

Masculine gender role mediates sex and mindfulness skills in predicting student athletes' sport-related anxiety and dispositional flow

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Abstract

Background and Study Aim Reduced sport-related anxiety, increased dispositional flow, and greater use of mindfulness skills appear to be essential psychological components for success in student athletes. Decades of sport psychology research have identified gender differences in psychological characteristics associated with sport performance in athletes, with little attention paid to the socialized contributions of sex. The aim of this study was to determine whether gender role better explains the relationships between sex and psychological sport outcomes.

Material and Methods The current study examined Division III student athletes (N = 100; 60% female; 46% White/European American). They ranged in age from 18 years to 23 years (M = 19.4, SD = 1.17, range = 18.0 - 23.0), with 1 to 6 years of experience in collegiate athletics (M = 2.45, SD = 1.44, range = 1-6). Participants completed self-report measures of gender role, mindfulness, sport-related anxiety, and dispositional flow.

Results While female athletes reported greater sport-related anxiety and less dispositional flow than male athletes, masculine gender role mediated the relationship between sex and sport-related anxiety, and sex and dispositional flow. Further, masculine gender role mediated the relationships between two mindfulness skills (acting with awareness and acceptance without judgment), and sport-related anxiety and dispositional flow. Feminine gender role did not serve a mediating function between variables.

Conclusions These findings suggest that socialization of sex, rather than sex assigned at birth, better explains gender differences reported in the literature. Future research needs to include measures of both sex and gender role to adequately examine gender differences.

Keywords: student athletes, mindfulness, gender role, sex, sport-related anxiety, flow

Introduction

Sex refers to “biological sex assignment or sex assigned at birth” [1]. Gender refers to the “attitudes, feelings, and behaviors that a given culture associates with a person’s biological sex” [1]. Gender roles are defined as “shared expectations that apply to individuals on the basis of their socially identified sex” [2]. Historically, it was assumed that sex and gender differences were synonymous and large; however, when effect sizes are examined, psychological characteristics such as communication, self-esteem, and cognitive abilities (i.e., math) show little to no differences between men and women, while physical characteristics such as motor performance (i.e., throwing velocity and distance) and physical aggression show moderate to large differences [3]. Though sex is assigned at birth and often considered binary or categorical, gender and gender role are socializations of sex that operate more so on a continuum. Since many researchers do not differentiate between biological

and socialized differences, the terms sex and gender have often been used interchangeably when most participants were likely referring to sex assigned at birth, and gender role was not assessed.

When examining sport performance in collegiate athletes, reduced sport-related anxiety and increased flow appear to be essential psychological components for success [4, 5]. Sport-related anxiety is defined as the intensity of cognitive and somatic anxiety symptoms that are appraised to be either positively or negatively related to performance [6]. Sport-related anxiety involves cognitive (i.e., worry) and somatic (i.e., body tension) symptoms that may impair or improve student athletes' sport performance [6, 7]. Flow is defined as a state of consciousness involving total immersion in an activity, intense concentration on the here-and-now, the ability to use specific skills in a challenging situation, and positive affect [8, 9]. While some exceptions exist, most studies find that female athletes report greater sport-related anxiety than male athletes [10, 11], and male athletes report greater dispositional flow than female athletes [12, 13].

Mindfulness skills have been largely studied as a mechanism to achieve greater performance in sport [14]. Mindfulness skills have been specifically linked to decreased sport-related anxiety [15, 16], and increased flow in athletes [17, 18]. Mindfulness is defined as “intentionally bringing one’s attention to the internal and external experiences occurring in the present moment” [19]. Mindfulness involves skills such as observing, describing, acting with awareness, and accepting without judgment [20]. Many researchers have examined sex differences in mindfulness skills with mixed results. Cathcart et al. [21] found that male athletes reported greater scores on the subscale ‘nonjudge,’ but there were no sex differences in overall mindfulness skills. Amemiya and Sakairi [22] found that female athletes reported lower dispositional mindfulness than male athletes, while Bulğay et al. [23] reported that female athletes reported higher use of mindfulness skills. In a national U.S. survey of adults, men were more likely to report mindfulness meditation (31.5%) than women (20.6%) [24]. Recent research demonstrates that mindfulness training can initiate self-reinforcing cycles of positive affect and cognition, supporting emotional resilience and psychological well-being [25].

Though several studies have found sex differences in student athletes’ experiences of sport-related anxiety [10], mindfulness skills [22], and flow [12], it is rare for authors to include sex and gender role within the same study. Given that most sex differences in psychological studies have small effect sizes [3], it is expected that previous differences found are more likely due to the socialization of sex (i.e., gender role) than biological sex. The following hypotheses were generated:

(1) It is hypothesized that sex (independent variable) will significantly differentiate sport-related anxiety and flow (dependent variables), such that female athletes will report greater sport-related anxiety than male athletes, and male athletes will report greater flow experiences than female athletes; however, it is expected that gender role (mediator) will mediate the relationship between sex and performance outcomes (sport-related anxiety and dispositional flow).

(2) It is hypothesized that mindfulness skills (independent variables) will be associated with sport-related anxiety and dispositional flow (dependent variables), such that greater mindfulness skills will be associated with less sport-related anxiety and greater flow; however, it is expected that gender role (mediator) will mediate the relationships between mindfulness skills and sport-related anxiety and flow.

The purpose of the present study is to assess student athletes’ sex and gender role in relation to mindfulness skills and experiences of sport-related anxiety and dispositional flow.

Materials and Methods

Participants

A total of 100 student athletes from NCAA Division III sports teams volunteered to participate in a research study titled, ‘Exploring Student Athletes’ Performance’ (Table 1). They ranged in age from 18 years to 23 years ($M = 19.4$, $SD = 1.17$, range = 18.0 - 23.0), with 1 to 6 years of experience in collegiate athletics ($M = 2.45$, $SD = 1.44$, range = 1–6).

Table 1. Sample Characteristics of the Division III Student Athletes

Characteristic	Frequency, %
Sex	
Female	60
Male	40
Race/Ethnicity	
Hispanic or Latino(a)	26
White or European American	46
Asian or Asian American	5
Black or African American	5
Mixed	14
Other	4
Sport Type	
Softball	18
Tennis	9
Volleyball	8
Football	34
Women’s Soccer	9
Cross Country	10
Other	2
More than 1 Sport	10
Level of Education	
Freshman	29
Sophomore	35
Junior	21
Senior	15
Years in Sport	
1 year	31
2 years	28
3 years	23
4 years	8
5 years	3
Other	7

Research Design

After receiving IRB approval, the researcher contacted the Director of Athletics to receive permission to contact the athletic coaches and

student athletes. Following permission, the researcher contacted the athletic coaches from the fall, winter, and spring individual and team sports to offer information about the study. Student athletes were given the opportunity to participate in a research study titled, 'Exploring Student Athletes' Performance'. Eligibility included (1) enrollment as a full-time student in undergraduate courses; (2) enrollment in an individual or team sport; and (3) being 18–24 years of age. Participation in the study was voluntary via open invitation. Student athletes received an informed consent and were asked to complete self-report surveys, which took approximately 15 minutes to complete. Following completion of the surveys, participants were given a debriefing form that included contact information for the University of La Verne Counseling and Psychological Services and additional resources about mindfulness.

Measures

Demographic Questionnaire. The demographic questionnaire was used to assess ethnicity, age, sex, level of education, sport type, years of experience in collegiate athletics, and regular playing position.

Personal Attributes Questionnaire (PAQ). The PAQ [26] is a 24-item self-report measure that determines gender role. The participants were asked to respond to eight items designed to assess the masculine gender role and eight items designed to assess the feminine gender role. The masculine gender role scale consists of response options such as, "never cries" or "indifferent to others' approval". The feminine gender role scale consists of response options such as, "very emotional" and "able to devote self completely to others". The participants used a 5-point scale to rate each item.

Kentucky Inventory of Mindfulness Skills (KIMS). The KIMS [20] is a 39-item multidimensional assessment that measures four essential mindfulness skills. The first skill is observing and is defined as "noticing or attending to internal and external stimuli, such as sounds, sensations, and smells." The second skill is describing and involves briefly labeling or noting observed phenomena by applying words or complete sentences. The third skill is acting with awareness, which emphasizes fully engaging in a current activity by focusing on one component of the activity. The fourth skill is accepting without judgment and consists of being in the present moment and nonjudgmental about the experience. The participants are asked to use a 5-point Likert scale (ranging from 1 = never or very rarely true to 5 = almost always or always true) to rate each item on the four subscales.

Sport Anxiety Scale 2 (SAS-2). The SAS-2 [6] is comprised of 15 items to measure anxiety in sport environments. The measure was developed to examine individual differences in cognitive and

somatic trait anxiety in children and adult athletes. The overall measure assesses somatic anxiety, worry, and concentration disruption using items such as: "My body feels tense," "I worry that I will play badly," and "It is hard to concentrate on the game." The participants rate each item on a four-point Likert scale ranging from "1 = not at all" to "4 = very much".

Dispositional Flow Scale 2 (DFS-2). The DFS-2 [8] is a 36-item questionnaire that assesses the frequency of flow experiences during physical activity. The participants were asked to recall a specific activity and rate their experiences across nine flow dimensions (challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on the task at hand, sense of control, transformation of time, and autotelic experience). These were used to calculate a global score. The participants used a 5-point Likert scale ranging from "1 = never" to "5 = always" to rate each item.

Statistical Analysis

All of the data were de-identified and followed the IRB protocol to ensure confidentiality. Descriptive statistics identified the percentages, means, standard deviations, and ranges of the sample and key variables. Independent samples t-tests were used to examine group differences by sex. Correlations were used to examine relationships among continuous variables. To test gender role as a mediator, the PROCESS macro was used in SPSS [27, 28]. Utilizing a p-value of .05 to determine significance and a power of 0.80, a sample size between 64–85 was needed to detect a medium effect size [29].

Results

Preliminary Findings

Data were screened for missing values, extreme outliers, skewness, kurtosis, normality violations, multicollinearity, and for errors. All of the participants completed surveys that examined sex, gender role, mindfulness skills, and sport-related anxiety, while only 98 participants filled out the survey to assess flow experiences. The skewness and kurtosis values fell within the acceptable range of ± 1 . Scatterplots conducted on each continuous variable showed that variables were normally distributed. Assumptions for linearity, independence, multicollinearity, and homoscedasticity for regression were met. Levene's test for equality of variances was satisfied for all continuous variables analyzed via independent samples t-test. Means, standard deviations, ranges, and independent samples t-tests are presented in Table 2 for the total sample and by sex. All continuous variables were inspected by Pearson correlation to determine appropriateness for analysis (Table 3).

Hypothesis Testing

Mediation Analyses to Determine Whether Gender Role Mediates Sex and Sport-Related Anxiety

Table 2. Means, standard deviations, ranges and independent samples t-scores for continuous variables

Continuous Variables	Total			Males		Females		t	d ^t
	Mean	SD	Range	Mean	SD	Mean	SD		
Performance Outcomes									
Sport-Related Anxiety	1.90	0.56	1.00-3.53	1.77	0.58	1.99	0.53	-2.00*	-0.41
Dispositional Flow	4.00	0.50	2.93-5.00	4.17	0.48	3.88	0.49	2.90*	0.60
Gender Role									
Masculine Gender Role	3.90	0.44	2.63-5.00	4.02	0.45	3.81	0.42	2.37*	0.48
Feminine Gender Role	3.86	0.50	2.25-5.00	3.75	0.44	3.94	0.53	-1.82	-0.37
Mindfulness Skills									
Acting With Awareness	3.01	0.55	1.60-4.30	3.03	0.56	3.00	0.55	0.25	0.05
Observe	3.24	0.61	1.83-4.83	3.13	0.64	3.32	0.58	-1.56	-0.32
Acceptance Without Judgment	3.21	0.67	1.00-4.56	3.23	0.67	3.20	0.68	0.24	0.05
Describe	3.39	0.70	2.13-5.00	3.42	0.70	3.38	0.71	0.30	0.06

Note. * $p < .05$; ** $p < .001$; ^tCohen's d.

Table 3. Pearson r correlations among continuous variables

Variable	1	2	3	4	5	6	7
1. Sport-Related Anxiety	-						
2. Dispositional Flow	-0.47** (0.22)	-					
3. Masculine Gender Role	-0.49** (0.24)	0.53** (0.28)	-				
4. Feminine Gender Role	-0.05 (0.00)	-0.08 (0.01)	0.01 (0.00)	-			
5. Acting with Awareness	-0.24* (0.06)	0.25* (0.06)	0.32* (0.10)	0.24* (0.06)	-		
6. Observe	0.00 (0.00)	0.03 (0.00)	0.11 (0.01)	0.36** (0.13)	0.19 (0.04)	-	
7. Acceptance without Judgment	-0.28* (0.08)	0.26* (0.07)	0.26* (0.07)	-0.06 (0.00)	0.31* (0.10)	-0.14 (0.02)	-
8. Describe	-0.15 (0.02)	0.12 (0.01)	0.34** (0.12)	0.15 (0.02)	0.27* (0.07)	0.29* (0.08)	0.10 (0.01)

Note. * $p < .05$; ** $p < .01$; coefficients of determination are in parentheses.

Sex was shown to have an effect on sport-related anxiety ($\beta = 0.40$, $b = 0.23$, $s.e. = 0.11$, $t = 2.00$, $p = .048$), such that females reported greater sport-related anxiety than males. Sex was significantly regressed onto the mediator, masculine gender role ($\beta = -0.47$, $b = -0.21$, $s.e. = 0.09$, $t = -2.37$, $p = .020$), but not onto feminine gender role ($\beta = 0.37$, $b = 0.18$, $s.e. = 0.10$, $t = 1.82$, $p = .071$). Masculine gender role was a significant predictor of sport-related anxiety ($\beta = -0.47$, $b = -0.59$, $s.e. = 0.12$, $t = -5.12$, $p < .001$), and the relationship between sex and sport-related anxiety was reduced to non-significance ($\beta = 0.21$, $b = 0.12$, $s.e. = 0.10$, $t = 1.10$, $p = .274$), indicating full mediation. A 95% bias-corrected confidence interval

based on 5000 bootstrap samples indicated that the indirect effect ($ab = 0.12$) was entirely above zero (0.02 to 0.25). A visual representation of the mediating role of masculine gender role in the relationship between sex and sport-related anxiety is provided in Figure 1.

Mediation Analyses to Determine Whether Gender Role Mediates Sex and Dispositional Flow

Sex was shown to have an effect on dispositional flow ($\beta = -0.57$, $b = -0.29$, $s.e. = 0.10$, $t = -2.90$, $p = .005$), such that males reported greater dispositional flow. Sex was significantly regressed onto the mediator, masculine gender role ($\beta = -0.43$, $b =$

-0.19, s.e. = 0.09, $t = -2.14$, $p = .035$), but not feminine gender role ($\beta = 0.38$, $b = 0.19$, s.e. = 0.10, $t = 1.88$, $p = .577$). Masculine gender role was a significant predictor of dispositional flow ($\beta = 0.49$, $b = 0.58$, s.e. = 0.10, $t = 5.65$, $p < .001$), and the relationship between sex and dispositional flow was reduced to non-significance ($\beta = -0.34$, $b = -0.18$, s.e. = 0.09, $t = -1.90$, $p = .060$), suggesting full mediation. A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect ($ab = -0.11$) was entirely below zero (-0.22 to -0.01). A visual representation of this mediating relationship is provided in Figure 2.

Mediation Analyses to Determine Whether Gender Role Mediates Mindfulness Skills and Sport-Related Anxiety

Acting with awareness was shown to have an effect on sport-related anxiety ($\beta = -0.24$, $b = -0.24$, s.e. = 0.10, $t = -2.45$, $p = .016$), such that greater use of

mindfulness was associated with lower sport-related anxiety. Acting with awareness was significantly regressed onto the mediators masculine gender role ($\beta = 0.32$, $b = 0.26$, s.e. = 0.08, $t = 3.39$, $p = .001$) and feminine gender role ($\beta = 0.24$, $b = 0.21$, s.e. = 0.09, $t = 2.40$, $p = .018$). Masculine gender role was a significant predictor of sport-related anxiety ($\beta = -0.46$, $b = -0.59$, s.e. = 0.12, $t = -4.93$, $p < .001$), and the relationship between acting with awareness and sport-related anxiety was reduced to non-significance ($\beta = -0.08$, $b = -0.09$, s.e. = 0.10, $t = -0.88$, $p = .382$), indicating full mediation. Feminine gender role was not a significant predictor of sport-related anxiety ($\beta = 0.24$, $b = 0.21$, s.e. = 0.09, $t = 2.40$, $p = .018$). A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect ($ab = -0.15$) was entirely below zero (-0.27 to -0.06). A visual representation of this mediating relationship is provided in Figure 3.

The relationship between observe and sport-

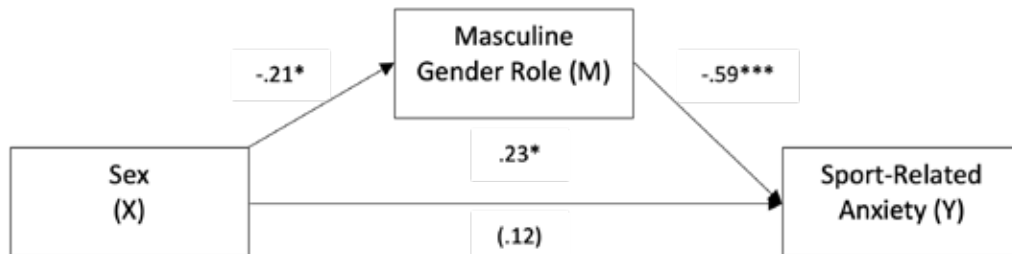


Figure 1. The mediating effect of masculine gender role in the relationship between sex and sport-related anxiety.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; numbers shown are unstandardized beta weights for each effect. Parentheses used to indicate mediating effect.

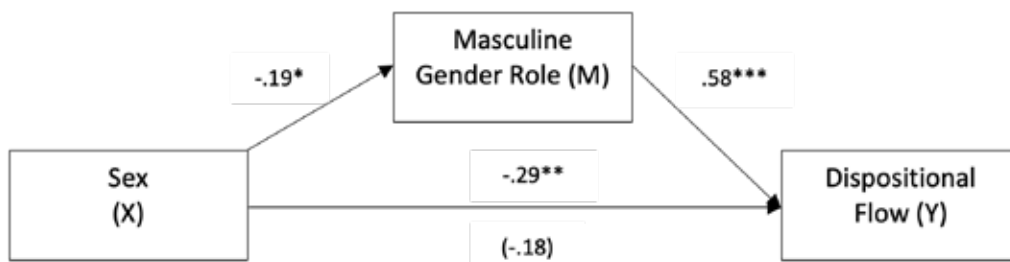


Figure 2. The mediating effect of masculine gender role in the relationship between sex and dispositional flow.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; numbers shown are unstandardized beta weights for each effect. Parentheses used to indicate mediating effect.

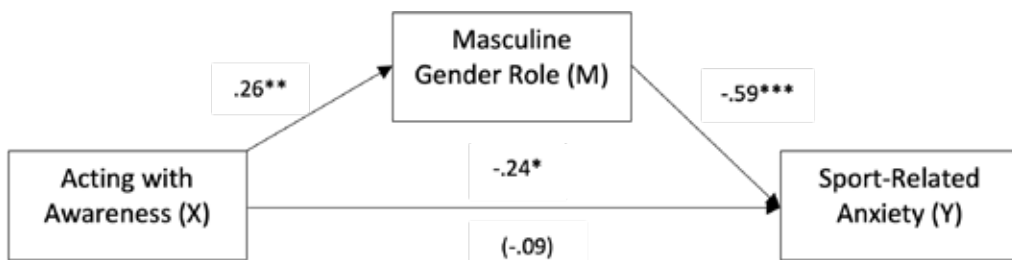


Figure 3. The mediating effect of masculine gender role in the relationship between acting with awareness and sport-related anxiety.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; numbers shown are unstandardized beta weights for each effect. Parentheses used to indicate mediating effect.

related anxiety was not significant ($r = 0.00, p = .99$), therefore mediation analysis was not tested for this mindfulness skill.

Acceptance without judgment was shown to have an effect on sport-related anxiety ($\beta = -0.28, b = -0.23, s.e. = 0.08, t = -2.87, p = .005$), such that greater use of mindfulness was associated with less sport-related anxiety. Acceptance without judgment was significantly regressed onto the mediator masculine gender role ($\beta = 0.26, b = 0.17, s.e. = 0.06, t = 2.70, p = .008$), but not feminine gender role ($\beta = -0.06, b = -0.04, s.e. = 0.08, t = -0.59, p = .559$). Masculine gender role was a significant predictor of sport-related anxiety ($\beta = -0.45, b = -0.57, s.e. = 0.12, t = -4.92, p < .001$), and the relationship between acceptance without judgment and sport-related anxiety was reduced to non-significance ($\beta = -0.16, b = -0.14, s.e. = 0.08, t = -1.81, p = .073$), indicating full mediation. A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect ($ab = -0.10$) was entirely below zero (-0.19 to -0.03). A visual representation of this mediating relationship is provided in Figure 4.

The relationship between describe and sport-related anxiety was not significant ($r = -0.15, p = .15$), therefore mediation analysis was not tested for this mindfulness skill.

Mediation Analyses to Determine Whether Gender Role Mediates Mindfulness Skills and Dispositional Flow

Acting with awareness was shown to have an

effect on dispositional flow ($\beta = 0.25, b = 0.22, s.e. = 0.09, t = 2.50, p = .014$), such that greater mindfulness was associated with greater flow. Acting with awareness was significantly regressed onto the mediator masculine gender role ($\beta = 0.33, b = 0.25, s.e. = 0.07, t = 3.41, p = .001$) and feminine gender role ($\beta = 0.24, b = 0.22, s.e. = 0.09, t = 2.39, p = .019$). Masculine gender role was a significant predictor of dispositional flow ($\beta = 0.49, b = 0.57, s.e. = 0.11, t = 5.38, p < .001$), and the relationship between acting with awareness and dispositional flow was reduced to non-significance ($\beta = 0.11, b = 0.10, s.e. = 0.09, t = 1.17, p = .245$), indicating full mediation. Feminine gender role was not associated with dispositional flow ($\beta = -0.11, b = -0.11, s.e. = 0.09, t = -1.20, p = .234$). A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect ($ab = 0.15$) was entirely above zero (0.07 to 0.25). A visual representation of this mediating relationship is provided in Figure 5.

The relationship between observe and dispositional flow was not significant ($r = 0.03, p = .77$), therefore mediation analysis was not tested for this mindfulness skill.

Acceptance without judgment was shown to have an effect on dispositional flow ($\beta = 0.26, b = 0.19, s.e. = 0.07, t = 2.59, p = .011$), such that greater mindfulness was associated with greater flow. Acceptance without judgment was significantly regressed onto the mediator masculine gender role ($\beta = 0.24, b = 0.16, s.e. = 0.06, t = 2.47, p = .015$), but not feminine gender role ($\beta = -0.06, b = -0.05, s.e.$



Figure 4. The mediating effect of masculine gender role in the relationship between acceptance without judgment and sport-related anxiety.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; numbers shown are unstandardized beta weights for each effect. Parentheses used to indicate mediating effect.

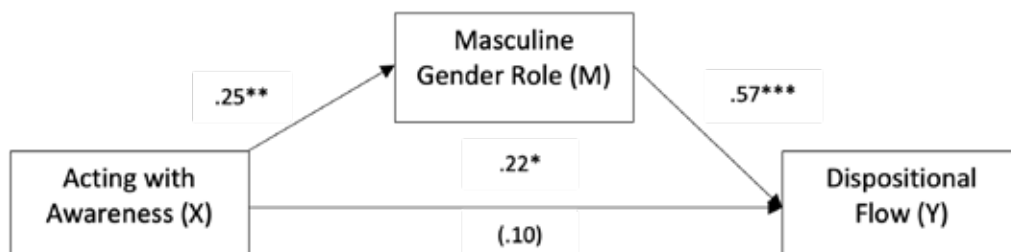


Figure 5. The mediating effect of masculine gender role in the relationship between acting with awareness and dispositional flow.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; numbers shown are unstandardized beta weights for each effect. Parentheses used to indicate mediating effect.

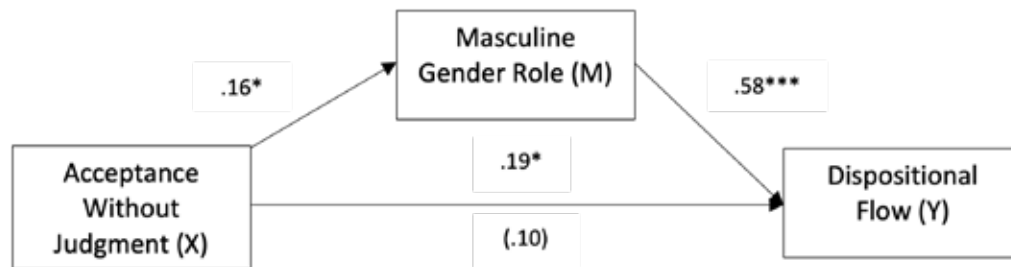


Figure 6. The mediating effect of masculine gender role in the relationship between acceptance without judgment and dispositional flow.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$; numbers shown are unstandardized beta weights for each effect. Parentheses used to indicate mediating effect.

$= 0.08$, $t = -0.62$, $p = .534$). Masculine gender role was a significant predictor of dispositional flow ($\beta = 0.50$, $b = 0.58$, $s.e. = 0.10$, $t = 5.62$, $p < .001$), and the relationship between acceptance without judgment and dispositional flow was reduced to non-significance ($\beta = 0.13$, $b = 0.10$, $s.e. = 0.07$, $t = 1.45$, $p = .150$), indicating full mediation. A 95% bias-corrected confidence interval based on 5000 bootstrap samples indicated that the indirect effect ($ab = 0.09$) was entirely above zero (0.02 to 0.18). A visual representation of this mediating relationship is provided in Figure 6.

The relationship between describe and dispositional flow was not significant ($r = 0.12$, $p = .23$), therefore mediation analysis was not tested for this mindfulness skill.

Discussion

As predicted, and consistent with the literature [10, 11], females reported greater sport-related anxiety than males; however, novel to this study is the finding that masculine gender role fully mediated the relationship between sex and sport-related anxiety. To our knowledge, no study has reported this relationship, testing gender role as a mediator of sex and sport-related anxiety, but some studies have alluded to this effect. For example, Anderson and Williams [30] found that participants categorized as feminine females using the Bem Sex Role Inventory had greater competition anxiety than all other groups. Another study found that male athletes who reported higher masculine gender role reported greater sport-related anxiety than males low in masculinity, but did not find differences in female athletes by gender role [31]. Swain and Jones [32] found that student athletes categorized as masculine males reported lower cognitive state anxiety than feminine males, and that masculine females reported lower anxiety than feminine females. Outside of the sport psychology literature, higher masculinity has been associated with lower anxiety in university students [33]. Palapattu et al. [34] found that specific qualities, such as fearfulness and avoidance, were endorsed more often by participants who also endorsed a feminine gender

role and were linked to more anxiety symptoms in a non-athlete African American adolescent sample [34]. It is unclear why testing of sex differences has continued without assessment of gender role when there have been indications that socialization plays a more important role in the construct of anxiety than biological sex. The current study makes this delineation clearer.

As predicted, and consistent with the literature [12, 13], male athletes reported greater flow experiences than female athletes, and masculine gender role fully mediated the effect between sex and flow. This is the first study to examine gender role as a mediator between sex and dispositional flow in student athletes. Outside of the sport psychology literature, several studies have identified physiological associations with flow [35] that have known biological differences between the sexes [36]. However, these studies do not include gender role, and it is possible that physiological differences by sex also have a socialized component that has not been accounted for [37]. Comprehensive biopsychosocial assessments would be useful in teasing apart the biological and social contributions of the relationship between flow and sex.

As expected, greater use of two mindfulness skills (acting with awareness and acceptance without judgment) was associated with less sport-related anxiety, and these relationships were fully mediated by masculine gender role. Counter to expectations, the mindfulness skills of observe and describe did not have significant relationships with sport-related anxiety and were not tested for mediation. A meta-analysis that examined facets of mindfulness found that nonjudge (similar to acceptance without judgment) and acting with awareness demonstrated the strongest relationships with negative affective outcomes (i.e., anxiety); describe had a smaller effect size, and observe was not related [38]. While several researchers have identified sex differences in mindfulness skills, results are not consistent, methods are often limited, and gender role is rarely included. For example, Amemiya and Sakairi [22] found that female athletes reported lower dispositional mindfulness than male athletes;

however, this was based on a sample of 152 athletes, with only 25 self-identified females, and gender role was not included. Somewhat similar to our design, Keng and Liew [39] found that trait mindfulness moderated the relationship between gender nonconformity and anxiety in a community sample. While these studies have some overlap with ours, it is difficult to directly compare research with our findings. It appears that attributes traditionally or stereotypically viewed as masculine are more important in the relationship between mindfulness and sport-related anxiety than biological sex.

The hypothesis predicting the relationships between mindfulness, gender role, and dispositional flow was also partially supported. Greater endorsement of the mindfulness skills, acting with awareness and acceptance without judgment, was associated with greater dispositional flow, and these relationships were fully mediated by masculine gender role. Again, the mindfulness skills of observe and describe were not associated with dispositional flow and therefore not tested for mediation. A recent meta-analysis showed a strong association between mindfulness and trait (i.e., dispositional) flow [40]. Cathcart et al. [21] found that facets of mindfulness were differentially associated with dispositional flow, depending on sex in elite athletes, but did not include a measure of gender role. In a dissertation, Chafos [41] found that androgynous sex role (i.e., both masculine and feminine characteristics) was associated with higher flow in a sample of female athletes, but this work has not been peer-reviewed and did not include male athletes in the sample.

Additionally, we did not find sex differences in any of the four mindfulness skills, but did find that masculine gender role was associated with three (acting with awareness, acceptance without judgment, and describe). Several studies have reported sex differences in mindfulness skills, with most suggesting that men endorse greater use of mindfulness skills than women, with some exceptions [21, 24]. Our findings align with Yarnell et al. [42], who also found that gender role had a stronger association with self-compassion (a tenet of mindfulness) than sex. This work followed a meta-analysis showing that men reported greater self-compassion than women, though the effect was small [42]. This interpretation is supported by

evidence showing that mindfulness-based cognitive therapy enhances momentary positive thoughts and emotions through a dynamic, reciprocal relationship, often described as an “upward spiral” [25].

The findings of this study are limited in that they are from a relatively small sample of NCAA Division III athletes who attended a small private university in California. These results may not be generalizable to student athletes from NCAA Division I and Division II individual and team sports, which tend to be large, state universities, or to student athletes outside of the United States. This study used a cross-sectional, correlational approach, and therefore, we are unable to infer causality. We did not assess gender identity or give participants the option to choose non-binary identifiers. The self-report measures provide information around student athletes’ overall ability to use mindfulness skills, and the relationships among the use of mindfulness skills recalled retrospectively, as well as sport-related anxiety and flow. Though participation was voluntary and not a requirement, coaches were the initial point of contact; therefore, whether athletes participated was a reflection of coach interest more so than student athlete interest.

Conclusions

The findings of this study help illuminate the significance of socialization of sex in facilitating or preventing sport-related anxiety, flow, and mindfulness skills in student athletes. Masculine gender role was strongly associated with lower sport-related anxiety and greater flow. Though sex was associated with sport-related anxiety and flow, masculine gender role was shown to fully mediate the relationship between sex and these outcomes. Further, two mindfulness skills were mediated by masculine gender role in predicting sport-related anxiety and dispositional flow. These findings suggest that the socialization of sex is more important when considering skills and performance outcomes of each athlete, rather than a biological or categorical assignment.

Conflict of interests

The authors declare that there is no conflict of interests.

References

1. American Psychological Association. *Publication manual of the American Psychological Association*. 7th ed. Washington (DC): American Psychological Association; 2020.
2. Eagly AH, Wood W. Social Role Theory. In: *Handbook of Theories of Social Psychology*, 1 Oliver’s Yard, 55 City Road, London EC1Y 1SP United Kingdom: SAGE Publications Ltd; 2012. p. 458–476. <https://doi.org/10.4135/9781446249222.n49>
3. Hyde JS. The gender similarities hypothesis. *American Psychologist*, 2005;60(6): 581–592. <https://doi.org/10.1037/0003-066X.60.6.581>
4. Ford J, Ildefonso K, Jones M, Arvinen-Barrow M. Sport-related anxiety: current insights. *Open Access Journal of Sports Medicine*, 2017;8: 205–212. <https://doi.org/10.2147/OAJSM.S125845>

5. Jackson SA, Thomas PR, Marsh HW, Smethurst CJ. Relationships between Flow, Self-Concept, Psychological Skills, and Performance. *Journal of Applied Sport Psychology*, 2001;13(2): 129–153. <https://doi.org/10.1080/104132001753149865>
6. Smith RE, Smoll FL, Cumming SP, Grossbard JR. Measurement of Multidimensional Sport Performance Anxiety in Children and Adults: The Sport Anxiety Scale-2. *Journal of Sport and Exercise Psychology*, 2006;28(4): 479–501. <https://doi.org/10.1123/jsep.28.4.479>
7. Smith RE, Smoll FL, Cumming SP. Effects of a Motivational Climate Intervention for Coaches on Young Athletes' Sport Performance Anxiety. *Journal of Sport and Exercise Psychology*, 2007;29(1): 39–59. <https://doi.org/10.1123/jsep.29.1.39>
8. Jackson SA, Eklund RC. Assessing Flow in Physical Activity: The Flow State Scale-2 and Dispositional Flow Scale-2. *Journal of Sport and Exercise Psychology*, 2002;24(2): 133–150. <https://doi.org/10.1123/jsep.24.2.133>
9. Stavrou NA, Jackson SA, Zervas Y, Karteroliotis K. Flow Experience and Athletes' Performance with Reference to the Orthogonal Model of Flow. *The Sport Psychologist*, 2007;21(4): 438–457. <https://doi.org/10.1123/tsp.21.4.438>
10. Abrahamsen FE, Roberts GC, Pensgaard AM. Achievement goals and gender effects on multidimensional anxiety in national elite sport. *Psychology of Sport and Exercise*, 2008;9(4): 449–464. <https://doi.org/10.1016/j.psychsport.2007.06.005>
11. Correia M, Rosado A. Anxiety in Athletes: Gender and Type of Sport Differences. *International Journal of Psychological Research*, 2019;12(1): 9–17. <https://doi.org/10.21500/20112084.3552>
12. Ahmed MDD, Ho WKY, Van Niekerk RL, Begum S. Will-to-Win, Self-Esteem, and Dispositional Flow State among adolescent athletes in India - a path analysis and comparisons by gender and level of achievement. *African Journal for Physical Activity and Health Sciences (AJPHES)*, 2020;26(4): 448–467. <https://doi.org/10.37597/ajphes.2020.26.4.8>
13. Liu W, Ji L, Watson JC. Dispositional Differences of Collegiate Athletes' Flow State: A Cross-Cultural Comparison. *The Spanish Journal of Psychology*. 2015;18:E13. <https://doi.org/10.1017/sjp.2015.12>
14. Glass CR, Spears CA, Perskaudas R, Kaufman KA. Mindful Sport Performance Enhancement: Randomized Controlled Trial of a Mental Training Program With Collegiate Athletes. *Journal of Clinical Sport Psychology*, 2019;13(4): 609–628. <https://doi.org/10.1123/jcsp.2017-0044>
15. Dehghani M, Delbar Saf A, Vosoughi A, Tebbenouri G, Ghazanfari Zarnagh H. Effectiveness of the mindfulness-acceptance-commitment-based approach on athletic performance and sports competition anxiety: a randomized clinical trial. *Electronic Physician*, 2018;10(5): 6749–6755. <https://doi.org/10.19082/6749>
16. Sánchez-Sánchez LC, Franco C, Amutio A, García-Silva J, González-Hernández J. Influence of Mindfulness on Levels of Impulsiveness, Moods and Pre-Competition Anxiety in Athletes of Different Sports. *Healthcare*, 2023;11(6): 898. <https://doi.org/10.3390/healthcare11060898>
17. Carraça B, Serpa S, Rosado A, Palmi Guerrero J, Magalhaes C. Mindful compassion training on elite soccer: effects, roles and associations on flow, psychological distress and thought suppression. *Rev Iberoam Psicol Ejerc Deporte*. 2019;14(2):141–149.
18. Kaufman KA, Glass CR, Arnkoff DB. Evaluation of Mindful Sport Performance Enhancement (MSPE): A New Approach to Promote Flow in Athletes. *Journal of Clinical Sport Psychology*, 2009;3(4): 334–356. <https://doi.org/10.1123/jcsp.3.4.334>
19. Baer RA. Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice*, 2003;10(2): 125–143. <https://doi.org/10.1093/clipsy.bpg015>
20. Baer RA, Smith GT, Allen KB. Assessment of Mindfulness by Self-Report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, 2004;11(3): 191–206. <https://doi.org/10.1177/1073191104268029>
21. Cathcart S, McGregor M, Groundwater E. Mindfulness and Flow in Elite Athletes. *Journal of Clinical Sport Psychology*, 2014;8(2): 119–141. <https://doi.org/10.1123/jcsp.2014-0018>
22. Amemiya R, Sakairi Y. The role of self-compassion in athlete mindfulness and burnout: Examination of the effects of gender differences. *Personality and Individual Differences*, 2020;166: 110167. <https://doi.org/10.1016/j.paid.2020.110167>
23. Bulğay C, Tingaz EO, Bayraktar I, Çetin E. Athletic performance and mindfulness in track and field athletes. *Current Psychology*, 2022;41(7): 4482–4489. <https://doi.org/10.1007/s12144-020-00967-y>
24. Upchurch DM, Johnson PJ. Gender Differences in Prevalence, Patterns, Purposes, and Perceived Benefits of Meditation Practices in the United States. *Journal of Women's Health*, 2019;28(2): 135–142. <https://doi.org/10.1089/jwh.2018.7178>
25. Garland EL, Geschwind N, Peeters F, Wichers M. Mindfulness training promotes upward spirals of positive affect and cognition: multilevel and autoregressive latent trajectory modeling analyses. *Frontiers in Psychology*, 2015;6. <https://doi.org/10.3389/fpsyg.2015.00015>
26. Spence JT, Helmreich R, Stapp J. *Personal Attributes Questionnaire*. 2012. <https://doi.org/10.1037/t02466-000> [Accessed 26th May 2025].
27. Hayes AF. *The PROCESS macro for SPSS. SAS and R.*; 2025.
28. Kane L, Ashbaugh AR. Simple and parallel mediation: {A} tutorial exploring anxiety sensitivity, sensation seeking, and gender. *The Quantitative Methods for Psychology*, 2017;13(3): 148–165. <https://doi.org/10.20982/tqmp.13.3.p148>
29. Cohen J. A power primer. *Psychological Bulletin*, 1992;112(1): 155–159. <https://doi.org/10.1037/0033-2909.112.1.155>
30. Andersen MB, Williams JM. Gender Role and Sport Competition Anxiety: A Re-examination. *Research Quarterly for Exercise and Sport*, 1987;58(1): 52–56. <https://doi.org/10.1080/02701367.1987.10605420>

31. Wittig AF. Sport competition anxiety and sex role. *Sex Roles*, 1984;10(5–6): 469–473. <https://doi.org/10.1007/BF00287563>
32. Jones G, Swain A, Cale A. Gender Differences in Precompetition Temporal Fattening and Antecedents of Anxiety and Self-Confidence. *Journal of Sport and Exercise Psychology*, 1991;13(1): 1–15. <https://doi.org/10.1123/jsep.13.1.1>
33. Arcand M, Bilodeau-Houle A, Juster RP, Marin MF. Sex and gender role differences on stress, depression, and anxiety symptoms in response to the COVID-19 pandemic over time. *Frontiers in Psychology*, 2023;14: 1166154. <https://doi.org/10.3389/fpsyg.2023.1166154>
34. Palapattu AG, Kingery JN, Ginsburg GS. Gender Role Orientation and Anxiety Symptoms Among African American Adolescents. *Journal of Abnormal Child Psychology*, 2006;34(3): 423–431. <https://doi.org/10.1007/s10802-006-9023-1>
35. Scheepers D, Keller J. On the physiology of flow: Bridging flow theory with the biopsychosocial model of challenge and threat. *International Journal of Psychophysiology*, 2022;182: 119–128. <https://doi.org/10.1016/j.ijpsycho.2022.10.007>
36. Koenig J, Thayer JF. Sex differences in healthy human heart rate variability: A meta-analysis. *Neuroscience & Biobehavioral Reviews*, 2016;64: 288–310. <https://doi.org/10.1016/j.neubiorev.2016.03.007>
37. Van Anders SM. Beyond masculinity: Testosterone, gender/sex, and human social behavior in a comparative context. *Frontiers in Neuroendocrinology*, 2013;34(3): 198–210. <https://doi.org/10.1016/j.yfrne.2013.07.001>
38. Carpenter JK, Conroy K, Gomez AF, Curren LC, Hofmann SG. The relationship between trait mindfulness and affective symptoms: A meta-analysis of the Five Facet Mindfulness Questionnaire (FFMQ). *Clinical Psychology Review*, 2019;74: 101785. <https://doi.org/10.1016/j.cpr.2019.101785>
39. Keng SL, Liew KWL. Trait Mindfulness and Self-Compassion as Moderators of the Association Between Gender Nonconformity and Psychological Health. *Mindfulness*, 2017;8(3): 615–626. <https://doi.org/10.1007/s12671-016-0639-0>
40. Schutte NS, Malouff JM. The connection between mindfulness and flow: A meta-analysis. *Personality and Individual Differences*, 2023;200: 111871. <https://doi.org/10.1016/j.paid.2022.111871>
41. Chafos V. The relationship between sex role, mindfulness, perceived stress, anxiety, and flow in team sport female athletes [dissertation]. South Orange (NJ): Seton Hall University; 2021.
42. Yarnell LM, Neff KD, Davidson OA, Mullarkey M. Gender Differences in Self-Compassion: Examining the Role of Gender Role Orientation. *Mindfulness*, 2019;10(6): 1136–1152. <https://doi.org/10.1007/s12671-018-1066-1>

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Cite this article as:

Price E, Martin L, Granquist M, Blumenthal B. Masculine gender role mediates sex and mindfulness skills in predicting student athletes' sport-related anxiety and dispositional flow. *Physical Education of Students*, 2025;29(3):212–221. <https://doi.org/10.15561/20755279.2025.0308>

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Received: 23.04.2025

Accepted: 06.06.2025; Published: 30.06.2025