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Untangling the Associations between Generalized Anxiety and Body Dissatisfaction: The Mediating Effects of Social Physique Anxiety Among Collegiate Men and Women

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Abstract

Researchers disagree on which types of anxiety influence body dissatisfaction and how gender (cisgender men vs. cisgender women) may impact these associations. Specifically, little is known about how generalized anxiety and social physique anxiety combine to predict body dissatisfaction in men and women. The purpose of the present study was to explore a moderated mediation model in which the relationships between generalized anxiety and body dissatisfaction (drive for thinness and drive for muscularity) were mediated by social physique anxiety and moderated by gender. Data from 423 U.S. college students (n = 259 women) were analyzed using multigroup structural equation modeling. Generalized anxiety was positively associated with social physique anxiety, and this association was significantly stronger for men than for women. Neither social physique anxiety nor generalized anxiety were associated with drive for muscularity. Social physique anxiety was positively and significantly associated with drive for thinness equally for men and women and emerged as a significant mediator. These results highlight gender differences/similarities in body image and suggest drive for thinness and social physique anxiety may have a common factor of generalized anxiety. When helping clients who suffer with body dissatisfaction, clinicians and researchers may wish to focus on generalized anxiety (and not just social physique anxiety).

Keywords: gender, college students, drive for thinness, drive for muscularity, generalized anxiety, social physique anxiety

Introduction

Research suggests that body dissatisfaction has become normative in collegiate men and women (De & Chakraborty, 2015; Hobza & Rochlen, 2009; Kelley et al., 2010; Neighbors & Sobal, 2007). As a result, investigators have increasingly focused on factors that might contribute to body dissatisfaction. Although there are many factors related to body dissatisfaction (e.g., drive for thinness and drive for muscularity) in college-age men and women (Lim & You, 2017; Murray et al., 2016), one factor that has received increased attention is anxiety (Barnes et al., 2020; Regis et al., 2018).

The present study focused on symptoms of generalized anxiety disorder (GAD) in relationship to drive for muscularity and drive for thinness, as well as possible gender (defined as cisgender men vs. cisgender women) differences in these associations. GAD is commonly viewed as the basic disorder of psychopathology (Newman et al., 2013). Specifically, GAD is considered to reflect trait anxiety (e.g., a general propensity to be fearful; Rapee, 1991). Indeed, GAD is highly predictive of other disorders later in life (Newman et al., 2013), and growing genetic research indicates the heritability of GAD (Gottschalk & Domschke, 2017). Furthermore, GAD is commonly correlated with decreased self-esteem (Eng & Heimberg, 2006; Lowe et al., 2008), suggesting it is reflective of a fundamentally negative view of self.

Although comparatively few researchers have examined GAD in relation to body image, some evidence suggests that there may be a link. For example, Chandler et al. (2009) argued that anxiety may serve as a motivational factor that influences body image. Sala and Levinson (2016) also reported that worry, a key and central component of GAD, prospectively predicted drive for thinness in collegiate women over a 6-month period. In a cross-sectional mediation

model, Brunet et al. (2010) noted a strong association between lower self-esteem, another common correlate of GAD, and greater body dissatisfaction. Thus, these initial results suggest that body dissatisfaction may stem from a general tendency for worry combined with low self-esteem, both are characteristics of individuals struggling with GAD symptomatology (Eng & Heimberg, 2006; Lowe et al., 2008; Pawijit et al., 2019).

Given that GAD revolves around a general propensity to worry and a negative view of self (American Psychiatric Association, 2013; Pawijit et al., 2019), one logical possibility is that men and women with greater generalized anxiety may be particularly likely to report more specific fears related to their body image. For example, fear of negative appearance evaluation (social appearance anxiety), which is more often labelled social physique anxiety, may represent one outcome of a generalized anxiety. Although related to (Chandler et al., 2009) and predicted by trait anxiety (Sanderson & Haase, 2007), social physique anxiety is marked by an individual's fears surrounding perceptions of negative evaluations of one's physique by others (Hart et al., 1989). Numerous studies have found a correlation between social physique anxiety and body image dissatisfaction in collegiate women (Koyuncu et al., 2010; Penkal & Kurdek, 2007) and men (Barnes et al., 2020; Chandler et al., 2009; Penkal & Kurdek, 2007).

Several researchers have also found gender differences in levels of generalized anxiety, with women often reporting significantly more anxiety symptoms than men (Mclean et al., 2011; Zalta & Chambless, 2012). By contrast, there have been mixed findings regarding gender and body dissatisfaction, with women often (but not always) reporting greater drive for thinness and men reporting greater drive for muscularity (Kelley et al., 2010; McCreary & Sasse, 2000). To date, researchers have yet to examine the relationships between generalized anxiety and body dissatisfaction in both men and women. One study examined the relationships between trait anxiety and drive for muscularity using the Drive for Muscularity Scale (McCreary & Sasse, 2000) and found no significant pathway between drive for muscularity and trait anxiety in collegiate men (Chandler et al., 2009). However, another study that used a different measure of muscularity dissatisfaction found that greater trait anxiety was associated with greater dissatisfaction with height, weight, and muscularity in collegiate men (Czeglédi et al., 2015). Thus, researchers do not have a full picture of whether the documented gender differences in generalized anxiety may translate to differences in body dissatisfaction.

Additionally, recent studies have suggested a more complicated relationship between body dissatisfaction and social physique anxiety with respect to gender. McCreary and Saucier (2009) found that relationships between body dissatisfaction and social physique anxiety may differ by gender. For example, in women, body comparison fully mediated the association between drive for muscularity and social physique anxiety. However, in men, both a direct path between drive for muscularity and social physique anxiety and an indirect path using body comparison as a mediator best explained the relationship between drive for muscularity and social physique anxiety. Brunet and colleagues (2010) also found gender differences in the relationship between body dissatisfaction and social physique anxiety. Specifically, they found that social physique anxiety explained a significant portion of the variance in both drive for thinness and drive for muscularity for both adolescent males and females. The authors also provided evidence that the latent constructs of drive for thinness and drive for muscularity were measured in a similar fashion for both men and women, suggesting that these variables share a common meaning regardless of gender. However, the path from social physique anxiety to drive for thinness differed significantly for adolescent males and females, such that the effect of social physique anxiety on drive for thinness and the variance explained in drive for thinness were much greater for females than for males.

Present Study

Previous research suggests that anxiety may play an important role in body dissatisfaction (Chandler et al., 2009), yet researchers disagree on which types of anxiety influence body dissatisfaction and have suggested that these relationships might vary by gender and type of body dissatisfaction (drive for muscularity or drive for thinness). While research suggests that generalized anxiety may predict drive for thinness in women (Sala & Levinson, 2016) and social physique anxiety may be predictive of both drive for thinness and drive for muscularity in men and women (Brunet et al., 2010; McCreary & Saucier, 2009), less is known about how generalized anxiety and social physique anxiety *combined* are associated with body dissatisfaction. It seems that more research should delve into the relationships between generalized anxiety, social physique anxiety, and body dissatisfaction. Said another way, how might an individuals' general propensity for worry and anxiety related to a variety of domains (i.e., generalized anxiety) translate into specific body dissatisfaction concerns?

The present study proposes that this relationship may be explained (i.e., mediated) by social physique anxiety. However, to our knowledge, only three studies have tapped into this possibility explicitly or implicitly. For example, Chandler et al. (2009) found a path between trait anxiety and social physique anxiety but found that only social physique anxiety directly predicted drive for muscularity. Sanderson and Haase (2007) found that trait anxiety predicted 19% of social physique anxiety variance in pregnant women but did not examine body dissatisfaction in their study. Most recently, Brunet and colleagues (2010) found evidence that the relationship between social physique anxiety and body dissatisfaction may be driven by lower global self-esteem, a construct related to (but also distinct from) generalized anxiety symptomology. Brunet and colleagues did not test whether gender moderated the indirect (i.e., mediation effects) of global self-esteem on body dissatisfaction through social physique anxiety in their study; however, they did note significant gender differences in the direct relationships between some of these variables. Given numerous inconsistent findings with respect to anxiety and gender within these associated networks (e.g., Brunet et al., 2010; Chandler et al., 2009; McCreary & Saucier, 2009; Sala & Levinson, 2016), a logical possibility is that the mediation effect of social physique anxiety may be moderated by gender. Thus, the present study proposed a moderated mediation model in which the relationships between generalized anxiety symptomology and drive for muscularity and drive for thinness would be mediated by social physique anxiety, and that this mediation effect may be conditional on gender. In other words, although we expect social physique anxiety to mediate the relationships between generalized anxiety and body dissatisfaction (drive for thinness, drive for muscularity), we wondered if this mediation effect may differ by gender. Given the lack of research addressing these specific possibilities, we did not advance any hypotheses regarding the directionality of a moderation effect of gender with respect to the relationships between generalized anxiety and other variables in the model. However, given that Brunet and colleagues (2010) found significant gender differences in the path from social physique anxiety to drive for thinness, but not social physique anxiety to drive for muscularity, we tentatively expected to find similar differences in our study.

In sum, we hypothesized that:

1) Generalized anxiety symptoms would be associated with social physique anxiety in both women (Sanderson & Haase, 2007) and men (Chandler et al., 2009).
2) Social physique anxiety would relate to drive for thinness in both women and men (Brunet et al., 2010).
3) Social physique anxiety would be associated with muscularity in both women and men (Brunet et al., 2010)
4) Relationships between generalized anxiety symptoms and drive for muscularity and drive for thinness would be mediated by social physique anxiety.

In addition, the present study explored whether this mediational association may be conditional on gender (e.g., Brunet et al., 2010). That is, we wanted to explore gender as a possible moderator of the mediation of social physique anxiety on relationships between generalized anxiety and drive for muscularity and drive for thinness.

Method

Participants

The initial sample consisted of 548 Introductory Psychology students at Boise State University. Participants eligible to participate in the survey ranged in age from 18-62 years of age (M = 20.14, SD = 4.50). Of the original sample, 89 participants were removed from analyses due to incomplete survey responses on items of interest (e.g., gender) or were not of age to be able to participate in the survey. In addition, as we wanted to focus our study on emerging adults and more traditionally aged college students, an additional 35 participants were removed from analysis due to being 26 years of age or older. Finally, one individual was removed due to being the only individual to identify as transgender when asked to identify the category that best represented their gender. The final sample for analysis totaled 423 participants (259 female, 164 male), ranging in age from 18-25 years of age (M = 19.09, SD = 1.60). The sample consisted of 84.6% White, 5.9% Hispanic/Latino/a, 4.3% Mixed Race, 2.6% Asian, 1.2% African American or Black, 0.5% Pacific Islander or Native Hawaiian, 0.2% American Indian or Alaska Native, and 0.7% Other.

Measures

Demographics. Participants were asked to self-identify their gender from the following categories: Male, Female, Transgendered. Participants were asked to self-identify their race using the following categories: White, African-American/Black, Pacific Islander or Native Hawaiian, American Indian or Alaska Native, Asian, Hispanic/Latino, Mixed Race, or Other. Finally, participants reported their age.

Generalized Anxiety Disorder – 7 (GAD-7). The GAD-7 (Spitzer et al., 2006) was used to assess respondents' perceived experiences of anxious symptoms within the last 2 weeks. The GAD-7 has been shown to be reliable and valid in college populations (Byrd-Bredbenner et al., 2021). The GAD-7 contains 7 items scored on a 4-point-Likert-type scale, with 0 = *not characteristic of me at all*, 1 = *several days*, 2 = *more than half the days*, 3 = *nearly every day*. Responses are summed to create a scale score ($\alpha = .90$ for males, $\alpha = .89$ for females in the present study). Scores on the GAD-7 range from 0 to 21, with higher scores indicating higher levels of anxiety.

Hart Social Physique Anxiety Scale (HSPAS). The HSPAS (Hart et al., 1989) measures the degree to which individuals feel anxious when they perceive others are evaluating their appearance and was designed for use in collegiate populations. The HSPAS contains 12 self-report items scored on a 5-point-Likert-type scale, with 1 = *not at all characteristic of me*, 2 = *slightly characteristic of me*, 3 = *moderately characteristic of me*, 4 = *very characteristic of me*, and 5 = *extremely characteristic of me*. Responses are totaled to produce a scale score, ranging from 12-60, with higher total scores indicating higher self-reports of social physique anxiety ($\alpha = .89$ for males, $\alpha = .89$ for females for the current study).

Drive for Muscularity Scale (DMS). The DMS assesses the degree to which individuals desire to have greater levels of muscularity (McCreary & Sasse, 2000) and has been validated for use with collegiate populations (McCreary et al., 2004). The DMS contains 15 items scored on a 6-point-Likert-type scale, ranging from 1 = *always* to 6 = *never*. The DMS has been argued to be a two-factor measure, however, McCreary et al. (2004) noted that the two-factor form of the DMS only holds for men and that comparisons between men and women should use the total score. Thus, responses were summed to create the total score, ranging from 15 to 90 ($\alpha = .91$ for men and $\alpha = .89$ for women in the present study), with a lower score indicating a greater drive for muscularity.

Drive for Thinness (DFT) Subscale. The DFT is a 7-item subscale of the Eating Disorder Inventory – 3 (Garner, 2004), which measures excessive concern with dieting and preoccupation with weight and thinness. It is a commonly used tool in collegiate populations (Harrer et al., 2020). Each item is scored using a 6-point scale, ranging from always to never. Items are then recoded to a 4-point scale (*always =3; never = 0*). Positive items are reverse scored and then all items are summed to create a scale score ($\alpha = .89$ for men, $\alpha = .90$ for women for the current study), with higher scores indicating greater drive for thinness, with scores ranging from 0 to 21.

Procedure

This study was cross-sectional in design. Once we received approval from the Institutional Review Board, students enrolled in Introduction to Psychology were given the opportunity to participate in our study for course credit. Students were allowed to choose from a variety of studies based on a researcher-provided description of each study using the Sona Systems participant recruitment platform. The description for our study indicated that the purpose of the study was to gather information from college students about their body image, feelings about themselves, and social media usage. Students who self-selected to participate in our study were then given a link to take our survey individually using an online survey format called Qualtrics. They were then asked to read through an informed consent form and click a button to give their consent to participate. Students were assured of the anonymity of their participation and were allowed to complete the survey on their own time.

Analysis Plan

To examine our hypothesized model, we used multi-group structural equation modeling (SEM) to test measurement and structural differences in the model between men and women. First, consistent with best practices in SEM (Kline, 2016), we tested a measurement model to ensure that all latent variables were sufficiently represented by their respective manifest indicators for both genders. Second, we examined a structural model to test the hypothesized direct and indirect effects. We then calculated bias-corrected bootstrapped confidence intervals (Shrout & Bolger, 2002) to determine the significance of the indirect effects (i.e., mediation) of social physique anxiety.

Additionally, since we examined a potential moderating effect of gender, we tested all models for invariance between men and women. Specifically, we tested (a) configural invariance (i.e., determination of whether the model as a whole provided an acceptable fit for each group while not imposing any cross-group equality constraints), (b) metric invariance (i.e., testing for equivalence between groups on the factor loadings from each manifest variable on its respective latent variable), and (c) direct-effects invariance (i.e., determination of equivalency between groups on the direct and indirect effects). These forms of invariance between groups are necessary for moderation in SEM (Kline, 2016). Configural invariance is a key prerequisite for examining metric invariance, which is a precondition for examining direct-effects invariance. Direct-effects invariance is the last step of moderation analysis within SEM. If significant differences in the strength of the direct or indirect effects are found, then moderation is supported (Kline, 2016). Of note, measurement and structural invariance tests provide a more rigorous approach to testing moderation compared to traditional linear regression by (a) reducing the biasing effects of measurement error, (b) ensuring that any evidence of moderation is not due to measurement bias favoring or disadvantaging one group, and (c) providing a detailed and nuanced picture of model fit.

For all models, we used the following recommended cutoffs and fit indices (Hu & Bentler, 1999; Kline, 2016) to evaluate each model: Comparative Fit Index (CFI) and the Tucker Lewis Index (TLI) (where values close to .95 are indicative of a good fit for both CFI and TLI); the Root Mean Square Error of Approximation (RMSEA) with 90% confidence intervals [CI] (where low values $\leq .06$ and high values less than .10 are indicative of a good fit), and the Standardized Root-Mean-square Residual (SRMR; where values $\leq .08$ are indicative of a good fit). We also reported the chi-square test statistic (where a non-significant value is indicative of a perfect fit to the data). However, we interpreted the chi-square test statistic with caution, due to its sensitivity to sample size (Kline, 2016).

To evaluate measurement invariance in each model, we tested a more parsimonious model (i.e., a model that imposes cross-group equality constraints) against a less parsimonious model (i.e., a model without cross-group equality constraints). This was done primarily using a scaled chi-square difference test. A significant chi-square difference did not provide support for invariance in the model (Kline, 2016). However, the chi-square difference test is extremely sensitive to sample size, where even modest changes in chi-square can be statistically significant (Kline, 2016). Therefore, to further explore and evidence for or against measurement invariance, we used two alternative approaches to inform our decisions. First, we examined the change in CFI (Cheung & Rensvold, 2002) and then we calculated the bias-corrected bootstrapped confidence intervals (CIs) of the difference between groups on the parameters of interest (Cheung & Lau, 2012). Within these approaches, a change of CFI less than or equal to .01 (Cheung & Rensvold, 2002) and a CI of the between-group difference on a particular unstandardized parameter containing zero indicates that the parameter was not significantly different between groups (i.e., invariance is supported; Cheung & Lau, 2012).

To evaluate the invariance of the direct and indirect effects, we used the Wald test of parameter constraints. Specifically, a nested model was created in which the effects of interest (e.g., social physique anxiety regressed on generalized anxiety) were constrained to be equal and tested against a freely constrained model. If the chi-square difference was non-significant, then the direct effect was statistically equivalent across groups.

Results

Preliminary Analyses

Before conducting our primary analyses, we screened our data for missing values, univariate outliers, and assumptions of normality. Missing values and univariate outliers were minimal (less than 1.5% of participants by scale and gender). When missing values are less than 2%, there may not be enough power to evaluate the pattern of missingness and values missing less than 2% are considered to meet the assumptions of at least missing at random (Meyers et al., 2017). However, scores on the GAD-7 were moderately and positively skewed for both men and women (skew approaching but not exceeding an absolute value of one). For men only, drive for thinness scores were strongly positively skewed (Skew = 1.62) and scores on the drive for muscularity evidenced small to moderate negative skew for men and women, respectively. Due to these departures from normality and to further address our missing values, we used a full information maximum likelihood estimator with robust standard errors for model fit. Table 1 displays the bivariate correlations, means, and standard deviations. Women's scores on generalized anxiety, social physique anxiety, and drive for thinness were significantly higher than those of men, whereas men had significantly higher scores on drive for muscularity than women (lower means = higher drive for muscularity).

Primary Analyses

Measurement Model. We formed a measurement model using three parcels from each of the instruments used to create latent variables of the constructs the instruments were designed to assess (i.e., generalized anxiety, social physique anxiety, drive for muscularity, and drive for thinness). Specifically, we used a factorial parceling procedure (Little et al., 2002; for a review see Matsunaga, 2008). This was done by conducting exploratory factor analyses of each instrument. We then iteratively assigned high and low items to one of the three parcels to form the perceived latent variables.

The measurement model provided acceptable global fit for men (n = 164) $\chi^2(48) = 72.13$, $p = .006$ (CFI = .98, TLI = .97, RMSEA = .060 [90% CI = .032, .084], SRMR = .045) and for women (n = 259) $\chi^2(48) = 123.03$, $p < .001$ (CFI = .96, TLI = .95, RMSEA = .078 [90% CI = .061, .095], SRMR = .045). Moreover, a configural pooled CFA, where all paths were freely estimated between men and women, also provided an acceptable fit $\chi^2(96) = 197.88$, $p < .001$ (CFI = .97, TLI = .96, RMSEA = .071 [90% CI = .057, .071], SRMR = .045). Thus, the latent factors did an adequate job of representing the variation of their respective items across men and women. See Table 2 and 3 for the factor loadings and correlations of the measurement model. Generalized anxiety symptomology was significantly and positively associated with social physique anxiety and drive for thinness among both men and women. Social physique anxiety was also significantly and positively related to drive for thinness among men and women. However, drive for muscularity was unrelated to generalized anxiety symptomology for both men and women and was significantly and negatively associated with social physique anxiety and drive for thinness for men only.

Measurement Invariance. Having met the conditions of configural invariance, we tested a metric invariance model by constraining the factor loadings to be equal across genders. The constrained model provided acceptable fit, $\chi^2(104) = 218.63$, $p < .001$ (CFI = .96, TLI = .95, RMSEA = .072 [90% CI = .059, .086], SRMR = .063). The scaled chi-square difference test indicated that the metric invariance model was significantly worse than the configural invariance model, $\chi^2(8) = 20.36$, $p = .009$. However, the change in CFI (Cheung & Rensvold, 2002) was acceptable (ΔCFI = .004). Also, we ran bias-corrected bootstrap confidence intervals of the differences between factor loadings between men and women (Cheung & Lau, 2012), and these were not significant (i.e., zero was present within each CI). Together, these results provided evidence of metric invariance.

Structural Model Direct Effects. Figure 1 displays the standardized regression coefficients for the direct effects in the model for men and women. Generalized anxiety symptomology was positively associated with social physique anxiety but was generally unrelated to drive for muscularity among men and women when controlling for social physique anxiety. However, generalized anxiety symptomology was positively associated with drive for thinness among men (but not women) after controlling for social physique anxiety. Social physique anxiety approached significance for a negative association with drive for muscularity among men only after controlling for generalized anxiety symptomology. By contrast, social physique anxiety was strongly associated with drive for thinness for both men and women.

Structural Model Indirect Effects. Bias corrected bootstrapped CIs revealed some significant indirect effects. Specifically, social physique anxiety emerged as a significant mediator of the association between generalized anxiety symptomology and drive for thinness for men, B = .27, 99% CI = [.101, .500] and for women, B = .18, 99% CI = [.044, .363]. With respect to drive for muscularity, social physique anxiety emerged as a significant mediator for men, B = -.13, 99% CI = [-.340, -.003] but not for women, B = .00, 99% CI = [-.062, .070].

Direct and Indirect Effects Invariance. Tests of gender as a moderator using direct effects invariance via the Wald test of equality constraints revealed one significant moderation effect. The positive association between generalized anxiety and social physique anxiety was significantly stronger for men than for women. However, gender did not moderate any other direct effects in the model. With respect to the indirect (i.e., mediation) effects, gender was not a significant moderator for either drive for muscularity or drive for thinness, despite the fact that men's (but not women's) indirect effects of generalized anxiety on drive for muscularity were statistically significant.

Discussion

Given the prevalence of body dissatisfaction in collegiate populations (e.g., Neighbors & Sobal, 2007) and its potential harmful negative outcomes (Eik et al., 2018; Paxton et al., 2006), it is important to understand associated risk factors for body dissatisfaction. Numerous studies have found relationships between social physique anxiety and body image

dissatisfaction in collegiate women and men (e.g., Penkal & Kurdek, 2007). However, some researchers have suggested that body dissatisfaction may stem from a general tendency for worry combined with low self-esteem, more commonly found in individuals struggling with generalized anxiety symptomatology (Eng & Heimberg, 2006; Lowe et al., 2008; Pawijit et al., 2019; Sala & Levinson, 2016). Thus, the purpose of the present study was to explore whether associations between a broader form of anxiety (i.e., generalized anxiety) and body dissatisfaction (as measured by drive for muscularity and drive for thinness) is explained by a more specific type of anxiety. In addition, we wondered whether these relationships may be different for men and women. To explore these possibilities, four hypotheses were advanced.

We first hypothesized that generalized anxiety symptomology would be positively associated with social physique anxiety in both men (Chandler et al., 2009) and women (Sanderson & Haase, 2007). Our results fully supported this hypothesis. Additionally, direct effects invariance moderation analyses revealed that this relationship was significantly stronger for men than women. That is, within our sample, the *relationship* between anxiety symptomology and body dissatisfaction appears to be more impactful for men than women. This may be reflective of a ceiling effect, where women are already scoring higher on these measures than men (Brown et al., 2020; Portman et al., 2018; Wenjuan et al., 2020) and thus there is little room left to influence the relationships in a positive direction. We also offer two alternative possibilities for this gender effect.

First, a rich body of literature has shown that men and women are socialized differently due to being raised in a society that values hegemonic masculinity (i.e., White, Western, cisgender, and heterosexual masculinity; Connell & Messerschmidt, 2005). Men have traditionally performed hegemonic masculinity via gender role stereotypes portraying power and dominance (Levant & Richmond, 2016). However, these roles are changing, and some researchers have noted that young men's more traditional roles as the "breadwinner" are becoming less relevant (Hakim, 2018). Increasing numbers of men are trying to prove their worth in other ways and may turn to 'improving' their bodies (muscular with low body fat) as a way of feeling valuable (Hakim, 2018). For men with a general tendency for anxiety, these pressures may be especially salient, considering numerous studies suggesting that internalized pressures to be masculine are positively associated with greater anxiety and stress (O'Neil, 2015). In other words, highly anxious men may be especially worried about their physical appearance, in part, because of the potential link between physical appearance and performative masculinity.

Alternatively, but also potentially due to hegemonic masculinity socialization, many men are taught to downplay or deny mental and physical vulnerabilities (Addis & Hoffman, 2017; McDermott et al., 2016). It may be that for men who are willing to admit they are worried, higher generalized anxiety symptomology may signal more willingness to admit to *also* suffering with social physique anxiety. Thus, men with higher levels of generalized anxiety symptomatology may also struggle with overall negative views of self that may create further vulnerability for externalized, contingent self-esteem based on appearance (van Tuijl et al., 2020). Indeed, Brunet et al. (2010), reported a negative association between self-esteem and social physique anxiety for both men and women; however, they did not detect any moderation effects by gender in their analysis. Our findings, therefore, may support the idea that generalized anxiety, which is closely associated with self-esteem (van Tuijl et al., 2020), is a separate construct from social physique anxiety.

Regardless of the reasons, the present results suggest that as generalized anxiety increases, there is a stronger likelihood that social physique anxiety will increase for men than for women. Future research should continue to examine relationships between generalized anxiety and social physique anxiety and explore how and why gender and gender role socialization differences might play a role in the strength of this relationship.

Similar to Brunet et al.'s (2010) study of adolescents, our second hypothesis was that social physique anxiety would be associated with drive for thinness in both collegiate women and men. Consistent with Brunet et al., this hypothesis was fully supported. In addition, no gender differences emerged, even when controlling for generalized anxiety symptomology, suggesting, once again, that generalized anxiety and social physique anxiety are related but distinct constructs, regardless of gender. Specifically, Brunet and colleagues (2010) had suggested that self-esteem related to social physique anxiety, which in turn was associated with drive for thinness in both male and female adolescents. Our results followed a similar pattern, only replacing self-esteem with generalized anxiety symptomology as the predictor variable. Adding to this, recent research suggests that adolescents (Ahulu et al., 2020) and college students (Musumari et al., 2018) who report lower levels of self-esteem are more likely to report higher levels of generalized anxiety. Thus, future researchers will need to further untangle the relationships between global self-esteem and

generalized anxiety symptomology in relation to social physique anxiety and body dissatisfaction. Specifically, investigators may wish to assess dispositions toward anxiety to ascertain if increasing self-esteem and/or reducing generalized anxiety could then alleviate drive for thinness or drive for muscularity.

It is also interesting to note that while men have a stronger relationship between generalized anxiety and social physique anxiety, men and women appear to be equally likely to have an association between social physique anxiety and drive for thinness. One possibility for this null moderation effect is that, once levels of generalized anxiety are held constant, men and women may share a common vulnerability for drive for thinness desires stemming from the universal, human experience of body dissatisfaction. Supporting this assertion, researchers have noted similar rates of body dissatisfaction and disordered eating in collegiate men and women (De & Chakraborty, 2015; Lavender et al., 2010; Luce et al., 2008).

Similar to our second hypothesis, as well as Brunet et al.'s (2010) findings, we expected that social physique anxiety would be positively associated with drive for muscularity in both women and men. This hypothesis was partially supported. At the bivariate level, there was an association between drive for muscularity and social physique anxiety in men, but not in women. However, this relationship dropped to non-significance in the model. However, both associations were small in magnitude, and the significant correlation for men evidenced a *p*-value barely below the .05 cut off, and thus it may have been due to multiple comparisons. Moreover, these effects were not conditional on gender, suggesting that neither men nor women exhibited an association with greater levels of drive for muscularity. Future research is needed to probe these null results, considering that Brunet et al. (2010) found significant associations between these constructs. Some potential explanations for the differences in these associations between the present study and Brunet et al.'s findings may revolve around participants' demographics. Specifically, Brunet et al.'s sample consisted of high school students and was published a decade prior to the present study. Cohort differences, such as an increase in self-focus (Twenge, 2013) through social media usage (Veldhuis et al., 2020) that may not have been as prevalent when Brunet et al. (2010) collected their data, may also explain these apparent differences. While this study did not focus on the role of social media, future researchers should replicate the current model including social media usage.

Our final hypothesis was that relationships between generalized anxiety and body dissatisfaction (drive for muscularity and drive for thinness) would be mediated by social physique anxiety. Results partially supported this hypothesis. The association between generalized anxiety and drive for thinness (but not drive for muscularity) was explained, in part, by variation in social physique anxiety. Said another way, men and women with higher generalized anxiety symptomology were likely to also worry about their physical appearance; however, these worries translated into a greater desire to appear thin rather than a desire to appear muscular.

Taken together, our results suggest that men and women may share a common vulnerability for drive for thinness. For example, some researchers have suggested this may actually constitute a drive for 'leanness' (Smolak & Murnen, 2008). In fact, Edman et al. (2005) found similar predictors of drive for thinness in male and female college students, most notably general body dissatisfaction and general self-dissatisfaction. Similarly, Fernandez and Pritchard (2012) found both media influence and internalization as well as low self-esteem related to drive for thinness in both male and female college students. Taken together, the present results, as well as prior research findings (e.g., Edman et al., 2005; Fernandez & Pritchard, 2012) are consistent with Brunet and colleagues' original mediation model. However, Brunet and colleagues' noted that the relationship between social physique anxiety and drive for thinness was significantly stronger for women than for men.

That being said, we did find some gender differences in this hypothesis, as well as differences in types of body dissatisfaction (drive for thinness v. drive for muscularity). Specifically, there was a mediation effect for drive for thinness for both men and women, and this was not moderated by gender. By contrast, tests of indirect effects revealed that, for men only, social physique anxiety mediated the association between generalized anxiety and drive for muscularity. Interestingly, this indirect effect was not moderated by gender, despite the fact that men exhibited the only statistically significant mediation pathway for drive for muscularity. This means that the magnitude of the indirect effects were statistically similar for men and women, but yet men in the sample may have had different characteristics than women which contributed to their indirect effects being less likely to be due to chance. Indeed, effects can be significant in one population and non-significant in another due to the characteristics of each population, despite being of similar magnitude (Skelly, 2011). Given that we employed a measurement invariance analysis to determine if any of the constructs in our model evidenced different meanings between men and women, our results suggest that factors external to the study and the measures may warrant closer attention (Kline, 2016). For example, men struggling with

generalized anxiety and subsequent social physique anxiety may be particularly at risk for drive for muscularity due to cultural pressures that proscribe concerns about body image (e.g., Parent et al., 2016; Seekis et al., 2021). However, women may not have the same socialized experiences (e.g., Gokee-LaRose et al., 2004).

Limitations and Future Directions

Several limitations should be noted. Most importantly, our study was cross-sectional. Thus, we are unable to comment with confidence on the causal nature of the model or the temporal order of variables. Future researchers need to follow individuals longitudinally throughout adolescence and young adulthood to better understand whether the relationships explored in the model are truly causal in nature. Additionally, our study focused on the broad construct of generalized anxiety. Given the social and evaluative nature of social physique anxiety, future researchers should consider other forms of anxiety. For example, social physique anxiety could be conceptualized as a subtype of social anxiety (Ostrovsky et al., 2013). Our survey also did not contain any validity/attention check questions. Thus, it is difficult to know whether participants were paying attention while taking the survey, which may have impacted our results.

In addition, our data was limited to a convenience sample of self-reported data from predominantly White participants enrolled in a psychology course at one university in the Rocky Mountain region of the United States. Therefore, it is possible that our findings may not fully represent collegiate women and men across the United States or students enrolled within different college courses and majors; a more diverse sample (age, race, ethnicity, gender identity) would help address this limitation. We also did not ask participants' sexual orientation, and we excluded individuals who identified as transgender. As previous research has suggested that gay men are more likely to exhibit body image concerns than are heterosexual men (Strübel & Petrie, 2019), future studies should explore whether these differences in body image relate to anxiety (generalized and social physique anxiety) in the same way in heteorosexual v. non-heterosexual samples. Likewise, additional research will be needed to examine potential differences between cisgender and transgender identities and should use more specific gender identity categories than those employed in the present study. Additionally, although many of our findings replicated Brunet et al.'s (2010) study of male and female adolescents, future research may also wish to ascertain whether age is a contributing factor to the relationships between anxiety and body image by exploring the model across different age groups. Our focus was on college students who predominantly did not meet clinical cut-off scores for an anxiety disorder and it will be important for future researchers to examine our model within clinical samples. Finally, the present study relied entirely on quantitative methods. Given the complexity of the relationships identified, additional investigations using mixed method or qualitative approaches will be invaluable, in particular with those suffering from anxiety-related symptomatology (Mason et al., 2019).

Practical Implications

Despite some limitations, the present findings may help inform approaches to treating body dissatisfaction, particularly men's and women's drive for thinness. Indeed, our results suggest that individuals who struggle with generalized anxiety symptomology (e.g., excessive worry) may be more likely to endorse *specific* worries or fears about how they appear in public (i.e., social physique anxiety) that is positively associated with body dissatisfaction. Therefore, interventions that target social physique anxiety could possibly disrupt the negative body dissatisfaction correlates of generalized anxiety symptomology. Although there are no (to the best of our knowledge) evidenced-based (EB) or empirically supported (ES) treatments for social physique anxiety, clinicians may find value in using one of many different validated treatments for generalized anxiety to address body image concerns and associated anxiety symptomatology. For example, cognitive-behavioral therapy (CBT) is a long established EB and ES treatment for anxiety symptoms (Springer et al., 2018) and eating disorders (Linardon, 2018). Specifically, CBT could be used to address maladaptive thoughts and beliefs that others are continually judging the individual based upon their physique (Beck, 2011). Additionally, the self-critical thoughts could be challenged and reframed to develop healthier and more adaptive beliefs about the self (Beck, 2011). Also, practitioners could incorporate mindfulness with CBT (Garay et al., 2015) as mindfulness is also an ES for anxiety symptoms (Khoury et al., 2013) and disordered eating (Sala et al., 2020). Incorporating mindfulness could increase being present and aware, along with self-compassion interventions that could help individuals begin to manage their excessive worries and ground themselves in social situations where their appearance based concerns may be triggered (Stallman et al., 2018).

Additionally, body dissatisfaction is predictive of more severe eating pathology, such as anorexia nervosa (Rosewall et al., 2020), and anxiety disorders are also risk factors for severe eating pathology (Schaumberg et al., 2019). Indeed, anorexia nervosa is highly comorbid with generalized anxiety (Thornton et al., 2011) and some have argued that

anxiety is a central trait of individuals suffering from anorexia nervosa (Hower et al., 2021). Given our findings regarding the relationships between generalized anxiety symptomology, social physique anxiety, and body dissatisfaction, early identification and intervention of anxieties and body dissatisfaction may prevent the development of more severe eating pathology.

Our findings may also suggest implications for general practices and procedures within college and university counseling centers. Anxiety related issues are a common reason that students seek out mental health services (Ramón-Arbués et al., 2020). Given our findings, they may indicate that when a student is identified as suffering from anxiety related issues, follow-up and further screening may be appropriate to also identify body dissatisfaction related issues. Indeed, body dissatisfaction issues are highly prevalent within college and university populations (De & Chakraborty, 2015; Hobza & Rochlen, 2009; Kelley et al., 2010; Neighbors & Sobal, 2007) and tend to be underreported when students seek services (Center for Collegiate Mental Health, 2020). College and university counseling centers, therefore, can identify potential warning or comorbid signs (i.e., anxiety symptomology) of body dissatisfaction to assess further for body dissatisfaction and incorporate body dissatisfaction issues within treatment or refer to other providers as is appropriate. This may prevent the development of more severe eating pathology.

Conclusion

This study helps contribute to our understanding of the relationships between generalized anxiety, social physique anxiety, and body image dissatisfaction (drive for thinness and drive for muscularity) in a sample of male and female college students. Our findings suggest that there are many similarities among women and men, but also some key differences in the relationships among these variables. While social physique anxiety clearly mediated the association between generalized anxiety and drive for thinness in both men and women, results for drive for muscularity seemed to vary by gender. Our results seem to suggest that men who are anxious and worried about appearance are likely to exhibit drive for thinness and possibly drive for muscularity, whereas women who are anxious and worried about their appearance seem to exhibit drive for thinness rather than drive for muscularity. This is consistent with media portrayals of the ideal male body, which tends to be lean and muscularly toned (Franko et al., 2015), as well as women's bodies being emphasized for thinness (Swami et al., 2015).

Given the prevalence of body dissatisfaction (e.g., Kelley et al., 2010; Neighbors & Sobal, 2007) and the fact it is underreported (Center for Collegiate Mental Health, 2020), it is imperative to understand risk factors and the social and cultural milieus that increase risk for these populations. Furthermore, by understanding early risk factors, clinicians and campus communities can develop programs and interventions to screen and address these issues before they become a more significant issue (i.e., eating disorders). Our study helps to clarify the relationships of these variables. Additionally, our study incorporates psychological vulnerabilities that may increase risk for some college students, building upon and adding nuance to an emerging area of research (Brunet et al., 2010) that suggest that drive for thinness may come from an unhealthy view of self. Therefore, the present findings highlight the importance of addressing generalized anxiety symptomology in future research and practice.

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Table 1

Bivariate Correlations, Means, and Standard Deviations

Variable	1	2	3	4	Mean	*SD*
1. GAD-7	---	.48**	-.10	.48**	8.02 (5.94)	5.27 (4.94)
2. HSPA	.27**	---	-.22**	.60**	40.24 (32.61)	12.79 (9.84)
3. DMS	-.08	-.12	---	-.22**	71.91 (56.18)	6.31 (15.95)
4. DFT	.28**	.58**	-.21**	---	7.22 (3.82)	6.31 (5.30)

Note. N = 423 (259 females, 164 males). HSPA = Hart Social Physique Anxiety scale (scores range from 12-60, with higher total scores indicating higher self-reports of social physique anxiety), DMS = Drive for Muscularity scale (scores range from 15 to 90, with a lower score indicating a greater drive for muscularity), and DFT = Drive for Thinness subscale of the Eating Disorder Inventory (scores range from 0 to 21, with higher scores indicating greater drive for thinness). Males' correlations are above the line, males' means and standard deviations are in parentheses, and ** are significant at $p < .01$.

Table 2

Correlations in the measurement model

Variable	1	2	3	4
1. genanx	---	.29**(.53***)	-07 (-.09)	.30*** (.53***)
2. hspa		---	-.10 (-.20*)	.63*** (.66***)
3. drmusc			---	-.15 (-.22*)
4. drthin				---

Note. Men's values are in parentheses. genanx = Generalized Anxiety symptomology, hspa = Hart Social Physique Anxiety, drmusc = Drive for Muscularity, and drthin = Drive for thinness.

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

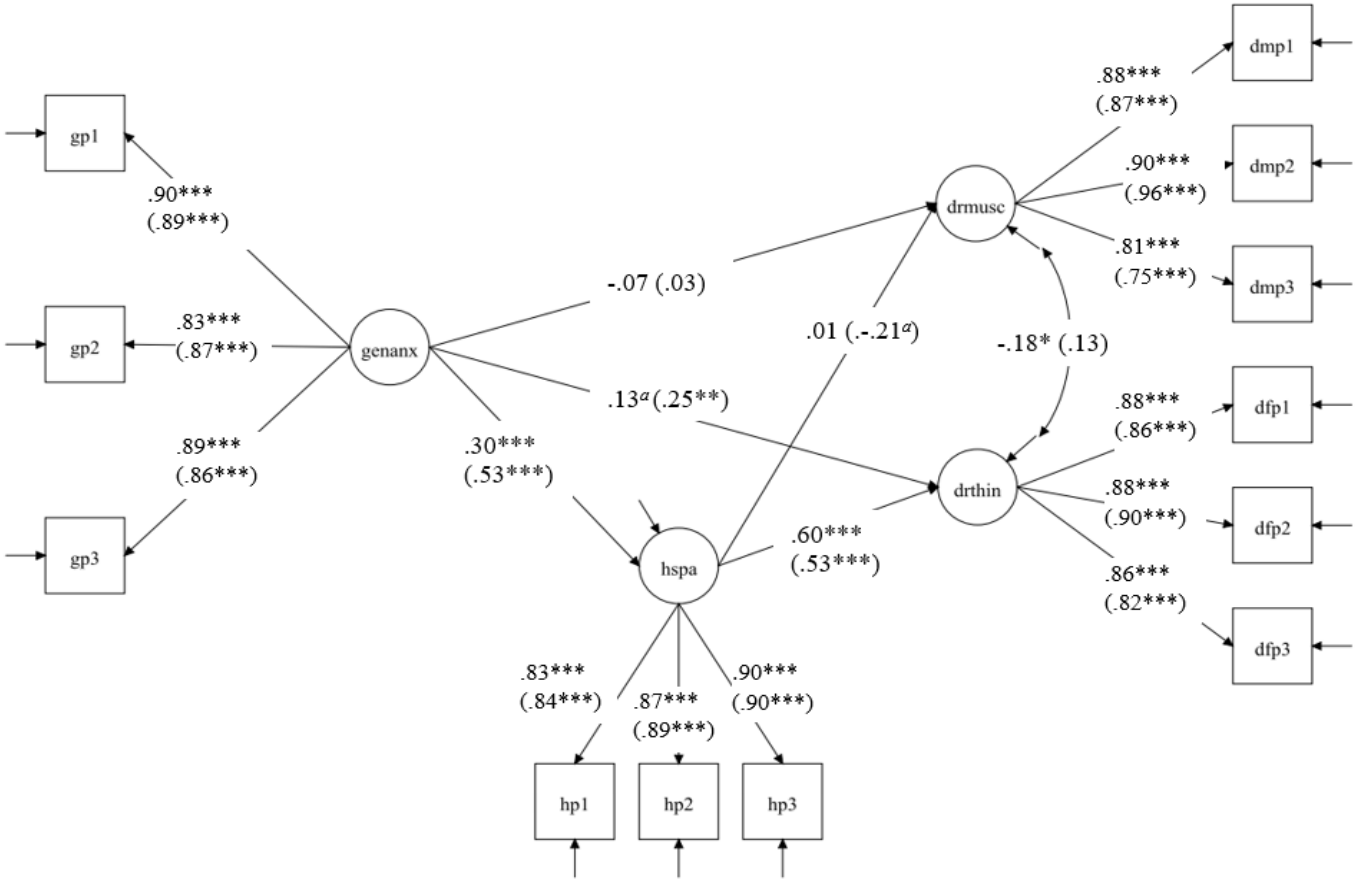

Figure 1

Standardized regression coefficients among latent variables in the structural model, as well standardized factor loading coefficients from latent variables to each manifest item parcel constituting the measurement model. genanx = Generalized Anxiety symptomology, hspa = Hart Social Physique Anxiety, drmusc = Drive for Muscularity, and drthin = Drive for thinness. Men's values are in parentheses. [a] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.