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Men High in Conforming to Masculine Norms have Less Intent to Practice Yoga: A Serial Mediation Analysis

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By

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ABSTRACT

Yoga is a spiritual lifestyle with the goal of alleviating human suffering and cultivating mental discipline. Practicing yoga has been shown to be effective at reducing stress, anxiety, depression, and promoting physical health. The total number of yoga practitioners has increased over the years, but surveys confirm that yoga practitioners are primarily women. Interviews with men have shown that traditional masculine gender norms serve as a barrier to practicing yoga. In the present study, drive for muscularity and self-esteem were tested as serial mediators of the association between conformity to masculine norms and intent to practice yoga. Participants (N=155) completed online measures of conformity to masculine norms, drive for muscularity, self-esteem, previous yoga experience, and intent to practice yoga in the future. Participants also answered one question in which they wrote why they might be hesitant to practice yoga and another about other men's hesitancy to practice yoga. Drive for muscularity and self-esteem did not serve as mediators of the association between conformity to masculine norms and intent to practice yoga in the future. Conformity to masculine norms was associated with lower intent to practice yoga but it was not associated with previous yoga experience. The specific masculine norm Disdain for Homosexuality had the strongest association with lower intent to practice yoga. Drive for muscularity was not associated with intent to practice yoga in the future but was associated with less previous yoga experience. Drive for muscularity was not related to how men described their own and other men's hesitancy to practice yoga, but many participants mentioned that masculine gender norms may serve as a barrier yoga practice for other men. Our results suggest that higher adherence to masculine norms predicts lower intent to engage in yoga, likely by virtues of men's perception of yoga as a feminine activity. Limitations and future directions are discussed.

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INTRODUCTION

More people are practicing yoga than ever before. The number of American yoga practitioners, defined as individuals who had practiced yoga in the past 6 months in a class setting and were not yoga teachers, has increased from 15.8 million in 2008 to 36.7 million in 2016 (Ipsos Public Affairs, 2016). An additional 30 million Americans have practiced yoga at least once in their life (Ipsos Public Affairs, 2016). As yoga practice has increased in popularity throughout the world, different styles of yoga have emerged to suit the needs and preferences of a wide range of practitioners. Practicing yoga has been shown to be effective at reducing stress (Pascoe & Bauer, 2015), anxiety (Zoogman et al., 2019), and depression (Brinsley et al., 2020). Yoga practice is also useful in promoting physical health, as evidence has shown it to be effective at improving flexibility and balance (Büssing et al., 2012; Youkhana et al., 2016), reducing back pain (Cramer et al., 2013), and producing positive changes in risk factors for cardiovascular disease, including blood pressure, cholesterol levels, and heart rate (Chu et al., 2014). Given yoga's potential to improve health, there is ample justification for the wide promotion of yoga practice.

Yet, there are clear gender differences in the adoption of yoga. Although the total number of practitioners has increased, several surveys confirm that yoga practitioners are primarily women. In 2016 in the United States, only 28% (10 million) of the current practitioners were men, up from 20% (4 million) in 2012 (Ipsos Public Affairs, 2016). In a systematic review of yoga demographics surveys, Park et al. (2015) found a similar gender pattern in nationally and internationally representative samples. A nationally representative United States sample also showed that more women than men practice yoga (72% vs. 18% respectively; Cramer et al., 2016).

Given the gender difference in engagement in yoga practice, the goal of the proposed study is to investigate factors that may be related to men's apparent reluctance to practice yoga. As will be outlined in further detail, interviews with men have shown that traditional masculine gender norms, which are culturally determined rules and standards that guide and constrain men's behaviour in public and private life (Ricciardelli et al., 2010; Thompson & Bennett, 2015), serve as an important barrier for yoga participation among men (Cagas et al., 2021). These masculine norms dictate, among other things, that men avoid all activities perceived as feminine and focus on the pursuit of power, including physical prowess (Levant, 1996; Mahalik et al., 2003). Men have been shown to incarnate the latter of these norms via the "drive for muscularity," which is a motivation to increase one's total muscular mass (McCreary & Sasse, 2000; Kelley et al., 2010). The drive for muscularity is quite prevalent among men. Indeed, a survey of United States college students showed that over 90 percent of undergraduate men wish to be more muscular (Frederick et al., 2007). Yoga is unlikely to be perceived as a physical activity that can increase muscularity, as evidenced by the results of interviews of men showing that they do not consider yoga to be comparable to a workout (Hurst et al., 2018). Taken together, this suggests that men who highly conform to traditional male gender norms and pursue physical prowess via drive for muscularity would be unlikely to practice yoga.

The association between masculine gender norms, drive for muscularity, and yoga may be further explained by self-esteem, which refers to the global evaluation of perceiving oneself as living up to standards that are derived from the culture at large and integrated into a person's unique worldview (Pyszczynski et al., 2004). The self-esteem of men who conform to masculine norms is, at least partially, contingent upon their self-perceived ability to adhere to the masculine norms that they have integrated. Since people are motivated to maintain their self-esteem

(Pyszczynski et al., 2004), self-esteem maintenance in these men would involve engaging in activities associated with masculinity. As already mentioned, men seek increased muscularity as a method of conforming to masculine norms (McCreary & Sasse, 2000) and pursue muscularity in the hope of increasing their self-esteem (Chittester & Hausenblas, 2009; Martin & Govender, 2011). However, high drive for muscularity is associated with low self-esteem (McCreary & Sasse, 2000; Smolak & Stein, 2006). This suggests that, as is the case for women for whom repeated failed attempts at weight loss entrain low-self esteem (Polivy & Herman, 2002), the repeated failure to achieve idealized muscularity levels may entrain low self-esteem in men. Thus, men with high conformity to masculine norms whose self-esteem has been damaged by the pursuit of muscularity may be especially unlikely engage in yoga for two main reasons. First, men perceive yoga as feminine (Barrett, 2017; Cagas et al., 2021), and male gender norms prescribe that men avoid activities associated with femininity (Mahalik et al., 2003) in order to maintain their masculine identity. Thus, men whose self-esteem is damaged are unlikely to seek a behaviour associated with femininity as a method of increasing their self-esteem. Second, yoga is not perceived by men as muscle-building (Hurst et al., 2018), one strategy of adherence to the male gender role (Mishkind et al., 1986; Martin & Govender, 2011). Thus, men whose self-esteem is damaged are unlikely to seek a behaviour not associated with muscle-building.

Based on this logic, the goal of this project was to investigate men's reported conformity to masculine norms as a predictor of future engagement with yoga practice, and drive for muscularity and self-esteem were tested as serial mediators of this association. Further, men's responses to two open-ended survey questions, one about why they are hesitant to practice yoga and another about why other men might be hesitant to practice yoga, were analyzed via a

quantitative content analysis to see if the responses of men who were higher in drive for muscularity included phrases related to physical appearance.

Yoga

Yoga is an ancient practice that originated in India (Broad, 2012). As understood traditionally, yoga is a spiritual lifestyle that cultivates the mental discipline required for the practitioner to obtain insights into their behavior and the nature of their consciousness. The philosophy of yoga was systematized by Patanjali in *The Yoga Sutras* in approximately 500-200 BCE (Iyengar, 2002). In this text, Patanjali outlines the eight components/limbs of the yogic spiritual path. As explained by Iyengar (1979), the eight limbs are defined as follows: The first limb, *yama*, refers to universal ethical discipline and is divided into five sub-components: *āhimsa* – non-harming, *satya* – truth, *asteya* – non-stealing, *brahmacharya* – sexual conduct based in the principles of *ahimsa* and *satya*, and *aparigraha* – non-attachment. The second limb, *niyama*, means individual ethical discipline and is also specified in five sub-components: *śaucha* – purity/cleanliness of mind and body, *santosa* – contentment, *tapas* – heat/discipline, *svādhyāya* – self-directed study of yoga philosophy, and *Īsvara pranidhāna* – surrender or dedication to God, with God defined by the individual practitioner. The third limb, *asana*, translates literally as "seat," and refers to the physical postures practiced in yoga. The fourth limb, *pranāyāma*, denotes the practice of controlled breathing. The fifth limb, *pratyahara*, refers to sensory control. More specifically, *pratyahara* is practiced by withdrawing sensory systems from external objects and instead directing them at internal cues and states. The sixth and seventh limbs, *dhāranā* and *dhyāna,* respectively refer to concentration, when all effort is directed towards focusing the mind's faculties on a single object of attention, and meditation, when one rests easily in the state of concentration. The dedicated practice of these limbs culminates in the eighth and final limb,

samādhi, translated as enlightenment or union with the divine. In the state of *samādhi*, identification with the ego, defined as the felt sense of "I" or "mine," which is deemed as the source of much of human suffering in yoga philosophy, dissolves. Following the detachment from the self, the yoga practitioner enters a subjective state of connection with the larger universe (Iyengar, 1979; see Iyengar, 2002 and Feuerstein, 1989 for further discussion of yoga's eight-limbed path).

Yoga practice was exported out of India largely thanks to the work of T. K. V. Krishnamacharya (c. 1888-1989); his students Pattahbi Jois, B. K. S. Iyengar, Indra Devi; and his son T. K. V. Desikachar (Desai & Desai, 2004). Although each of these students made personal adaptations to the yoga taught to them by Krishnamacharya, all endorsed that yoga practice is suitable and beneficial for all people and claimed the practice to have physical, social, psychological, and spiritual benefits.

Yoga Styles

The spread of yoga throughout the world begot many different styles (e.g., Anusara yoga, Power yoga, Vinyasa yoga, Bikram yoga, Kundalini yoga, Laughter yoga, etc.). Each of these styles vary in terms of their goals and the practices implemented to attain these goals. To illustrate, Kundalini yoga emphasizes awakening the subtle energy (called *prana*) located in the base of the spinal cord and channeling it up the spinal cord through chanting, *asanas* (yoga poses), and *pranayama* (controlled breathing). It is believed that once the *prana* reaches the crown of the head, *samadhi* is attained. In contrast, Vinyasa yoga typically accentuates coordinating the *asanas* with the breath to increase physical strength, relieve psychological stress, and increase concentration.

These different yoga styles can be grouped into two broader categories: traditional and contemporary. Traditional styles, such as Ashtanga and Iyengar yoga, emphasize that practitioners follow the lifestyle of the *Yoga Sutras* as part of their overall yogic practice. Physical posture practice (*asana*) serves primarily to keep the body and mind fit for the practice of the other limbs of yoga. The *asanas* also constitute an embodied experience of the other limbs. For example, Ashtanga yoga promotes the achievement of a meditative state (*dhyana)* through the simultaneous engagement in *asana*, *pranayama*, and gazing points (Maehle, 2006). In contrast, contemporary yoga styles, such as Vinyasa yoga, typically emphasize physical posture (*asana*) and, depending on the teaching style of the yoga instructor, may include breathing practice (*pranayama*) or meditation (*dhyana*) practiced separately from the asanas. In contrast to traditional styles, *asana* is practiced primarily for physical fitness, *dhyana* is taught for stress relief, and the yogic spiritual path outlined by Patanjali is taught far less often. Simply put, contemporary styles are physical practices that sometimes include a spiritual component while traditional styles are spiritual practices with a physical component.

Empirically Supported Benefits of Yoga

Seventy-five percent of Americans surveyed believe that yoga is "good for you" (Ipsos Public Affairs, 2016). Empirical research in both the psychological and physical health domains supports their belief. Below is a review of the psychological benefits of yoga and a sample of the physical benefits of yoga, preceded by a discussion of two methodological considerations in yoga research.

First, research on yoga as an intervention is relatively new but has followed a logical methodological evolution. Given the cost and intensive labour required to conduct randomized, controlled trials (RCTs), an appropriate step in new intervention research is to begin with

uncontrolled experimental designs. Such designs allow researchers to assess the feasibility and acceptability of the new intervention, as well as gather preliminary data on the effectiveness of the intervention (Thabane et al., 2010). Yoga research has followed this logical trajectory and, as such, the research is evolving rapidly. Depending on the inclusion criteria, analyses of the yoga literature showed 128 RCTs investigating yoga's effect on health or well-being outcomes (Park et al., 2014) and 312 total RCTs (Cramer, et al., 2014); these numbers represent the most recent numerical estimates available. Cramer et al. (2014) noted that the majority of yoga RCTs were published after the year 2000 and emphasized that the number of yoga RCTs published each year has increased, which bodes well for the field.

Second, there is wide variability in the yoga interventions tested in these studies. Specifically, the term "yoga" is used to describe both *asana*- and non-*asana*-based yoga interventions. To illustrate, searching "yoga" on scholarly databases such as PubMED and Google Scholar retrieves results for both *asana*-based (e.g., Iyengar yoga) and non-*asana*-based forms (e.g., Sudarshan Kriya Yoga: a non-variable set of controlled breathing exercises) of yoga. Yoga is an inherently multimodal intervention, and the imprecise use of the term "yoga" leads to difficulty in distilling yoga research results, especially for those unfamiliar with the various styles of yoga.

Further, authors vary widely in the precision of the descriptions of the yoga interventions used in their studies. Some authors give little detail beyond stating that participants attended a yoga class (e.g., West et al., 2004). Others are more thorough and provide manualized descriptions of the yoga intervention implemented in their studies that include not only the exact frequency and length of the classes, but also provide lists of *asanas* practiced during each class,

the specific yoga sutra on which the yoga instructor focused in each yoga class, and the breathing technique that was taught on each day/week (e.g., Streeter et al., 2017; Jarry et al., 2017).

Given these considerations, the following review will specify whether a study was controlled or uncontrolled and, unless otherwise specified, care has been taken to only include results from studies that used *asana*-based yoga interventions.

Psychological Benefits

Yoga and Psychological Stress. Controlled studies have shown asana-based yoga to be effective at reducing stress when measured via participant self-report (Michalsen et al., 2005; Maddux et al., 2018) and via physiological indicators of stress (Innes & Selfe, 2012). Yoga's effectiveness at reducing stress has been demonstrated in various samples, including nurses (Fang & Li, 2015), older adults who engaged in physical activity less than 2 days per week (Gothe et al., 2016), and pregnant women (Satyapriya et al., 2009). Pascoe & Bauer (2015) conducted a systematic review of RCTs showing yoga's effect on physiological parameters involved in the human stress response and concluded that asana-based yoga is consistently associated with positive changes in blood pressure, heart rate, and cortisol, all of which are involved in two of the body's major stress response systems, the sympathetic nervous system and the hypothalamic pituitary adrenal axis (6/25 studies included in this review did not specify the type of yoga intervention used).

Yoga and Anxiety. A meta-analysis of RCTs showed that asana-based yoga practice is an effective method of ameliorating self-reported anxiety symptoms when compared to active, waitlist, and no intervention control groups (Zoogman et al., 2019). Additional RCTs have demonstrated yoga's positive effect on anxiety in various adult populations, including those reporting high levels of stress (Maddux et al., 2018), and those with generalized anxiety disorder

(Simon et al., 2020), Parkinson's disease (Kwok et al., 2019), human immunodeficiency virus (HIV; Kiloor et al., 2019), and with coronary artery disease (Sharma et al., 2020).

Yoga and Depression. Researchers also have found evidence that *asana*-based yoga has a positive effect on depressive symptoms (Jarry et al., 2017). For individuals with subclinical depressive symptoms and those diagnosed with a depressive disorder, a meta-analysis showed that yoga incorporating *asana* was effective at reducing symptoms when compared to usual care, which included aerobic exercise, waitlist, and pharmacotherapy (Cramer et al., 2013). The finding of yoga as effective in decreasing depressive symptoms has been replicated across various samples, including women with high perceived stress (Michalsen et al., 2012), patients with cancer and survivors of cancer (Buffart et al., 2012), and people diagnosed with mental disorders (Brinsley et al., 2020).

Importantly, *asana*-based yoga is effective in the treatment of individuals with major depressive disorder (MDD). For example, Streeter et al. (2018) compared healthy controls to individuals with MDD and found the MDD group had significantly lower levels of gamma-aminobutyric acid (GABA), an inhibitory neurotransmitter that is typically lower in individuals with MDD (Möhler, 2012). However, after the MDD-group underwent a 12-week *asana*-based yoga intervention and the healthy controls completed a metabolically matched walking intervention, GABA levels did not differ significantly between the two groups, indicating that the GABA levels in the MDD group had "normalized." Further, the MDD group experienced significant reductions in depression and anxiety symptoms (Streeter et al., 2018).

Physical Benefits

In surveys, yoga practitioners report improvements in physical domains, including improved sleep (Ross et al., 2013; Park et al., 2016), improved diet (Ross et al., 2013; Park et al.,

2016), and increased flexibility (Park et al., 2016). The American College of Physicians recommended yoga as treatment for lower back pain (Qaseem et al., 2017), a recommendation which is supported by evidence from individual RCTs (Groessl et al., 2017), meta-analyses of RCTs (Cramer et al., 2013), and systematic reviews of RCTs (Chang et al., 2016), which all show that yoga practice is a safe adjunctive treatment that is effective at reducing back pain in the short- and long-term.

Further, Hagins et al. (2013) and Cramer et al. (2014) both conducted systematic reviews and meta-analyses and concluded that yoga has a small but significant effect on hypertension (i.e. yoga reduces systolic and diastolic blood pressure). Other researchers, through systematic review and meta-analysis, have found evidence that *asana*-based yoga may improve pain, function, and stiffness in individuals with arthritis of the knee (Lauche et al., 2019), improves balance and mobility in people aged over 60 (Youkhana et al., 2016), and improves indicators of type II diabetes (Innes & Selfe, 2016; Kumar et al., 2016; Cui et al., 2017), including fasting blood glucose and postprandial blood glucose.

Yoga Compared to Exercise. Ross & Thomas (2010) conducted a review of studies that compared *asana*-based yoga practice with exercise and concluded that, in samples of women and mixed-gender samples, yoga is as effective or more effective than exercise at relieving symptoms associated with multiple conditions, such as diabetes, menopause, multiple sclerosis, and schizophrenia. To illustrate, one study included in the review showed that, in a sample of women experiencing symptoms of menopause who were randomized to participate in 8-weeks of either an exercise or yoga intervention, women in the yoga group experienced greater decreases in perceived stress and menopausal symptoms (Chattaha et al., 2008). Govindaraj et al. (2016) posit that, in addition to the *asanas*, which are primarily isometric bodily positions, yoga practice

emphasizes being mindful during the practice, regulating one's breathing, and paying special attention to the proper bodily maintenance of each *asana*. The eight-limbed path of yoga also offers positive ethical principles by which to conduct one's life. In comparison, the purpose of exercise is primarily muscular and cardiorespiratory training without the emphasis on breath regulation and mindfulness, which are skills that can be taken "off the yoga mat." Thus, we can conclude that yoga is at least as effective as exercise and, for some conditions, may be more so.

Men

Yoga's effectiveness at ameliorating psychological and physical wellbeing raises the question of men's reluctance to engage in the practice. Men remain an understudied population in yoga research. To illustrate, of the 12 controlled studies that were not systematic reviews or meta-analyses cited in the above section, only 24% (n=1084; 263 men) of participants identified as men. The following section will document that yoga is beneficial for men and will introduce the concept of gender norms, which were used in the investigation of factors that may contribute to men's low uptake of yoga.

Yoga's Effects on Men

In order to present a comprehensive account of what is known from studies about men and *asana*-based yoga, PubMed and PsycINFO were searched from their inception until June 2021. The search strategy for PubMed and PsycINFO were as follows, respectively: (yoga[Title]) AND ((men[Title/Abstract]) OR (male[Title/Abstract])); ti(yoga) AND (men OR male). Thirty-one full text articles were extracted from this search and the general results from this search are presented below.

Psychological Benefits. Yoga has positive psychological effects in men. For example, researchers used a matched pairs design and divided a group of men in the Brazilian army into

two groups balanced for age and rank in military hierarchy. One group continued their conventional military exercise, which consisted of four 60-minute sessions per week, while the other replaced half their exercise sessions with asana-based yoga classes for 6 months (Rocha et al., 2012). The men who did yoga reported less depression, anxiety, and stress and had lower salivary cortisol, a physiological indicator of stress, than the group who did only conventional military exercise. Two RCTs with groups of obese men found that an asana-based yoga intervention, one that lasted 14 weeks (Rshikesan & Subramanya, 2016) and another that lasted 6 months (Rshikesan et al., 2016), significantly reduced perceived stress.

A cross-sectional study showed that yoga beginners and experienced yoga practitioners who identified as men had significantly higher body satisfaction than men who did not practice yoga but engaged in aerobic and weight training exercises (Flaherty, 2014). In the domain of sexual function, a pilot study showed that *asana*-based yoga may be effective at improving men's self-reported sexual function and satisfaction (Dhikav et al., 2010) and a comparative trial showed that *asana*-based yoga improved intravaginal ejaculatory latencies in men with premature ejaculation (Dhikav et al., 2007).

Two studies tested yoga's effects on cognitive parameters. First, a single session of yoga with *asana* was found to improve men's performance on a digit-substitution task (Telles et al., 2012). Second, men who met the criteria for a substance use-disorder were randomized to complete an *asana*-based yoga or a physical exercise intervention (Gaihre & Rajesh, 2018). Both groups significantly improved their performance on the WAIS-R digit forward and digit backward tests, the Stroop Color-Word Test, and the Six Letter Cancellation Task.

Physical Benefits. Yoga also may have utility in improving the physical health of men. For men suffering from type-2 diabetes, asana-based yoga in controlled trials was found to

reduce fasting blood sugar and post-prandial blood sugar (Chimkode et al., 2015; Datey et al., 2018). Yoga also reduces inflammation (Rajbhoj et al., 2015) and oxidative stress (Pati et al., 2014; Manna, 2018). Two controlled trials (Harinath et al., 2004; Patil et al., 2014) and one uncontrolled trial (Sarvottam et al., 2013) showed that yoga improves blood pressure. Another controlled trial that compared standard cardiac rehabilitation to standard cardiac rehabilitation plus *asana*-based yoga showed yoga did not decrease blood pressure, but the yoga group did display a significant reduction in resting and peak heart rate (Grabara et al., 2020).

Mixed-Gender Samples. Yoga also improves psychological health in yoga studies with samples consisting primarily of men. For example, Davis et al. (2020) conducted an RCT on a sample of veterans with a confirmed diagnosis of post-traumatic stress disorder (PTSD) who were mostly men (66%). The researchers found that participants who were randomized into a group that completed a 16-week *asana*-based yoga intervention demonstrated greater improvements in depression, anxiety, sleep problems, and PTSD symptoms at the end of treatment than a group randomized to complete a 16-week wellness lifestyle program that was matched for attention and included physical activity (Davis et al., 2020). In an RCT conducted using patients with cardiac problems (86% were men), individuals who completed a 12-week *asana*-based yoga intervention had a significant reduction in depression and anxiety symptoms compared to a group receiving standard cardiac care, which included pharmacologic treatment and instruction from a cardiologist (Sharma et al., 2020).

Taken together, the results from studies utilizing mixed-gender samples with predominantly women, mixed-gender samples with mostly men, and samples of solely men, converge on a similar conclusion. That is, men reap psychological and physical benefits from the practice of yoga.

Barriers to Yoga Practice Endorsed by Men

Despite yoga's positive effect on men's psychological health, studies have shown attitudinal barriers to practicing yoga that are uniquely endorsed by men (Cagas et al., 2021). As will be documented below, men are known to say that "yoga is for girls" and male and female undergraduates indicated in a survey that they considered it to be a feminine activity (Matteo, 1986). The appraisal of yoga as too feminine to be taken seriously is confirmed in qualitative explorations of men's opinion of yoga. In the most explicit analysis of barriers to yoga participation among men, Cagas et al. (2021) interviewed Australian men who had not consistently practiced yoga in the past six months. Using a qualitative descriptive approach, researchers identified two-barriers specific to men: 1) preference for other forms of physical activity, such as sports and gym training, and 2) gender-related perceptions and pressures. Specifically, even though the majority of men interviewed acknowledged that yoga is suitable for everyone, they still believed that yoga is a feminine and a female-dominated activity. This was clear in the comment of one participant who described a stereotype of yoga practitioners as "mothers in their active wear, driving an SUV and going out for breakfast after yoga" (Cagas et al., 2021; p. 4). Finally, several participants cited Australian "bloke" culture as a barrier to men engaging in yoga. Bloke culture expects men, among other things, to be strong, be tough, drink beer, and to distance themselves from anything that might be perceived as feminine or un-manly to avoid being called a "poofter," a pejorative term for a man who identifies as homosexual (Cagas et al., 2021; p. 5).

As another example, Barrett (2017) observed yoga classes conducted as part of an alternative to incarceration (ATI) program, for people charged with felonies, and interviewed young-adult men (aged 18-24) who had attended at least eight of these yoga classes. She found

that the term “yoga class” initially held a negative connotation for men. To illustrate, it was common to see men hesitantly stick their head in the room to investigate a few minutes before the yoga classes started. When these men were invited to participate, the men “would say things like, ‘hell, no, I ain’t doing yoga!’ or ‘Yoga?, nah, that’s for girls’ or ‘Yoga? You doing yoga? Nah, Man’ and walk away” (Barrett, 2017, p. 1725). Despite the general reluctance to participate, the men she interviewed described that the combination of the physical postures and breathing techniques/awareness increased their ability to be mindful, which helped them with stress management and emotion/anger regulation, even in the face of their extraordinary stressors, which included lack of money/work, threat of gang violence, curfews, court dates, and random drug testing (Barrett, 2017). Several men commented that yoga helped them manage their anger more effectively than their required anger management classes. When Barrett (2017) asked the men if there was anything they did not like about the classes, they said the classes were too short. They wanted more yoga! Another man said, “I’m a believer. I love yoga now” (Barrett, 2017, p. 1727).

Yoga’s perceived femininity is also present in the military culture, which is dominated by men and masculine gender norms (Hinojosa, 2010). Researchers identified stigmas about yoga by performing a conventional content analysis on interviews conducted with active-duty military, reservists, veterans, and yoga instructors who taught active-duty or veterans (Hurst et al., 2018). These stigmas included negative typecasting that yoga is not manly or “macho,” yoga is not a sport or competition, and that yoga isn’t comparable to endurance or physical training workouts. Specifically, one participant said “it’s men thinking that it’s a women’s sport or not even a sport, they think that it’s stretching and silliness” (Hurst et al., 2018, p. 226).

Men in focus groups have conveyed the impression that yoga is dominated by women (Atkinson & Permuth-Levine, 2009) and, in a online survey, significantly more men than women endorsed that yoga seems to be only for women (Brems et al., 2015). This impression also contributed to male practitioners feeling self-conscious when they did practice and feeling intimidated by women who seemed to be able to do more poses than they could (Atkinson & Permuth-Levine, 2009). In interviews, men have gone as far as to say that "yoga is designed for women, that's why I can't do it well" (Lee et al., 2019, p. 92). This belief is not based in historical fact, as yoga was primarily practiced by men prior to its exportation out of India (Broad, 2012), but it highlights that some men incorrectly perceive that yoga excludes them by design.

Finally, the fact that yoga is associated with spirituality may serve as a barrier, particularly for men. A survey showed that women are more motivated by yoga's spiritual component than are men (Park et al., 2019), which is consistent with studies showing that women are relatively more open to, and interested in, religion and spirituality than are men (Francis, 1997; Büssing et al., 2005). Further, men who were interviewed reported an association of yoga with hippies (Combs & Thorn, 2014), explicit in a statement by one man who suggested that yoga practitioners were "dope smoking hippies with incense" (Lee et al., 2019, p. 92). This provides evidence that men who associate yoga with spirituality may be skeptical of its potential benefits.

In summary, men consistently report that the association of yoga with femininity and feminine traits (i.e., spirituality) serves as a barrier to their engagement in the practice. Based on this understanding, an investigation of men's gender norms may serve as a fruitful avenue to explore factors that contribute to men's lower uptake of yoga relative to that of women.

Gender Norms

Before discussing how gender norms may be related to men's low uptake of yoga, three related but distinct terms – gender norms, gender identity, and gender expression – must be introduced. Gender norms are the rules and standards that define, guide, and constrain masculine and feminine behavior (Mahalik et al., 2003). Gender identity is a person's internal, felt sense of their individual experience of gender (Ontario Human Rights Commission, 2014). Gender expression refers to how a person publicly presents their gender identity through their behaviour (e.g., body language and voice), outward appearance (e.g., clothing, hair, make-up), and chosen name and pronouns (Ontario Human Rights Commission, 2014).

Although gender norms are reflective of traditional, binary categorisation of gender (i.e., gender norms exist for men and women), gender identity and gender expression exist along a spectrum or continuum with masculine on one pole/end and feminine on the other. Consequently, a person may identify as a woman, a man, both, neither, or anywhere along the spectrum and express their gender identity through behaviours and appearance associated with masculinity, femininity, or a combination of both.

Gender norms are learned through a process known as socialization, in which gender-appropriate thoughts, emotions, and behaviours are learned and subsequently reinforced by observing what most men and women do, observing how popular/famous men and women act, and by being explicitly told what is acceptable and unacceptable behavior for men and women (Lindsey, 2016; Mahalik et al., 2003). These norms are continually reinforced by the environment and, consequently, gender norms become internalized early in childhood, meaning that behavior becomes increasingly dictated by internal representations of gender norms and the perceived consequences of behaving in gendered ways (Leaper & Farkas, 2015). From this

understanding, gender norms are reflective of gender as "something that one does, and *does* recurrently, in interaction with others" (West & Zimmerman, 1987, p.140, as cited in Courtenay, 2000; italics theirs).

Traditional Masculinity

Although some people do not follow the gender norms associated with their gender identity, most do (Leaper & Brown, 2018). Relevant to the current project, a large proportion of men endorse, and seek to express, a specific gender norm that is representative of the masculine extreme of the gender spectrum often referred to as "traditional masculinity" (also known as toxic masculinity or hegemonic masculinity; Levant, 1996; Addis & Mahalik, 2003). Traditional masculinity is a culturally determined set of norms and ideals that are prescriptive and proscriptive in terms of what a man should strive to be and how he should conduct his life (Ricciardelli et al., 2010; Thompson & Bennett, 2015). Definitions of traditional masculinity generally include the following constellation of standards and expectations for men: the avoidance of all things perceived as feminine; emotional stoicism or restricting one's emotional life; an emphasis on aggression and toughness; self-reliance; prioritization of achieving status above all else; endorsement of nonrelational, objectifying attitudes towards sexuality; and internalizing attitudes ranging from fear to outright hatred of anything perceived to be associated with homosexual men (Levant, 1996; Mahalik et al., 2003).

The standards of traditional masculinity are defined by societal factors such as the historical era, influential social institutions, and one's local community (Thompson & Bennett, 2015; Ricciardelli et al., 2010). As such, the specific norms and the cultural emphasis for men to pursue them may differ between nations (e.g., nations differ in their levels of endorsement of masculine values; Hofstede, 2016), local cultures (e.g., members of different social classes differ

in their levels of endorsement of traditional masculinity; Liu et al., 2016), and an individual's community identity (e.g., the way men who are gay describe masculinity differs from how straight men describe masculinity and descriptions of masculinity vary between gay subcultures; Sánchez, 2016).

Researchers in the field of men and masculinity posit that adherence to traditional masculinity has inherently unhealthy qualities and is directly associated with unhealthy beliefs and behaviours (Courtenay, 2000). For example, in a sample of adult men (aged 18-35), those who reported greater endorsement of traditional masculine ideologies were more likely to report perpetration of interpersonal violence in the past year (Santana et al., 2006). In interviews with American undergraduates, men depicted heavy alcohol use as a symbol of masculine strength, toughness, and power, and both men and women described drinking and heavy drinking as a "macho" or masculine behavior (Peralta, 2007). The toxicity of this belief is highlighted by the fact that 3.8% of all deaths are attributable to alcohol use (Rehm et al., 2009). In adolescents, higher conformity to traditional masculinity was longitudinally associated with decreased engagement with academic pursuits and increased depressive symptoms (Rogers et al., 2017). Finally, traditional masculinity is associated with men's low rates of help-seeking from mental and physical health professionals – rates that are far lower than those at which women seek help (Addis & Mahalik, 2003; Vogel et al., 2011; Yousaf et al., 2015).

Dimensions of the construct of traditional masculinity have been shown to be differentially related to mental health outcomes. For instance, Wong et al. (2017) conducted a meta-analysis of 78 studies (over 19,000 participants) that used the conformity to masculine norms inventory (CMNI; Mahalik et al., 2003), which measures an individual's conformity to 11 masculine norms, such as Pursuit of Status, Emotional Control, and Disdain for Homosexuality.

The researchers found that overall conformity to masculine norms was positively associated with negative mental health outcomes, such as depression, psychological stress, and negative social functioning, and was inversely associated with positive mental health outcomes, such as life-satisfaction and self-esteem, and attitudes towards psychological help-seeking.

However, upon examining each masculine norm individually, Wong et al. (2017) found that not all masculine norms shared these associations. For example, the norms of Primacy of Work and Disdain for Homosexuals were not found to be associated with negative mental health outcomes, and the norms of Power Over Women, Self-Reliance, Playboy, and Emotional Control, which all emphasize that men never show weakness or disclose personal feelings, were the only norms that were negatively associated with positive mental health outcomes. Thus, researchers should be cautious when making conclusions about overall conformity to traditional masculinity by being aware that certain norms may be more responsible than others for the effects found.

Traditional Masculinity and Yoga

The dominance of traditionally masculine attitudes in the social milieu is likely to affect men's perceptions of yoga. As described earlier, men widely perceive yoga as a feminine activity and an investigation into yoga's perceived masculinity/femininity with university undergraduates showed yoga to be perceived as a feminine activity (Matteo, 1986). Since traditionally masculine men are "supposed" to avoid all things perceived as feminine, it follows that yoga's perceived femininity would serve as a barrier to men practicing it. One military veteran commented on how he thought men might react to the idea of other men doing yoga: "So guys say 'No, I need to throw around weights. That's what I like. I wanna run 26 miles and bike another 30 and swim for 5 miles" (Hurst et al., 2018, p. 226).

Drive for Muscularity

One of the ways in which men appear to incarnate their pursuit of masculinity is by also pursuing muscularity. This pursuit is captured by the "drive for muscularity," a two-factor construct defined by McCreary et al. (2004) as consisting of muscularity-oriented body image e.g.: "*I think that my arms are not big enough"* and muscularity behavior: e.g. "*I drink weight gain or protein shakes.*" Compared to women, who tend to desire to be thin via the drive for thinness (Kelley et al., 2010), men are more likely to engage, or intend to engage, in exercise behaviours that will bring them closer to becoming a "muscular mesomorph," a V-shaped body figure that emphasizes muscle mass and physical bulk (McCreary & Sasse, 2000; Martin & Govender, 2011).

Traditional Masculinity and Drive for Muscularity

Sociocultural norms associate masculinity with muscularity, especially in Western culture (Mahalik et al., 2003). Indeed, researchers have consistently demonstrated traditional masculinity and drive for muscularity to be positively related. For example, in two surveys conducted with university undergraduates, McCreary et al. (2005) showed that several indices of masculinity, including measures of stereotypically masculine behaviors and endorsement of traditionally masculine beliefs, were positively associated with drive for muscularity. This positive association also was found in a sample that included participants from the United States, the United Kingdom, Australia, and Sweden (Gattario et al., 2015). A survey completed by college football players showed that specific traditionally masculine norms, namely Emotional Control, Risk-Taking, and Primacy of Work, correlated with higher drive for muscularity (Steinfeldt et al., 2011). In responses to open-ended survey questions that asked why *they* wanted to be muscular, these same football players most often cited reasons related to sport performance and

functionality (e.g., “to be stronger at my sport and my position”; Steinfeldt et al., 2011, p. 333). However, when the players were asked why they thought *other men* want to be muscular, the most common responses were related to masculine gender norms and sociocultural messages that link masculinity and muscularity (e.g., “the media and for some men it is seen as being masculine and not gay”; Steinfeldt et al., 2011, p. 333).

Traditional Masculinity, Drive for Muscularity, and Yoga

The fact that traditional masculinity is associated with drive for muscularity constitutes part of the rationale to suggest that drive for muscularity may mediate the relationship between traditional masculinity and future intent to practice yoga. Further, yoga is unlikely to be perceived by men as a muscle-building activity. Indeed, a content analysis of the *Yoga Journal* magazine, a highly popular magazine and web site among yoga teachers and trainees (Ipsos Public Affairs, 2016), showed that the women models shown on the magazine’s cover typically had a “yoga body,” defined as a small-breasted woman of low-normal weight with a thin/lean or skinny/bony body shape (Webb et al., 2017). Further, an analysis of a subset of 100 images posted on Instagram, a popular social media platform, with the hashtag “#yoga” over a 9-day period showed that 68 of these images were of people who were underweight, as defined by a BMI visual figure rating scale (Lacasse et al., 2019). Thus, as depicted in popular media, the body shape associated with yoga is not at all similar to the V-shaped, muscular, physically bulky physique that men high in drive for muscularity seek to attain. Moreover, recall the finding by Hurst et al. (2018) that men in the military, a culture which reinforces traditionally masculine ideals (Hinojosa, 2010), perceived that yoga practice was not comparable to physical training or endurance workouts, which are typically used to build muscle bulk and tone.

In summary, traditional masculinity is associated with drive for muscularity (Gattario et al., 2015). Men perceive increased muscularity as one method by which they can conform to societal expectations of what it means to be masculine. Since yoga participation is not perceived by men as an activity that leads to larger muscles (Hurst et al., 2018), this may contribute to men's low uptake of yoga relative to that of women.

Self-Esteem

Self-esteem is defined as a persons' global evaluation of their ability to live up to standards that are derived from the culture at large and integrated into a person's unique worldview (Pyszczynski et al., 2004). An understanding of how the pursuit of muscularity affects self-esteem may further clarify the relationship between drive for muscularity and future intent to practice yoga. Recall that, in general, men desire to be more muscular, expressed through the drive for muscularity, and women desire to be thinner, expressed through the drive for thinness (Kelley et al., 2010). Women's pursuit of societal appearance standards, which emphasize being extremely thin (Furnham et al., 2002) through body-modifying behaviours such as dieting, has been demonstrated to contribute to low self-esteem. To illustrate, Stice et al. (2000) assessed adolescent females over a 4-year period for major depression using a structured clinical interview and concurrently collected measures of dietary restraint and bulimic symptoms. The results showed that dieting and bulimic symptoms predicted the onset of major depression among initially nondepressed females (Stice et al., 2000). Since low global self-esteem is a core feature of major depression (Orth & Robins, 2013; Sowislo & Orth, 2013), one can infer that dieting also may lead to a decrease in self-esteem. This is confirmed by Stice et al. (2000), who found that initial self-esteem deficits were not significantly related to the onset of major

depression. Cross-sectional research further validates that higher dieting is associated with lower self-esteem (Ackard et al., 2002; Utter et al., 2003).

Dieting appears to erode self-esteem because of the repeated failure to achieve long-term weight loss. Indeed, the majority of attempts at dieting end in failure (Dansinger et al., 2005). Despite this fact, dieters are persistent and initiate novel attempts at dieting, adopting a new type of diet or generating explanations (often misattributions) for why the previous attempt ended in failure. However, the fact remains that most attempts at dieting do not result in long-term weight loss. Polivy & Herman (2002) detail how the repeated failure to attain weight goals may impair self-esteem and how failed dieters tend to engage in self-hatred, feel guilty, and see themselves as lazy and undisciplined. Further, when interviewed, dieters reported a tendency for their self-esteem to be dependent on their ability to adhere to their diet (Buchanan & Sheffield, 2017).

Drive for Muscularity and Self-Esteem

This research on dieters can be extrapolated to men who pursue muscularity. Simply put, the societal appearance standard for men, a V-shaped body figure that emphasizes large biceps, chest, and shoulders (Furnham et al., 2002; Martin & Govender, 2011), is unattainable for a large proportion of men, just as extreme thinness is unattainable for most women. Thus, the pursuit of the societally esteemed muscularity levels may entrain low self-esteem through repeated failure at attaining this unnatural level of muscularity. This extrapolation is supported empirically, as higher drive for muscularity is associated with lower self-esteem (McCreary & Sasse, 2000; Smolak & Stein, 2006).

Traditional Masculinity, Drive for Muscularity, Self-Esteem, and Yoga

Men high in traditional gender role and whose self-esteem is damaged from repeated failure to attain muscularity may be especially unlikely to engage in yoga. First, as stated above,

men perceive yoga as feminine (Barrett, 2017; Cagas et al., 2021) and engaging in feminine activities may be particularly aversive for men who rely on masculine attributes and behaviour for self-worth. Indeed, using a sample of United States respondents, researchers found that male stereotypes are more strongly based on activities that men *should not do* rather than what men *should do* (Koenig, 2018). Second, men do not perceive yoga as muscle-building (Hurst et al., 2018). Once their self-esteem is damaged by the failure to increase muscle mass, men who pursue muscularity to adhere to the male gender role may be even less likely to engage in an activity that they do not see as contributing to the achievement of the elusive goal of becoming more muscular and thus, more masculine.

It is also possible that low self-esteem may act as a barrier for people trying new things which, in this case, is yoga. Attempting a new activity brings with it the inherent possibility of failure. Since people are motivated to defend and maintain their self-esteem (Pyszczynski et al., 2004), those with low self-esteem are less likely to expose themselves to new activities and are more likely to continue in activities/actions that they believe will reinforce their self-esteem. Indeed, Crocker et al. (2010) posit that the pursuit of self-esteem may prevent people from doing things that are uncomfortable, difficult, or threatening to their ego.

Putting it All Together

In summary, far fewer men than women practice yoga (Ipsos Public Affairs, 2016). This could be because many men seek to express a gender norm called traditional masculinity that emphasizes, among other things, the avoidance of feminine activities (Levant, 1996; Mahalik et al., 2003). One method by which men exteriorize their pursuit of masculinity is through the drive for muscularity (McCreary & Sasse, 2000) because larger muscles are associated with masculinity (McCreary et al., 2005; Gattario et al., 2015). Yoga is consistently associated with

femininity (Barrett, 2017; Cagas et al., 2021) and, as advertised in the popular media (e.g., magazines and social media), is not associated with the V-shaped, bulky physique that men high in drive for muscularity seek to attain (Webb et al., 2017; Lacasse et al., 2019), so men are unlikely to pursue it as an activity in their quest for larger muscles and adherence to the traditional male gender role.

Further, the pursuit of muscularity is likely to entrain low self-esteem because of the repeated failure to achieve an unrealistically muscular physique. Men with damaged self-esteem and increased vulnerability to low self-esteem may have even less intent to practice yoga, as it may be seen as only taking them further away from their goal of being masculine by building muscle, and engaging in an activity seen as feminine.

The Proposed Research

In the present research, I sought to expand the current literature on yoga and men by investigating the relationship between traditional masculinity and future intent to practice yoga and the serial mediators of this relationship, which I posited would be drive for muscularity and self-esteem. There is much qualitative literature that hints at a negative association between masculine gender norms and intent to practice yoga. This study served as the first quantitative investigation of this association. To this end, individuals who identified as men when asked to provide their gender identity, which included cisgender men (i.e., people whose gender identity matches the sex assigned at birth) and transgender men (i.e., people whose gender identity differs from the sex assigned to them at birth and now identify as men), completed self-report measures of conformity to masculine norms, drive for muscularity, self-esteem, and future intent to practice yoga. To further investigate the association between drive for muscularity and intent to practice yoga, these men also responded to two open-ended survey questions, one about why

they are hesitant to practice yoga and another about why other men might be hesitant to practice yoga.

Research Questions

The proposed study was designed to answer the overarching research question: why are fewer men than women practicing yoga? To this end, the following questions were addressed. First, are masculine gender norms, the pursuit of a body type associated with masculinity, and self-esteem related to engagement in yoga practice as indicated by future intent to practice yoga and previous experience with yoga? Second, is drive for muscularity related to how men spontaneously describe their reluctance and other men's reluctance to practice yoga?

Research Aims and Hypotheses

Aim 1. The first aim of this study was to examine whether conformity to traditional masculinity was related to men's intent to practice yoga. Specifically, this study was designed to test a serial mediation model in which drive for muscularity and self-esteem acted as sequential mediators to explain the association between conformity to traditional masculinity and future intent to practice yoga.

Hypothesis 1. Drive for muscularity and self-esteem would serially mediate the relationship between conformity to traditional masculinity and intent to practice yoga in the future, such that higher conformity to traditional masculinity would be associated with higher drive for muscularity, which would be associated with lower self-esteem, which in turn would be associated with lower intent to practice yoga in the future (see Figure 1).

Two additional serial mediation models were tested as part of validating hypothesis one. First, a model in which the predictor and outcome variable are switched: drive for muscularity and self-esteem would serially mediate the relationship between intent to practice yoga in the

future and conformity to masculine norms such that higher intent to practice yoga in the future would be associated with lower drive for muscularity, which would be associated with higher self-esteem, which would in turn be associated with lower conformity to masculine norms. Second, a model in which the mediators are switched: self-esteem and drive for muscularity would serially mediate the relationships between conformity to masculine norms and intent to practice yoga in the future, such that higher conformity to masculine norms would be associated with lower self-esteem, which would be associated with higher drive for muscularity, which would in turn be associated with lower intent to practice yoga.

Alternative models were tested because, as described by Hayes (2018), mediation is a causal process. Particularly when the predictor variables have not been experimentally manipulated, multiple ordering of the predictor variables should be tested to increase confidence in the mediation model of interest. Hayes (2018) notes that some alternative models can be rejected outright because the causal flow of mediation is implausible.

The first alternative model is implausible, as it is unclear how intent to practice yoga would cause an increase or decrease in a person's conformity to masculine norms. However, since this relationship has never been empirically tested, we ruled it out officially through our analysis.

The second alternative model is more plausible. Higher conformity to masculine norms may lead to decreased self-esteem by the pursuit of conformity to all masculine norms, which is impossible in practice. Lower levels of self-esteem brought about by high conformity to masculine norms may lead men to have increased drive for muscularity as they seek to use muscularity to increase their self-esteem. In turn, increased drive for muscularity would lead to increased muscularity behaviour, such as weight lifting, which leaves men in a position where

they are highly unlikely to engage in behaviours that are contradictory to their muscle-building goals, such as yoga.

Hypothesis 2. Drive for muscularity would be negatively correlated to intent to practice yoga in the future. The more men pursue a muscular physique, the less intent to practice yoga they would have (see Figure 1).

Hypothesis 3. Conformity to traditional masculinity would be negatively correlated with previous yoga experience. The more men conform to traditional masculinity, the less likely they would be to have engaged in yoga in the past.

Hypothesis 4. Drive for muscularity would be negatively correlated with previous yoga experience. The more men pursue a muscular physique, the less likely they would be to have engaged in yoga in the past.

Additional Research Question. The final aim of this project was to examine whether some traditionally masculine norms had a stronger predictive power than others in the serial mediation model proposed in Hypothesis 1 (see Figure 1). Wong et al. (2017) found that specific masculine norms were differentially related to mental-health outcomes, so these same norms may be differentially related to intent to practice yoga. Specifically, 11 masculine norms, namely Winning, Emotional Control, Risk Taking, Violence, Power Over Women, Dominance, Playboy, Self-Reliance, Primacy of Work, Disdain for Homosexuality, and Pursuit of Status, were entered as predictors into separate serial mediation models in which drive for muscularity and self-esteem acted as sequential mediators to explain the association between each masculine norm and intent to practice yoga. No specific hypotheses were formulated because this research question is exploratory.

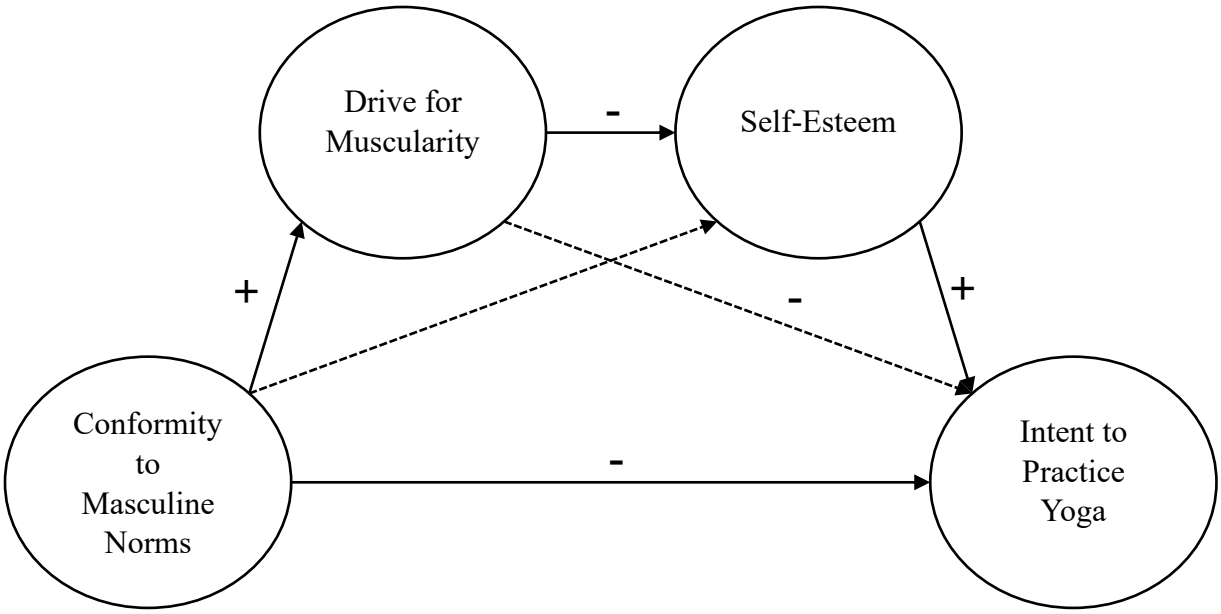

Figure 1. Serial Mediation Model with hypothesized directions of the associations; + = positive association, meaning that the value of one variable tends to increase as the value of the other variable increases; - = negative association, meaning that the value of one variable tends to increase as the value of the other variable decreases

Aim 2. The second aim of this study was to examine whether men's drive for muscularity was related to how they responded to open-ended survey questions about engagement in yoga. Specifically, participants' responses to two survey questions, one that asked why they are hesitant to practice yoga and one that asked why other men might be hesitant to practice yoga, were analyzed using quantitative content analysis and binomial linear regression to see if men who were higher in drive for muscularity more frequently used appearance-related phrases in their answers.

Hypothesis 5. When asked why they are hesitant to practice yoga, men who are higher in drive for muscularity would use appearance-related phrases in their responses more frequently than would men who are lower in drive for muscularity.

Hypothesis 6. When asked why other men are hesitant to practice yoga, men who were higher in drive for muscularity would use appearance-related phrases in their responses more frequently than would men who are lower in drive for muscularity.

METHODS

Participants

To be eligible for this study, participants were required to be able to read English, be 18 years of age or older, and identify as a man. Individuals with other gender identities, such as woman, genderfluid, and non-binary, were not eligible to participate because the research question specifically pertained to individuals who identify as men and their conformity to masculine norms. Participants were recruited from two sources to maximize recruitment because this project required men and the proportion of men in the University of Windsor Psychology Department Participant Pool is small relative to that of women. Participant demographics can be found in Table 1. See the *Test of Group Equivalence* section for explanation of the reporting by recruitment method.

Participant Pool Recruitment

Participants were 78 students recruited from the University of Windsor Psychology Department Participant Pool during the Fall 2021 semester, and 58 students recruited during the Winter 2022 academic semester. All students in the Participant Pool were enrolled in courses offering bonus marks as compensation for research participation. As such, participants recruited via this method were compensated with bonus marks/course credit.

University of Windsor Departmental Emails Recruitment

Calls for research participants sent by departmental secretaries procured 19 participants. Secretaries were emailed individually to ask if they were willing to disseminate a call for research participants. There were 10 participants majoring in law, 8 participants majoring in human kinetics, and 1 participant majoring in psychology. Participants recruited via this method were entered into a random draw for 1 of 4, $25 UberEats, digital gift cards

Table 1.
Participant Demographics

	Fall 2021 Psychology Participant Pool (n=78)	Winter 2022 Psychology Participant Pool (n=58)	Fall 2021 Departmental Email (n=19)
Age, mean (SD), in years	21.96 (5.42)	21.67 (5.96)	23.05 (3.87)
Gender Identity, *n* (%)			
Man	75 (96.2)	57 (98.3)	19 (100)
Transgender Man	3 (3.8)	1 (1.7)	0
Sexual Orientation, *n* (%)			
Heterosexual	63 (80.8)	54 (93.1)	18 (94.7)
Homosexual	9 (11.5)	1 (1.7)	0
Bisexual	4 (5.1)	2 (3.4)	0
Asexual	1 (1.3)	0	0
Pansexual/Omnisexual	0	0	1 (5.3)
Something else	1 (1.3)	0	0
Choose not to disclose	0	1 (1.7)	0
Relationship Status, *n* (%)			
Single	45 (57.7)	32 (55.2)	5 (26.3)
Casually Dating	5 (6.4)	6 (10.3)	2 (10.5)
Non-married Committed Relationship	23 (29.5)	16 (27.6)	10 (52.6)
Married/Civil Union	4 (5.1)	4 (4.9)	2 (10.5)
Other	1 (1.3)	0	0
Ethnicity, *n* (%)			
White/Caucasian	43 (55.1)	23 (44.8)	13 (68.4)
Aboriginal	0	2 (3.4)	0
Chinese	1 (1.3)	3 (5.2)	0
Black/African	3 (3.8)	3 (5.2)	1 (5.3)
West Asian	1 (1.3)	0	0
South Asian	8 (10.3)	8 (13.8)	1 (5.3)
Southeast Asian	0	2 (3.4)	1 (5.3)
Filipino	0	2 (3.4)	0
Korean	1 (1.3)	0	0
Latin American	2 (2.6)	0	0
Mixed	5 (6.4)	3 (5.2)	0
Caribbean	1 (1.3)	1 (1.7)	1 (5.3)
Arab	11 (14.1)	5 (8.6)	1 (5.3)
Other	2 (2.6)	3 (5.2)	1 (5.3)
Body Mass Index, mean (SD)	25.44 (4.86)	25.49 (5.11)	25.06 (3.31)

Measures

Demographics/Screening

Basic demographic information - including gender identity, age, ethnic background, relationship status, academic major, university enrollment (full-time/part-time), English first

language (y/n), year in university, number of previous psychology courses - was gathered using a demographics questionnaire (see Appendix A).

Experience with Yoga Questionnaire

This 4-item questionnaire was used to assess participants' previous experience practicing yoga and their intention to practice yoga in the future (see Appendix B). This questionnaire was developed by the author for use in this study.

Conformity to Traditional Masculinity

The Conformity to Masculine Norms Inventory (CMNI; Mahalik et al., 2003; see Appendix C) is a 94-item self-report measure that assesses conformity to masculine role norms of the cultural mainstream (i.e., dominant culture) in Western society. The instrument comprises 11 subscales each measuring a specific masculine norm – Winning, Emotional Control, Risk-Taking, Violence, Power Over Women, Dominance, Playboy, Self-Reliance, Primacy of Work, Disdain for Homosexuals, and Pursuit of Status. Items such as, "It is best to keep your emotions hidden" and "Taking dangerous risks helps me to prove myself" are rated on a 4-point scale ranging from 0 (*strongly disagree)* to 3 (*strongly agree*). Higher scores reflect greater conformity to masculine norms. Internal consistency values for the total CMNI score were $\alpha = .94$ in a sample of college undergraduate and graduate students (Mahalik et al., 2003). For the subscales, alpha levels ranged from $\alpha = .72$ for Pursuit of Status to $\alpha = .91$ for Emotional Control (Mahalik et al., 2003). Internal consistency for the total CMNI score in the present study was $\alpha = .92$. For the subscales, alpha levels ranged from $\alpha = .66$ for Dominance to $\alpha = .93$ for Disdain for Homosexuality (see Table 3).

Drive for Muscularity

The Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000; see Appendix D) is a 15-item self-report measure that assesses drive to achieve a more muscular physical body. The instrument comprises two subscales – Muscularity-Oriented Body Image and Muscularity Behavior. Items such as "I lift weights to build up muscle" are rated on a 7-point scale ranging from 1 (*always*) to 6 (*never*). Lower scores reflect higher levels of drive for muscularity. McCreary et al. (2004) recommend omitting one item of the DMS for use in the general population (i.e., *I think about taking anabolic steroids*) because it does not load onto the higher order DMS composite factor or either subscale for this group. In the current study, this item was included but not used in the scoring algorithm. Research with adolescents (McCreary & Sasse, 2000), undergraduates (McCreary et al., 2004), and community men (Hughes et al., 2016) denote good internal consistency for the total measure (α = .78 - .93) and the subscales (α = .81 - .91). Internal consistency in the present study was α = .90 (see Table 3).

Self-Esteem

The Rosenburg Self-Esteem Scale (RSES; Rosenberg, 1965; see Appendix E) is a 10-item measure of trait self-esteem. Items such as "I take a positive attitude toward myself" are rated on a 4-point scale from 0 (*strongly agree*) to 3 (*strongly disagree*). Higher scores indicate greater trait self-esteem.

Research by Rosenberg (1965) indicated excellent internal consistency (α = .92). More recently, researchers administered the RSES to large samples in 53 countries and reported an average internal consistency level of α = .81 (Schmitt & Allik, 2005). Results from a sample of United States adults showed a level of α = .91 (Sinclair et al., 2010). Internal consistency in the present study was α = .88 (see Table 3.)

Open-Ended Survey Questions

Open-ended survey questions designed to capture men's opinions of why they and other men might be hesitant to practice yoga are listed in Appendix F. These questions were formulated by the author for use in this study.

Validity Checks

A total of three validity checks were used to screen for careless responding. A validity check was embedded in the CMNI, the DMS, and the RSES. The validity checks instructed participants to select a particular response. For the CMNI and the RSES, the validity check read, "If you have read this statement, please select 'Strongly Agree'." The validity check in the DMS was, "I read this question and the correct answer is 'Always'."

Power Analysis

A power analysis for the serial mediation model was conducted using the application created and described by Schoemann et al. (2017; see https://schoemanna.shinyapps.io/mc_power_med/), which uses the Monte Carlo power analysis technique to determine power for the indirect effect of mediation models. In order to conduct a Monte Carlo power analysis, the researcher must input the value of the standard deviation of each variable and the value of the correlation coefficients between all variables in the mediation model into the Monte Carlo application. However, this was the first project to investigate the associations between intent to practice yoga and the other variables (i.e., CMNI, DMS, RSES), which meant that the standard deviations and associations were entirely unknown prior to this project. Thus, an a priori power analysis could not be conducted.

A power analysis was conducted after data collection. The power analysis was conducted with the following settings: N=155, 1000 replications, 20,000 Monte Carlo Draws per rep,

random seed 1234, and a 95% confidence interval. The power analysis showed a power level (i.e., $1 - \beta$) of 0.06, which is highly underpowered compared to the desired level of $1 - \beta = 0.8$. This low power level is explained by the size of the effect revealed by the serial mediation analysis. Statistical power is primarily affected by three components: effect size, Type I error rate, and sample size (Schoemann et al., 2017). Thus, the low power revealed by the power analysis is unsurprising given the small and non-significant indirect effect (see Table 2).

Procedure

This project was conducted in accordance with Tri-Council ethical guidelines and after approval from the University of Windsor's Research Ethics Board (REB# 21-161). The proposed study was conducted utilizing an online questionnaire with two components: 1) a series of self-report measures and 2) open-ended questions.

Students registered in the University of Windsor Participant Pool selected this study from a list of available studies in the participant pool online interface. Once they chose the study, a hyperlink directed them to the questionnaire hosted on the Qualtrics online survey platform. Participants recruited via the mass university email clicked the hyperlink located in the body of the departmental email to access the questionnaire

Participants were told that the purpose of the survey was to understand men's interest in fitness behaviors. Prior to completing the survey, participants were provided with an informed consent form which differed slightly depending on the method of recruitment: participant pool (Appendix G) or departmental email (Appendix H). The only difference in the two consent forms is the method of participant compensation. Participants indicated their consent by typing in their name and date.

After providing informed consent, participants completed the online survey. This survey took approximately 30-60 min and was worth 1 bonus point to the participants from the University of Windsor Participant Pool. The self-report measures (CMNI, DMS, RSES, Experience with Yoga Questionnaire) and the open-ended survey questions were presented in a randomized order to mitigate potential order effects. When the open-ended survey questions were presented, each question was timed, meaning that the participants could click "submit" and advance to the next question only after spending at least 30 seconds on the previous question. Participants could see the timer and they could spend more than 30 seconds on each question. The text box allotted to type responses was unlimited, allowing participants to write as much as they wished.

Following the completion of the open-ended questions and self-report measures, participants completed the demographics questionnaire. Participants recruited via the University of Windsor Psychology Department Pool then were asked to provide their full name and email address for course credit assignment. Participants recruited via the mass email also were asked to provide their full name and email address if they wished to be entered into the raffle for 1 of 4, $25 UberEats, digital gift cards. At the end of the survey, all participants were shown the Letter of Information for Debriefing (Appendix I) which explained the purpose of the study. In this letter, participants were informed that they could email the primary investigator if they wished to have their data withdrawn and that their decision would have no impact on their academic standing, course grades, and relationships with the university.

Coding Training

Two coders, the primary researcher and an external coder, analyzed the responses to the open-ended survey questions. The use of two coders allowed for the calculation of inter-rater

reliability. Prior to coding the responses, the primary researcher ensured that the external coder understood the study rationale and the research questions through discussion. The primary researcher and external coder practiced coding by reviewing the answers to the open-ended survey questions provided by a pilot sample of 5 respondents, who consisted of people who identified as men in the primary researcher or external coder's social circle that were willing to pilot the survey.

First, the coders agreed upon an a priori coding scheme to form an initial operationalization of "appearance-related phrases" by discussing what constituted such a phrase. For example, a phrase such as "I do yoga to be strong and to look good" would be coded as an appearance-related phrase due to the presence of "look good." However, "I do yoga to be strong," would indicate an emphasis on physical function rather than physical appearance and, thus, would not be coded as an appearance phrase. Both coders then coded for the presence of appearance-related phrases in the sample responses using the coding sheet in Appendix J. Coders took note of the participant ID, whether they were coding the response for the first or second open-ended survey question and included the phrase they considered an appearance-related phrase. Once the data from the sample respondents was coded by both coders, the frequency of appearance-related phrases for each participant was counted for each open-ended question. Inter-rater reliability was be calculated using Cohen's Kappa.

Final Coding and Analysis

Coding of the "real" participant data was undertaken once the Cohen's Kappa reliability statistic from the pilot sample was above an acceptable value ($\kappa > .80$; McHugh, 2012). The data from the study participants was coded using the method described above. The original plan was for the coding to be done iteratively until the inter-rater reliability statistic was acceptable.

However, coding was performed only once because the inter-rater reliability statistic was adequate after the first coding; interrater reliability was $\kappa = .92$.

RESULTS

Data Inspection and Cleaning

The data were analyzed using SPSS version 22 for Windows and the PROCESS macro for SPSS version 3.4 (Hayes, 2018). Hypothesis 1 was tested using a serial mediation regression analysis, which is a type of multiple regression analysis and has the same statistical assumptions as multiple regression. Results that met a significance level of $p < .05$ or $p < .01$ were noted for all direct and indirect effects, and 95% bootstrap confidence intervals were used. Exploratory analyses were conducted using serial multiple mediation regression. As these analyses were exploratory, results that met a significance level of $p < .05$ or $p < .01$ were noted for all direct and indirect effects, and 99% bootstrap confidence intervals were used. The 99% bootstrap confidence interval was used to decrease the potential for Type I error. Hypotheses two, three, and four were tested using Pearson correlations.

Hypotheses five and six were tested using binary logistic regression. Initially, these hypotheses were to be tested using simple linear regression. However, coding the responses to the open-ended questions for the presence of appearance-related phrases revealed that, other than one participant who included two distinct appearance-related phrases, participants who mentioned appearance included one appearance-related phrase or did not include one at all. Thus, a binary logistic regression was deemed most appropriate for the research question because it is designed for use with a continuous predictor variable and a categorial outcome variable. In this case, drive for muscularity was used to predict the presence or absence of appearance-related phrases. Prior to hypothesis testing, missing data were assessed, the samples were assessed for equivalence, and the assumptions of serial multiple mediation were tested.

Lower scores on the Drive for Muscularity scale reflect higher drive for muscularity by default. On all other measures (Experience with Yoga Questionnaire, Conformity to Masculine Norms Index, Rosenberg Self-Esteem Scale) higher scores indicate greater levels of the construct. Thus, for ease of interpretation, the Drive for Muscularity scores were reversed such that higher scores on Drive for Muscularity scale reflect higher drive for muscularity.

Invalid Responses/Missing Data

Participants were removed from the final dataset if they failed two or more validity checks (N=6), which was taken as an indicator of careless responding, or if they did not indicate their gender (N=14), a core inclusion criterion for this study. After this, there were no missing data in any of the measures in the final dataset, therefore Missing Values Analysis and Little's Missing Completely at Random test were not conducted.

Test of Group Equivalence

Participants were recruited from three different samples: Fall 2021 Participant Pool (N=78), Winter 2022 Participant Pool (N=58), Fall 2021 Departmental Email (N=19). Thus, four one-way, three levels ANOVAs were conducted to test for differences between means scores on the four variables that were used in the serial mediation model: CMNI Total, DMS Total, RSES Total, and Experience with Yoga Questionnaire item 3. CMNI Total scores differed between the three samples, F (2, 152) = 3.19, p = .044. Tukey post-hoc comparisons of the three groups showed that the Fall 2021 Departmental email group (M = 113.96, 95% CI [107.97, 119.95]) had significantly lower CMNI Total scores than the Winter 2022 Participant Pool group (M = 128.47, 95% CI [120.10, 136.84]), p = .044, meaning that they had higher conformity to masculine norms. Comparisons between the other groups on the CMNI Total and the other three variables were not significant ($ps \geqq .332$). Thus, the subsequent analyses were conducted twice: once with

a dataset that included all three samples (N = 155), and again with a dataset that included only the Fall 2021 and Winter 2022 Participant Pool samples (N = 136). Results from analyses with the three- and two-sample datasets showed near identical results, therefore only the results from the three-sample dataset are reported. Results from the two-sample dataset can be found in Appendix M. Note that if a Bonferroni correction were used, the aforementioned post-hoc comparison would no longer be considered significant.

Assumptions of Serial Mediation Regression Analysis

The three-sample dataset was screened for outliers on the outcome and predictor variables using the cut off value of $z = |3.29|$ (Field, 2013). Using this criterion, two outliers were found, $z = -3.57$, both on the CMNI subscale Pursuit of Status. Each of these outlying values were winsorized by replacing them with the next highest non-outlying values of the scale to which they belonged (Field, 2013).

Multivariate outliers were assessed via Mahalanobis distances, which measure the distances of cases from the means of the predictor variables (Field. 2013). Influential observations were assessed via Cook's distances, which measure the influence of each individual datapoint on the overall model (Field. 2013). Obtaining these values requires conducting a multiple regression analysis, which was done by entering item 3 of the Experience with Yoga Questionnaire as the outcome variable and the CMNI, DMS, and RSES scores as the predictors. Mahalanobis distances have a chi-square distribution with the cut-off values available in a chi-square table using degrees of freedom equal to the number of predictors (Tabachnik & Fidell, 2013). Tabachnik and Fidell (2013) state that using a very conservative *p*-value (i.e., $p < .001$) is appropriate for Mahalanobis distances. Thus, using a significance level of $p = 0.001$ and degrees of freedom (df) = 3, the cut-off value for suspected outliers was determined to be 16.27. No

Mahalanobis distances were above this distance. Cook's distances that are larger than a value of one denote influential observations (Tabachnik & Fidell, 2013) and no distances were above one.

One assumption of serial mediation regression analysis is that the residuals of the regression line are normally distributed. This means that if the distance of each observed data point to the regression line were quantified and plotted, these distances (i.e., residuals) would be normally distributed (Tabachnik & Fidell, 2013). This assumption is evaluated by visual inspection of a frequency histogram of the standardized residuals and a normal probability plot (P-P plot). Inspection of the histogram of the standardized residuals showed that the data was approximately normal with a mild positive skew. The P-P plot showed that the residuals did not evenly follow the diagonal line, indicating that the residuals in this dataset depart from normality. To further investigate normality of residuals, the residuals were plotted using a normal *q*-*q* plot. If the residuals follow a straight line in the *q*-*q* plot, they are understood to be normally distributed. In this dataset, the residuals generally followed the straight line, but they departed from the line enough to undermine confidence in the assumption of normality. Further, the Kolmogorov-Smirnov test (.120, $p < .001$) and the Shapiro-Wilk test (.943, $p < .001$) were both significant, which suggests that the residuals are not normally distributed. However, Hayes (2018) notes that the assumption of normality of residuals is rarely met due to the measurement procedures that researchers use, such as utilizing scales bounded by zero. Such measurement procedures were used in this project, so analyses were conducted with this in mind.

A key assumption of serial mediation regression is that the relationship between the residuals is linear or approximately linear (Hayes, 2018). This assumption is diagnosed via visual examination of the scatterplot of the standardized residuals and standardized predicted values for each direct pathway in the serial mediation model. For example, a simple regression was

conducted by entering conformity to masculine norms as the predictor variable and intention to practice yoga in the future as the outcome variable. Examination of all scatterplots revealed that the dots were scattered through the plot fairly randomly and there were no curves in the datapoints. For the three scatterplots in which intent to practice yoga in the future was individually predicted by conformity to masculine norms, drive for muscularity, and self-esteem, the dots on the scatterplot were organized into five parallel lines of negative slope. Taken together, the direct relationships between the residuals of all the variables were determined to be approximately linear.

The assumption of homoscedasticity means that the variability in scores for one variable is roughly the same at all values of another variable (Tabachnik & Fidell, 2013). This assumption is tested with the same scatterplots as the assumption of linearity of residuals. A funnel pattern in these scatterplots would indicate a violation of this assumption (Tabachnik & Fidell, 2013). There were no funnel patterns in any of the scatterplots, therefore the assumption of homoscedasticity was determined to be met.

The assumption of multicollinearity was assessed using a combination of variance inflation factors (VIF) and tolerance values. A threshold of 10 for the VIF values was used (Pituch & Stevens, 2016) and threshold of 0.2 was used for tolerance values (Field, 2013). All VIF values were below 10 and all tolerance values were above 0.2, which suggests that all the predictors were distinct enough to move forward with the serial mediation analysis.

Assumptions of Binary Logistic Regression Analysis

Outliers and influential observations were already tested when evaluating the assumptions of serial mediation regression analysis. In logistic regression, the assumption of linearity refers to a linear relationship between the continuous predictors and the logit of the

outcome variable (Field, 2013). As outlined by Field (2013), this assumption requires performing a natural log (ln) transformation on the continuous predictor variables which, in this case, was drive for muscularity. The assumption was then tested by conducting a binary logistic regression with the presence of appearance-related phrases as the outcome variable and two predictor variables: drive for muscularity and the interaction term between drive for muscularity and ln(drive for muscularity). The interaction term was non-significant, $p = .121$, which means the assumption of linearity of the logit was met.

Main Analyses

Serial mediation analysis was conducted using Hayes (2018) PROCESS macro for SPSS v3.4, model 6, with 10,000 bias-corrected bootstrap samples. PROCESS conducts ordinary least squares regression for each mediator and outcome variable from its respective predictor variables. For example, the second mediator is predicted by the independent variable and the first mediator. Hayes (2018) argues that bootstrap confidence intervals have higher power for testing the significance of indirect effects because they do not depend on the normality assumption for the sampling distribution of the indirect effect. Thus, indirect effects and direct effects with 95% bootstrapped confidence intervals are presented for the primary serial mediation model. All exploratory serial mediation analyses are reported with 99% bootstrapped confidence intervals to control for Type I error. Indirect effects are understood to be significant if their bootstrapped confidence interval does not include zero (Hayes, 2018). As recommended by Hayes (2018), unstandardized coefficients (i.e., B-weights) are reported. This means that a one unit increase in the predictor variable is related to a change in the outcome variable equal to the size of the B coefficient. Standardized coefficients are also reported. Standardized standard errors and standardized confidence intervals of the direct effect are not reported because the PROCESS

macro does not calculate them. The three correlational hypotheses were directional and were calculated using one-tailed Pearson correlations. A Bonferroni correction was used based on the number of hypothesized correlations (i.e., $\alpha = .05/3 = .0166$).

Aim 1 Analyses

Serial Mediation Analysis. To test hypothesis 1, that drive for muscularity and self-esteem will serially mediate the relationship between conformity to traditional masculinity and intent to practice yoga in the future, a serial mediation analysis was conducted using the method described above. Conformity to masculine norms was entered as the predictor variable and intent to practice yoga in the future was entered as the outcome variable. Drive for muscularity was entered as the first mediator and self-esteem was entered as the second, sequential mediator. Regression coefficients, standard errors, and confidence intervals for all pathways are in Table 2, the results are visually presented in Figure 2. Results showed a non-significant indirect effect of conformity to masculine norms on intent to practice yoga in the future through drive for muscularity and self-esteem, 95% CI [-.001, .001]. Variable means, standard deviations, Cronbach alphas, and bivariate correlations are reported in Table 3.

Given that the main model was not supported, alternative models aimed at verifying the validity of the main model were not conducted. Alternative models are designed to test alternative explanations for associations observed in a mediation model (Hayes, 2018). Therefore, it is not useful to test alternative models of a non-significant main model.

Correlational Analyses. Results for the three correlational hypotheses are reported in Table 4. Hypothesis four was supported.

Table 2.

Path Estimates and Confidence Intervals for Serial Mediation Analyses of the Effect of Conformity to Masculine Norms (IV) on Intent to Practice Yoga in the Future (DV) through Drive for Muscularity (M1) and Self-Esteem (M2)

Unstandardized	Effect of IV on M1 B(SE)	*p*	Effect of M1 on M2 B(SE)	*p*	Effect of M2 on DV B(SE)	*p*	Effect of IV on DV B(SE)	*p*	Indirect Effect B(SE)	Direct Effect		Indirect Effect	
										Lower Limit	Upper Limit	Lower Limit	Upper Limit
Conformity to Masculine Norms	**.204(.46)**	<.001	**-.100(.03)**	.001	.008(.19)	.663	-.011(.004)*	.011	-.000(.001)	-.020	-.003	-.001	.001

Standardized	Effect of IV on M1 β	*p*	Effect of M1 on M2 β	*p*	Effect of M2 on DV β	*p*	Effect of IV on DV β	*p*	Indirect Effect β(SE)	Indirect Effect	
										Lower Limit	Upper Limit
Conformity to Masculine Norms	**.339**	<.001	**-.271**	.001	.036	.663	-.211*	.011	-.003(.009)	-.023	.016

Note. ***** indicates significance at the .05 level (2-tailed), **bold** indicates significance at the .01 level. Estimates of indirect effect are based on 10,000 bootstrapped sample estimates. Upper and lower limits of the direct and indirect effect are based on 95% confidence intervals (CIs). Significant paths are indicated by CIs that do not include 0.

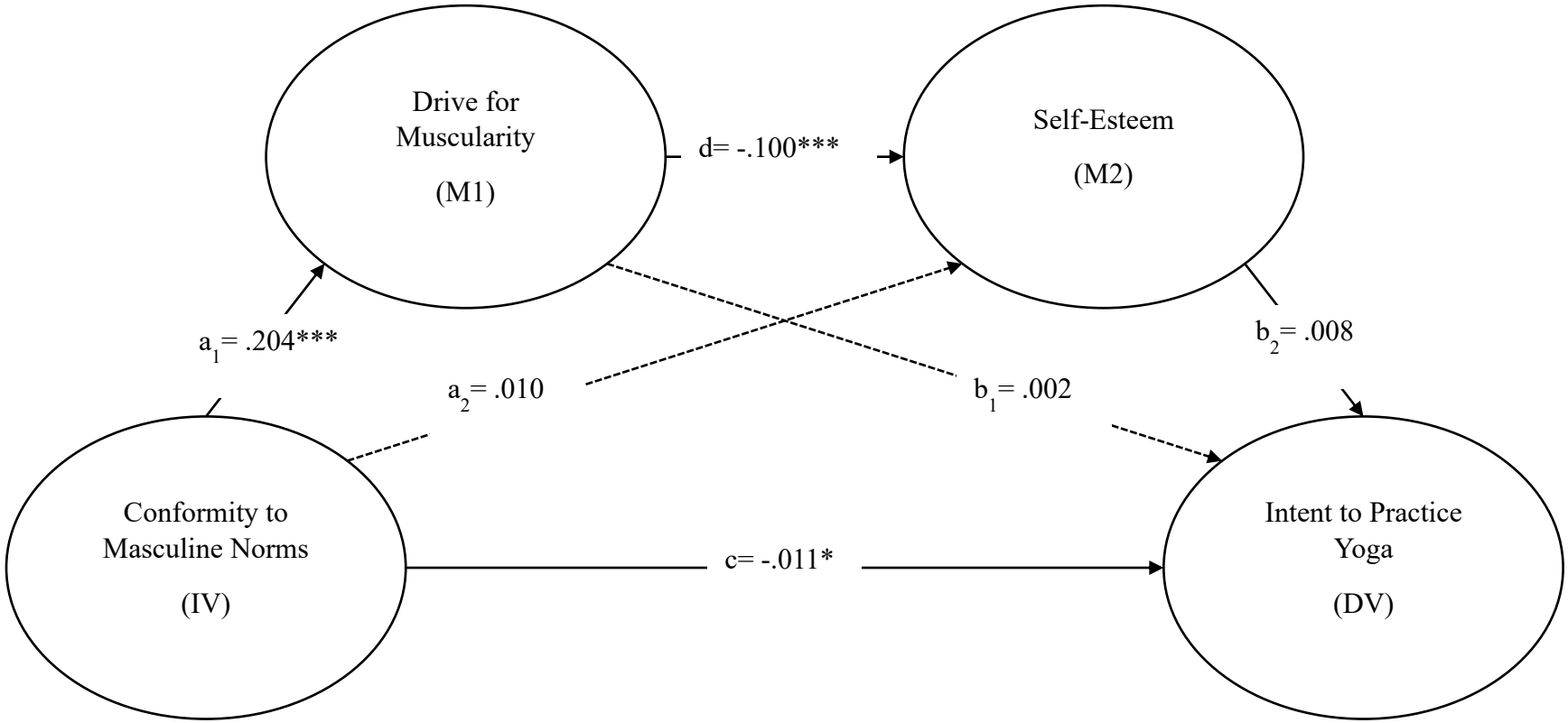

Figure 2. Serial Mediation Model with unstandardized regression coefficients (i.e., B-weights). *Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed) ***Correlation is significant at the 0.001 level (2-tailed)

Table 3.

Bivariate correlations, variable means, standard deviations, and Cronbach alphas

N = 155	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Conformity to Masculine Norms	-	.59***	.52***	.51***	.50***	.65***	.63***	.44***	.41***	.35***	.58***	.33***	.34***	-.05
2. Winning		-	.13	.12	.24**	.28***	.49***	.07	.18*	.28***	.31***	.40**	.23**	.06
3. Emotional Control			-	.08	.20*	.23**	.21**	.12	.43***	.06	.27***	-.11	.12	-.02
4. Risk Taking				-	.32***	.28***	.31***	.10	.03	.29***	.25**	.07	.11	-.02
5. Violence					-	.21**	.20*	.08	.26***	.02	.09	.22**	.18*	-.08
6. Power Over Women						-	.39***	.38***	.22**	.14	.38***	.13	.17*	-.09
7. Dominance							-	.20*	.04	.35***	.39***	.31***	.29***	.09
8. Playboy								-	.20*	.05	.00	.13	.16*	-.10
9. Self-Reliance									-	-.15	.07	-.04	.24**	-.42***
10. Primacy of Work										-	.09	.12	.19*	.09
11. Disdain for Homosexuality											-	.09	.17*	.17*
12. Pursuit of Status												-	.11	.00
13. Drive for Muscularity													-	-.26**
14. Self-Esteem														-
15. Intent to practice yoga in the future														
16. Predicted future yoga practice frequency														
17. Previous yoga practice frequency														
M	117.83	15.56	15.38	14.76	11.6	5.35	5.52	9.29	6.95	10.14	12.6	10.71	45.88	3.95
SD	23.74	4.68	5.48	4.45	4.50	3.89	1.99	5.81	3.33	3.5	6.44	2.67	14.25	5.28
Alpha	.92	.86	.89	.86	.87	.85	.66	.87	.85	.75	.93	.76	.90	.88

Note: *Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed) ***Correlation is significant at the 0.001 level (2-tailed)

Table 3.
Bivariate correlations, variable means, standard deviations, and Cronbach alphas

N = 155	15	16	17
1. Conformity to Masculine Norms	-.21**	-.14	-.10
2. Winning	-.21**	-.14	-.18*
3. Emotional Control	-.17*	-.16*	-.14
4. Risk Taking	-.03	-.07	.12
5. Violence	-.02	.03	.02
6. Power Over Women	-.09	.01	-.04
7. Dominance	-.12	-.09	-.17*
8. Playboy	.08	.13	.15
9. Self-Reliance	-.07	.01	.03
10. Primacy of Work	-.18*	-.19*	-.13
11. Disdain for Homosexuality	-.27***	-.20*	-.20*
12. Pursuit of Status	-.04	-.02	-.00
13. Drive for Muscularity	-.06	-.01	-.20*
14. Self-Esteem	.04	-.12	-.03
15. Intent to practice yoga in the future	-	.74***	.52***
16. Predicted future yoga practice frequency		-	.47***
17. Previous yoga practice frequency			-
M	2.42	1.08	2.54
SD	1.21	1.08	1.22
Alpha	-	-	-

Note: *Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed) ***Correlation is significant at the 0.001 level (2-tailed)

Table 4.
Correlational Hypotheses with Results

Hypotheses 2-4	**Correlation Coefficients, *p*-values**
2. Drive for muscularity will be negatively correlated with intent to practice yoga in the future	$r(153) = -.06$, $p = .241$.
3. Conformity to traditional masculinity will be negatively correlated with previous yoga experience	$r(153) = -.10$, $p = .115$
4. Drive for muscularity will be negatively correlated with previous yoga experience	$r(153) = -.20$, $p = .006$*
*Correlation is significant at the Bonferroni corrected alpha level of $p = .0166$	

Additional Research Question Analyses

Eleven serial mediation models were conducted to evaluate if specific traditionally masculine norms more strongly predicted intent to practice yoga. For example, Disdain for Homosexuality was entered as the predictor variable and intent to practice yoga in the future was entered as the outcome variable. Drive for muscularity was entered as the first mediator and self-esteem was entered as the second, sequential mediator. Regression coefficients, standard errors, and confidence intervals for all pathways are in Table 6. Results showed a non-significant indirect effect of all specific masculine norms on intent to practice yoga in the future through self-esteem and drive for muscularity.

Despite the non-significant results of the mediation models, results derived from the exploratory analyses suggest that some traditionally masculine norms have stronger predictive power than others. For example, only 9 out of 11 masculine norms were found to be significant predictors of drive for muscularity. The strongest predictor was Dominance, $B = 2.09$ ($SE = .555$), $p < .001$, followed by Self-Reliance, $B = 1.03$ ($SE = .335$), $p = .003$. Three masculine norms were found to significantly predict intent to practice yoga at the $p < .05$ significance level: Winning, $B = -.055$ ($SE = .022$), $p = .012$, 99% CI [-.111, .001]; Emotional Control, $B = -.037$ ($SE = .018$), $p = .041$, 99% CI [-.084, .010]; Primacy of Work, $B = -.063$ ($SE = .029$), $p = .029$,

99% CI [-.137, .012]. Only one masculine norm, Disdain for Homosexuality, predicted intent to practice yoga at the more conservative $p < .01$ significance level, $B = -.055$ ($SE = .015$), $p < .001$, 99% CI [-.095, -.015], and it was the most robust predictor of intent to practice yoga.

Table 5. Three Samples

Exploratory Serial Mediation Analyses Unstandardized Path Estimates and Confidence Intervals for Serial Mediation Analyses of the Effect of Individual Masculine Norms (IV) on Intent to Practice Yoga in the Future (DV) through Drive for Muscularity (M1) and Self-Esteem (M2)

Individual Masculine Norm	Effect of IV on M1 B(SE)	*p*	Effect of M1 on M2 B(SE)	*p*	Effect of M2 on DV B(SE)	*p*	Effect of IV on DV B(SE)	*p*	Indirect Effect B(SE)	Direct Effect		Indirect Effect	
										Lower Limit	Upper Limit	Lower Limit	Upper Limit
Winning	**.697(.241)**	.004	**-.105(.03)**	<.001	.012(.019)	.529	-.055(.022)*	.012	-.001(.002)	-.111	.001	-.007	.005
Emotional Control	.322(.209)	.125	**-.095(.029)**	.001	.007(.019)	.726	-.037(.018)*	.041	-.000(.001)	-.084	.010	-.004	.003
Risk Taking	.362(.258)	.163	**-.095(.029)**	.002	.006(.019)	.750	-.007(.022)	.763	-.000(.001)	-.065	.052	-.004	.003
Violence	.578(.252)*	.023	**-.092(.030)**	.002	.006(.019)	.756	-.002(.022)	.923	-.000(.002)	-.061	.056	-.006	.004
Power Over Women	.608(.295)*	.041	**-.089(.029)**	.003	.006(.0196)	.744	-.025(.026)	.342	-.000(.001)	-.093	.043	-.005	.005
Dominance	**2.09(.555)**	<.001	**-.113(.029)**	.002	.011(.0195)	.579	-.074	.162	-.003(.006)	-.210	.063	-.021	.015
Playboy	.390(.196)*	.048	**-.091(.029)**	.002	.007(.019)	.701	.019(.017)	.277	-.000(.001)	-.026	.064	-.003	.003
Self-Reliance	**1.03(.335)**	.003	-.06(.028)*	.031	.002(.021)	.945	-.019(.033)	.566	-.000(.002)	-.105	.067	-.006	.005
Primacy of Work	.762(.324)*	.020	**-.104(.029)**	<.001	.012(.019)	.531	-.063(.029)*	.029	-.001(.002)	-.137	.012	-.008	.004
Disdain for Homosexuality	.037(.176)*	.03	**-.107(.029)**	<.001	.021(.019)	.267	**-.055(.015)**	<.001	-.001(.001)	-.095	-.015	-.005	.002
Pursuit of Status	.585(.428)*	.017	**-.096(.029)**	.001	.006(.019)	.741	-.018(.037)	.632	-.000(.002)	-.115	.079	-.008	.005

Note. ***** indicates significance at the .05 level (2-tailed), while **bold** indicates significance at the .01 level. Items with estimates of indirect effect are based on 10,000 bootstrapped sample estimates. Upper and lower limits of the direct and indirect effect are based on 99% confidence intervals (Cis). Significant indirect paths are indicated by 99% Cis that do not include 0.

Table 6. Three Samples

Exploratory Serial Mediation Analyses Standardized Path Estimates and Confidence Intervals for Serial Mediation Analyses of the Effect of Individual Masculine Norms (IV) on Intent to Practice Yoga in the Future (DV) through Drive for Muscularity (M1) and Self-Esteem (M2)

Individual Masculine Norm	Effect of IV on M1 β	*p*	Effect of M1 on M2 β	*p*	Effect of M2 on DV β	*p*	Effect of IV on DV β	*p*	Indirect Effect β(SE)	Indirect Effect	
										Lower Limit	Upper Limit
Winning	**.228**	.004	**-.282**	<.001	.052	.529	-.211*	.012	-.003(.007)	-.029	.019
Emotional Control	.124	.125	**-.257**	.001	.029	.726	-.166*	.041	-.001(.004)	-.015	.012
Risk Taking	.113	.163	**-.256**	.002	.027	.750	-.025	.763	-.001(.004)	-.014	.013
Violence	.182*	.023	**-.249**	.002	.026	.756	-.008	.923	-.001(.005)	-.022	.014
Power Over Women	.165*	.041	**-.243**	.003	.028	.744	-.079	.342	-.001(.005)	-.015	.016
Dominance	**.291**	<.001	**-.306**	.002	.047	.579	-.120	.162	-.004(.01)	-.034	.026
Playboy	.159*	.048	**-.245**	.002	.032	.701	.09	.277	-.001(.005)	-.017	.013
Self-Reliance	**.242**	.003	-.162*	.031	.006	.945	-.052	.566	-.000(.004)	-.015	.014
Primacy of Work	.187*	.020	**-.281**	<.001	.053	.531	-.180*	.029	-.003(.005)	-.021	.011
Disdain for Homosexuality	.174*	.03	**-.293**	<.001	.093	.267	**-.293**	<.001	-.005	-.029	.010
Pursuit of Status	.11*	.017	**-.259**	.001	.028	.741	-.039	.632	-.000(.004)	-.016	.011

Note. ***** indicates significance at the .05 level (2-tailed), while **bold** indicates significance at the .01 level. Items with estimates of the indirect effect are based on 10,000 bootstrapped sample estimates. Upper and lower limits of the indirect effect are based on 99% confidence intervals (CIs). Significant indirect paths are indicated by 99% CIs that do not include 0.

Aim 2 Analyses

To test hypothesis five, that men who are higher in drive for muscularity would use appearance-related words and/or phrases more frequently than would men lower in drive for muscularity when asked why *they* are hesitant to practice yoga, a binary logistic regression was conducted. Drive for muscularity was entered as the predictor variable. The presence of appearance-related phrases when participants were asked why *they* were hesitant to practice yoga was entered as the outcome variable. Unstandardized regression coefficients, standard errors, and *p*-values are in Table 7. Results showed that drive for muscularity did not significantly predict the presence of appearance-related phrases when participants were asked why *they* were hesitant to practice yoga, $p = .718$.

Another binary logistic regression was conducted to test hypothesis six, that men who are higher in drive for muscularity will use appearance-related phrases more frequently than will men who are lower in drive for muscularity when asked why *other men* are hesitant to practice yoga. Drive for muscularity was entered as the predictor variable. The presence of appearance-related phrases when participants were asked why *other men* might be hesitant to practice yoga was entered as the outcome variable. Results showed that drive for muscularity did not significantly predict the presence of appearance-related phrases when participants were asked why *other men* might be hesitant to practice yoga, $p = .756$. While not the purpose of the coding, both coders noted that multiple participants cited the perception of yoga as a feminine activity as a reason why other men might be hesitant to practice yoga.

Table 7.
Logistic Regression Results

	B	(SE)	*p*	R^2 Nagelkerke
Participant Yoga Hesitancy	.025	.068	.718	.011
Other Men Yoga Hesitancy	.005	.017	.756	.001

DISCUSSION

Yoga continues to be practiced mostly by women, effectively depriving a large proportion of men from its extensively demonstrated physical and mental health benefits. The aim of the present study was to investigate a possible explanation for this by examining the potential contribution of conformity to traditional masculine norms to men's reluctance to engage in yoga. A further aim was to investigate mechanisms for this association, should it be verified, by testing whether drive for muscularity and self-esteem would serially mediate this relationship. The results indicated that higher conformity to traditional masculine norms was associated with less intent to practice yoga in the future. However, drive for muscularity and self-esteem did not mediate this relationship. Further, correlations and results of exploratory analyses showed that conformity to the traditionally masculine norm Disdain for Homosexuality had the most robust negative relationship with intent to practice yoga in the future.

Another aim was to evaluate whether drive for muscularity was related to how men spontaneously described their reluctance and other men's reluctance to practice yoga. Drive for muscularity was not related to whether men used appearance-related phrases when describing their reluctance, and other men's reluctance, to practice yoga. A more detailed discussion of findings follows.

Hypothesis 1

As predicted, higher conformity to traditionally masculine norms was associated with lower intent to practice yoga in the future. Also as expected, higher conformity to traditionally masculine norms was associated with a higher drive for muscularity, itself associated with lower self-esteem. However, contrary to expectations, lower self-esteem was not associated with lower intend to practice yoga in the future, effectively rendering the mediation model non-significant.

Further, higher drive for muscularity was not associated with lower intent to practice yoga in the future. Therefore, neither drive for muscularity nor self-esteem can explain the reluctance of men who highly adhere to traditional masculine norms to engage in yoga.

Taken together, these results indicate that neither drive for muscularity nor self-esteem play a role in the association between adherence to traditionally masculine norms and intent to practice yoga. This was further clarified in exploratory analyses conducted to explore which specific masculine norm may account for the association between global masculine norms and intent to practice yoga. None of the models testing the 11 specific masculine norms showed any significant mediating effect of drive for muscularity and self-esteem.

The positive association found between conformity to traditionally masculine norms and drive for muscularity replicates findings of previous research in university undergraduates (McCreary et al., 2005), university athletes (Steinfeldt et al., 2011), and men from several countries (Gattario et al., 2015). Similarly, the negative association between drive for muscularity and self-esteem replicates previous research (McCreary & Sasse, 2000; Smolak & Stein, 2006).

This is the first study to examine the association between traditional masculine norms and intent to practice yoga in men. The results indicate a clear association between these two variables such that higher adherence to masculine norms is associated with lower intention to practice yoga. The present results indicate that it is not mediated by either the pursuit of muscularity or low self-esteem. These results await replication. Further, whether this association can be explained by other factors remains an empirical question.

Correlational and exploratory mediation analyses revealed that Disdain for Homosexuality was the most robust negative predictor of intent to practice yoga. Disdain for

Homosexuality is highly related to avoidance of femininity. Indeed, in the initial development of the Conformity to Masculine Norms Inventory (CMNI), scores on the Disdain for Homosexuality subscale were positively related to the Antifemininity subscale of the Brannon Masculinity Scale (Mahalik et al., 2003). This lends further support to the suggestion that it is the perceived femininity of yoga that is responsible for the reluctance of men high in traditionally masculine norms to engage in this practice. It also points to the possibility that avoidance of femininity, or antifemininity, may be a mediator of the association between overall adherence to masculine norms and reluctance to practice yoga for men.

Although not as consistently, the masculine norms of Winning, Emotional Control, and Primacy of Work also had a negative association with intent to practice yoga. However, given the large number of comparisons made in the exploratory analyses, the fact that these three norms were associated at the $p < .05$ level may suggest that these are spurious effects. Nevertheless, Disdain for Homosexuality was positively associated with Winning and Emotional Control but not Primacy of Work. This may indicate an undercurrent between these three associated norms that helps explain why these particular norms were associated with intent to practice yoga in the future. This speculation attempts to explain the constellation of results found and needs empirical replication and validation.

Although not the primary goal of this project, all mediation models revealed a positive relationship between conformity to masculine norms and drive for muscularity, which confirms the findings of previous research (McCreary & Sasse, 2000; Smolak & Stein, 2006). Again, the exploration of specific masculine norms added specificity to the relationship. The masculine norm of Dominance was the most robust predictor of drive for muscularity, the next strongest was Self-Reliance. Previous research has shown associations between dominance and drive for

muscularity (McCreary et al., 2005), and it has been suggested that men who feel that their masculinity is threatened may seek to reassert it by increasing muscle mass (Swami et al., 2013). Further, men who seek increased muscularity may do so as a method of appearing or being more self-reliant. However, no previous research was found that investigated the relationships between drive for muscularity and the masculine norm Self-Reliance, so it may deserve further investigation.

At a broad level, results from the exploratory analyses support the conclusion made by Wong et al. (2017) that discussing individual's conformity to masculine norms in a generic sense is not particularly meaningful. Instead, researchers should routinely use specific dimensions of conformity to masculine norms to investigate the differential associations between specific masculine norms and other outcomes (Wong et al., 2017).

Hypothesis 2

Contrary to our hypothesis, drive for muscularity was not associated with future intent to practice yoga. Thus, men may not perceive yoga as conflicting with their pursuit of muscularity. This was unexpected, as military men have said that yoga is not comparable to physical training or endurance workouts (Hurst et al., 2018). As depicted in the popular media, such as yoga magazines, the body shape used to advertise yoga is a thin woman of low-normal weight (Webb et al., 2017), which is not congruent with the V-shaped, muscular physique that men seek. Yet, results suggest that men may not perceive yoga as a non-muscle-building behaviour. Some men perceive yoga as a supplementary physical activity or a therapeutic exercise (Cagas et al., 2021). When taken together with the findings of this study, this suggests that the fact that men have described yoga as *not comparable* to endurance workouts does not mean that they consider yoga as *incompatible* with seeking a muscular physique. Further research is needed to understand

men's nuanced perception of yoga with respect to their physical fitness and muscle-building behaviour.

Hypothesis 3

Conformity to masculine norms was not found to be associated with previous yoga experience, disconfirming hypothesis three. This suggests that traditionally masculine norms do not interfere with men trying yoga outright. In fact, the majority of men in this study reported that they had tried yoga a few times in the past. However, the negative association found between conformity to masculine norms and intent to practice yoga in the future suggests that men who are higher in masculine norms may have experienced their initial yoga classes differently than men who are low in masculine norms. According to the present results, they may have found it excessively feminine, found this aversive, and decided to not pursue the practice. It is also possible that attending classes mostly populated by women may have been a deterrent for men high in masculine norms. For example, consider a man who attends his first yoga class to find it is attended mostly by women who are much more proficient at executing yoga poses than he. A man lower in masculine norms might not be distressed by this situation, but a man higher in masculine norms might experience it as an indignity to his masculine identity, which could decrease his interest in practicing yoga again. Again, although plausible, these speculations await empirical testing.

Hypothesis 4

As predicted, higher drive for muscularity was associated with less engagement in yoga in the past. However, it was not found to be associated with intent to practice yoga in the future. Thus, although men who highly pursue muscularity have done less yoga in the past than did men who pursue muscularity to a lesser extent, this association disappears when considering future

engagement in yoga. This suggests that although men high in drive for muscularity may have concentrated on exercises directly meant to build muscle in the past, they may not be entirely reluctant to engage in yoga in the future, suggesting that they do not see this activity as incompatible with muscle-building behaviour. This further highlights that men's exact perception of yoga is nuanced and that a deeper understanding of it may require qualitative research.

Hypotheses 5 & 6

It was hypothesized that men who were higher in drive for muscularity would be more likely to use appearance-related phrases when asked why *they* are hesitant to practice yoga (hypothesis five), and the same was hypothesized when men were asked why *other men* might be hesitant to practice yoga (hypothesis six). Results showed that drive for muscularity was not related to the use of appearance phrases when men described their reluctance, and other men's reluctance, to practice yoga. This result is consistent with the finding that drive for muscularity was not related to intent to practice yoga. However, both researchers who coded the participants' responses to the open-ended questions noted that multiple participants mentioned that the perception of yoga as a feminine activity might be related to *other men's* hesitance to practice yoga. While this was not formally analysed in this project, this observation is consistent with that of the negative association between adherence to masculine norms and the intent to practice yoga in the future and with previous research suggesting that men's perception of yoga as feminine may be a deterrent to engage in the practice.

At the same time, this same pattern was not present when men were asked to describe *their own* hesitance to practice yoga. It is interesting that despite the clear association between the participants' adherence to masculine norms and their reluctance to practice yoga, and their

attribution of other men's reluctance to practice yoga in the future to yoga's femininity, men in this study were unwilling to cite the femininity of yoga as their own reason for not wanting to practice it in the future. This points to a potentially complex relationship with femininity and consequently an equally complex relationship with yoga, an activity largely perceived as feminine by men, and probably more so by men high in masculine norms.

Limitations

The present findings should be interpreted in the context of several limitations. First, the cross-sectional nature of the study precludes drawing causal conclusions from the research. In other words, conformity to masculine norms and intent to practice yoga are certainly related. Logically, conformity to masculine norms can be seen as the cause in this association because an individual difference, such as adherence to masculine norms, is more likely to influence an intention such as practicing yoga in the future. However, it is unclear how low intention to practice yoga would cause higher adherence to masculine norms. Nevertheless, replication in cross-sectional designs and ideally, longitudinal research, would increase confidence in the direction of the association found here.

Second, all of the participants were university students. Such samples tend to have demographic characteristics that have been described as white, educated, industrialized, rich, and democratic (Henrich et al., 2010), and these characteristics can serve as a threat to external validity. This sample was 52.9% white and 87.1% heterosexual, but there was not a large enough sample to conduct detailed sub-analyses by ethnic/cultural background or sexual orientation. It will be important for the field to study more diverse samples, as masculine norms have been shown to vary between cultures (Liu et al., 2016) and sexual orientations (Sánchez, 2016).

Implications and Future Directions

This is the first study to quantitatively demonstrate that higher conformity to masculine norms was associated with less intent to practice yoga. Participant's levels of drive for muscularity and self-esteem were unrelated to intent to practice yoga and did not explain this association. Further, the masculine norm Disdain for Homosexuality had the most consistent association with intent to practice yoga in the future, confirming that it may be the perception of yoga as a feminine activity that keeps men from engaging in it more than they presently do. This further suggests that, to increase men's participation in yoga, the association between yoga and femininity may need to be weakened in men's mind. This may be achieved by increasing the compatibility of yoga with masculine norms, or by directing attention to other dimensions of yoga altogether.

One method suggested by Cagas et al. (2021) is to offer occasional men-only yoga classes or workshops. The men in their study commented that men-only classes might help remove the stigma that yoga is a feminine activity. Further, it might allow the participants to learn about, and practice, yoga in a "safe" environment where they do not have to feel embarrassed or anxious in the presence of women who outperform them. Participants in Cagas et al., (2021) also described their positive reaction to a brief information session about yoga. They reported that it clarified some of their misconceptions about yoga and allowed them to learn about lesser-known aspects of yoga, such as the ethical principles, mental health benefits, and specific benefits for spinal muscles. Importantly, many participants reported higher interest in yoga as a result of learning about these less frequently mentioned benefits of yoga, which suggests that advertising yoga as exercise only may not be the most effective way of portraying yoga as congruent with masculinity.

Another possible strategy may be to promote an association between yoga and masculinity through endorsements of yoga by male public figures associated with masculinity. For examples, sports celebrities such as professional basketball player Myles Turner of the Indiana Pacers (The Players' Tribune, 2018), and professional football player Ray Lewis of the Florida Ravens (South Florida High School Sports, 2012) both have spoken positively of their experiences with yoga. Turner described his initial skepticism of yoga's benefits and both Turner and Lewis cited the flexibility, focus, and "mental strength" they have gained from yoga practice. Such marketing campaigns might also include information about yoga styles that involve more strength development or discipline, such as Ashtanga yoga, and specify how yoga can be used as a complementary activity to men's "masculine" activities, such as weightlifting or team sports

Another potentially fruitful avenue of research would consist of increasing the granularity of the measurement of intention to engage in yoga. Intent to practice yoga was measured with a single item in this project. Yet, according to the theory of planned behaviour (Ajzen, 1991) intention to engage in a behaviour has three distinct components: attitudes towards the behaviour, subjective norms, and perceived behavioural control. Including all three aspects of intention in future research may be fruitful. Conformity to masculine norms is particularly likely to be associated with attitudes towards the behaviour and subjective norms. These two components of intention reflect attitudes that an individual and those in their social circle have about a behaviour. As shown in this study, men's attitudes towards yoga can be succinctly summarized: yoga is a feminine activity. Regarding subjective norms, men may not want others to associate them with a feminine activity. It may also be the case that specific masculine norms have different associations with each aspect of intention, such as Disdain for Homosexuality

having an association with subjective norms. These avenues of exploration would bring specificity to men's reluctance to engage in yoga.

In summary, the results of the present study show that higher adherence to masculine norms predicts lower intent to engage in yoga, likely by virtues of men's perception of yoga as a feminine activity, a perception largely supported by how yoga is publicised in mass media. This deprives men as a group of the demonstrated physical and mental health benefits of yoga. More research is needed to fully understand the role of femininity in this association. Nevertheless, the present results suggest that public health campaigns positioning yoga as an activity compatible with masculinity may lower men's reluctance to initiate yoga, thus increasing their access to its benefits.

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Appendix A

Demographics Questionnaire

1. Your age, in years: _____
2. Do you think of yourself as a:
    a. Man
    b. Woman
    c. Transgender man/trans man/female-to-male (FTM)
    d. Transgender woman/trans woman/male-to-female (MTF)
    e. Genderqueer/gender nonconforming/neither exclusively male or female
    f. Something else; please specify: _____
    g. Don't know
3. Do you think of yourself as:
    a. Straight or heterosexual
    b. Lesbian, gay, or homosexual
    c. Bisexual
    d. Pansexual/Omnisexual
    e. Asexual
    f. Something else; please specify: _____
    g. Don't know
    h. Choose not to disclose
4. Your Height (in feet/inches): _____
5. Your Weight (in pounds):_____
6. Ethnic Background (i.e., the ethnic or cultural group[s] to which your ancestors belong):
    a. Aboriginal (North American Indian, First Nation, Metis, or Inuit)
    b. White
    c. Chinese
    d. Black/African
    e. Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.)
    f. West Asian (e.g., Iranian, Afghan, etc.)
    g. South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
    h. Korean
    i. Japanese
    j. Latin American
    k. Filipino
    l. Mixed
    m. Caribbean
    n. Arab (e.g., Lebanese, Palestinian, Egyptian, Iraqi, etc.)
    o. Other; please specify: _____
7. Relationship Status
    a. Single
    b. Casually dating
    c. Partnered / Non-married committed relationship
    d. Married / Civil union
    e. Separated
    f. Divorced

   g. Widowed
   h. Other (please specify):_____
8. Your university enrollment
   a. Full-time student
   b. Part-time student
   c. Alumnus
   d. Other; please specify: _____
9. Your academic focus
   - Major(s) _____
   - If applicable, Minor(s) _____
10. Number of psychology courses taken
   - I have never taken a psychology course
   - I am taking my first psychology course(s) this term
   - I have completed one prior psychology course
   - I have completed 2-3 prior psychology courses
   - I have completed 4-5 prior psychology courses
   - I have completed more than 5 prior psychology courses
11. Is English your first language?
   a. Yes
   b. No
12. Do you have a gym membership?
   a. Yes
   b. No
13. How many times do you workout (i.e., are physically active) per week? _____

Appendix B

Experience with Yoga Questionnaire

1. **Please describe your level of previous yoga experience by selecting the option which best fits.**
   - I have never tried yoga
   - I have tried yoga once in my life
   - I have tried yoga a few times in my life
   - I practiced yoga 1-4 times per month
   - I practiced yoga 1-4 times per week
   - I practiced yoga more than 4 times a week
   - I practiced yoga daily or almost every day

If participant answered "None" to the previous question, this question will not appear:

2. **Currently, how often do you practice yoga?**
   - Daily or almost every day
   - More than 4 times per week
   - 1-4 times per week
   - 1-4 times per month
   - Less than once a month

3. **How likely are you to practice yoga at all in the future?**
   - Not at all likely
   - Mildly likely
   - Moderately likely
   - Highly likely
   - Completely certain

4. **How often might you practice yoga in the future?**
   - Daily or almost every day
   - More than 4 times per week
   - 1-4 times a week
   - 1-4 times per month
   - Less than once a month

Appendix C

Conformity to Masculine Norms Inventory

The following items contain a series of statements about how men might think, feel or behave. The statements are designed to measure attitudes, beliefs, and behaviors associated with both traditional and non-traditional masculine gender roles.

Thinking about your own actions, feelings and beliefs, please indicate how much **you personally agree or disagree with each statement** by circling SD for "Strongly Disagree", D for "Disagree", A for "Agree", or SA for "Strongly agree" to the right of the statement. There are no correct or wrong answers to the items. You should give the responses that most accurately describe your personal actions, feelings and beliefs. It is best if you respond with your first impression when answering.

1. It is best to keep your emotions hidden	SD	D	A	SA
2. In general, I will do anything to win	SD	D	A	SA
3. If I could, I would frequently change sexual partners	SD	D	A	SA
4. If there is going to be violence, I find a way to avoid it	SD	D	A	SA
5. It is important to me that people think I am heterosexual	SD	D	A	SA
6. In general, I must get my way	SD	D	A	SA
7. Trying to be important is the greatest waste of time	SD	D	A	SA
8. I am often absorbed in my work	SD	D	A	SA
9. I will only be satisfied when women are equal to men	SD	D	A	SA
10. I hate asking for help	SD	D	A	SA
11. Taking dangerous risks helps me to prove myself	SD	D	A	SA
12. In general, I do not expend a lot of energy trying to win at things	SD	D	A	SA
13. An emotional bond with a partner is the best part of sex	SD	D	A	SA
14. I should take every opportunity to show my feelings	SD	D	A	SA
15. I believe that violence is never justified	SD	D	A	SA

Appendix D

Drive for Muscularity Scale

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

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

1. I wish that I were more muscular.
   1 2 3 4 5 6
2. I lift weights to build up muscle.
   1 2 3 4 5 6
3. I use protein or energy supplements.
   1 2 3 4 5 6
4. I drink weight gain or protein shakes.
   1 2 3 4 5 6
5. I try to consume as many calories as I can in a day.
   1 2 3 4 5 6
6. I feel guilty if I miss a weight training session.
   1 2 3 4 5 6
7. I think I would feel more confident if I had more muscle mass.
   1 2 3 4 5 6
8. Other people think I work out with weights too often.
   1 2 3 4 5 6
9. I think that I would look better if I gained 10 pounds in bulk.
   1 2 3 4 5 6
10. I think about taking anabolic steroids.
    1 2 3 4 5 6
11. I think that I would feel stronger if I gained a little more muscle mass.
    1 2 3 4 5 6
12. I think that my weight training schedule interferes with other aspects of my life.
    1 2 3 4 5 6
13. I think that my arms are not muscular enough.
    1 2 3 4 5 6
14. I think that my chest is not muscular enough.
    1 2 3 4 5 6
15. I think that my legs are not muscular enough.
    1 2 3 4 5 6

Appendix E

Rosenberg Self-Esteem Scale

Please select the appropriate answer per item, depending on whether you strongly agree, agree, disagree, or strongly disagree with it.

0	1	2	3
Strongly Disagree	Disagree	Agree	Strongly Agree

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

Appendix F

Open-Ended Survey Questions

The next couple questions will ask you to write about your thoughts on certain topics. Spend time thinking about your answers before you write. Answer questions fully and give specific examples.

For each question, the "Submit" button will appear after 30 seconds, but spend as much time as you desire answering each question.

If the participant indicated on the Experience with Yoga questionnaire that they have never practiced yoga, the first question will read:

1. You stated that you have never tried yoga in the past. What are your reasons for not practicing yoga? Please describe all that apply.

If the participant indicated on the Experience with Yoga questionnaire that they have previously practiced yoga, the first question will read:

1. You stated that you have practiced/tried yoga in the past. Did you have any concerns before trying it? Please describe why or why not.

All participants will answer the following question:

2. What do you think are reasons that other men might be hesitant to practice yoga? Please list and describe all that might apply.

Appendix G

Participant Pool Consent Form

CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: "University Men's Interest in Fitness Behaviours: Participant Pool"

You are asked to participate in a research study conducted by Conner Motzkus and supervised by Dr. Josée Jarry, from the Department of Psychology at the University of Windsor. Results of this study will be used to fulfil the requirements of a Master's thesis.

If you have any questions or concerns about the research, please feel free to contact the primary investigator, Conner Motzkus, by email at motzkus@uwindsor.ca or the faculty supervisor, Dr. Josée Jarry, by email at jjarry@uwindsor.ca or by telephone at 519-253-3000, ext. 2237.

PURPOSE OF THE STUDY

The aim of this study is to evaluate university men's interest in fitness behaviours.

PROCEDURES

By selecting "I agree to participate" and typing your name in the box below, you are indicating that you consent to participate in this study. Once you have signed this consent form by typing your name, you will complete a survey that consists of several questionnaires in randomized order. Please complete the survey when you are alone in a quiet place where you can concentrate fully. The survey will take approximately 1 hour to complete, and you are required to complete the questionnaires in one sitting.

POTENTIAL RISKS AND DISCOMFORTS

During the course of your participation in this study, you will be asked to answer questions that are personal and may cause discomfort. Some people may experience mild discomfort when answering questions about how they feel about themselves. However, no significant risks or discomforts are anticipated. You may choose not to answer any question if you feel uncomfortable answering, and you may withdraw from the study at any time. If you experience any discomfort you may contact the primary investigator or the faculty supervisor directly to

address your concerns. If you have any concerns you would like to discuss with an independent party, please feel free to contact the Student Counselling Centre at 519-252-3000 ext. 4616.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Participating in this study provides you the opportunity to contribute to psychological research and gain familiarity with online research procedures. Information provided by individuals participating in this study will help guide future research and will increase society's knowledge of university men's interest in fitness behaviours.

COMPENSATION FOR PARTICIPATION

Participants will receive 1 bonus point for 1 hour of participation towards the psychology participant pool, if registered in the pool and enrolled in one or more eligible courses.
A valid response profile is required to receive compensation; an invalid response profile may be defined as a profile that is unlikely to occur by chance, such as all questions being given the same answer. If an invalid response profile arises, you will receive an e-mail inviting you to redo the study. If you decline or another invalid response profile is produced, you will not receive the bonus point.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential. Data will be de-identified for analysis after completion of the survey and no data will be associated with an individual. Consent forms will be stored separate from the data, keeping the data anonymous. The data will be acquired and stored online, using Qualtrics, which ensures complete confidentiality. Qualtrics does not record any information from the device accessing the website, except for the answers provided on the questionnaires. Once the questionnaires are completed, the data will be uploaded to an Excel spreadsheet and stored on the principal investigator's computer and the lab computer. Only the principal investigator (Conner Motzkus) and the faculty supervisor (Dr. Josée Jarry) will have password required to access the data file. Upon completion of the study, participant data will be kept for approximately nine years, and then all data will be destroyed. This is in compliance with psychology discipline guidelines of keeping data for seven years post publication.

PARTICIPATION AND WITHDRAWAL

Your participation in this study is voluntary and you are free to withdraw at any time during the study. You are not required to answer any questions that you do not feel comfortable answering. Participation in this study will have no bearing on evaluation of your class performance. Additionally, you may refuse to answer any questions you don't want to answer and still remain

in the study. The investigator may withdraw you from this research if appropriate circumstances arise. If you choose to withdraw at any point, you may do so by exiting the survey and contacting the primary investigator (Conner Motzkus) before December 10, 2021 (motzkus@uwindsor.ca).

You may request your data be withdrawn from the study at any point up to two weeks after completion of the study by emailing Conner Motzkus (motzkus@uwindsor.ca). Your decision to participate in this study is completely independent of your academic standing, course grades, and relationship with the University. Your decision to withdraw from the study will not result in any negative consequences; for example, a negative credit will not be applied to your account in the pool. Withdrawal does not forfeit your bonus credit, however, as outlined above, depending on the portion of the study completed up to the time of withdrawal, fewer credits may be awarded. This is consistent with participant pool policies.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of results is expected to be available on the Research Ethics Board Website after August 2022.

Web address: www.uwindsor.ca/reb

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact:

Research Ethics Coordinator
University of Windsor
Windsor, Ontario, N9B 3P4
Telephone: 519-253-3000, ext. 3948
E-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study **"**University Men's Interest in Fitness Behaviours: Participant Pool" as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study.

Please select "I agree to participate" and enter your first name to indicate that you consent to participate. If you DO NOT consent to participate, please select "I do NOT agree to participate." It is recommended that you print a copy of this form for your records.

- I agree to participate
- I do NOT agree to participate

Please enter your name in the box below in place of a signature

Please enter today's date.

YYYY/MM/DD

Appendix H

Mass Email Consent Form

CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: "University Men's Interest in Fitness Behaviours: UWindsor Email"

You are asked to participate in a research study conducted by Conner Motzkus and supervised by Dr. Josée Jarry, from the Department of Psychology at the University of Windsor. Results of this study will be used to fulfil the requirements of a Master's thesis.

If you have any questions or concerns about the research, please feel free to contact the primary investigator, Conner Motzkus, by email at motzkus@uwindsor.ca or the faculty supervisor, Dr. Josée Jarry by email at jjarry@uwindsor.ca or by telephone at 519-253-3000, ext. 2237.

PURPOSE OF THE STUDY

The aim of this study is to evaluate university men's interest in fitness behaviours.

PROCEDURES

By selecting "I agree to participate" and typing your name in the box below, you are indicating that you consent to participate in this study. Once you have signed this consent form by typing your name, you will complete a survey that consists of several questionnaires in randomized order. Please complete the survey when you are alone in a quiet place where you can concentrate fully. The survey will take approximately 1 hour to complete, and you are required to complete the questionnaires in one sitting.

POTENTIAL RISKS AND DISCOMFORTS

During the course of your participation in this study, you will be asked to answer questions that are personal and may cause discomfort. Some people may experience mild discomfort when answering questions about how they feel about themselves. However, no significant risks or discomforts are anticipated. You may choose not to answer any question if you feel uncomfortable answering, and you may withdraw from the study at any time. If you experience any discomfort you may contact the primary investigator or the faculty supervisor directly to address your concerns. If you have any concerns you would like to discuss with an independent party, please feel free to contact the Student Counselling Centre at 519-252-3000 ext. 4616.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Participating in this study provides you the opportunity to contribute to psychological research and gain familiarity with online research procedures. Information provided by individuals participating in this study will help guide future research and will increase society's knowledge of university men's interest in fitness behaviours.

COMPENSATION FOR PARTICIPATION

After completing the survey, you will be invited to enter your name and email address to be entered into a raffle for 1 of 4 $25, UberEats digital gift cards. After all data for the study has been collected, the four winners will be notified by email. If you decide not to provide your name and email, no compensation will be provided for your participation.
A valid response profile is required to receive compensation; an invalid response profile may be defined as a profile that is unlikely to occur by chance, such as all questions being given the same answer. If an invalid response profile arises, you will receive an e-mail inviting you to redo the study. If you decline or another invalid response profile is produced, you will not receive the bonus point.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential. Data will be de-identified for analysis after completion of the survey and no data will be associated with an individual. Consent forms will be stored separate from the data, keeping the data anonymous. The data will be acquired and stored online, using Qualtrics, which ensures complete confidentiality. Qualtrics does not record any information from the device accessing the website, except for the answers provided on the questionnaires. Once the questionnaires are completed, the data will be uploaded to an Excel spreadsheet and stored on the principal investigator's computer and the lab computer. Only the principal investigator (Conner Motzkus) and the faculty supervisor (Dr. Josée Jarry) will have password required to access the data file. Upon completion of the study, participant data will be kept for approximately nine years, and then all data will be destroyed. This is in compliance with psychology discipline guidelines of keeping data for seven years post publication.

PARTICIPATION AND WITHDRAWAL

Your participation in this study is voluntary and you are free to withdraw at any time during the study. You are not required to answer any questions that you do not feel comfortable answering. Participation in this study will have no bearing on evaluation of your class performance.

Additionally, you may refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if appropriate circumstances arise. If you choose to withdraw at any point, you may do so by exiting the survey and contacting the primary investigator (Conner Motzkus) before December 10, 2021 (motzkus@uwindsor.ca).

You may request your data be withdrawn from the study at any point up to two weeks after completion of the study by emailing Conner Motzkus (motzkus@uwindsor.ca). Your decision to participate in this study is completely independent of your academic standing, course grades, and relationship with the University. Your decision to withdraw from the study will not result in any negative consequences.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of results is expected to be available on the Research Ethics Board Website after August 2022.

Web address: www.uwindsor.ca/reb

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact:
Research Ethics Coordinator
University of Windsor
Windsor, Ontario, N9B 3P4
Telephone: 519-253-3000, ext. 3948
E-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study **"**University Men's Interest in Fitness Behaviours: UWindsor Email" as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study.

Please select "I agree to participate" and enter your first name to indicate that you consent to participate. If you DO NOT consent to participate, please select "I do NOT agree to participate." It is recommended that you print a copy of this form for your records.

- I agree to participate
- I do NOT agree to participate

Please enter your name in the box below in place of a signature

Please enter today's date.

YYYY/MM/DD

Appendix I

Letter of Information for Debriefing

Are "manly men" interested in yoga? A serial mediation model of conformity to traditional masculinity on future interest in yoga practice

Thank you for participating in this study. This study was designed to investigate the relationship between traditionally masculine gender norms and future interest in yoga practice. Researchers have found that practicing yoga can improve mental and physical health, but surveys have shown that yoga practitioners are mostly women, which means that men who might benefit from yoga may not be practicing it. When men have been interviewed and asked what they think of yoga, many men have said they are not interested in it because “yoga is for girls” and yoga is not comparable to a physical workout.

This study is the first to use a self-report online survey to test if men’s conformity to traditionally masculine norms is related to future interest in practicing yoga in the future. Traditionally masculine norms are societal expectations of what a man should strive to be and how a man should and should not act. These norms include, among other things, that men avoid all things perceived as feminine, be aggressive and tough, prioritize the achievement of social and monetary status, and be self-reliant. Some men express these norms through a drive for muscularity in which they seek activities to increase the size of their muscles. This drive for muscularity may also be related to future interest in practicing yoga.

For this study, you completed an online survey in which you answered several self-report questionnaires, followed by open-ended questions about why you and other men might be hesitant to practice yoga. The questionnaires measure conformity to masculine norms, drive for muscularity, self-esteem, and previous experience with and future interest in practicing yoga. The open-ended questions will be coded for the frequency of phrases that use words related to physical appearance.

I want you to know that I recognize that some of the questionnaires I asked you to complete were personal in nature. Some people might feel uncomfortable answering these questionnaires, others would not be uncomfortable at all. Both of these responses are perfectly normal. If you have any concerns, I encourage you to contact the primary investigator, Conner Motzkus. You may also contact the Student Counselling Centre at 519-253-3000, ext. 4616, if you wish to discuss your concerns with someone outside the study. If you have any concerns or questions at all about the study, or are interested in receiving more information, please feel free to contact the primary investigator, Conner Motzkus, Department of Psychology, at motzkus@uwindsor.ca.

As in most psychological research, we are interested in how the average person reacts in this situation. We need to test many people and combine their results in order to get a good indication of how the average person reacts under the different conditions. In order for us to draw any conclusions, we have to combine the data we got from you with data we get from other

people so that we have enough data to draw conclusions. What this means is that there will be many people participating in this study. It is going to be necessary for us to ask you not to say anything about the study to anyone else. If you talked to someone else about the study and told them all the things I just told you and then they were in the study, their reactions wouldn't be spontaneous and natural, and their results couldn't be used and combined with your data and those from other people. If that happened, we wouldn't have enough data to make conclusions about the average person, so the whole study really would be for nothing. I hope you can see why it is extremely important that I ask you not to say anything about the study. You might think that it won't make a difference if you talk to your roommate about it because they'll never be in the study, but your roommate might say something to someone else who might be in the study. Thus, I would like to ask you not to say anything about the study, other than you completed some questionnaires until the end of the study, when results are posted on the Research Ethics Board website.

You may request your data be withdrawn from the study at any point up to December 10, 2021 by emailing Conner Motzkus (motzkus@uwindsor.ca). Your decision to participate in this study is completely independent of your academic standing, course grades, and relationship with the University. Your decision to withdraw from the study will not result in any negative consequences; for example, a negative credit will not be applied to your account in the pool. Withdrawal does not forfeit your bonus credit.

If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca. Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

Appendix J

Coding Sheet & Coding Examples

Coder Name: Date:

Participant ID:	**Survey Question** # (1 or 2)	**Appearance-Phrase**

Coding Guidelines

- If the word "strength" appears independent of any other appearance-related phrases, do not code it as an appearance-related phrase.
- Anything related to physical function, including flexibility, will NOT be coded as an appearance phrase, even if the participant describes worries/concern/awareness about how their functionality will be perceived by others.
- Remember that muscle size does not determine strength (i.e., function)
- We will not code people's worries about how they will appear to others or be perceived by others because this is not the type of "appearance" we are looking for.
    - We're not interested in others' "perceptions" of the participants.

- **Appendix K**

Participant Pool Advertisement

Title: University Men's Interest in Fitness Behaviours

Description: The following study consists of an online survey. The total duration of the online survey is not expected to exceed 1 hour of your time, and it is worth 1 bonus point if you are registered in one or more eligible psychology courses.

Eligibility Requirements: To participate in this study, you must (a) identify as a man, (b) are 18 years of age or older, and (c) be able to read English.

Duration: 60 minutes

Points: 1

Researchers: Conner Motzkus, Dr. Josée Jarry

Appendix L

Mass Email Advertisement

Dear Student,

We would like to invite you to participate in our study about university men's interest in fitness behaviours and to contribute to scientific advancements being made at the University of Windsor. This research study is conducted by Conner Motzkus under the supervision of Dr. Josée Jarry from the Department of Psychology, University of Windsor. REB clearance has been obtained for REB # [REB APPROVAL NUMBER]. **To be eligible for this study, you must (a) identify as a man and (b) be 18 years of age or older, and (c) be able to read English.**

INSTRUCTIONS: Please complete the online survey by [ENTER DATE], or as close to this date as possible. The survey can be accessed by clicking on the following URL link or by copying and pasting the URL into your Internet browser: [INSERT HYPERLINK TO STUDY].

We ask that you answer all questions as honestly and as accurately as possible, without the assistance of others, in a safe and secure location where no one can view your responses. Please **DO NOT** type your name, student ID number, or any other identifying information in the survey unless prompted. If you are unsure about an item, please make your best guess. When you are finished, you will have the opportunity to enter your name and email to be entered into a raffle for a chance to win a $25 UberEats digital gift card. Once we verify that you have completed the online survey, we will enter you into the raffle.

Thank you!

Appendix M

Results from the Two-Sample Dataset: Fall 2021 and Winter 2022 Participant Pool

Assumptions of Serial Mediation Regression Analysis

Two Samples. Checking assumptions on the dataset comprised of only two samples led to near identical findings to those found in the three-sample dataset. Namely, the same two univariate outliers were found on the Conformity to Masculine Norms Index (CMNI) subscale Pursuit of Status, and each of these outlying values were winsorized. No multivariate outliers or influential observations were found.

The distribution of residuals of the linear regression line was similar to that of the dataset with all three samples: the data was approximately normal with a mild positive skew. The P-P plot showed that the residuals did not evenly follow the diagonal line, indicating a mild departure from normality. When the residuals were plotted using a normal *q*-*q* plot, they generally followed the straight line but they departed from the line enough to undermine confidence in the assumption of normality. Further, the Kolmogrov-Smirnov test (.124, $p < .000$) and the Shapiro-Wilk test (.944, $p < .000$) were significant, which suggests that the residuals were not normally distributed.

When the linear relationship between the residuals was assessed via visual examination of the scatterplots of the standardized residuals and standardized predicted values for each direct pathway in the serial mediation model, the dots were organized in a pattern nearly identical to that of the three-sample dataset. Thus, the assumption of linearity was met. No funnel pattern was present in these scatterplots, so the assumption of homoscedasticity was determined to be met. All VIF values were below 10 and all tolerance values were above 0.2, which suggests that all the predictors were distinct enough to move forward with the serial mediation analysis.

Assumptions of Binary Logistic Regression Analysis

Two Samples. The same analysis that was conducted in the three-sample dataset was conducted to test the assumption of linearity. The interaction term was non-significant, $p = .857$, which means the assumption of linearity of the logit was met. Interrater reliability was $\kappa = .93$.

Two Samples

All results for the two-sample dataset were generated using identical methodology as that for the three-sample dataset.

Results for the serial mediation analyses can be found in Table 1 and Figure 1. Results showed a non-significant indirect effect of conformity to masculine norms on intent to practice yoga in the future through drive for muscularity and self-esteem, 95% CI [-.001, .001]. Therefore, as was the case for the three-sample analyses, no alternative models were tested.

Results for the additional analyses can be found in Table 4. These results suggest that some traditionally masculine norms have stronger predictive power than others. Results showed that only 7 out of 11 masculine norms were significant predictors of drive for muscularity, and the strongest predictor was Dominance, $B = 2.56$ ($SE = .577$), $p < .001$, followed by Self-Reliance, $B = .995$ ($SE = .383$), $p = .011$. One masculine norm was found to significantly predict intent to practice yoga at the $p < .05$ significance level: Primacy of Work, $B = -.080$ ($SE = .031$), $p = .010$, 99% CI [-.160, <.000]. Two masculine norms were found to predict intent to practice yoga at the more conservative $p < .01$ significance level: Winning, $B = -.060$ ($SE = .023$), $p = .009$, 99% CI [-.120,-.001]; Disdain for Homosexuality, $B = -.061$ ($SE = .016$), $p < .001$, 99% CI [-.102,-.020].

Results for the one-tailed correlational analyses can be found in Table 3. Support was found for hypotheses two and four. Variable means, standard deviations, Cronbach alphas, and bivariate correlations are included in Table 2.

Results for the binary logistic regression analyses can be found in Table 5. Results showed that drive for muscularity did not significantly predict the presence of appearance-related phrases when participants were asked why *they* were hesitant to practice yoga, $p = .745$. Results showed that drive for muscularity did not significantly predict the presence of appearance-related phrases when participants were asked why *other men* might be hesitant to practice yoga, $p = .827$.

Table 1. Two Samples

Path Estimates and Confidence Intervals for Serial Mediation Analyses of the Effect of Conformity to Masculine Norms (IV) on Intent to Practice Yoga in the Future (DV) through Drive for Muscularity (M1) and Self-Esteem (M2)

	Effect of IV on M1 B(SE)	*p*	Effect of M1 on M2 B(SE)	*p*	Effect of M2 on DV B(SE)	*p*	Effect of IV on DV B(SE)	*p*	Indirect Effect B(SE)	Direct Effect		Indirect Effect	
										Lower Limit	Upper Limit	Lower Limit	Upper Limit
Conformity to Masculine Norms	**.208(.48)**	<.001	**-.100(.03)**	.003	.005(.20)	.663	**-.013(.005)**	.007	-.000(.001)	-.022	-.004	-.001	.001

Note. ***** indicates significance at the .05 level (2-tailed), while **bold** indicates significance at the .01 level. Estimates of indirect effect are based on 10,000 bootstrapped sample estimates. Upper and lower limits of the direct and indirect effect are based on 95% confidence intervals (CIs). Significant indirect paths are indicated by CIs that do not include 0.

Two Samples Serial Mediation Model

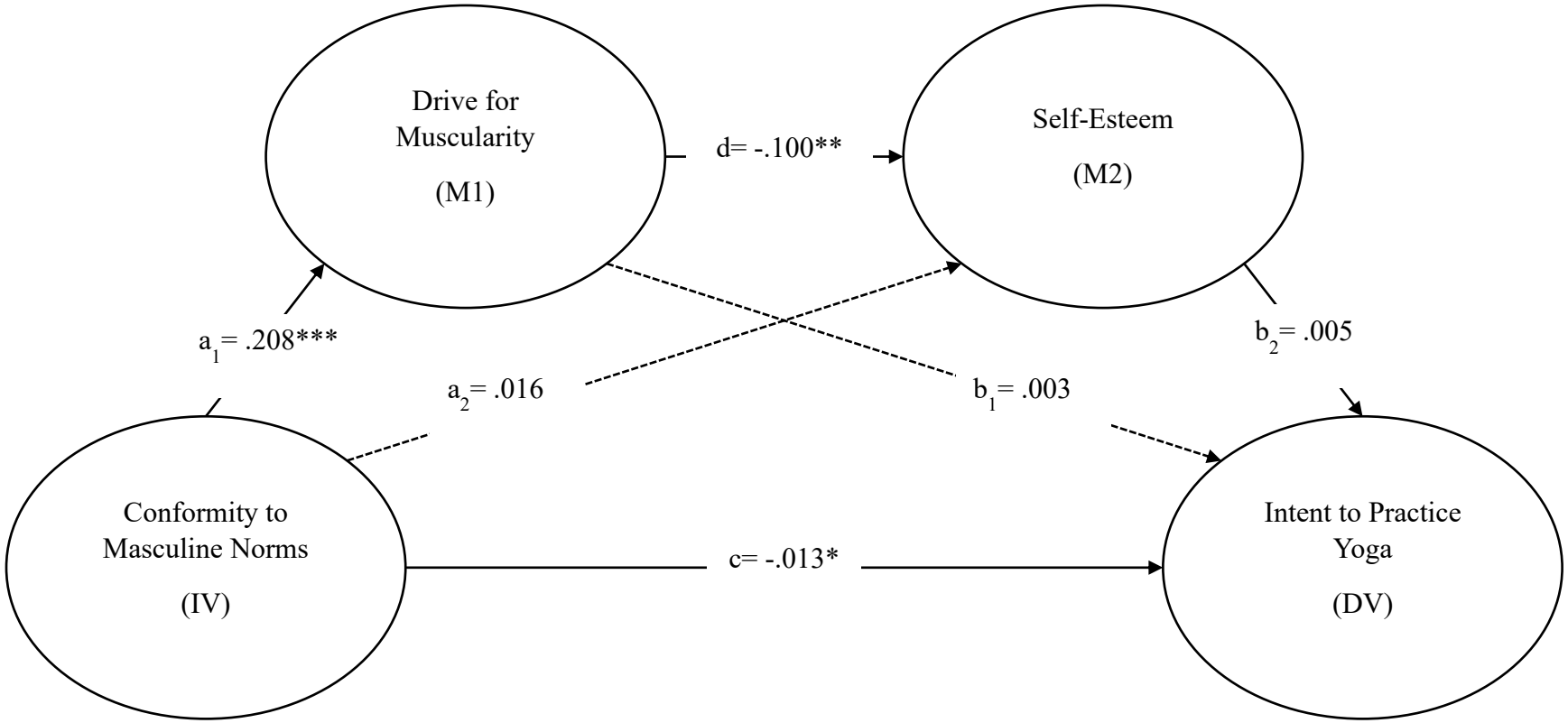

Figure 1. Serial Mediation Model with unstandardized regression coefficients (i.e., B-weights). *Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed) ***Correlation is significant at the 0.001 level (2-tailed)

Table 2. Two Samples

Variable means, standard deviations, Cronbach alphas, and bivariate correlations

N = 136	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Conformity to Masculine Norms	-	.59***	.53***	.52***	.51***	.64***	.64***	.43***	.39***	.39***	.62***	.31***	.35***	-.02
2. Winning		-	.13	.12	.20*	.27**	.50***	.07	.18*	.29***	.35***	.37**	.24**	.08
3. Emotional Control			-	.11	.29***	.19*	.20*	.12	.38***	.11	.31***	-.12	.11	-.01
4. Risk Taking				-	.33***	.29***	.31***	.12	.04	.30***	.26**	.04	.17	-.03
5. Violence					-	.23**	.21**	.07	.33***	<.00	.12	.16	.22*	-.13
6. Power Over Women						-	.36***	.38***	.18*	.17	.40***	.12	.17*	-.07
7. Dominance							-	.20*	.03	.38***	.43***	.32***	.36***	.11
8. Playboy								-	.15	.08	<.00	.13	.11	-.11
9. Self-Reliance									-	-.11	.08	-.07	.22**	-.45***
10. Primacy of Work										-	.12	.13	.18*	.16
11. Disdain for Homosexuality											-	.11	.19*	.20*
12. Pursuit of Status												-	.12	-.02
13. Drive for Muscularity													-	-.25**
14. Self-Esteem														-
15. Intent to practice yoga in the future														
16. Predicted future yoga practice frequency														
17. Previous yoga practice frequency														
M	116.35	15.37	15.33	14.53	11.15	5.12	5.42	9.72	6.94	10.19	12.70	10.56	46.32	18.8
SD	24.18	4.73	5.40	4.61	4.40	3.84	2.02	5.75	3.17	3.5	6.74	2.73	14.43	5.33
Alpha	.92	.86	.89	.87	.86	.84	.68	.86	.84	.75	.93	.77	.90	.89

Note: *Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed) ***Correlation is significant at the 0.001 level (2-tailed)

Table 2. Two Samples

Variable means, standard deviations, Cronbach alphas, and bivariate correlations

N = 136	15	16	17
1. Conformity to Masculine Norms	-.23**	-.22*	-.14
2. Winning	-.23**	-.21*	-.20*
3. Emotional Control	-.16	-.15	-.14
4. Risk Taking	-.04	-.10	.10
5. Violence	-.07	-.06	-.02
6. Power Over Women	-.07	-.03	-.08
7. Dominance	-.13	-.15	-.23**
8. Playboy	.07	.09	.12
9. Self-Reliance	-.01	.03	.11
10. Primacy of Work	-.22*	-.24**	-.11
11. Disdain for Homosexuality	-.31***	-.27***	-.25**
12. Pursuit of Status	-.07	-.08	-.01
13. Drive for Muscularity	-.05	-.01	-.19*
14. Self-Esteem	.02	-.12	-.09
15. Intent to practice yoga in the future	-	.75***	.52***
16. Predicted future yoga practice frequency		-	.44***
17. Previous yoga practice frequency			-
M	2.40	2.01	2.48
SD	1.22	1.03	1.19
Alpha	-	-	-

Note: *Correlation is significant at the 0.05 level (2-tailed) **Correlation is significant at the 0.01 level (2-tailed) ***Correlation is significant at the 0.001 level (2-tailed)

Table 3. Two Samples
Correlational Hypotheses with Results

Hypotheses 2-4	**Correlation Coefficients and *p*-values**
2. Drive for muscularity will be negatively correlated with self-esteem	$r(134) = -.25$, $p = .002$*
3. Conformity to traditional masculinity will be negatively correlated with previous yoga experience	$r(134) = -.14$, $p = .058$
4. Drive for muscularity will be negatively correlated with previous yoga experience	$r(134) = -.19$, $p = .015$*
*Correlation is significant at the Bonferroni corrected alpha level of $p = .017$	

Table 4. Two Samples

Path Estimates and Confidence Intervals for Serial Mediation Analyses of the Effect of Individual Masculine Norms (IV) on Intent to Practice Yoga in the Future (DV) through Drive for Muscularity (M1) and Self-Esteem (M2) and Exploratory Serial Mediation Analyses

Individual Masculine Norm	Effect of IV on M1 B(SE)	*p*	Effect of M1 on M2 B(SE)	*p*	Effect of M2 on DV B(SE)	*p*	Effect of IV on DV B(SE)	*p*	Indirect Effect B(SE)	Direct Effect		Indirect Effect	
										Lower Limit	Upper Limit	Lower Limit	Upper Limit
Winning	**.736(.257)**	.005	**-.104(.032)**	.001	.009(.020)	.653	**-.060(.023)**	.009	-.001(.002)	-.120	-.001	-.008	.005
Emotional Control	.300(.230)	.194	**-.093(.031)**	.004	.003(.020)	.897	-.036(.020)	.066	-.000(.001)	-.087	.015	-.003	.003
Risk Taking	.521(.268)	.054	**-.092(.032)**	.004	.001(.021)	.945	-.009(.023)	.707	-.000(.001)	-.070	.052	-.005	.005
Violence	.713(.276)*	.011	**-.085(.032)**	.008	.000(.021)	.989	-.016(.025)	.527	.000(.002)	-.080	.049	-.007	.005
Power Over Women	.659(.324)*	.044	**-.087(.031)**	.007	.002(.021)	.916	-.020(.028)	.492	-.000(.002)	-.094	.055	-.005	.005
Dominance	**2.56(.577)**	<.001	**-.121(.032)**	.003	.008(.021)	.701	-.084(.057)	.146	-.003(.008)	-.233	.066	-.025	.021
Playboy	.277(.216)	.201	**-.088(.031)**	.005	.003(.021)	.887	.017(.019)	.354	-.000(.001)	-.031	.066	-.003	.003
Self-Reliance	.995(.383)*	.011	-.058(.029)*	.047	.002(.023)	.940	.001(.038)	.971	-.000(.002)	-.097	.020	-.006	.006
Primacy of Work	.758(.349)*	.032	**-.106(.031)**	<.001	.013(.021)	.530	-.080(.031)*	.010	-.001(.002)	-.160	>.000	-.008	.005
Disdain for Homosexuality	.415(.181)*	.024	**-.110(.037)**	<.001	.021(.020)	.291	**-.061(.016)**	<.001	-.001(.001)	-.102	-.020	-.006	.002
Pursuit of Status	.633(.454)	.165	**-.092(.031)**	.004	.002(.021)	.939	-.029(.039)	.465	-.000(.002)	-.131	.074	-.007	.007

Note. ***** indicates significance at the .05 level (2-tailed), while **bold** indicates significance at the .01 level. Items with estimates of indirect effect are based on 10,000 bootstrapped sample estimates. Upper and lower limits of the direct and indirect effect are based on 99% confidence intervals (CIs). Significant indirect paths are indicated by 99% CIs that do not include 0.

Table 5. Two Samples

Logistic Regression

	B	(SE)	*p*	R^2 Nagelkerke
Participant Yoga Hesitancy	.022	.068	.745	.009
Other Men Yoga Hesitancy	.004	.018	.827	.001

Vita Auctoris

Conner J. Motzkus was born in 1995 in Pasadena, California. He moved to Salt Lake City, Utah, in 2003. He graduated from Skyline High school in 2013. He attended Southern Utah University and graduated with a Bachelor of Science in Psychology, Summa Cum Laude, in 2016. He is currently a Master's student in the Clinical Psychology – Adult track program at the University of Windsor.