Social Support, Stress, and Mental Health: Examining the Stress-Buffering Hypothesis in Adolescent Football Athletes

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Context: Football sport participation has been linked to both positive and negative effects on overall health. *Social support*, a network that provides individuals with resources to cope effectively, may positively influence one's stress and mental health. However, little research has been conducted on adolescent football players.

Objective: To examine the relationships among social support, psychological stress, and mental health in adolescent football athletes.

Design: Cross-sectional study.

Setting: High school athletes during the precompetitive and postcompetitive football season in rural Alabama.

Patients or Other Participants: Black and African American adolescent athletes (N = 93) competing for a school-sponsored football team.

Main Outcome Measure(s): After a competitive season, participants completed a battery of social support, psychological stress, and mental health symptom measures using the National Institutes of Health Toolbox Application and Patient-Reported Outcomes Measurement Information System. The T-score means, Pearson correlations, and multiple regression analyses were calculated.

Results: Social support was negatively correlated with psychological stress (emotional support, r = -0.386; family relationships,

r = -0.412; peer relationships, r = -0.265) and mental health (depression, r = -0.367 and r = -0.323 for emotional support and family relationships, respectively), whereas psychological stress and mental health (depression, r = 0.751; anxiety, r = 0.732) were positively correlated. In regression analyses, social support measures (ie, emotional support, family relationships, and peer relationships) were used to predict psychological stress (F = 7.094, P < .001, $R^2 = 0.191$), depression symptoms (F = 5.323, P < .001, $R^2 = 0.151$), and anxiety symptoms (F = 1.644, P = .190, $R^2 = 0.052$).

Conclusions: In line with the stress-buffering hypothesis, social support in the form of family relationships and overall emotional support garnered through sport participation may reduce psychological stress and help to preserve the mental health of football athletes. These findings indicate that perceived social support may act as a positive resource for the coping of Black and African American adolescent athletes. Further research is warranted to understand the effects of stress and social support on the mental health of adolescents, particularly racial and ethnic minorities who are underrepresented in the athletic training literature.

Key Words: psychology, minorities, sports

Key Points

- Social support garnered through sport may help reduce psychological stress and depression in Black and African American adolescent football athletes.
- Sport participation may improve the mental health of Black and African American adolescent athletes, even after the stress of a competitive football season.
- Given the positive implications sport can have on psychological health, athletic trainers should advocate for adolescents to have access to sport, encourage sport participation throughout adolescence, and promote social support within the sport context.

pproximately 1 million athletes participate in high school American football in the United States each year.¹ Football athletes have expressed that engaging in the sport has led to many positive benefits, including better preparation for life challenges as well as financial benefits through college scholarship opportunities. Parents of adolescent football athletes reported persistence, camaraderie, and being part of a team collective as benefits of football participation.² Despite these benefits, some negative consequences have also been identified. Football athletes are exposed to a wide range of stressors, including the physical stress of training, possibility of musculoskeletal injuries and concussions because of the contact nature of the sport, high social expectations of performance, and time demands, all of which are thought to be associated with worsened mental health.³

Researchers have suggested that concussive injuries sustained through football can negatively affect mental health in the future, including with the manifestation of depression.⁴ Consequently, this link between injury and depression is of major concern, as investigators have found that football athletes with more depression symptoms reported a history of more concussions than athletes with fewer depression symptoms.⁴ However, the research linking mental health symptoms and football has led to differing results. Participation in high school football did not appear to lead to later-life cognitive impairments or depression, and school sport participation during adolescence predicted fewer depression symptoms, less perceived stress, and better self-reported mental health in adolescents.^{5,6} Furthermore, Deshpande et al noted that high school football did not appear to be a major risk factor for early adulthood depression.⁷ Yet these data were from the 1994–1995 school year and may not accurately reflect the current association between football participation and mental health. Therefore, understanding this relationship in a different generation of adolescent football athletes and identifying factors that may improve mental health or protect against mental illness in this population are critically needed.

Social support may positively influence interpersonal relationships in adolescent football athletes. Engaging in football may provide community and, therefore, allow for the development of social support networks that can include family, teammates, and coaches.² These networks may be beneficial when handling the various physical, performance, and life stressors that athletes encounter and may serve as a pertinent mediator between football participation and the development of mental illness. One theoretical model that offers further support for the role of football as potentially protective against the negative consequences of stressors is the stress-buffering hypothesis.⁸ The stressbuffering hypothesis proposes that social support can attenuate the stress appraisal response and reduce the physiological stress reaction, thereby making an individual healthier and less reactive to stressors.8 Specifically, the perceived availability of social support can help to weaken the relationship between perceived stress and negative health conditions, such as depression, anxiety, or both.⁸ Previous researchers have suggested that perceived social support helps to lessen psychological responses postinjury and decrease symptoms of burnout and is associated with improved mental well-being in athletic populations.9,10

Interestingly, Petrie et al observed that family social support moderated the effects of the stress-injury relationship in collegiate football players.¹¹ Football athletes who reported a low level of family social support during periods of high life stress lost more time due to injury than those with high levels of family social support.¹¹ This same relationship was not seen for social support supplied by friends. However, we do not know if similar relationships exist in adolescent football players. Also, the role of social support as a buffer against various stressors and a protective variable against mental health symptoms in adolescent football athletes is unclear.

To date, few authors have examined the relationships among social support, psychological stress, and mental health in adolescent football athletes. Despite the large number of adolescent football participants in the United States, a multifaceted exploration of the stress-buffering hypothesis is lacking in this population.¹ Football was the most popular high school sport for males in the southeastern United States, where data collection occurred, and provided access to sport in secondary schools that might not have offered many sporting opportunities due to a lack of resources.¹ Further, American football is a sport in which Black and African American males are overrepresented, but the literature addressing the mental health of racial and ethnic minority individuals is sparse.¹² It is imperative to continue to diversify mental health research and our understanding of protective mechanisms to preserve the mental health of at-risk populations. Therefore, we determined it was necessary to include secondary schools with large racial and ethnic minority representation for this study.

Previous investigators have highlighted the importance of identifying various sources of social support and their potential mediating effect on psychological stress and mental health outcomes.¹³ Thus, the purpose of our study was to examine the relationships among perceived social support, physical and life stress, and mental health in adolescent football athletes after a competitive athletic season. We hypothesized that higher levels of stress and (2) fewer depression and anxiety symptoms in adolescent football athletes.

METHODS

Participants

This study was approved by the University of Alabama Institutional Review Board before data collection. Inclusion criteria were being a high school athlete between the ages of 13 and 18 years currently on the official roster of a school-sponsored football team. Participants were high school athletes from 4 high schools in school districts across Tuscaloosa, Dallas, Jefferson, and Pickens counties in Alabama. All 4 high schools have Title I status, consisting of a large racial and ethnic minority demographic in both urban and rural counties. All enrolled athletes and their parent or legal guardian completed and signed assent and consent forms, respectively, before participation. The survey was administered within 2 weeks of completing the last official competition of the fall 2021 football season.

Measures

Demographic information collected included age, sex, race or ethnicity, medical history including depression and anxiety, free or reduced-price lunch status, and subjective social status. Earlier authors have indicated that receiving a free or reduced-price lunch can be used to assess adolescent socioeconomic status and is correlated with community-based measures such as the percentage of families in poverty.¹⁰ The MacArthur Subjective Social Status Scale for Youth was administered to obtain a subjective evaluation of the socioeconomic status of the examinee and family. This measure has been validated in adolescents.¹⁴ The

MacArthur Subjective Social Status Scale requires participants to rank their perception of self and family status on a scale of 1 to 10, with higher scores reflecting higher perceived social status.

Instrumentation

Participants completed iPad-administered questionnaires that assessed social support, stress, and mental health using the National Institutes of Health (NIH) Toolbox Application and the Patient-Reported Outcomes Measurement Information System (PROMIS) scales.^{15,16} Emotional support was measured using the NIH Toolbox Emotional Support scale. Scores from the 7-item scale ranged between 7 and 35; higher scores indicated higher levels of perceived emotional support. This scale is part of a larger Emotion Battery of the NIH Toolbox and evaluates social relationships in pediatric populations. This scale has shown excellent reliability ($\alpha = 0.91$).¹⁵

The PROMIS Family Relationships and Peer Relationships scales assessed the quality of perceived social support and acceptance from each participant's family and peers.^{16,17} Stress was measured using the PROMIS Psychological Stress scale¹⁸ and mental health was evaluated using the PROMIS Depression and Anxiety scales.¹⁹ All PROMIS measures were 8-item questionnaires with scores ranging from 8 to 40. Higher scores on the PROMIS measures indicated a higher level of the measured construct. As such, higher scores on social support measures and lower scores on stress and mental illness measures would be preferable. The psychometric properties of these PROMIS measures were assessed in pediatric populations, which demonstrated excellent reliability for the Psychological Stress ($\alpha = 0.87$), Family Relationships ($\alpha = 0.94$), Peer Relationships ($\alpha = 0.85$), Depressive Symptoms ($\alpha =$ 0.94), and Anxiety Symptoms ($\alpha = 0.91$) scales.^{18,20,21}

Procedures

Participants completed the survey in a quiet classroom setting and were supervised throughout the process. The questionnaires were administered on iPads with the preloaded NIH Toolbox and PROMIS measures. All respondents were given standardized instructions before beginning. Completion of the survey took approximately 5 to 10 minutes. Participants were informed of their ability to skip survey items or withdraw from the study at any time without consequence. Those who had incomplete data on any of the scales were excluded from the analyses.

Statistical Analysis

All data were analyzed using SPSS (version 27; IBM Corp). Descriptive statistics were used to characterize the sample for age, sex, race or ethnicity, history of mental health diagnoses, and subjective social status. The scores for each scale were summed, and T-score means, SDs, and normality were assessed. Pearson correlations were calculated between all outcomes, and 3 multiple regression analyses were performed. Each model consisted of 3 types of social support (emotional support, family relationships, and peer relationships) as independent variables, and the outcomes of interest were psychological stress, depression, and anxiety. Statistical significance was set a priori to P < .05. The sample size was

adequately powered to detect a medium bivariate correlation $(1 - \beta = 0.90)$ and medium effect size for an individual β weight in the regression equation $(1 - \beta = 0.98)$.²²

RESULTS

Sample Characteristics

A total of 96 participants completed at least part of the survey, and 3 were excluded due to missing survey items on the Emotional Support scale. The final sample consisted of 93 high school football athletes, 13 to 18 years old, who completed the entire survey (Table 1). Approximately 62% (n = 57) of participants were older adolescents aged 16 to 18 years, whereas 38% (n = 35) were younger adolescents aged 13 to 15 years. The mean age was 15.67 ± 1.21 years. All participants were male, and 98.9% (n = 92) identified as Black or African American. Most athletes (93.5%; n = 87) were eligible for a free or reduced-price lunch at school, which is a traditional measure of socioeconomic status. Regarding subjective social status on a 10-point scale, the family mean was 6.57 ± 1.89 and the individual mean was 7.32 ± 1.86 .

These ratings indicate that participants viewed themselves having slightly higher family social status and individual social status than other adolescent populations.^{11,12} Lastly, 17.2% (n = 16) and 15.1% (n = 14) of participants reported a history of depression or anxiety, respectively. As shown in Table 2, mean T-scores for all measures revealed roughly average ratings compared with the US population, with all values approximating the population average (50 ± 10).

Correlation analyses yielded moderate to strong correlations between social support, stress, and mental health (Table 3). Specifically, psychological stress was moderately and negatively correlated with the 3 types of social support; family relationships demonstrated the strongest relationship (r = -0.412). Psychological stress was also strongly and positively correlated with depression (r = 0.751) and anxiety (r = 0.732). Social support was negatively correlated with mental health; however, only emotional support (r = -0.367) and family relationships (r = -0.323) were significantly related to less depression, and only family relationships (r = -0.217) were significantly related to less anxiety. Peer relationships were related to neither depression nor anxiety. Depression and anxiety were highly correlated (r = 0.811).

We conducted 3 multivariable linear regression analyses. Separate models were calculated with psychological stress, depression, and anxiety as dependent variables to further explain the relationships between variables (Table 4). Emotional support, family relationships, and peer relationships were included as independent variables in each model to assess their ability to predict mental health. In the first model, emotional support, family relationships, and peer relationships collectively predicted psychological stress (F = 7.094, P < .001, $R^2 = 0.191$). In the second and third models, the 3 social support measures again collectively predicted depression ($F = 5.323, P < .001, R^2 = 0.151$) and anxiety $(F = 1.644, P = .190, R^2 = 0.052)$. Per conventional rules of thumb,²³ the prediction of psychological stress ($R^2 = 0.191$) and depression ($R^2 = 0.151$) was associated with moderate effect sizes for the overall model, whereas the prediction of anxiety symptoms resulted in a small effect size ($R^2 = 0.052$). The only independently

Table 1. Sample Characteristics (N = 93)

Variable	No. (%)
Age, y	
13	1 (1.1)
14	15 (16.1)
15	19 (20.9)
16	30 (33.0)
17	26 (28.6)
18	1 (1.1)
Sex	
Male	93 (100.0)
Race or ethnicity	
Black or African American	92 (98.9)
Other	1 (1.1)
Eligible for free or reduced-price lunch	87 (93.5)
MacArthur Subjective Social Status	
Family	
1–5	28 (31.1)
6–10	62 (68.9)
Self	
1–5	18 (20.0)
6–10	72 (80.0)
History of depression	16 (17.2)
History of anxiety	14 (15.1)

significant variable associated with psychological stress was family relationships ($\beta = -0.258$, P = .032), and emotional support ($\beta = -0.284$, P = .023) was the only variable independently associated with depression symptoms. No independently significant predictors of anxiety symptoms were observed.

DISCUSSION

Compared with the normative population, our findings suggest average levels of social support as well as average levels of stress, depression, and anxiety among a sample of primarily Black and African American adolescent boys after a competitive football season. Emotional support and family relationship sources of social support demonstrated negative correlations with psychological stress, depression, and anxiety, and not surprisingly, greater psychological stress and worse mental health were highly correlated. In a regression model, better reported family relationships and emotional support independently predicted lower levels of psychological stress and depression, respectively. Psychological stress is often a precursor to the development of mental health conditions such as depression.²⁴ Involvement in sports allows adolescents to be part of a team collective and provides opportunities to interact with coaches, peers, teammates, family, and the community. Evidence indicates that social support networks, garnered through sport participation, may act as a potentially protective factor against the development of mental illness.

Support for this proposed mechanism is elicited from the stress-buffering hypothesis.8 The stress-buffering hypothesis posits that perceived social support may aid in limiting the detrimental effects of psychological stress on mental health.⁸ This theoretical model helps to explain the inverse correlations between sources of social support and psychological stress, depression, and anxiety noted in the current sample. The regression equations showed that emotional support and family relationship sources of social support were associated with depression symptoms and psychological stress, respectively. Thus, emotional support may provide unique contributions in reducing depression and familial support may assist in reducing stress. Though the stress-buffering hypothesis has not explicitly been applied to this population, researchers have identified similar relationships between social support from family and perceived stress, mental health symptoms, and other mental wellbeing indicators.²⁴

Compared with psychological stress and depression, anxiety displayed much smaller relationships with social support according to the bivariate correlations, with only family relationships modestly associated with anxiety. The social support variables had the smallest collective relationship with anxiety in the regression models compared with stress and depression. Previous investigators have proposed that social support has a moderating effect on anxiety symptoms in adults²⁴; however, little is known about this association in adolescent populations or in individuals of minoritized racial or ethnic identities. During this window of development, levels of social comparison may be "high," frequently exacerbated by social media usage.²⁵ Adolescents have a desire to belong and may use various sources of social support to protect against victimization (eg, social exclusion or rejection), often at the hands of peers.²⁵ These types of victimization are strong predictors of social anxiety in this population.²⁵ This may help to explain the protective role of family relationships and overall emotional support against psychological stress and depression but not anxiety.

Additionally, peer support had much weaker, nonsignificant bivariate relationships with stress and mental health than family relationships and emotional support, a finding that is consistent with earlier research in adolescents.²⁶ Authors have suggested an individual's social support needs may fluctuate throughout adolescence and into young adulthood.²⁶ For example, Demaray and Malecki found that elementary-aged students reported higher levels of social support than middle school– and high school–aged students, and middle school students reported higher levels of social support than high school–aged students.²⁷ Further, elementary-aged students described higher levels of social support from classmates and peers.²⁷ Therefore, different sources of support may influence stress and mental health

Table 2. Postseason Social Support, Stress, and Mental Health Symptoms

Measure	Range	T-Score, Mean \pm SD	Minimum	Maximum	Skewness	Kurtosis
Emotional support	7–35	47.24 ± 9.79	13	33	-0.361	-0.993
Family relationships	8–40	50.13 ± 10.10	16	40	-0.668	-0.561
Peer relationships	8–40	47.41 ± 9.29	16	40	-0.310	-0.438
Depression symptoms	8–40	49.85 ± 11.77	8	39	1.138	0.804
Anxiety symptoms	8–40	47.86 ± 11.45	8	36	1.073	0.825
Psychological stress	8–40	52.08 ± 10.68	8	34	0.442	-0.899

Table 3. Correlation Coefficients Matrix

Measure	Emotional Support	Family Relationships	Peer Relationships	Psychological Stress	Depression Symptoms	Anxiety Symptoms
Emotional support	NA	· ·			, , , , , , , , , , , , , , , , , , , ,	
Family relationships	.579ª	NA				
Peer relationships	.397ª	.370ª	NA			
Psychological stress	386 ^a	412 ^a	265 ^b	NA		
Depression symptoms	367 ^a	323 ^b	158	.751ª	NA	
Anxiety symptoms	200	217 ^b	149	.732ª	.811ª	NA

Abbreviation: NA, not applicable.

^a $P \le .001$.

^b $P \le .05$.

to varying degrees as children and adolescents mature, with reductions in quality peer support as development advances.

Given the increased prevalence of mental illness in American youth,²⁴ it is imperative to consider effective prevention strategies, including the positive implications football participation may have on this population. This examination would be especially salient among local communities that build social cohesion and relationships around football. The mental health benefits of sport cannot be understated in developing youth and adolescents.² Although we specifically examined football athletes, participation in other sports may offer the same protective benefits. Thus, athletic trainers should continue to advocate for access to sport among youths, given the positive implications. Further, continued participation in sport throughout childhood and adolescence may provide resources in the form of social support that help develop positive coping strategies and preserve mental health. Sport participation should then be encouraged for this demographic. Athletic trainers can educate various stakeholders on the benefits of sport from the physical and psychological perspectives. Lastly, within existing athletic teams and patient populations, athletic trainers can promote the development of social support networks through sport. Athletic trainers can generate dialog with stakeholders, including coaches and administrators, about the importance of their own relationships with the athlete and the benefit of cultivating a trusting connection. They can also work to develop positive and trusting relationships from a clinician standpoint and

Table 4.	Multivariable Linear	Regression	Analyses
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Variable	β Coefficient	P Value	R ² Value
Model 1			
Psychological stress			0.191
Emotional support	-0.210	.083	
Family relationships	-0.258ª	.032ª	
Peer relationships	-0.044	.673	
Model 2			
Anxiety symptoms			0.052
Emotional support	-0.116	.372	
Family relationships	-0.136	.290	
Peer relationships	-0.008	.946	
Model 3			
Depression symptoms			0.151
Emotional support	-0.284ª	.023ª	
Family relationships	-0.168	.170	
Peer relationships	0.044	.686	

^a *P* < .05.

promote a supportive environment in the clinic. Strategies can include using a patient-centered care approach, providing tailored feedback and supportive messages to the patient, and encouraging social integration in the context of sport.

Though this study only represents a snapshot of how social support can likely reduce the manifestation of psychological stress and depression symptoms, other important data elements should also be discussed. Our sample overwhelmingly comprised Black and African American adolescents who embody a historically excluded group in psychological research. These results add representation in the psychological and sports medicine research spheres and highlight the importance of social support for adolescent athletes. Previous researchers have suggested racial or ethnic minorities reported increased levels of stress even after adjusting for sociodemographic factors such as age, sex, and socioeconomic status²⁸; however, the breadth of studies conducted in adolescent populations is limited. Although Black and African American adults are known to experience the highest risk of cumulative stress and describe an increased prevalence of mental illness, little is known about the stress and mental well-being of Black and African American adolescents.²⁸ The absence of such literature is concerning given the strong patterns of chronicity of mental health conditions and the long-term effects of such challenges across the lifespan.

Among this sample of football athletes, the majority qualified for a free or reduced-price lunch, and more than 40% of Black children living in the counties represented in these data live in poverty.²⁹ Despite higher poverty, most athletes rated their family social status as 6 to 10, which indicates more perceived wealth and prestige. Additionally, 80% of the athletes ranked themselves as having higher social status than their peers at school. Similar to the way in which socioeconomic status can provide a mechanism for less psychological stress in adulthood, subjective social status has been associated with lower levels of stress in adolescence, and this may explain why the current sample, despite experiencing socioeconomic disparities, rated their levels of stress, depression, and anxiety as average.¹⁴

Decreased psychological stress and minimal mental health symptoms in adolescence are associated with improved academic engagement, fewer absences, and higher college enrollment, which may serve secondary schools through academic accountability, high-stakes testing, and educational policy decision-making.²⁰ It is recommended that schools prioritize the growth, maintenance, and retention of sports to benefit their student body.³⁰ Promoting sports participation may also interest policymakers, as decreased stress and mental health symptoms are also associated with decreased rates of crime, delinquency, and violence in both adolescent and adult populations.³¹ These benefits may be especially salient in communities experiencing poverty and disparate economic opportunities. Coaches, parents, and other stakeholders can be deliberate in building social support through sport by establishing trusting relationships with adolescent athletes, promoting team activities that encourage supportive behaviors among teammates, and supplying opportunities for conflict resolution within a team. To this end, adolescent sport participation should be encouraged and supported by various stakeholders for the short- and long-term benefits it may produce through social support's moderating effect on stress and mental health symptoms.

Adolescence marks a critical opportunity for facilitating optimal development and functioning; thus, future researchers should continue to study stress and mental health symptoms in this population, particularly for factors that can moderate or offer protective mechanisms such as social support. Of marked importance is the opportunity to expand psychological research in historically excluded and minoritized populations, particularly in the field of athletic training. Authors of future investigations should examine stress and mental health symptoms from a multifaceted perspective due to the dynamic nature of mental well-being and the potential to uncover interacting or compounding effects among variables. Specific to sport participation, stress, and mental health symptoms, future researchers should consider comparing athlete and nonathlete populations to advance our perspective on the effects of sport participation. Similarly, including diverse populations with variations in age, sex, gender, sport, and geographic region would be beneficial to expanding the mechanisms through which sport participation can influence mental well-being.

It is important to note the limitations of this study. First, participants were recruited from 4 high schools within 1 geographic region, and this must be considered when interpreting and generalizing the findings. Further, participants largely represented similar demographics in sport played, sex, and race reported, which limits generalizability to other demographic groups. However, we do believe research in racially diverse groups is imperative to the field. Lastly, given the nature of the self-reporting instrumentation used, we cannot guarantee that all individuals responded honestly.

CONCLUSIONS

We examined a sample of primarily Black and African American boys playing high school football and demonstrated that, despite exposure to a competitive football season, they reported average levels of stress and mental health. They also experienced average levels of family and emotional support, which were related to better mental health. In spite of its known risks, participation in football may also offer a feasible and economical means of preserving positive indicators of mental well-being in an adolescent population and should continue to be explored for these effects. Many elements of sports participation can benefit adolescents' mental health, and researchers should continue to assess the risks and benefits of contact-sport involvement.

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