

Sports Participation as a Protective Factor against Anxiety and Academic Stress in Pakistani Adolescents: The Mediating Role of Self-Esteem

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Abstract

Academic anxiety and academic stress are important school-related psychological concerns during adolescence. Organized sport may provide mastery experiences, competence feedback, and repeated opportunities for successful performance that strengthen self-esteem, a plausible intrapersonal mechanism linking sport with better psychological adjustment. This study examined associations of organized sports participation with academic anxiety and academic stress among Pakistani adolescent student-athletes and evaluated self-esteem as a mediator. A cross-sectional predictive-correlational design was specified. The analytical sample comprised 362 student-athletes (181 males, 181 females), aged 13-18 years and enrolled in Grades 9-12, recruited through multistage stratified cluster sampling from BISE-affiliated schools in Bahawalpur, Dera Ghazi Khan, and Multan divisions. Sports participation was represented by a researcher-adapted Sports Participation Index; academic anxiety by the Academic Anxiety Scale; academic stress by the available Academic Stress Scale items; and self-esteem by the Rosenberg Self-Esteem Scale. Descriptive statistics, Pearson correlations, regression, and mediation were used. Sports participation was negatively correlated with academic anxiety ($r = -.244$, $p < .001$) and academic stress ($r = -.168$, $p = .001$) and positively correlated with self-esteem ($r = .197$). Self-esteem was negatively related to academic anxiety ($r = -.349$) and academic stress ($r = -.412$). Re-specification as a single-mediator model yielded point-estimated indirect associations through self-esteem of $B = -0.070$ for academic anxiety and $B = -0.360$ for academic stress; these estimates require bootstrap verification using the actual raw dataset. The observed pattern is consistent with an intrapersonal pathway in which organized sport is associated with lower school-related psychological strain partly through more favorable self-evaluation. Longitudinal, multilevel, and intervention research is required before causal protection can be inferred.

Keywords: Adolescent; Academic Anxiety; Academic Stress; Organized Sport; Pakistan; Self-Esteem; Mediation

Introduction

Adolescence combines developmental change with increasing educational demands. Examinations, workload, performance comparison, expectations from families and teachers, and

uncertainty about future study can generate academic anxiety and academic stress. Although these constructs overlap, academic anxiety primarily reflects apprehension and threat related to academic performance, whereas academic stress concerns perceived demands that exceed available coping resources. Identifying modifiable developmental contexts associated with lower levels of both outcomes is therefore important for schools and adolescent well-being.

Organized sport is a plausible protective context because it combines physical activity with repeated practice, goal pursuit, feedback, skill mastery, competition, and identity development. A substantial international literature links youth sport participation with more favorable mental-health indicators. Panza et al. (2020) synthesized evidence connecting adolescent sport participation with lower anxiety and depressive symptoms, while prospective and longitudinal studies have reported favorable psychological adjustment among adolescents who sustain sport involvement (Briere et al., 2018; Dore et al., 2019; Graupensperger et al., 2021). Large observational studies similarly associate organized sport with fewer mental-health difficulties (Guddal et al., 2019; Hoffmann et al., 2022).

Self-esteem provides a theoretically strong mechanism for these associations. Sport exposes adolescents to skill acquisition, performance feedback, competence experiences, recognition, and opportunities to observe personal improvement. When these experiences are constructive, they may strengthen global self-worth. Conversely, low self-esteem may amplify negative interpretations of academic evaluation and reduce confidence in coping with demanding school situations. Dolenc (2015) directly linked organized sport, self-esteem, anxiety, and stress coping among secondary-school students, while Qurban et al. (2019) positioned self-esteem within an indirect sport-related pathway.

Recent evidence strengthens this mechanism-based interpretation. The 2026 systematic review updating the Mental Health through Sport conceptual model included 189 studies and identified self-perceptions, including self-esteem, among the central mechanisms connecting sport participation with youth psychological outcomes. The review found especially consistent evidence for self-esteem/self-worth across cross-sectional, longitudinal, and experimental studies. A 2025 systematic review and meta-analysis of youth sport likewise concluded that participation is associated with multiple psychological benefits, including improved self-esteem. Qualitative synthesis further indicates that sport can influence self-confidence and self-esteem positively or negatively depending on performance experiences and the quality of the sport environment.

The Pakistani context remains underrepresented in this mechanism-focused literature. Kayani et al. (2020) examined physical activity and academic anxiety in Pakistan, and other local work has considered sport, academic stress, and psychosocial outcomes. Yet evidence is limited on whether self-esteem statistically explains the relationship between organized sport participation and both academic anxiety and academic stress among Pakistani school-going student-athletes. Testing this pathway is particularly relevant because school sport operates within a culture of strong academic expectations and variable institutional support for athletic participation.

The present paper therefore isolates the intrapersonal pathway from the broader thesis model. It examines four constructs only: sports participation, self-esteem, academic anxiety, and academic stress. The central proposition is that greater organized sports participation is associated with stronger self-esteem, which in turn is associated with lower academic anxiety and academic stress. Because the study is cross-sectional, the term mediation denotes an indirect statistical association rather than demonstrated temporal causation.

Hypotheses

H1: Sports participation is negatively associated with academic anxiety.

H2: Sports participation is negatively associated with academic stress.

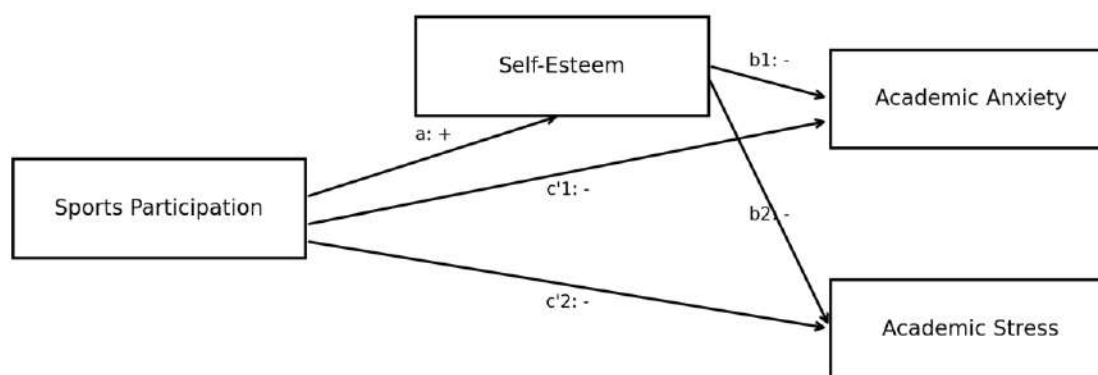
H3: Sports participation is positively associated with self-esteem.

H4: Self-esteem is negatively associated with academic anxiety.

H5: Self-esteem is negatively associated with academic stress.

H6: Self-esteem statistically mediates the association between sports participation and academic anxiety.

H7: Self-esteem statistically mediates the association between sports participation and academic stress.



Hypothesized self-esteem mediation model

Figure 1. Proposed self-esteem mediation model.

Methods

Design and Setting

A quantitative, cross-sectional predictive-correlational design was used. The study focused on male and female school-going student-athletes in Grades 9-12 across the Bahawalpur, Dera Ghazi Khan, and Multan divisions of Southern Punjab, Pakistan. Eligible participants had documented involvement in organized sports competitions conducted through the relevant Boards of Intermediate and Secondary Education (BISE). The individual student-athlete was the unit of analysis and schools served as recruitment clusters.

Participants and Sampling

The planned sample comprised 384 student-athletes recruited from 48 schools (24 male and 24 female schools), with eight eligible student-athletes targeted per school. A multistage stratified cluster sampling strategy preserved geographic and sex representation. Eligible student-athletes were identified from official school/BISE competition records; where more than eight eligible athletes were available, simple random selection was specified. After exclusion of 22 incomplete, invalid, or partially completed questionnaires, 362 cases were retained, including 181 males and 181 females.

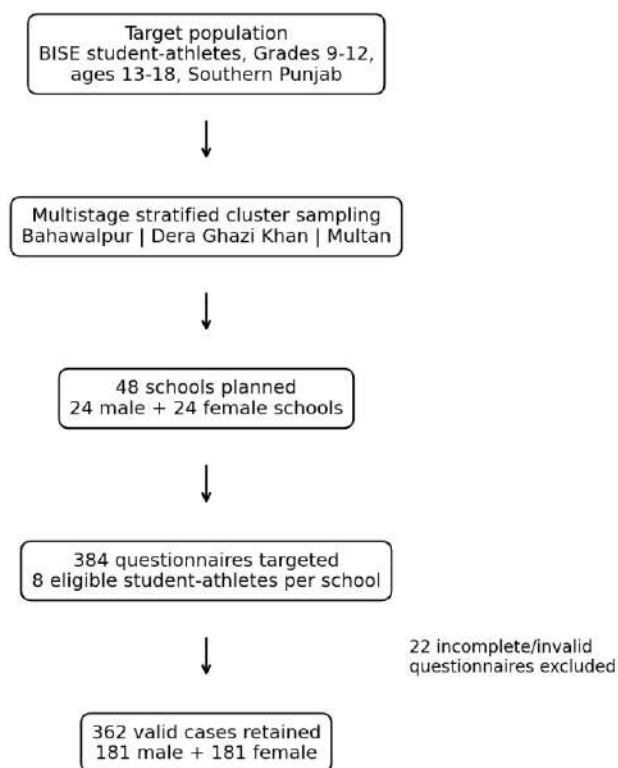


Figure 2. Sampling and analytical flow of participants.

Measures

Sports participation. A researcher-adapted Sports Participation Questionnaire was used to construct a Sports Participation Index (SPI). The scored index incorporated organized participation settings, days per week, session duration, years of regular participation, highest competition level, and organized competitions/events during the previous 12 months. Higher scores represented greater organized sport involvement. Because the SPI is a formative index, internal-consistency reliability is not an appropriate criterion.

Academic anxiety. Academic anxiety was assessed with the 11-item Academic Anxiety Scale on a four-point response format. Higher total scores indicated greater academic anxiety. Although the manuscript title uses the broader word anxiety for readability, the measured outcome is specifically academic anxiety.

Academic stress. Academic stress was assessed using the Academic Stress Scale framework reported in the thesis. The analytical dataset contained 34 available items scored on a five-point response format. Higher scores indicated greater academic stress. Because the supplied analytical version contained 34 rather than the stated full 40 items, comparison with full-scale norms must be avoided.

Self-esteem. Global self-esteem was assessed with the 10-item Rosenberg Self-Esteem Scale (RSES). In the study coding, positively worded items were reverse-scored so that higher total scores represented higher self-esteem. The RSES is treated as a reflective measure and its internal consistency was evaluated.

Statistical Analysis

Data analysis comprised screening, descriptive statistics, Cronbach's alpha for reflective scales, Pearson correlations, and ordinary least squares regression. The focused manuscript specifies two single-mediator models in which sports participation is X, self-esteem is M, and academic anxiety or academic stress is Y. In the final empirical analysis, indirect effects must be evaluated with 5,000 bootstrap resamples and 95% confidence intervals. Point estimates reported below were algebraically re-specified from the thesis correlation matrix and standard deviations; bootstrap intervals are not fabricated. Statistical interpretation emphasizes effect magnitude and uncertainty rather than p values alone.

Results

Participant Characteristics and Screening

The analytical file contained 362 cases, with equal numbers of male and female student-athletes. No missing values were present in the principal composite variables. The thesis reported a maximum Mahalanobis distance of 16.80, below the chi-square screening criterion of 20.52 at $p < .001$ for five principal variables. Absolute skewness values were below 0.25 and absolute excess kurtosis values below 0.70, indicating no severe distributional departures.

Table 1

Participant Characteristics

Characteristic	n	%
Male	181	50.0
Female	181	50.0
Bahawalpur	128	35.4
Dera Ghazi Khan	98	27.1
Multan	136	37.6
Age 13	16	4.4
Age 14	67	18.5
Age 15	75	20.7
Age 16	91	25.1
Age 17	70	19.3
Age 18	43	11.9
Grade 9	77	21.3
Grade 10	85	23.5
Grade 11	113	31.2
Grade 12	87	24.0

Descriptive Statistics and Reliability

Academic anxiety ($\alpha = .884$), academic stress based on the 34 available items ($\alpha = .958$), and self-esteem ($\alpha = .908$) demonstrated strong internal consistency in the thesis analytical file. The SPI was not evaluated with alpha because it was formative.

Table 2

Descriptive Statistics and Reliability of Focal Variables

Variable	M	SD	Observed range	alpha
Sports Participation Index	17.95	5.89	7-32	-

Academic anxiety	28.33	6.67	11-43	.884
Academic stress (34 items)	103.46	27.28	35-164	.958
Self-esteem	25.47	6.56	10-40	.908

Correlations

Sports participation was negatively associated with academic anxiety ($r = -.244$, $p < .001$) and academic stress ($r = -.168$, $p = .001$), while it was positively associated with self-esteem ($r = .197$). Self-esteem was inversely related to academic anxiety ($r = -.349$) and academic stress ($r = -.412$). Academic anxiety and academic stress were moderately positively correlated ($r = .515$).

Table 3

Pearson Correlations Among the Focal Variables

Variable	1	2	3	4
1. Sports participation	-			
2. Academic anxiety	-.244***	-		
3. Academic stress	-.168**	.515***	-	
4. Self-esteem	.197***	-.349***	-.412***	-

Note. ** $p < .01$. *** $p < .001$. Exact p values for reconstructed coefficients must be verified against the empirical raw-data output before submission.

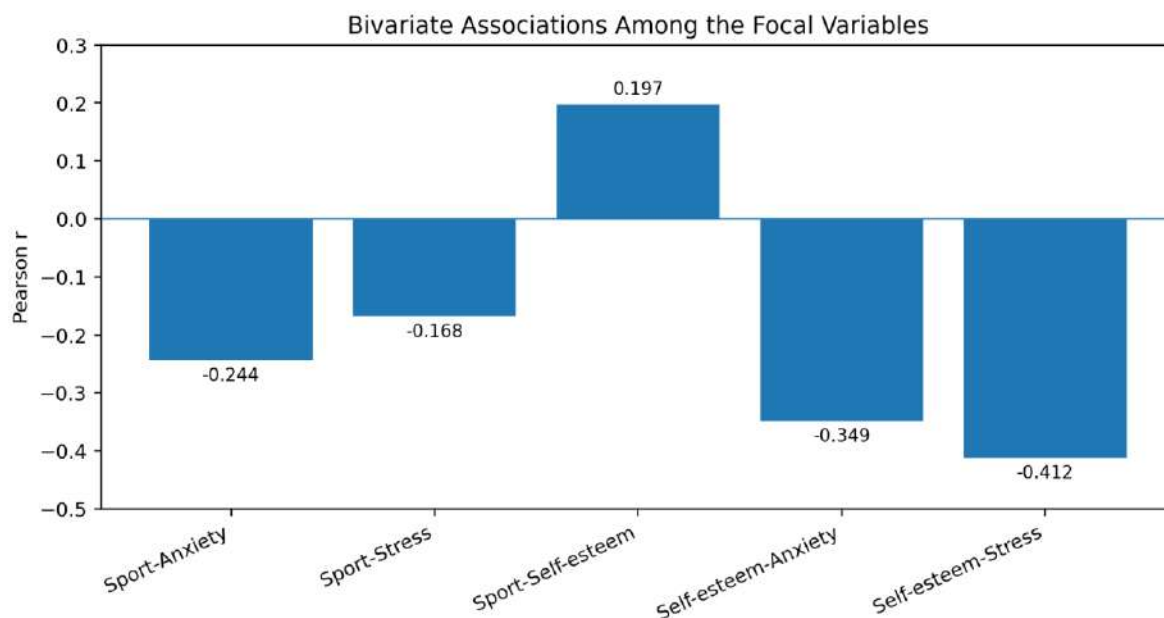


Figure 3. Magnitude and direction of focal bivariate correlations.

Focused Self-Esteem Mediation Models

To match the scope of this paper, the thesis correlation matrix was re-specified as two single-mediator models containing only sports participation, self-esteem, and the respective outcome. Sports participation positively predicted self-esteem (a path: B approximately 0.219). For academic anxiety, the reconstructed self-esteem b path was B approximately -0.318, the direct

sport effect was B approximately -0.206 , and the indirect effect was approximately $B = -0.070$. For academic stress, the self-esteem b path was B approximately -1.639 , the direct sport effect was B approximately -0.418 , and the indirect effect was approximately $B = -0.360$. These estimates are mathematically consistent with the reported correlation matrix and standard deviations, but they are not substitutes for raw-data bootstrap mediation.

Table 4

Re-specified Single-Mediator Point Estimates

Outcome	Total effect c	Direct effect c'	a path	b path	Indirect $a \times b$
Academic anxiety	-0.276	-0.206	0.219	-0.318	-0.070
Academic stress	-0.778	-0.418	0.219	-1.639	-0.360

Note. Unstandardized point estimates reconstructed from the thesis correlation matrix and descriptive statistics. Bootstrap standard errors and 95% confidence intervals must be regenerated from the actual raw dataset before publication.

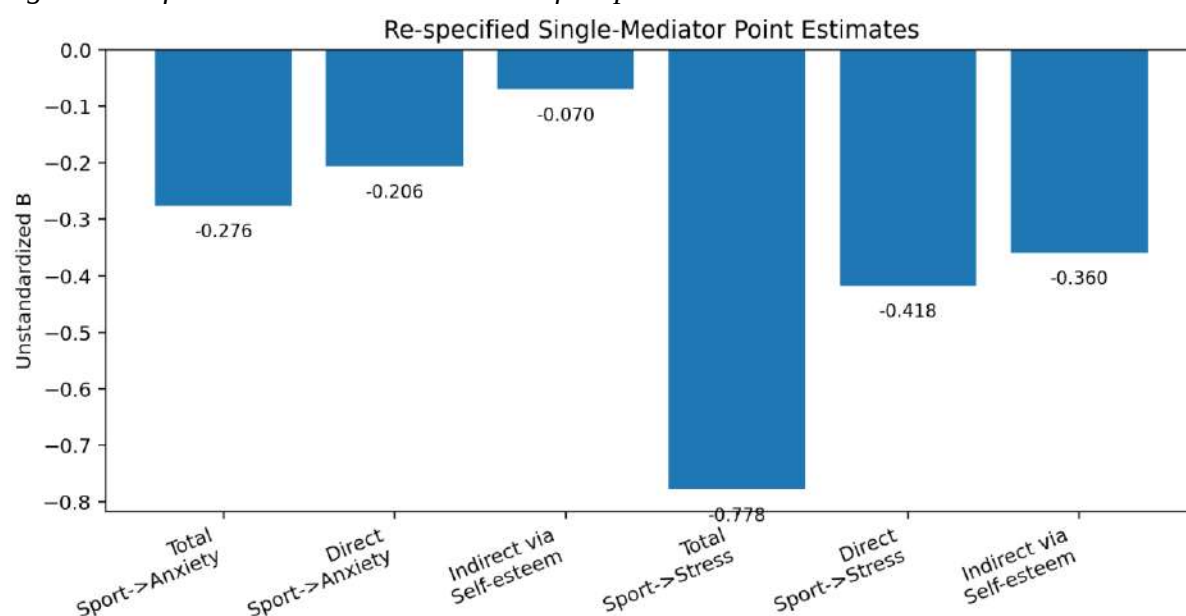


Figure 4. Total, direct, and indirect point estimates in the focused self-esteem models.

Discussion

The focused model produced a theoretically coherent pattern: greater organized sports participation co-occurred with lower academic anxiety and academic stress and with higher self-esteem, while higher self-esteem was associated with lower levels of both adverse academic outcomes. This pattern supports self-esteem as a plausible intrapersonal mechanism connecting sport involvement with school-related psychological adjustment.

The negative sport-anxiety association is consistent with the broader youth sport literature. Panza et al. (2020) found lower anxiety and depressive symptoms among sport-involved adolescents in a systematic review and meta-analysis. Prospective evidence from Briere et al. (2018), Dore et al. (2019), and Graupensperger et al. (2021) further suggests that sustained participation may relate to later psychological adjustment. Guddal et al. (2019), Murphy et al. (2020, 2021), Khan et al. (2022), and Hoffmann et al. (2022) similarly reported favorable mental-health correlates of

physical activity or organized sport. The present model adds a specifically academic outcome and a mechanism centered on global self-worth.

The sport-stress association was smaller than the sport-anxiety association. This is plausible because academic stress is directly embedded in workload, examinations, deadlines, teacher expectations, family expectations, and time management. Sport may help adolescents disengage temporarily from academic demands, develop coping skills, and experience competence, but intensive training can also add scheduling pressure. Hutchinson et al. (2006), Fromel et al. (2020), Park and Kim (2018), and de Souza Lima et al. (2024) collectively support the relevance of leisure and physical activity to stress coping while also indicating contextual heterogeneity.

Self-esteem is particularly important because it provides a bridge between what adolescents experience in sport and how they evaluate themselves when confronting academic demands. Repeated skill mastery, improvement, selection for competition, constructive feedback, and successful coping with performance situations may contribute to a more stable sense of competence and worth. Dolenc (2015) reported relationships among organized sport, self-esteem, anxiety, and coping in secondary-school students. Qurban et al. (2019) also situated self-esteem within a sport-related psychosocial pathway, while more recent studies have continued to identify self-esteem as an indirect mechanism linking physical activity or sport with psychological outcomes.

The most recent systematic evidence gives this interpretation additional weight. Wade et al. (2026) reviewed 189 studies and identified self-perceptions as one of the major mechanism categories through which sport relates to youth mental health. Their synthesis found especially consistent evidence for self-esteem and self-worth across 35 studies. Bengtsson et al. (2025) likewise reported psychological benefits of youth sport participation, including improved self-esteem. A qualitative systematic review published in 2026 found that sport can shape self-confidence and self-esteem through performance, personal development, focus, and belonging, while also emphasizing that sport environments can generate negative experiences. These findings argue against treating sport exposure as uniformly beneficial and instead place programme quality at the center of interpretation.

For academic anxiety, the reconstructed single-mediator estimates suggest that self-esteem may account for part, but not all, of the inverse association with sport participation. Remaining pathways could include emotion regulation, sleep, self-efficacy, attentional control, peer belonging, social support, and psychological detachment from schoolwork. For academic stress, the indirect point estimate through self-esteem was substantial relative to the total association, suggesting that self-evaluation deserves particular attention when adolescents balance sport and educational demands. Formal bootstrap inference using the actual dataset is required before either indirect effect can be claimed statistically.

The Pakistani context makes the mechanism practically meaningful. Competitive student-athletes often navigate simultaneous academic and sport expectations. If school sport is to function as a developmental resource, coaches and physical education teachers may need to emphasize achievable mastery, improvement, constructive feedback, fair participation, and recognition that is not contingent solely on winning. Such practices may help strengthen self-esteem without intensifying performance-based self-worth. At the same time, sport cannot substitute for counselling, academic support, reasonable workload, or supportive family and school environments.

Several limitations constrain interpretation. The cross-sectional design cannot establish temporal mediation or rule out selection effects. The sample consisted of BISE competitive student-athletes rather than the general adolescent population. The focal constructs were self-reported and therefore susceptible to recall, social-desirability, and common-method bias. The analytical academic-stress

composite contained 34 available items rather than the stated complete 40-item instrument, limiting direct comparison with full-scale norms. School-based clustering also warrants multilevel or cluster-robust analysis in the final empirical paper. Future research should use longitudinal measurement, include non-athletes, assess sport type and coaching climate, and test whether change in self-esteem temporally precedes change in academic anxiety and stress.

Practical Implications

The findings support a school-sport approach that prioritizes competence-building rather than participation counts alone. BISE sports sections, school leaders, physical education teachers, and coaches may incorporate mastery-oriented feedback, realistic goal setting, recognition of effort and improvement, and psychologically safe competition into routine programmes. Schools may also monitor whether highly competitive sport strengthens or undermines self-worth for individual students. Integrating these practices with academic counselling and workload support may help sport function as one component of a broader adolescent well-being strategy.

Conclusion

Greater organized sports participation was associated with lower academic anxiety, lower academic stress, and higher self-esteem in the analyzed student-athletes, while higher self-esteem was associated with lower levels of both academic outcomes. The focused model is consistent with self-esteem as an intrapersonal pathway linking sport participation with academic psychological adjustment. Because the evidence is cross-sectional, the study supports a mechanism hypothesis rather than causal mediation. Prospective and intervention studies should test whether improvements in self-esteem following high-quality sport participation precede reductions in academic anxiety and stress.

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