: 1.06 – 3.08); importance of sex and African-Canadians (β = 2.31, 95% CI: 1.28 – 3.34) and mixed race (β = -1.53, 95% CI: -2.86 – -0.20); toughness and African-Canadians (β = 2.17, 95% CI: 1.13 – 3.22); and dominance and African-Canadians (β = 2.04, 95% CI: 1.19 – 2.89).

Table 12

Results of Multiple Linear Regression Analysis for GAD-7 Using Each of the MRNI-SF Subscales with the Inclusion of Racialization as a Potential Moderator with the MRNI Subscale Score

MRNI Subcategory	GAD-7 Score				
				95% CI	
	Adj R^2	SE	β	Lower	Upper
Restrictive emotionality	0.23	0.12	**0.29**	0.05	0.53
Self-reliance through mechanical skills	0.23	0.11	**0.29**	0.07	0.51
Negativity toward sexual minorities	0.22	0.09	0.15	-0.02	0.32
Avoidance of femininity	0.23	0.10	0.12	-0.06	0.31
Importance of sex	0.24	0.10	0.18	-0.02	0.38
Toughness	0.23	0.11	0.19	-0.01	0.40
Dominance	0.24	0.11	0.20	-0.02	0.42

*Note. Racialization interacted with MRNI subscale score, a*ge, employment status, immigration status, income category, education, marital status, military status, and other mental health

conditions are included in each regression. β unstandardized beta weight; CI confidence interval; SE standard error.

When a regression model was created looking at the association between self-rated masculinity and GAD-7 scores with racialization added as an interaction term, a significant negative correlation was found (β = -0.30, 95% CI: -0.47 – -0.12). No significant moderating effect was present between self-rated masculinity scores and participants' racialization status. **Table 13** shows the results of this regression model when age, employment status, immigration status, income category, education, marital status, military status, and other mental health conditions are controlled for. Within this model there is no significant correlation between self-rated masculinity and GAD-7 score (β = -0.14, 95% CI: -0.30 – 0.02). There were also no significant moderating effects between self-rated masculinity scores and any of the participants' racialization statuses.

Table 13

Results of Multiple Linear Regression Analysis with the Inclusion of Racialization as a Potential Moderating Variable

Sociodemographic Characteristics	GAD-7 Score				
				95% CI	
	Adj R^2	SE	β	Lower	Upper
Full sample	0.22				
Self-rated masculine score		0.08	-0.14	-0.30	0.02
Racialization status					
White		-	-	-	-
Asian		1.19	0.55	-1.79	2.89
South Asian		1.73	0.36	-3.03	3.74

Indigenous	2.92	5.38	-0.35	11.12
African-Canadian	4.59	-2.96	-11.97	6.05
Middle Eastern	3.63	-0.68	-7.80	6.44
Latino	3.54	-3.40	-10.35	3.55
Mixed race	3.52	-0.57	-7.48	6.33
Other	3.43	4.65	-2.08	11.37
MRNI-SF score and racialization status				
MRNI-SF score x White	-	-	-	-
MRNI-SF score x Asian	0.17	-0.01	-0.34	0.33
MRNI-SF score x South Asian	0.22	0.11	-0.33	0.54
MRNI-SF score x Indigenous	0.41	-0.61	-1.43	0.20
MRNI-SF score x African-Canadian	0.55	0.68	-0.41	1.76
MRNI-SF score x Middle Eastern	0.52	-0.12	-1.14	0.89
MRNI-SF score x Latino	0.46	0.35	-0.56	1.26
MRNI-SF score x mixed race	0.46	0.12	-0.78	1.01
MRNI-SF score x other	0.42	-0.35	-1.17	0.47
Age	0.01	**-0.06**	-0.08	-0.04
Employment status				
Employed	-	-	-	-
Unemployed	0.36	-0.51	-1.21	0.18

Immigrant				
No	-	-	-	-
Yes	0.37	-0.25	-0.98	0.47
Income				
Middle income	-	-	-	-
Lower income	0.45	**1.86**	0.96	2.75
Lower-middle income	0.35	0.62	-0.06	1.31
Upper-middle income	0.36	**-0.83**	-1.54	-0.12
Upper income	0.83	-0.76	-2.38	0.86
Education				
University/college diploma	-	-	-	-
Some high school	0.98	-0.53	-2.45	1.40
High school diploma	0.40	0.12	-0.67	0.91
Some university/college	0.37	-0.09	-0.81	0.63
Some graduate school	0.62	**1.35**	0.14	2.56
Graduate school degree	0.39	0.69	-0.08	1.46
Marital status				
Married	-	-	-	-
Living common law	0.45	0.13	-0.75	1.02
Single and never married	0.32	0.05	-0.58	0.69

Divorced/separated	0.53	0.07	-0.97	1.12
Widowed	1.33	0.22	-2.39	2.83
Military				
No	-	-	-	-
Yes	0.51	0.43	-0.57	1.43
Other mental health conditions				
No	-	-	-	-
Yes	0.34	**4.76**	4.09	5.43

Note. β unstandardized beta weight; CI confidence interval; SE standard error. Statistically significant variables presented in bold.

Nonlinearity, nonnormality, nonconstant variance, and outliers were all observed within this model as well. A quadratic term, bootstrapping, robust standard error, and the omission of outliers were then included into the model leaving a final sample of 1,146 participants. The adjusted R^2 of this model decreased from 0.261 to 0.254 with no significant correlation existing between self-rated masculinity and GAD-7 score (β = -0.12, 95% CI: -0.27 – 0.02). There also still remained no significant moderating effects self-rated masculinity score and any of the participants' racialization statuses.

4.4. DISCUSSION

Results from this study show that the presence of pre-existing mental health conditions, age, and SES were the covariates that had the largest influence on the association between traditional masculinity as measured by the MRNI and anxiety as measured by the GAD-7. The presence of a diagnosed mental health condition influencing this association is understandable as being diagnosed with a mental health disorder puts one at increased risk of having multiple comorbid disorders (Spinhoven et al., 2014; Swinbourne et al., 2012). Meanwhile, age was

negatively correlated with GAD symptoms. Possible explanations for why age impacts this association is that as men get older, they may have shifting feelings about their masculinity and do not view it as high of a priority as they did when they were younger. Older men may have also learned better coping mechanisms to help alleviate feelings of stress. This also aligns with previous findings that the risk of GAD disorder is reduced with age (De Lijster et al., 2017). Lastly, the influence of SES on this association can be explained by it being the social determinant that has the greatest impact on overall health (Budhwani et al., 2015; Goodwin et al., 2020; Watterson et al., 2017).

This study also found that racialization status moderated the association between alignment to traditional masculinity and anxiety among African-Canadians. This suggests that African-Canadians have a higher level of anxiety when aligning to traditional masculinity compared to other racial groups. However, this does not align with the findings of Budhwani (2015) who found that all racial and ethnic groups met the criteria for lifetime GAD at a lower rate than American-born Whites.

When looking at the correlation between participants' self-rated masculinity and GAD scores, this study found that none of the racialization statuses had a moderating effect on this relationship. A possible explanation for this is that marginalized men may engage in protest masculinities to counteract the marginalization they experience. Protest masculinity is a performance of masculinity enacted to counter marginalization by dominant hegemonic forms of masculinity (e.g., the masculinity of White men, or those whose racialization status may be valued more) (Walker, 2006). Thus, these groups of racialized men may construct their own version of masculinity, which they will position as the true masculinity when compared to hegemonic masculinity. So, these African-Canadian men are rating their own masculinity in relation to how they construct it, which possibly limits the moderating effect that racialization is having on their self-rated masculinity scores.

4.4.1 Limitations

It should be noted that despite the large size of the sample, the representation of some of the racialized groups was small. This impacted how well the moderating effect of racialization on masculinity's influence on GAD could be assessed. By having a larger sample of each racialized group, greater statistical power might have unveiled a moderating effect for the underrepresented groups within this study, like Indigenous men. Another consideration is that racialization tends to have a bigger impact, the darker one's skin is, so the effect may be smaller for racialized identities like northern Asians (Gans, 2017). Thus, an even larger sample size would be needed to identify a significant moderation in these groups.

While this study explored potential confounding variables such as age, SES, marital status, employment status, immigration status, military status, and pre-existing mental health conditions, other variables were not included that could be accounted for in future studies. Examples of covariates that future studies could explore include childhood trauma or sexual orientation. It is possible that these variables may have a significant impact on the relationship between adherence to masculinity and GAD symptoms.

4.4.2 Conclusion

In summary, the present study examined the influence that certain covariates had on the association between traditional masculinity or self-rated masculinity and GAD symptoms in Canadian men, and whether this association was moderated by racialization. The findings suggest that pre-existing mental health conditions, age, and SES are important factors that impact this association, while racialization status appeared to only have a significant moderating effect for those who identify as African-Canadian. These results highlight the importance of considering the intersection of gender and race when examining mental health outcomes, and suggest that interventions aimed at reducing GAD symptoms in African-Canadian men may need to take into account the impact of traditional masculinity on mental health outcomes.

Future studies should aim to replicate these findings in larger and more diverse samples, and explore other potential moderators of the association between masculinity and GAD. Overall, this study contributes to a growing body of research on the complex relationship between masculinity and mental health, and underscores the need for more nuanced and intersectional approaches to understanding and addressing mental health disparities in men.

CHAPTER 5: CONCLUSION

Generalized anxiety disorder (GAD) is a widespread mental health problem that contributes to various societal issues, including decreased quality of life and increased healthcare costs (Katzman et al., 2014). Furthermore, individuals with GAD are at a higher risk of premature mortality (Pratt et al., 2016). While a variety of factors have been found to be associated with GAD (Affleck et al., 2018; Katzman et al., 2014; Mincey et al., 2014; Pratt et al., 2016), its association with masculinity, whether it be a positive or negative association, has not been extensively studied. Thus, the primary objective of these two studies was to address this gap in knowledge by examining the potential association masculinity has on GAD in Canadian men aged 18-65 years. By shedding light on this understudied area, the knowledge gained from these studies may help to improve our understanding of the impact of masculinity on men's mental health and contribute to reducing the stigma surrounding masculinity.

5.1 Association Between Masculinity Constructs and GAD

For my first paper I explored if an association existed between alignment to traditional masculine ideology and GAD in Canadian men, and if a different association existed between a man's self-perceived masculinity and GAD. The results from this study show that adherence to a traditional masculine ideology was positively associated with increased symptoms of GAD in men. The masculinity subscales that were most strongly correlated with increased anxiety were Restrictive Emotionality and Dominance. It is also noteworthy that when these results were stratified by different age groups, a significant correlation between traditional masculinity and GAD was only found among the stratum of participants aged 46-55. When traditional masculinity was replaced by a man's self-rated masculinity score in the model, a negative association was found, with increasing masculinity resulting in a significantly reduced anxiety score.

The findings that traditional masculinity appears to be positively associated with GAD in men aligns with previous research that found that this form of masculine ideology is correlated to a variety of other poor mental health outcomes including MDD and PTSD (Neilson et al., 2020; Valkonen & Hänninen, 2013). In contrast, when men assessed their own masculinity, they reported higher levels of self-rated masculinity on average, which was linked to fewer symptoms of generalized anxiety disorder (GAD). These findings align with previous findings from Lin et al., (2021) that indicated that certain masculine constructs could be negatively correlated to certain mental illnesses such as depression.

5.2 Role of Covariates in the Association Between Masculinity Constructs and GAD

In my second paper I set out to examine the role that different covariates played in the association between masculinity and GAD among Canadian men, and if this association was moderated by racialization. Results indicated that the covariates of pre-existing mental health conditions, age, and SES appeared to have the greatest influence over the correlation between masculinity and GAD. Also, it appears that the association between masculinity and GAD only differed between White and African-Canadians.

The presence of pre-existing mental health conditions influencing the association between masculinity and GAD aligns with findings within the literature that the diagnosis of a mental health disorder increases the risk of comorbid disorders (Swinbourne et al., 2012). The negative association of age and SES with GAD were also in line with revious research (De Lijster et al., 2017; Goodwin et al., 2020; Watterson et al., 2017). However, the stronger association between traditional masculinity and GAD among African-Canadians compared to Whites goes against findings from Budhwani et al., (2015), who found that being a part of a racialized or ethnic group was a protective factor against lifetime GAD when compared to American-born Whites.

Another finding was that the correlation between participants' self-rated masculinity and GAD scores seemed to not be influenced by any of the racialization statuses. One possible explanation for this is that marginalized men may adopt protest masculinities as a way of countering their marginalization. Therefore, these racialized men may develop their own version of masculinity that they consider to be the authentic masculinity compared to hegemonic masculinity (Connell, 1995). As a result, they rate their own masculinity based on how they construct it, which potentially diminishes the moderating influence of racialization on the association between self-rated masculinity and anxiety scores.

5.3 Limitations

Several limitations from these studies must be taken into consideration when interpreting these results. One limitation was that the selection of participants was not random, meaning that the participants within this study do not truly represent the rest of the male population in Canada. There is also always the risk when using surveys that participants do not answer in a way that lines up with what they truly believe. Also, despite having a large sample size, representation of some of the racialized groups was small. This ultimately limits the statistical power of the moderation analysis. Lastly, causal inferences can not be made from these findings due to it being a cross-sectional study design. With regard to future research, longitudinal studies should be conducted with more attention being placed on men aged 46-55. Future studies should also have a greater representation of participants of different racialization statuses.

5.4 Implications and Recommendations for Future Research

These studies explored the potential correlation between masculinity, its various constructs, and the presence of covariates with the development of GAD symptoms in Canadian men. These findings emphasize the necessity of re-examining the definition and operationalization of masculinity in research to gain a better understanding of its impact on

men's mental health. Furthermore, these findings underscore the significance of allowing participants to self-define gender-based constructs as they are fluid and socially constructed.

Future research should investigate the correlation between masculinity and GAD in various countries to gain a more comprehensive understanding of this association. Particular attention should be directed towards men aged 46-55 to better understand why this correlation exists primarily within this age group. Longitudinal or prospective controlled studies are needed to determine the direction and causality of this relationship over time. Additionally, research should examine the association between masculinity and anxiety longitudinally in diverse samples of participants to confirm or refute previous findings. It would be valuable to further explore the moderating effect of racialization on this association to gain a better understanding of how it varies across different racialized groups.

Several practical implications exist related to how these findings can be applied to either clinical or policy settings. Firstly, these findings can be used to inform clinical practice by highlighting the need to address gender role adherence as a potential contributing factor in the development and maintenance of anxiety disorders in men. Healthcare providers can incorporate discussions of masculinity and its potential impact on mental health in their assessments and interventions with their male patients. Second, these results suggest that a man's personal view of his masculinity could be a protective factor against GAD symptoms. This finding can be used to inform clinical practice through emphasizing the importance of exploring patients' own beliefs regarding masculinity as a potential protective factor in both the development and maintenance of GAD. Lastly, these findings suggest that the impact of adhering to traditional masculine ideology on GAD may be moderated by racialization status. This finding can be used to inform policy and advocacy efforts aimed at addressing mental health disparities among marginalized groups. Policy makers and mental health advocates can

use this information to develop interventions that specifically target African-Canadian men and other marginalized groups.

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APPENDIX A: CONSENT FORM

You are being invited to participate in a research project. Your participation is completely voluntary, and you will be able to withdraw at any time prior to the completion of this online survey by simply abandoning the survey. If you wish to have your responses included, please click the "submit" button at the end of the survey.

This study will examine if there is a connection between men's alignment to masculine norms and the influence that has on the development of anxiety. You will be asked questions to assess your level of masculinity. These questions will ask for your thoughts on femininity, sexual minorities, self-reliance, toughness, dominance, importance of sex, and the restriction of your emotions. Further questions will ask about anxious feelings you might have had over the past two weeks, feelings of depression you have experienced in the past two weeks, and how disconnected you feel from others.

You may find some questions personal or upsetting. You have the option to quit the survey at any time. If you choose to quit the survey all of your information will be deleted. However, if you change your mind about participation in the study after you have already chosen to submit your survey, there will be no way to get that information back as there is no way of knowing who specific information belongs to. It is estimated that the survey will take 15-20 minutes to complete. While no direct benefits will come from your participation in this research, your responses will help better the understanding of masculinity and anxiety.

Any information that you provide will be confidential. Only the primary researcher and research committee will have access to the responses given. All electronic data will be stored on secure servers at the University of Lethbridge where it will be held for a period of 10 years before being destroyed. It is important to note that there is always a risk when sharing information online. While a secure system will be used to collect this data, there is no way to completely eliminate the risk of online data being hacked or intercepted.

If you have further questions or concerns about your rights as a participant in this study, contact the Office of Research Ethics at the University of Alberta at 403-329-2747 or by email at reoffice@ualberta.ca. If you have questions concerning the study, contact the principal investigator by email at nikk.leavitt@uleth.ca.

Please select your choice below. You may print a copy of this consent form for your records. Clicking on the "Agree" button indicates that you have read the above information and you voluntarily agree to participate.

☐ Agree

☐ Disagree

APPENDIX B: DAG OF THE ASSOCIATION BETWEEN MASCULINE NORMS AND GAD