

Depressive Symptoms Among Competitive High School Student-Athletes

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Adolescent athletes face documented mental health risks, yet research has largely treated them as a single group, giving little attention to how psychological burdens are distributed across racially and ethnically diverse youth or to competitive athletes while still in high school. This study examined depressive symptoms, sport anxiety, academic stress, mental health, and academic performance among 147 competitive high school student-athletes (ages 14 to 18; 78% male). Minoritized athletes reported significantly higher depressive symptoms than their white peers ($d = 0.70$), a difference corroborated by parametric and nonparametric tests, significant for MENA and Black athletes and directionally present for the remaining groups. The difference was largest for depressive symptoms; contrasts for sport anxiety, academic stress, and academic performance were small and nonsignificant, though confidence intervals did not exclude modest differences. The depressive symptom difference persisted essentially unchanged after adjusting for primary sport, indicating that it was not attributable to the uneven distribution of racial and ethnic groups across sports. Training hours, years of experience, level of play, and grade level showed no main-effect associations with any outcome. The pattern is consistent with, but does not test, the hypothesis that social position rather than athletic involvement underlies the disparity, and that adults supporting athletes through high school should attend to depressive symptoms that sport-specific and academic stress measures do not capture. As high school sports become more public and high-stakes, and performance pressure increases, understanding the mental health and psychological burdens young athletes go through is both a research opportunity and a responsibility.

Keywords: student-athletes, competitive athletes, depressive symptoms, academic outcomes, race/ethnicity, adolescents

Introduction

Competitive sport occupies a central place in the lives of many American adolescents, and for a subset of talented high school athletes, participation is organized around being the very best at their respective sport. These athletes carry the academic and social demands common to adolescence alongside the pressures of high-level competition. Although a growing literature documents mental health concerns among athletes^{1,2}, including adolescents³, far less is known about how these burdens are distributed across racially and ethnically diverse youth or about athletes navigating competitive sports while still in high school. The present study examines depressive symptoms, sport anxiety, academic stress, and academic performance among racially and ethnically diverse competitive high school student-athletes.

The Mental Health Landscape of Adolescent Athletes

Adolescent athletes face the everyday stressors of adolescence⁴ alongside sport-specific demands such as competition

and performance pressure. Depression and anxiety are among the most commonly cited psychological concerns³ for adolescent athletes, and prevalence among elite athletes appears broadly comparable to that of the general population². A systematic review and meta-analysis found that roughly one third of current elite athletes reported symptoms of anxiety or depression, with prevalence ranging from 19% to 34% across outcomes¹.

Stress is similarly prevalent. 91% of high school athletes experience at least some sport-related stress, and 58% report moderate or higher stress, with fear of failure and self-pressure the most commonly reported sources⁵. Notably, 27% of those reporting moderate to extreme stress wanted professional help but did not receive it⁵.

For talented high school athletes, these pressures are exacerbated by the evaluative and forward-looking nature of competitive sport. Performance is constantly assessed in tryouts, showcases, and games, and for many athletes the perceived stakes extend beyond the current season to the prospect of playing in college, a process that begins informally in camps and showcases and can be unresolved for months^{6,7}. Identifying

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tity is implicated: high-level athletes' self-worth is frequently bound up in the athlete role^{8,9}, so that outcomes can be felt as a verdict on an athlete's value, and parents' financial investment and expectations further add pressure¹⁰. Most research in the experience of student-athletes comes from current collegians^{6,11}, and there is little understanding of competitive athletes at the high school developmental moment when identity is still being formed¹².

Racial and Ethnic Differences in Adolescent Mental Health

Decades of developmental research show that youth from racial and ethnic minority backgrounds show patterns of internalizing problems that differ from those of their white peers, not as a sign of uniform deficit but through varying directions and varying processes^{13,14}. Meta-analytic research indicates that racial and ethnic discrimination is associated with increased internalizing and externalizing symptoms among Black, Latinx, and Asian American youth¹⁵, and depressive symptoms were prevalent among multiracial adolescents, with rates varying widely depending on measurement of race and symptoms¹⁴. This suggests that patterns are context- and method-dependent rather than inherent to any particular racial group.

Across this literature runs a consistent idea that disparities in internalizing outcomes stem from social location, not inherent qualities of race and ethnicity itself. The integrative model of García Coll and colleagues¹⁶ positions race and ethnicity as dimensions of social position that mediate the impact of external stressors and the resources available to manage them, and Spencer's¹⁷ phenomenological variant of ecological systems theory positions individual meaning-making within a specific ecological niche as critical in shaping outcomes from otherwise identical structural conditions. Consistent with these frameworks, racial discrimination is a documented correlate of depressive and anxious symptoms among Black, Latino, and Asian American adolescents^{15,18}. Ethnic-racial identity has been proposed as a potential buffer against the negative effects of discrimination on mental health¹², although meta-analytic evidence shows little buffering at the group level¹⁵. Whether these processes operate similarly among competitive high school athletes is unclear, as most research on athlete mental health has treated this population as an aggregated whole.

Theoretical Framework

Adolescence is a period of heightened identity salience¹² and heightened sensitivity to social evaluations¹⁹, and a developmental contextual perspective locates these processes within the proximal settings in which adolescents spend their time. For adolescents in competitive sport, the athletic setting con-

stitutes one such proximal context, one in which performance is continually appraised, standing is publicly contested, and future opportunities are perceived to be at stake. Because athletic identity⁹ is often at its strongest during adolescence and intensifies with transitions to higher levels of play²⁰, grade level serves as an index of developmental timing within the athletic domain. We also draw on an intersectional lens²¹ to frame the athletic setting as one that is not experienced uniformly across social groups. The integrative model¹⁶ further explains that the effects of social position are shaped by the proximal settings youth occupy. Because primary sport is one such setting and was associated with race and ethnicity in this sample, we ask whether any group differences in depressive symptoms persist once sport is taken into account. Our analyses estimate group differences and their robustness to sport, not interactions among social positions.

The Present Study

First, we describe depressive symptoms, sport-specific anxiety, academic stress, and academic performance across racial and ethnic groups. We expected minoritized athletes to report greater depressive symptoms than their white peers, although given uneven group sizes this prediction was treated as exploratory. Second, we examined whether athletic load and grade level are associated with these outcomes and whether grade level moderates the relation between athletic load and depressive symptoms; these analyses were likewise exploratory. Third, because sport participation patterns differ by race and ethnicity in prior work and primary sport was unevenly distributed across groups in this sample, we tested whether any racial and ethnic differences in depressive symptoms persist after adjusting for sport, hypothesizing a priori that the difference would persist.

Methods

Participants

Participants were 147 high school student-athletes (77.6% male, 22.4% female) ages 14 to 18 ($M = 15.97$, $SD = 1.39$), distributed relatively evenly across grades 9 through 12. With respect to race and ethnicity, 27.2% identified as white and 72.8% as members of a minoritized group (see Table 1). All participants were active competitive athletes ranging from junior varsity to national teams. On average, participants had competed in their primary sport for 6.41 years ($SD = 2.50$) and trained 12.92 hours per week in season ($SD = 4.61$). Participants were recruited from Bergen Catholic High School, Real Futbol Academy, and through personal contacts of the research team. Eligible participants were enrolled in grades 9 through 12 in U.S. high schools and actively competing in an

organized sport. Eligibility was established through recruitment source rather than a screening item: participants were rostered athletes at the two organized sites or were identified as active competitive athletes by the research team's personal contacts, and every participant reported a current competitive level of play on the survey. Recruitment status (e.g., contact with college programs, offers held) was not assessed.

Bergen Catholic is an all-male school, so the 33 female participants were recruited through Real Futbol Academy. Since the survey asked for primary sport, academy participants could report a sport other than soccer, and female athletes were represented in all three team sports.

Procedure

The study protocol was designed and conducted by high school student researchers and was not reviewed by an institutional review board. The research questions and survey instruments were approved by administrators at Bergen Catholic High School and Real Futbol Academy. Parental permission was not sought. The first page of the anonymous survey presented information and consent statements, and participants could not proceed to the survey items without indicating agreement. The survey was administered via Google Forms, which took approximately 10 minutes to complete. No identifying information was requested, and no compensation was offered.

Measures

Academic Performance, Athletic Involvement, and Demographics

Academic performance was indexed by self-reported cumulative grade point average (GPA) on a 4.0 scale. Participants reported their primary sport in an open-ended item, later coded into soccer, basketball, football, or other; the number of years they had competed in their primary sport and the average hours per week they trained in season, both as open-ended numeric items (two free-text responses were recoded, one to the stated number of years and one to missing because it did not contain a value); and their highest current level of play from five options (varsity, junior varsity, club, travel, or national team). Demographic items included age in years (open-ended), grade level (9, 10, 11, or 12), and sex (male or female). Race and ethnicity were assessed with a single-select item with five options: White; Middle Eastern or North African; Black or African American; Asian, with an optional subgroup write-in; and Other, with an optional write-in. No participant used either write-in, so the 27 participants who selected "Other" cannot be further characterized. The item did not include a separate Hispanic or Latino option, so Latino participants

may have selected White, Other, or another category, and because the item was single-select, multiracial participants could not be identified. Race and ethnicity were analyzed both as the five-category variable and as a dichotomous contrast between white and minoritized participants, given uneven cell sizes across the five groups.

Depressive Symptoms

Depressive symptoms were measured using the Depression Anxiety Stress Scales (DASS^{22,23}). Participants rated how much each statement (e.g., I felt down-hearted and blue, I felt that I had nothing to look forward to) applied to them over the past week on a 4-point scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Item responses were summed, with higher scores indicating greater depressive symptoms (possible range 0 to 21). Internal consistency in the present sample was marginal (Cronbach's alpha = .69).

Sport Anxiety

The 15-item Sport Anxiety Scale-2 (SAS-2²⁴) assessed cognitive and somatic anxiety experienced before or during competition across three subscales: Somatic Anxiety (5 items; e.g., My body feels tense), Worry (5 items; e.g., I worry that I will not play well), and Concentration Disruption (5 items; e.g., It is hard to concentrate on the game). Participants rated each item on a 4-point scale ranging from 1 (not at all) to 4 (very much). Item responses were summed to form a total sport anxiety score, with higher scores indicating greater sport anxiety (possible range 15 to 60). Internal consistency for the total score in the present sample was acceptable (Cronbach's alpha = .70).

Academic Stress

The 16-item Educational Stress Scale for Adolescents (ESSA²⁵) assessed pressure from study, workload, worry about grades, self-expectation, and despondency; items were summed, with higher scores indicating greater academic stress (Cronbach's alpha = .72).

Academic Performance, Athletic Involvement, and Demographics

Academic performance was indexed by self-reported cumulative grade point average (GPA) on a 4.0 scale. Participants also reported their primary sport in an open-ended item, later coded into categories; years competing in their primary sport; the average hours per week they trained in season; highest current level of play (varsity, junior varsity, club, travel, or national team); and their age, grade level, sex, and race and ethnicity. Race and ethnicity was analyzed both as a five-category variable (White, Middle Eastern or North African, Black, Asian, and Other) and as a dichotomous contrast between white and

minoritized participants, given uneven cell sizes across the five groups.

Analytic Strategy

Analyses were conducted in R software²⁶. For Aim 1, group differences in the four outcomes were tested with one-way analyses of variance across the five racial and ethnic groups, corroborated by nonparametric Kruskal-Wallis tests given uneven cell sizes with Dunnett post hoc comparisons of each group against white athletes and Tukey HSD tests for all pairwise comparisons, and followed by Welch's tests comparing minoritized and white athletes. To keep group-specific patterns visible, each minoritized group was also contrasted with white athletes in the covariate-adjusted model, with 95% confidence intervals, and the four minoritized groups were tested for differences among themselves. The pooled contrast was then re-estimated, excluding MENA participants, excluding other participants, and excluding both, to assess whether the effect depended on either category. For Aim 2, each outcome was regressed on weekly in-season training hours, grade level, and their interaction, controlling for sex, racial and ethnic group, level of play, and years competing; simple slopes were probed at successive grade levels. For Aim 3, the model predicting depressive symptoms was re-estimated with primary sport added among participants in the three team sports with adequate representation (soccer, basketball, and football). Missing data were negligible. One participant did not report GPA, and one provided an uninterpretable response for weekly training hours (both < 1%); these cases were excluded listwise from analyses involving those variables, and all other variables were complete. A sensitivity power analysis indicated that, with 80% power and two-sided $\alpha = .05$, the design could detect a minoritized versus white difference of $d = 0.52$, group-specific differences from white athletes of $d = 0.64$ (MENA), 0.71 (Other), 0.73 (Black), and 0.83 (Asian), and an interaction increment of approximately $\Delta R^2 = .05$.

Results

Preliminary Analyses

Internal consistency was acceptable to marginal across the three scales (alphas of .69 for depressive symptoms, .70 for sport anxiety, and .72 for academic stress). Because reliability in this range attenuates observed associations somewhat, significant effects may modestly underestimate the corresponding population values. The distribution of participants across demographic and athletic categories is shown in Table 1, and descriptive statistics for the study variables are presented in Table 2. Depressive symptoms and sport anxiety were modestly associated ($r = .30$, $p < .001$), as were sport anxiety and

academic stress ($r = .21$, $p = .01$), whereas depressive symptoms and academic stress were not significantly related ($r = .08$). Academic performance was unrelated to the three depressive symptom measures. The outcomes captured related but distinguishable constructs rather than a single underlying dimension of depressive symptoms.

Aim 1: Group Differences in Psychological and Academic Outcomes

Group means and omnibus tests are presented in Table 3. A statistically significant difference emerged for depressive symptoms, $F(4, 142) = 4.90$, $p < .001$, $\eta^2 = .12$, and this result was corroborated by a nonparametric Kruskal-Wallis test, $\chi^2(4) = 19.62$, $p < .001$. Post hoc comparisons against white athletes ($M = 6.10$, $SD = 2.88$) indicated significantly higher depressive symptoms among Middle Eastern and North African athletes (mean difference = 2.74 , 95% CI [$1.17, 4.32$], $p < .001$) and Black athletes (mean difference = 1.90 , 95% CI [$0.13, 3.67$], $p = .031$), with directionally higher but non-significant differences for Other (mean difference = 1.34 , 95% CI [$-0.39, 3.08$], $p = .18$) and Asian athletes (mean difference = 1.37 , 95% CI [$-0.64, 3.38$], $p = .29$). No two minoritized groups differed from each other (Tukey HSD, all $p > .27$). No significant group differences emerged for sport anxiety, $F(4, 142) = 0.42$, $p = .79$, academic stress, $F(4, 142) = 0.73$, $p = .57$, or academic performance, $F(4, 141) = 1.10$, $p = .36$.

The white versus minoritized contrast was the primary planned analysis, specified a priori because several racial and ethnic groups were represented by relatively small sample sizes. Minoritized athletes reported significantly higher depressive symptoms than their white peers ($M = 8.07$, $SD = 2.79$ versus $M = 6.10$, $SD = 2.88$), $t(68.01) = 3.73$, $p < .001$, $d = 0.70$. The corresponding contrasts for the three other outcomes were nonsignificant—sport anxiety (mean difference = 0.23 , 95% CI [$-1.74, 2.20$], $d = 0.05$), academic stress (mean difference = 1.32 , 95% CI [$-1.36, 3.99$], $d = 0.21$), and academic performance (mean difference = 0.01 , 95% CI [$-0.09, 0.11$], $d = 0.03$). Their confidence intervals included small-to-moderate effects in either direction. These results indicate that the depressive symptom difference was the largest and the only one distinguishable from zero, not that the groups were equivalent on the other outcomes.

Adjusted for sex, grade level, level of play, weekly training hours, and years competing, depressive symptoms were higher than among white athletes for MENA ($b = 2.71$, 95% CI [$1.48, 3.94$]), Black ($b = 2.01$, 95% CI [$0.60, 3.43$]), and Other ($b = 1.59$, 95% CI [$0.20, 2.99$]) athletes, and directionally higher for Asian athletes ($b = 1.30$, 95% CI [$-0.26, 2.85$]), whose small group size yielded the widest interval (Table 4). The four minoritized groups did not differ from one another, $F(3, 96) = 1.62$, $p = .19$. The pooled contrast remained significant

when MENA athletes were excluded ($b = 1.69$, 95% CI [0.56, 2.81], $p = .004$), when Other athletes were excluded ($b = 2.18$, 95% CI [1.07, 3.29], $p < .001$), and when both were excluded ($b = 1.74$, 95% CI [0.37, 3.10], $p = .013$). The pooled coefficient should therefore be read as an average across groups whose individual estimates ranged from 1.30 to 2.71, with MENA athletes contributing the largest share, rather than as evidence of a single shared experience.

Aim 2: Athletic Load, Developmental Timing, and Their Interaction

Full regression results are presented in Table 5. In multiple regression models that controlled for sex, racial and ethnic group, grade level, level of play, and years competing, weekly in-season training hours were not significantly associated with depressive symptoms ($b = 0.05$, $p = .32$), sport anxiety ($b = 0.09$, $p = .28$), academic stress ($b = -0.01$, $p = .92$), or academic performance ($b = -0.00$, $p = .98$). Grade level was likewise unrelated to the psychological outcomes. The interaction between athletic load and grade level was non-significant for depressive symptoms ($b = 0.02$, 95% CI [-0.07, 0.11], $p = .62$), sport anxiety ($b = -0.02$, 95% CI [-0.17, 0.13], $p = .83$), and academic stress ($b = 0.04$, 95% CI [-0.16, 0.24], $p = .69$), and did not improve fit for any of the three (all $\Delta R^2 \leq .002$). An unhypothesized interaction emerged for academic performance ($b = -0.011$, 95% CI [-0.020, -0.003], $p = .010$, $\Delta R^2 = .046$). That is, weekly training hours were associated with slightly higher GPA among 9th graders ($b = 0.016$, $p = .045$) and slightly lower GPA among 12th graders ($b = -0.018$, $p = .028$), with nonsignificant slopes in grades 10 and 11. Given its small magnitude and exploratory status, this finding requires replication. Simple slopes at successive grade levels were flat. Minoritized status remained a significant predictor after adjustment for the athletic and demographic covariates ($b = 2.04$, $p < .001$), consistent with the group comparison reported under Aim 1. For academic performance, the only reliable predictor in the main-effects model was sex, with female athletes scoring lower than male athletes ($b = -0.12$, 95% CI [-0.22, -0.01], $p = .031$). The coefficient remained significant with heteroskedasticity-consistent (HC3) standard errors ($p = .038$). This association ran counter to the more commonly reported direction and was estimated from a small subsample of female athletes ($n = 33$), and it should therefore be interpreted with caution. None of these psychological outcomes predicted academic performance, and their addition did not account for significant changes in performance beyond the covariates, $F(3, 132) = 1.24$, $p = .30$. These associations were estimated within a restricted GPA range (see Limitations).

Aim 3: Racial and Ethnic Differences in Depressive

Symptoms Adjusting for Sport

Minoritized athletes made up a larger share of basketball players (83%) than of football (68.2%) or soccer (67.3%) players, although this imbalance did not reach significance, $\chi^2(2, N = 143) = 3.72$, $p = .16$. Because even a modest imbalance may contribute to the observed difference in depressive symptoms, we kept primary sport in the model. Depressive symptoms differed modestly across the three sports, $F(2, 140) = 3.29$, $p = .04$ (see Table 6), with basketball athletes reporting the highest mean, whereas sport anxiety, academic stress, and academic performance did not differ by sport. Minoritized status predicted depressive symptoms before adjustment for sport ($b = 2.08$, $p < .001$), and the association was essentially unchanged after primary sport was added to the model ($b = 1.96$, 95% CI [0.84, 3.08], $p < .00$). Primary sport did not account for significant variance in depressive symptoms once racial and ethnic group and the covariates were included, $F(2, 134) = 1.90$, $p = .15$, and multicollinearity was negligible (all variance inflation factors < 1.1). Because primary sport was reconstructed from open-ended responses, the adjusted estimate is bounded to team sport participation.

The pattern was consistent within sport. White athletes had the lowest mean depressive symptoms in basketball ($M = 5.88$ versus 8.12 to 9.50 across minoritized groups), football ($M = 6.79$ versus 6.91 to 9.89), and soccer ($M = 5.53$ versus 6.57 to 7.89), indicating that the disparity was not concentrated in a single sport.

Table 1 Sample Characteristics (N = 147)

Variable	Category	n	%
Grade level	Freshman	40	27.2
	Sophomore	32	21.8
	Junior	36	24.5
	Senior	39	26.5
Sex	Male	114	77.6
	Female	33	22.4
Race/ethnicity	White	40	27.2
	MENA	38	25.9
	Other	27	18.4
	Black	25	17.0
	Asian	17	11.6
Race (collapsed)	Minoritized	107	72.8
	White	40	27.2
Level of play	Varsity	28	19.0
	JV	32	21.8
	Club	32	21.8
	Travel	33	22.4
	National Team	22	15.0

Note. MENA = Middle Eastern or North African. Grade level = year in school (9-12), distinct from GPA.

Discussion

The present study examined whether psychological and academic outcomes differed across racially and ethnically diverse high school student-athletes, and whether athletic involvement or developmental timing explained any differences. Three

Table 2 Descriptive Statistics and Reliability for Study Variables

Variable	n	M	SD	Range	alpha
Age (years)	147	15.97	1.39	14-18	-
Years in primary sport	147	6.41	2.50	0-12	-
Hours/week in season	146	12.92	4.61	5-20	-
GPA (0-4.0)	146	3.59	0.26	3.11-4.00	-
Depressive symptoms (7 items)	147	7.54	2.94	0-14	.69
Sport anxiety (15 items)	147	32.67	4.61	17-42	.70
Academic stress (16 items)	147	47.78	6.38	19-68	.72

Note. alpha = Cronbach's alpha.

Table 3 Outcome Means by Race/Ethnicity, with Omnibus Tests

Outcome	Test	Asian	Black	MENA	Other
DASS	M (SD)	7.47 (2.76)	8.00 (3.48)	8.84 (2.50)	7.44 (2.33)
SAS	M (SD)	32.35 (4.68)	32.32 (4.85)	32.47 (3.73)	33.70 (3.82)
ESS	M (SD)	47.71 (9.18)	47.20 (6.70)	49.18 (4.15)	47.81 (4.25)
GPA	M (SD)	3.64 (0.29)	3.52 (0.28)	3.58 (0.26)	3.66 (0.23)

Outcome	White	ANOVA F(4,142)	eta-squared	K-W p
DASS	6.10 (2.88)	4.90, $p < .001$	.12	.001
SAS	32.50 (5.67)	0.42, $p = .79$	.01	.68
ESS	46.83 (7.67)	0.73, $p = .57$	.02	.75
GPA	3.59 (0.27)	1.10, $p = .36$	.03	.38

Note. K-W = Kruskal-Wallis (non-parametric) p-value. Only DASS (depressive symptoms) differed by race/ethnicity. Cell sizes are uneven (White 40, MENA 38, Other 27, Black 25, Asian 17); interpret the omnibus effect alongside the minoritized vs. White contrast ($d = 0.70$, $p < .001$).

findings emerged. First, minoritized athletes reported meaningfully higher general depressive symptoms than their white peers, a difference of moderate size that was corroborated across parametric and nonparametric tests. The difference was significant for Middle Eastern and North African and Black athletes, directionally present for Asian and Other athletes, and remained when the MENA or Other group was excluded from the pooled contrast.

Second, the difference was concentrated in general depressive symptoms; contrasts for sport anxiety, academic stress, and academic performance were small, and their intervals included zero, although the sample was not large enough to rule out modest differences on those outcomes. Third, the gap was not explained by sport. Taken together, the pattern rules out sport composition and the measured athletic and academic stressors as explanations and leaves social position as a hypothesis for future work to test directly.

One hypothesis consistent with the higher depressive symptoms reported by minoritized athletes is the psychological cost of navigating environments not built around one's background. Meyer's²⁷ minority stress model, developed for sexual minority populations and since extended to other marginalized groups, states that the added burden comes not from group membership itself but from chronic minority-related stress and the vigilance it requires. Racial discrimination has been linked repeatedly to poorer adolescent mental health^{18,28}, and youth-development models argue that everyday social position, not

any single stressor, shapes psychological experience over time^{16,17}. Assari further shows that the same economic and psychological resources yield systematically smaller health gains for Black Americans than for white Americans, and thus do not provide the same protection²⁹. Because high school sports are already high-stakes, evaluative processes, that evaluation may sit on top of the everyday experience of being racially or ethnically minoritized, which could help explain why a difference emerged. We did not measure discrimination, ethnic-racial identity, socioeconomic position, or related processes, so this account remains untested here. The groups compared in the present study differ in history, community context, and likely exposure to discrimination, and the comparatively large MENA group reflects the local community from which the sample was drawn. That the estimates were nonetheless similar in direction and did not differ significantly from one another is consistent with a common cost of minoritized position, though group-specific mechanisms could not be tested.

That the group difference was clearly evident for general depressive symptoms but not for sport-specific anxiety, academic stress, or academic performance suggests that whatever produced the higher depressive symptoms among minoritized athletes was not spilling over uniformly into every domain measured, with the caveat that the study lacked power to detect small differences on those outcomes and that the restricted GPA range (3.11- 4.00) limited the ability to detect academic performance differences in particular. One explanation is that sport-related pressure —tryouts, showcases, eligibility grades—is experienced fairly similarly across athletes regardless of race, since performance anxiety is a common feature of high-level sport participation generally^{2,30}, and academic demands are shared by students regardless of race. Together, these findings point away from the athletic and academic domains as the source of the disparity and toward something broader operating outside the measures used.

Our one-directional, a priori hypothesis, that the disparity would persist after accounting for primary sport, was supported. Black and white students are likely to participate in different high school sports, even when attending schools that offer the same activities; the sports that white students are more likely to participate in can be predicted by socioeconomic factors and students' neighborhood, while those that Black students are more likely to participate in can be predicted by race³¹, which made sport a plausible alternative explanation. Adjusting for primary sport left the minority-depressive symptoms association essentially unchanged. This makes a fairly intuitive alternative unlikely, at least among team-sport athletes, and is consistent with the hypothesis that social position carries psychological weight on its own. The pattern fits evidence that socioeconomic resources alone do not account for racial disparities in health²⁹.

Table 4 Depressive Symptoms by Racial and Ethnic Group Relative to White Athletes, and Sensitivity Analyses

Group	n	M (SD)	Unadjusted [95% CI]	difference	Hedges' g	Adjusted b [95% CI]	p
<i>Group relative to white athletes</i>							
MENA	38	8.84 (2.50)	2.74 [1.53, 3.96]		1.00	2.71 [1.48, 3.94]	< .001
Black	25	8.00 (3.48)	1.90 [0.23, 3.57]		0.60	2.01 [0.60, 3.43]	.006
Other	27	7.44 (2.33)	1.34 [0.07, 2.62]		0.50	1.59 [0.20, 2.99]	.026
Asian	17	7.47 (2.76)	1.37 [-0.28, 3.02]		0.47	1.30 [-0.26, 2.85]	.102
<i>Sensitivity analyses: pooled minoritized vs. white contrast</i>							
Full sample	146					2.04 [1.02, 3.06]	< .001
Excluding MENA	108					1.69 [0.56, 2.81]	.004
Excluding Other	119					2.18 [1.07, 3.29]	< .001
Excluding MENA and Other	81					1.74 [0.37, 3.10]	.013

Note. White athletes (n = 40, M = 6.10, SD = 2.88) are the reference group. MENA = Middle Eastern or North African. Unadjusted differences and 95% confidence intervals are from Welch's t tests. Adjusted coefficients are unstandardized b from models controlling for sex, grade level, level of play, weekly training hours, and years competing. The four minoritized groups did not differ from one another after adjustment, $F(3, 96) = 1.62$, $p = .19$. Sensitivity analyses re-estimate the pooled contrast after excluding the indicated group(s); one participant with missing training hours is excluded from all adjusted models.

Table 5 Hierarchical Regression Models Predicting Each Outcome

Predictor	Depressive symptoms			Sport anxiety		
	b (SE)	95% CI	p	b (SE)	95% CI	p
<i>Step 1: Main effects</i>						
Intercept	1.59 (2.36)	[-3.07, 6.25]	.501	31.59 (3.91)	[23.86, 39.31]	< .001
Female (ref: male)	-0.91 (0.55)	[-2.00, 0.18]	.102	0.82 (0.91)	[-0.98, 2.63]	.370
Minoritized (ref: white)	2.04 (0.51)	[1.02, 3.06]	< .001	0.37 (0.85)	[-1.31, 2.06]	.663
Grade level	0.31 (0.20)	[-0.08, 0.70]	.123	-0.06 (0.33)	[-0.71, 0.59]	.847
Level: junior varsity	0.82 (0.72)	[-0.60, 2.24]	.254	0.89 (1.19)	[-1.46, 3.24]	.454
Level: club	1.16 (0.71)	[-0.25, 2.56]	.106	-0.38 (1.18)	[-2.71, 1.95]	.746
Level: travel	1.01 (0.71)	[-0.40, 2.41]	.159	0.38 (1.18)	[-1.95, 2.71]	.746
Level: national team	0.09 (0.78)	[-1.46, 1.64]	.911	1.26 (1.30)	[-1.32, 3.83]	.336
Training hours per week	0.05 (0.05)	[-0.05, 0.15]	.316	0.09 (0.08)	[-0.07, 0.25]	.278
Years in primary sport	0.03 (0.10)	[-0.16, 0.21]	.776	-0.02 (0.16)	[-0.33, 0.29]	.889
R ²	.17			.03		
Adjusted R ²	.11			-.03		
Model F (p)	2.99 (.003)			0.51 (.864)		
<i>Step 2: Interaction added</i>						
Training hours × grade level	0.02 (0.04)	[-0.07, 0.11]	.616	-0.02 (0.07)	[-0.17, 0.13]	.826
ΔR ² (F change, p)	.002 (0.25, .616)			.000 (0.05, .826)		

Table 6 Outcomes by Primary Sport (Team Sports Only), and the Sport-Controlled Race Effect

Outcome	Soccer (52)	Basketball (47)	Football (44)	F (p)
Depressive symptoms	6.77 (3.06)	8.19 (2.63)	7.77 (2.80)	3.29 (.04)
sport anxiety	32.21 (5.05)	32.77 (4.76)	32.95 (3.69)	0.35 (.71)
academic stress	46.63 (6.99)	47.62 (4.48)	49.23 (4.55)	2.62 (.08)
GPA	3.59 (0.26)	3.59 (0.29)	3.61 (0.24)	0.10 (.90)

Note. Cell entries are M (SD). F-test is one-way ANOVA across the three team sports. Robustness check: the minoritized vs. White depressive symptoms effect was $b = 2.08$ ($p < .001$) without sport and $b = 1.96$ ($p < .001$) with primary sport controlled, indicating the racial-ethnic disparity is not explained by sport composition. Sport was reconstructed from free text; interpreted descriptively.

Limitations

Several limitations constrain the conclusions that can be drawn from this study. First, internal consistency was mod-

est across the three self-report scales (alphas of .69, .70, and .72), and the resulting measurement error attenuates observed associations, so small true associations may have gone undetected. Similarly, self-reported GPA was restricted in range (3.11 to 4.00, SD= 0.26), a ceiling likely due to a competitive sample of high-achieving athletes. This restriction attenuates associations between GPA and the psychological variables, so the null findings reflect an absence of detectable association within a narrow band. Second, the cross-sectional design precludes causal and developmental inference. Third, the sample was a convenience sample recruited through two organized sites and personal contacts, and the recruitment source was not recorded, so its association with race and ethnicity and with depressive symptoms could not be examined directly. Participants recruited from the same school or team share coaches, climate, and academic policies, and this non-independence could not be modeled because team member-

ship was not recorded, and standard errors may therefore be somewhat understated. Primary sport, the closest available proxy for site, was included as a covariate, and the disparity was present within each sport, but site and group composition cannot be fully separated in these data, and the findings should be read as descriptive of this local sample rather than of high school athletes broadly. The comparatively large group of Middle Eastern and North African athletes may reflect the local community. Uneven cell sizes across racial and ethnic groups limited power for group-specific comparisons, which could detect only medium-to-large effects (minimum detectable $d = 0.64$ to 0.83), and for the interaction tests, which could detect only relatively large moderation ($\Delta R^2 \approx .05$). The nonsignificant contrasts for the Asian and Other groups (observed $d = 0.47$ and 0.50) were below these thresholds and should not be read as evidence of no difference. The pooled contrast was adequately powered for the difference observed. The white comparison group ($n = 40$) also limited power for the null contrasts, whose confidence intervals were wide enough to include small-to-moderate differences. The unexpected sex difference in academic performance requires replication rather than interpretation. Fourth, recruitment status was not measured. The sample consisted of competitive high school athletes and could range from those with a general interest in playing at the next level to those actively talking to college programs or with offers; whether the observed disparity varies across this continuum is a question for future work with a direct measure of recruitment activity. Fifth, the race and ethnicity item did not assess Hispanic or Latino ethnicity separately, so some Latino athletes were likely classified as White or Other. Because Latino adolescents tend to report elevated depressive symptoms, this misclassification would attenuate rather than inflate the white versus minoritized contrast, making the reported difference a conservative estimate. Future work should use the combined race and ethnicity question in the 2024 federal standards, which includes Hispanic or Latino and Middle Eastern or North African as parallel categories and permits multiple selections. Sixth, the study's ethical oversight was limited. As student-conducted research, the project was not reviewed by an institutional review board. Administrators at both sites granted permission for recruitment, but we acknowledge that administrative permission is not independent ethics review. Parental permission was not sought for participants under 18, who provided their own assent on the survey's first page. The anonymous, voluntary, survey-only design limited but did not eliminate the concerns this raises. Future research with minors on mental health topics should be conducted under formal IRB review with parental permission or a formally authorized waiver. Finally, the study measured outcomes but not mechanisms. The interpretation that the depressive symptoms disparity reflects social position is consistent with the pattern of findings but was not tested di-

rectly, as the survey included no measures of discrimination, ethnic-racial identity, or other candidate processes. Socioeconomic position deserves particular mention because it may covary with both race and ethnicity and level of play in this sample and could account for part of the observed difference. The present findings identify where a disparity exists but cannot say why.

Implications and Conclusion

The findings carry practical implications for the adults who support competitive high school athletes. Coaches, athletic trainers, and school counselors often monitor the stressors most visible in their own domains. In this sample, however, domain-specific measures showed only small, nonsignificant racial and ethnic differences, while general depressive symptoms showed a moderate one. An adult relying only on those indicators has no reason to suspect that minoritized athletes were carrying a heavier burden, because the disparity resided precisely in the domain they did not capture. Screening and informal check-ins should extend beyond sport and school stress to general mood and well-being, and staff working with racially and ethnically diverse teams should be aware that comparable performance, grades, and composure during competition do not imply comparable psychological experience.

Because the disparity was not attributable to which sport athletes played, sport-specific interventions may not be sufficient to address it. More promising may be approaches that address the athletic environment as a whole: ensuring that minoritized athletes have access to mental health resources and to adults with whom they feel comfortable disclosing depressive symptoms, and attending to the climate of programs in which may be experienced differently by minoritized youth. Studies that directly assess discrimination, ethnic-racial identity, and coping resources, and that are large enough to examine whether the disparity varies by sex, sport, or socioeconomic position, are needed to establish why minoritized athletes report more depressive symptoms and whether patterns persist or shift across the high school years. As high school sports grow more public, prolonged, and consequential, understanding and addressing the unequal psychological burdens young athletes carry into it is both a research priority and a practical responsibility.

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