

Stress, Sport Anxiety, Neuroticism, and Coping in Student-Athletes: Implications for Patient Mental Health

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Context: Patients' mental health has been recognized as important in providing patient-centered care in athletic training.

Objective: To evaluate stress, sport anxiety, neuroticism, and coping in student-athletes.

Design: Cross-sectional study.

Setting: University athletics.

Patients or Other Participants: The sample comprised 86 student-athletes competing in National Collegiate Athletic Association (NCAA) Division III.

Main Outcome Measure(s): The Perceived Stress Scale, Sport Anxiety Scale-2, neuroticism scale of the Big Five Inventory, and Brief COPE were used to measure stress, sport anxiety, neuroticism, and coping, respectively.

Results: Sport anxiety was positively related to stress ($r = 0.446$, $P < .001$) and neuroticism ($r = 0.311$, $P < .01$) and not

related to emotion-focused coping ($r = 0.270$, $P = .804$). Neuroticism was a negative predictor of emotion-focused coping ($b = -0.373$, $P < .001$), and sport anxiety and stress were predictors of dysfunctional coping ($b = 0.120$, $P < .05$; $b = 0.037$, $P < .05$). Stress, sport anxiety, and neuroticism were not predictors of problem-focused coping.

Conclusions: Support was evident for the relationship among stress, sport anxiety, neuroticism, and coping in NCAA Division III student-athletes. Such results warrant future exploration to inform behavioral interventions targeting student-athlete psychosocial factors to promote improved performance, reduce injury risk factors (eg, stress, personality, coping), and enhance student-athlete mental health and well-being.

Key Words: well-being, personality, patient-centered care

Key Points

- Student-athletes' sport anxiety was positively related to stress and the personality factor of neuroticism.
- The personality factor of neuroticism was a negative predictor of emotion-focused coping.
- Sport anxiety and stress were predictors of dysfunctional coping.

The Stress-Injury Model describes 3 interrelated categories of antecedents to injury risk: stress, personality, and coping.² Given that identification of mental health issues and injury prevention are within the scope of athletic training practice, in this research, we examine these 3 categories of stress (including sport anxiety), personality (specifically neuroticism), and coping.

Student-athletes experiencing higher levels of perceived stress reported greater sport anxiety.³ When stress and sport anxiety were combined with a personality factor such as neuroticism, athletes were less able to deal with stressors that may arise during a competition, which in turn influenced their coping response.^{4,5} Continued evaluation of sport anxiety in athletes is warranted given that it has been associated with increased risk for injury in players with starting status,⁶ positively associated with athletes' well-being,⁷ and linked to overall satisfaction in athletes.⁸ Sport anxiety has also been negatively related to satisfaction in sport activities,⁹ shown to mediate the protective factor of athletic involvement,¹⁰ and associated with increased

incidences of eating disorders in collegiate athletes.¹¹ Continued research into these variables is needed because of a variety of potentially severe outcomes, such as mental health concerns,^{12–14} poor academic performance,¹⁵ injury during competition,⁶ burnout,⁸ and diminished sport performance.⁶

Authors⁴ have investigated the relationship between sport anxiety and coping strategies; however, to date, the relationships between factors such as stress, sport anxiety, neuroticism, and coping strategies in National College Athletic Association (NCAA) Division III student-athletes have not been addressed. Elite-level athletes may have better-developed mechanisms for coping with general life stressors and sport anxiety, given that their higher level of competition requires a better-developed set of psychological and physical skills; therefore, Division III athletes may have unique responses to life stressors and sport anxiety and may use different mechanisms for coping.¹⁶

When considering that athletes who experience the life stressors associated with being a traditional college student must also handle the stressors associated with being a

student-athlete and may have competitive trait anxiety, which predisposes them to becoming anxious or stressed in sport-related experiences, it becomes apparent that further exploration of the individual differences that either contribute to or hinder an athlete's coping response to stressors is needed. We used coping as an outcome with the rationale that athletes cannot change their stressors or personalities, but coping can be targeted by athletic trainers and mental health providers. If we can determine what leads to certain coping strategies, then these strategies can be targeted for intervention. Therefore, the purpose of our study was to examine the relationships between stress, sport anxiety, the personality factor neuroticism, and coping strategies in a sample of NCAA Division III student-athletes.

METHODS

Participants

From 102 original participants, complete data from 86 participants were included in the analyses. Participants consisted of a purposive sample of Division III student-athletes (55% female, 45% male; mean age = 19.62 ± 1.39 years). The participant sample was racially or ethnically diverse as 6.8% identified as African American, 1.2% as American Indian, 4.1% as Asian-American, 21.9% as Hispanic or Latino, 16.4% as mixed ethnicity, and 49.3% as White or European American (see Table 1).

Procedures

After we obtained institutional review board approval, volunteers were sought in collaboration with the university athletics department. Student-athletes were recruited through email and flyers posted throughout the university. All student-athletes who were enrolled in a weight training course were asked to engage in the study. Initial data were gathered using hardcopy survey packets but were later obtained using an online survey. Participants were asked to sign a consent form and complete the survey, which took approximately 45 minutes. Those who completed the survey were entered into a raffle to win 1 of ten \$20 gift cards.

Instrumentation

Stress. Stress was measured using the 10-item version of the Perceived Stress Scale (PSS10).¹⁷ The PSS10 was adapted from the 14-item Perceived Stress Scale (PSS14) and demonstrated a slight improvement in psychometric properties over the PSS14 with internal reliability ranging from 0.84 to 0.86. The PSS10 measures perceived stress over the course of 1 month on a Likert scale ranging from 0 (*never*) to 4 (*very often*). High scores on the PSS10 indicate high levels of perceived stress, and low scores indicate low levels of perceived stress.¹⁷ A sample item from the PSS10 is "In the last month, how often have you been upset because of something that happened unexpectedly?" The PSS10 has been validated with a collegiate population ($\alpha = .89$).¹⁸ Additional support for the use of the PSS10 in a collegiate athlete population was evidenced by an internal consistency coefficient of 0.90 in a sample of 123 injured student-athletes.¹⁹

Sport Anxiety. The Sport Anxiety Scale-2 (SAS-2)²⁰ was used to measure sport anxiety via the composite score.

Table 1. Participant and Demographic Information (N = 86)

Variable	Value
	No. (%)
Sex	
Female	47 (55)
Male	39 (45)
Ethnicity, No. (%) ^{a,b}	
African American	5 (6.8)
Asian American	3 (4.1)
American Indian	1 (1.2)
Hispanic or Latino(a)	16 (21.9)
Mixed or biracial	12 (16.4)
Other	1 (1.4)
White or European American	36 (49.3)
	Mean \pm SD (Range)
Age, y	19.62 \pm 1.39 (18–23)
Stress	1.79 \pm 0.65 (0.10–3.60)
Sport anxiety	1.34 \pm 0.17 (1.00–1.68)
Neuroticism	2.53 \pm 0.71 (1.00–4.38)
Emotion-focused coping	2.72 \pm 0.53 (1.60–4.00)
Problem-focused coping	3.00 \pm 0.59 (1.50–4.00)
Dysfunctional coping	1.95 \pm 0.39 (1.08–3.25)

^a Some participants did not provide data regarding ethnicity.

^b Percentages add up to 99.9% due to rounding error.

This 15-item measure was adapted from the original Sport Anxiety Scale to provide a measure that was suitable for both child and adult populations. A sample item from the SAS-2 is "Before or while I compete in sports, it is hard to concentrate on the game." The SAS-2 demonstrates strong psychometric properties with an internal consistency coefficient of 0.91.²⁰ Normative data were gathered from a sample of 1038 child athletes and 593 college students participating in organized sports activities (eg, intercollegiate athletics, intramural sports, club sports).²⁰ Items are divided into 3 subscales (somatic, worry, concentration disruption) consisting of 5 items each. Reliability coefficients for each subscale were 0.84 for somatic, 0.89 for worry, and 0.84 for concentration disruption, indicating strong reliability coefficients at both the total score and subscale levels.²⁰ In a collegiate student-athlete population, internal consistencies were 0.87 for somatic anxiety, 0.91 for worry, and 0.70 for concentration disruption.²¹

Personality. The Big Five Inventory (BFI),²² consisting of 44 short-phrase items, was used to measure the neuroticism trait of the Big Five personality domain. Items are responded to on a 5-point Likert scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). The neuroticism subscale consists of 8 items, and respondents are asked to indicate the extent to which they agree or disagree with each statement beginning with the phrase, "I see myself as someone who. . ."

Despite the scales of the BFI containing only 8 to 10 items, good psychometric properties are still evident throughout the scale. Researchers²³ have shown an internal consistency coefficient of 0.87 for neuroticism²² and test-retest stability of 0.70. Convergent and divergent validity were examined in a community dataset of BFI self-reports and peer ratings, yielding correlations of 0.52 for neuroticism. The BFI has also demonstrated satisfactory reliability

in an athlete population with a reliability coefficient of 0.79 for neuroticism.⁵

Coping. The Brief COPE was administered to measure the use of coping behaviors.²⁴ The Brief COPE was derived from the original 60-item COPE scale to meet the needs of time-sensitive health care settings and to address the redundancy of items on the COPE.²⁴ The Brief COPE comprises 28 items grouped into 14 subscales: active coping, planning, positive reframing, self-distraction, acceptance, using instrumental support, using emotional support, religion, venting, denial, behavioral disengagement, substance use, humor, and self-blame. Questions are answered on a Likert scale ranging from 1 (*I haven't been doing this at all*) to 4 (*I've been doing this a lot*). Carver²⁴ found α reliabilities ranging from .50 (venting) to .90 (substance use).

Data gathered from the Brief COPE were organized into problem-focused, emotion-focused, and dysfunctional coping aggregate scores as shown by Chiavarino et al²⁵: problem-focused coping (active coping, planning, and instrumental support; $\alpha = .78$); emotion-focused coping (positive reframing, humor, acceptance, religion, and emotional support; $\alpha = .72$); and dysfunctional coping (self-distraction, denial, behavioral disengagement, self-blame, substance use, and venting; $\alpha = .70$).

Data Analyses

A Pearson r correlation and multiple regression were conducted to examine relationships between stress, sport anxiety, neuroticism, and emotion-focused coping. Multiple regressions were calculated to examine the relationships between stress, sport anxiety, neuroticism, and problem-focused coping and between stress, sport anxiety, neuroticism, and dysfunctional-focused coping.

RESULTS

Analysis was completed using SPSS (version 23; IBM Corp). Data were screened for missing values and violations of statistical assumptions. We examined the assumptions of multiple regression analysis and found 2 violations of normality. The dysfunctional coping and sport anxiety factors were positively skewed (dysfunctional coping: skewness = 0.754, kurtosis = 1.012; sport anxiety: skewness = 1.004, kurtosis = 0.409). Means, SDs, and ranges for variables of interest can be found in Table 1. Dysfunctional coping was transformed using a logarithmic function and was returned to normality (skewness = 0.103, kurtosis = 0.294). Regarding sport anxiety, logarithmic and square root functions were attempted but unsuccessful. Inverse transformation yielded a normally distributed dataset; however, the data were reflected to maintain interpretative statements. Specifically, after transformation, a constant (eg, maximum inverted SAS score + 1) was subtracted from each inverse transformation so the data could be interpreted as before the transformation (skewness = -0.103, kurtosis = -0.690).

The demographic variables of sex, race, age, and income were examined in relation to the 6 continuous variables of interest. Sex was coded such that male = 0 and female = 1, race as White = 1 and all others = 0, and income as less than \$10 000 per year = 0 and \$10 000 or more = 1. Sex and neuroticism were significantly related ($r = 0.221$, $P =$

.041), and race and emotion-focused coping were inversely related ($r = -0.269$, $P = .012$). No other significant differences were found among demographic variables.

Tolerance, variance inflation factors, and correlations between predictor variables were examined for multicollinearity and deemed acceptable (tolerance ≥ 0.01 , variance inflation factor < 10). Additionally, on visual examination of a scatterplot for each regression model, no evidence of severe violations of multicollinearity, homoscedasticity, or linearity was present. Given the relatively small sample size, adjusted R^2 values were used to examine the variance accounted for by each model.

Inferential Analysis

A Pearson r correlation indicated that neuroticism was significantly positively correlated with sport anxiety ($r_{86} = 0.311$, $P = .004$), and perceived stress was significantly positively correlated with sport anxiety ($r_{86} = 0.446$, $P < .001$). Similar results using partial correlations were evident while controlling for sex and race (see Table 2).

Multiple regression was used to examine the relationships between perceived stress, sport anxiety, neuroticism, and emotion-focused coping. Regression analysis demonstrated that perceived stress, sport anxiety, and neuroticism accounted for a significant portion of the variance in emotion-focused coping (adjusted $R^2 = 0.150$, $F_{3,82} = 5.98$, $P < .001$). Neuroticism was a significant negative predictor of emotion-focused coping ($b = -0.373$, $t_{85} = -4.22$, $P < .001$; see Table 3).

To evaluate the relationships between perceived stress, sport anxiety, neuroticism, and problem-focused coping, multiple regression was calculated. Perceived stress, sport anxiety, and neuroticism did not account for a significant portion of the variance in problem-focused coping (adjusted $R^2 = 0.030$, $F_{3,82} = 1.89$, $P = .13$; see Table 4).

Multiple regression was computed to examine the relationships between perceived stress, sport anxiety, neuroticism, and dysfunctional coping. Perceived stress, sport anxiety, and neuroticism accounted for a significant portion of the variance in dysfunctional coping (adjusted $R^2 = 0.218$, $F_{3,82} = 8.90$, $P < .001$). Perceived stress ($b = 0.037$, $t_{85} = 2.36$, $P = .020$) and sport anxiety ($b = 0.120$, $t_{85} = 2.25$, $P = .027$) were significant predictors of dysfunctional coping (see Table 5).

Post Hoc Analysis

To test the role of stress as a mediator between sport anxiety, neuroticism, and dysfunctional coping, we used the PROCESS macro in SPSS.^{26,27}

As indicated in Table 6, a simple mediation analysis indicated that neuroticism was indirectly related to dysfunctional coping through stress. Neuroticism was significantly regressed onto the mediator, stress ($b = 0.47$, $SE = 0.09$, $P < .001$). Furthermore, neuroticism had an indirect effect on dysfunctional coping ($b = 0.04$, $SE = 0.01$, $P = .004$). Stress was a significant predictor of dysfunctional coping ($b = 0.05$, $SE = 0.01$, $P = .001$), and the relationship between neuroticism and dysfunctional coping was reduced to nonsignificance ($b = 0.01$, $SE = 0.01$, $P = .314$), reflecting full mediation. A 95% bias-corrected CI based on 5000 bootstrap samples indicated that the indirect

Table 2. Bivariate and Partial Correlations Among Neuroticism, Stress, Sport Anxiety, Emotion-Focused Coping, Problem-Focused Coping, and Dysfunctional Coping^a

Variable	1	2	3	4	5	6
1. Neuroticism	NA	0.328 ^b	0.521 ^b	−0.384 ^b	−0.253 ^c	0.348 ^b
2. Sport anxiety	0.311 ^b	NA	0.461 ^b	0.042	0.003	0.394 ^b
3. Stress	0.508 ^b	0.446 ^b	NA	−0.061	−0.093	0.468 ^b
4. Emotion-focused coping	−0.362 ^b	0.027	−0.006	NA	0.647 ^b	0.227 ^c
5. Problem-focused coping	−0.236 ^c	−0.008	−0.047	0.672 ^b	NA	0.113
6. Dysfunctional coping	0.306	0.396 ^b	0.435 ^b	0.184	0.083	NA

Abbreviation: NA, not applicable.

^a Left, bottom diagonal shows bivariate correlations between variables. Right, upper diagonal shows partial correlations controlling for sex (female = 1, male = 0) and race (white = 1; all other = 0).

^b $P < .01$.

^c $P < .05$.

effect ($ab = 0.0229$) was entirely above zero (0.0084, 0.0415).

As shown in Table 7, sport anxiety was significantly regressed onto the mediator ($b = 1.70$, $SE = 0.37$, $P < .001$). Sport anxiety also had an indirect effect on dysfunctional coping ($b = 0.20$, $SE = 0.05$, $P < .001$). Stress was a significant predictor of dysfunctional coping when controlling for sport anxiety ($b = 0.04$, $SE = 0.01$, $P < .003$); however, the relationship between anxiety and dysfunctional coping remained significant ($b = 0.13$, $SE = 0.05$, $P = .021$), signifying partial mediation. A 95% bias-corrected CI based on 5000 bootstrap samples indicated that the indirect effect ($ab = 0.0712$) was entirely above zero (0.0234, 0.1383).

DISCUSSION

The purpose of our study was to examine the relationships between stress, sport anxiety, neuroticism, and coping in student-athletes. Such a design is especially salient given the growing number of difficulties student-athletes face, specifically growing rates of substance use, academic dishonesty, injury, eating disorders, and stress.^{12–14,28}

These findings can inform the development of interventions targeting stressed, anxious, and neurotic student-athletes in the hope of helping them acquire more appropriate means of coping. High levels of stress and sport anxiety were the best predictors of dysfunctional coping in student-athletes, which suggests that they may benefit from interventions fostering adaptive means of coping with such feelings or thoughts. Additionally, stress serving as a significant mediator between the neuroticism and dysfunctional coping relationship highlights

the need for interventions aimed at reducing their stress, which could in turn reduce dysfunctional coping. Dysfunctional coping spans a range of strategies, including self-distraction, denial, behavioral disengagement, self-blame, substance use, and venting. All strategies can lead to potentially problematic outcomes such as injury, poor sport performance, disordered eating, and academic dishonesty.^{12–14,28}

Decreases in neuroticism predicted increases in emotion-focused coping strategies, indicating that an emotion-focused factor such as acceptance may be affected by an individual factor such as neuroticism. This assertion makes sense in that, by nature, the neuroticism personality construct reflects emotion constriction and self-consciousness, qualities that are paradoxical to acceptance. Helping student-athletes identify whether they possess a degree of neuroticism may aid them in developing a less judgmental stance and more adaptive means of coping with their distress.

Neuroticism was not a significant predictor of dysfunctional coping. This finding was partially expected, as we originally thought that stress, competitive anxiety, and neuroticism would all account for a portion of the dysfunctional coping variance. Additionally, we thought that, because higher levels of neuroticism are considered problematic and overall relatively negative (eg, dysfunctional coping, stress, and competitive trait anxiety), it would account for some of the variance. The current results contrast with those of others²⁹ who found denial, behavioral disengagement, self-blame, and substance abuse to be unrelated to stress.

Interestingly, no statistically significant relationship was noted between competitive trait anxiety and emotion-focused coping. This outcome was unexpected and inconsistent

Table 3. Multiple Regression Analysis for Variables Associated With Emotion-Focused Coping

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>P</i>
Constant	2.99 ^a	0.43	NA	6.85	.000
Stress	0.167	0.101	.205	1.65	.103
Sport anxiety	0.279	0.35	.089	0.79	.430
Neuroticism	−0.373 ^a	0.088	−.493	−4.22	.000
<i>R</i>	NA	0.424	NA	NA	NA
<i>R</i> ²	NA	0.180	NA	NA	NA
Adjusted <i>R</i> ²	NA	0.150	NA	NA	NA
<i>F</i>	NA	5.98 ^a	NA	NA	NA

Abbreviation: NA, not applicable.

^a $P < .01$.

Table 4. Multiple Regression Analysis for Variables Associated With Problem-Focused Coping

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>P</i>
Constant	3.26 ^a	0.512		6.38	.000
Stress	0.071	0.119	.079	0.598	.551
Sport anxiety	0.163	0.412	.048	0.396	.693
Neuroticism	−0.242	0.104	−.291	−2.33	.02 ^b
<i>R</i>	NA	0.254	NA	NA	NA
<i>R</i> ²	NA	0.065	NA	NA	NA
Adjusted <i>R</i> ²	NA	0.030	NA	NA	NA
<i>F</i>	NA	1.89	NA	NA	NA

Abbreviation: NA, not applicable.

^a $P < .01$.

^b $P < .05$.

Table 5. Multiple Regression Analysis for Variables Associated With Dysfunctional Coping

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>P</i>
Constant	0.028	0.066	NA	0.422	.674
Stress	0.037 ^a	0.015	.282	2.36	.020
Sport anxiety	0.120 ^a	0.053	.243	2.25	.027
Neuroticism	0.011	0.013	.088	0.785	.435
<i>R</i>	NA	0.496	NA	NA	NA
<i>R</i> ²	NA	0.246	NA	NA	NA
Adjusted <i>R</i> ²	NA	0.218	NA	NA	NA
<i>F</i>	NA	8.90 ^b	NA	NA	NA

Abbreviation: NA, not applicable.

^a *P* < .05.^b *P* < .01

with the previous literature,³⁰ which showed that student-athletes who possessed higher levels of competitive anxiety demonstrated a tendency to engage in emotion-focused strategies (eg, denial, disengagement, venting of emotions). This difference may be explained by how coping was grouped. Emotion-focused coping comprised positive reframing, humor, acceptance, religion, and emotional support skills, all of which can be seen as positive coping skills when compared with denial, disengagement, and venting of emotions, the coping skills that were included in the dysfunctional coping aggregate. The skills in the emotion-focused aggregate can be considered adaptive; therefore, individuals who scored higher in emotion-focused coping may have more adaptive responses to stressors.

Our study adds to the research in several ways. First, we are the first to examine the relationships between stress, sport anxiety, neuroticism, and coping strategies in student-athletes. We provide novel support for the role of neuroticism as a negative predictor of emotion-focused coping. We also observed support for the role of stress and sport anxiety in influencing coping strategies. Moreover, the positive relationship between stress, sport anxiety, and neuroticism was endorsed, which possibly suggests that domain-specific anxiety is influenced by individual differences such as stress and neuroticism.

Limitations of the Study

Although our work had several strengths, certain limitations should be considered when evaluating the findings. First, sample size was a notable limitation. The number of participants (*N* = 86) was sufficient for the purposes of the appropriate statistical analyses, yet the risk of type I error

Table 6. Stress as a Mediator of Neuroticism and Dysfunctional Coping

	<i>B</i>	<i>SE B</i>	<i>CI</i>
Path c (<i>R</i> ² = 0.31, <i>F</i> _{1,84} = 8.71 ^a)			
Outcome: dysfunctional coping			
Predictor: neuroticism	0.04 ^a	0.01	0.01, 0.06
Path a (<i>R</i> ² = 0.51, <i>F</i> _{1,84} = 29.17 ^a)			
Outcome: stress			
Predictor: neuroticism	0.47 ^a	0.09	0.30, 0.64
Paths b and c (<i>R</i> ² = 0.47, <i>F</i> _{2,83} = 10.31 ^a)			
Outcome: dysfunctional coping			
Mediator: stress	0.05 ^a	0.01	0.02, 0.08
Predictor: neuroticism	0.01	0.01	−0.01, 0.04

^a *P* < .05.**Table 7. Stress as a Mediator of Sport-Related Anxiety and Dysfunctional Coping**

	<i>B</i>	<i>SE B</i>	<i>CI</i>
Path c (<i>R</i> ² = 0.40, <i>F</i> _{1,84} = 15.64 ^a)			
Outcome: dysfunctional coping			
Predictor: sport anxiety	0.20 ^a	0.05	0.10, 0.29
Path a (<i>R</i> ² = 0.47, <i>F</i> _{1,84} = 20.88 ^a)			
Outcome: stress			
Predictor: sport anxiety	1.70 ^a	0.37	0.96, 2.44
Paths b and c' (<i>R</i> ² = 0.49, <i>F</i> _{2,84} = 13.12 ^a)			
Outcome: dysfunctional coping			
Mediator: stress	0.04 ^a	0.01	0.01, 0.07
Predictor: sport anxiety	0.13 ^a	0.05	0.02, 0.23

^a *P* < .05.

(eg, false-positive results) was increased. Additionally, our findings were significant at the *P* < .01 level, which further supports the notion that they did not occur based on chance alone. The insignificant findings related to neuroticism and emotion-focused coping findings do not appear to have occurred because of type II error.

Differences may have existed between athletes of different sexes, sport types, ethnic identities, or injury histories in terms of their levels of stress, sport anxiety, neuroticism, and coping. Including individuals from other institutions or, at a minimum, a greater number of student-athletes from the participating institution would have provided more statistical power and better generalizability of the findings.

Regarding other measurement limitations, although the Brief COPE has been aggregated into emotion-focused, problem-focused, and dysfunctional coping composites with success and sound psychometric values,²⁵ this was not specifically how the measure was designed and may have influenced the interpretability of the results. Moreover, the dysfunctional coping variable was transformed to satisfy statistical assumptions necessary for regression analysis. Because the initial dysfunctional coping variable was not perfectly normal and subsequently converted, such skewness could reflect a novel phenomenon in the current dataset. However, even after transformation, this phenomenon was still present, as dysfunctional coping was correlated with multiple psychosocial variables, thus indicating that transformation of the data did not obscure interpretative statements.

Our sample of NCAA Division III student-athletes was a noted strength of the investigation, yet this design was also limited in that Division III athletes may face stressors that are unique to their status as student-athletes who are not eligible for athletic scholarships. For example, Division III student-athletes may have increased financial stress and less accommodation by professors or university stakeholders, as sport participation is not as heavily integrated into the college experience, or increased academic demands.³¹

Finally, as with many self-report designs, social desirability and recall bias may have affected the results,³² and the length of the survey may have been partially responsible for the lack of responses, as it took approximately 45 minutes to complete.

Recommendations for Future Research

Future research into the relationships between stress, sport anxiety, neuroticism, and coping is necessary to elucidate what factors or combination of factors influences coping in

athletes. The body of literature would benefit from continued examination of the role of personality characteristics in influencing athlete behavior, particularly as related to injury, mental health, and well-being.

Another area for inquiry is the sport-type differences in stress, sport anxiety, and coping. Authors have argued that sport-type differences in coping and types of stressors exist³³; however, despite the differences in coping strategies between male and female student-athletes, the outcomes regarding which strategies are typically employed by each group are largely mixed.^{33,34}

Ideally, future investigators should attempt to gather participants from each level of the NCAA or National Association of Intercollegiate Athletics competition to obtain a more complete picture of how factors such as stress, sport anxiety, and neuroticism influence behavior. Within-group differences in student-athletes may add to the complexity of investigating student-athlete stress, sport anxiety, and coping behavior.

SUMMARY AND CONCLUSION

We explored the relationships between stress, sport anxiety, neuroticism, and coping strategies in NCAA Division III student-athletes. Sport anxiety was positively related to stress and neuroticism and not related to emotion-focused coping. Neuroticism was a negative predictor of emotion-focused coping, and stress and sport anxiety were predictors of dysfunctional coping. Stress, sport anxiety, and neuroticism were not predictors of problem-focused coping.

The current study had several strengths that should be considered. Notably, we sought to expand upon the body of research by examining the aforementioned factors in a sample of NCAA Division III student-athletes, a section of the student-athlete population that had been largely unexamined.³¹ Even though we achieved this goal, the limitations should be considered when interpreting the findings and in the development of future research projects. Specifically, given the relatively small sample size ($N = 86$), the generalizability of the results is limited. The limited sample size also restricted our ability to more precisely determine what specific coping skills NCAA Division III athletes employed and how selection of such strategies was affected by stress, sport anxiety, or neuroticism.

These outcomes warrant future exploration, yet they can inform behavioral interventions targeting student-athlete psychosocial factors to promote improved performance, reduce injury risk factors (eg, stress, personality, coping), and enhance student-athlete mental health and well-being.

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