

The Effect of Basketball Experience on Psychological Resilience in Adolescents: A Cross-Sectional Study

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Abstract

This study aimed to compare the psychological resilience levels of adolescents with basketball experience to those of their non-playing peers and to identify the predictive factors of psychological resilience. A total of 189 adolescents residing in Van, Türkiye (87 basketball players, 102 control group; age range 9–14 years, mean age 11.4 ± 1.46 years) were included in this cross-sectional study. Psychological resilience was assessed using the Child and Youth Resilience Measure (CYRM-28). Since the data were normally distributed, the Student's t-test was applied and the chi-square test was used for categorical variables; hierarchical linear regression analysis was employed to identify predictive factors. Basketball players demonstrated significantly higher CYRM-28 mean scores (121 ± 10.6) compared to non-players (109 ± 15.7) ($p < 0.001$, Cohen's $d = 0.866$). In the hierarchical regression analysis, Model 1 containing sociodemographic variables explained 15.6% of the variance, whereas Model 2 with the addition of years of basketball experience explained 21.8% of the variance. Years of basketball experience ($B = 3.88$, 95% CI: 1.93–5.84, $p < 0.001$), age ($B = 1.63$, 95% CI: 0.32–2.94, $p = 0.015$), and maternal university-level education ($B = 10.19$, 95% CI: 3.44–16.95, $p = 0.003$) were identified as significant predictors of psychological resilience. The findings indicate that basketball experience is positively associated with psychological resilience in adolescents; however, the cross-sectional design of the study precludes causal inference. Participation in team sports may be considered a supportive factor for adolescent mental health, and longitudinal research is warranted to determine the direction of this relationship.

Keywords: Psychological Resilience, Basketball, Adolescent, CYRM-28, Team Sports

Basketbol Deneyimi ile Ergenlerde Psikolojik Dayanıklılık Arasındaki İlişki: Kesitsel Bir Çalışma

Öz

Bu çalışma, basketbol deneyimine sahip ergenlerin psikolojik dayanıklılık düzeylerini, basketbol oynamayan akranlarıyla karşılaştırmayı ve psikolojik dayanıklılığın yordayıcı faktörlerini belirlemeyi amaçlamaktadır. Bu kesitsel çalışmaya Van ilinde ikamet eden toplam 189 ergen (87 basketbol oyuncusu, 102 kontrol grubu; yaş aralığı 9–14 yıl, ortalama yaş $11,4 \pm 1,46$ yıl) dahil edilmiştir. Psikolojik dayanıklılık, Çocuk ve Genç Dayanıklılık Ölçeği (ÇGDÖ-28) kullanılarak değerlendirilmiştir. Sürekli değişkenlerin gruplar arası karşılaştırmasında, verilerin normal dağılım göstermesi sebebiyle Student t-testi uygulanmıştır. Kategorik değişkenler için ki-kare testi kullanılmış; yordayıcı faktörlerin belirlenmesinde ise hiyerarşik doğrusal regresyon analizi uygulanmıştır. Basketbol oyuncuları, ÇGDÖ-28 ortalama puanları açısından ($121 \pm 10,6$) basketbol oynamayanlara ($109 \pm 15,7$) kıyasla istatistiksel olarak anlamlı düzeyde daha ruh yüksek puanlar sergilemiştir ($p < 0,001$, Cohen's $d = 0,866$). Hiyerarşik regresyon analizinde, sosyodemografik değişkenleri içeren Model 1 varyansın %15,6'sını açıklarken, basketbol deneyimi yılının eklenmesiyle oluşturulan Model 2'nin varyansın %21,8'ini açıkladığı görülmüştür. Basketbol deneyimi yılı ($B = 3,88$, %95 GA: 1,93–5,84, $p < 0,001$), yaş ($B = 1,63$, %95 GA: 0,32–2,94, $p = 0,015$) ve annenin üniversite düzeyinde eğitime sahip olması ($B = 10,19$, %95 GA: 3,44–16,95, $p = 0,003$) psikolojik dayanıklılığın anlamlı yordayıcıları olarak belirlenmiştir. Bulgular, basketbol deneyiminin ergenlerde psikolojik dayanıklılıkla pozitif yönde ilişkili olduğuna işaret etmekle birlikte, çalışmanın kesitsel tasarımı nedensellik çıkarımına olanak tanımamaktadır. Takım sporlarına katılım, ergen ruh sağlığını destekleyici bir faktör olarak değerlendirilebilir; ilişkinin yönünün belirlenebilmesi için boylamsal araştırmalara ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Psikolojik Dayanıklılık, Basketbol, Ergen, ÇGDÖ-28, Takım Sporları

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Introduction

In contemporary psychological literature, resilience is characterized as the individual's capacity to sustain or restore healthy functioning despite exposure to severe stressors, trauma, or adverse environments (Masten, 2018). Over four distinct waves of scholarly inquiry, the understanding of this construct has shifted from a static trait to a highly dynamic, multidimensional process (Masten, 2001; Southwick et al., 2014). Adolescence serves as a particularly sensitive developmental window, defined by profound biological, cognitive, and social transitions. The adaptive mechanisms fostered during these formative years provide a fundamental framework for navigating subsequent life crises in adulthood (Godor et al., 2024). The necessity of cultivating such protective factors is starkly evident in recent World Health Organization reports, which estimate that roughly 14% of the global adolescent population (aged 10–19) struggles with psychiatric conditions (WHO, 2021). Building on this developmental backdrop, recent empirical evidence consistently highlights the positive impact of athletic engagement on the psychological well-being of youth (Eime et al., 2013; Hu et al., 2025; Martín-Rodríguez et al., 2024). For instance, an extensive cross-sectional analysis involving over 67,000 students revealed a robust correlation between athletic involvement and psychological resilience (Sheng et al., 2024). Group-based athletic activities, in particular, provide organized settings where adolescents can develop critical interpersonal competencies, learn to work collaboratively, establish goals, and navigate both successes and setbacks (Fraser-Thomas et al., 2005; Holt & Neely, 2011). Extending this line of evidence, engagement in team-oriented sports has been identified as an important buffer against severe psychological distress, including mental-health disorders and suicidal ideation among adolescents (Machado-Oliveira et al., 2023). Investigations into the underlying mechanisms further indicate that regular exercise strengthens resilience by enhancing self-efficacy and meeting core psychological needs (Li et al., 2024).

Within the broader category of team sports, basketball occupies a particularly relevant position. Characterized by its high-tempo environment, the demand for rapid cognitive processing, and a reliance on intricate group cohesion, basketball has been conceptualized as an especially effective medium for promoting holistic growth during adolescence. Consistent engagement in structured basketball regimens cultivates essential behavioral attributes, including tenacity, collective efficacy, and behavioral

regulation. Furthermore, exposure to the inherent pressures of athletic competition serves as a practical arena for youths to refine their affective control and stress mitigation strategies. Viewed through the lens of the Positive Youth Development paradigm, these organized athletic settings supply the necessary architecture for adolescents to cultivate core psycho-social assets—namely, confidence, competence, social connectedness, and moral character (Lerner et al., 2005; Newman et al., 2020). Beyond the direct benefits of sport, current conceptualizations of psychological resilience frame it as a fluid construct, continuously molded by the interplay between internal traits and external surroundings. Underscoring the necessity of cultural situatedness, Ungar (2008) postulated that the broader social matrix within which an individual operates is fundamental to the cultivation of resilient behaviors. This paradigm is corroborated by modern empirical literature, which broadly affirms that resilience is generated through a complex nexus of personal, interpersonal, and environmental variables (Jonkman et al., 2022; Artuch-Garde et al., 2022). From this theoretical standpoint, organized collective settings—such as athletic clubs—serve as vital developmental arenas; they bolster youth resilience by facilitating access to robust social networks, constructive mentorship, and tangible milestones of success.

A critical assessment of the existing body of literature highlights a notable scarcity of empirical investigations focused explicitly on the intersection of basketball participation and psychological resilience among adolescents in Turkey. The predominant share of current scholarly work has been directed toward adult athletic populations, thereby underscoring a distinct imperative for further inquiry within younger demographic cohorts. This gap is further corroborated by Martín-Rodríguez et al. (2024); in their extensive evaluation of physical activity and mental well-being, the authors articulated a clear need to explore the psychological advantages of athletic engagement across diverse developmental stages and distinct sociocultural landscapes. Against this backdrop, the present study aimed to (i) compare the psychological resilience levels of adolescents with basketball experience to those of their non-playing peers, and (ii) identify the sociodemographic and sport-related predictors of psychological resilience, with a particular focus on the role of cumulative basketball experience. The originality of the study lies in its explicit focus on adolescent basketball players in Türkiye—an underrepresented context in the international resilience literature—and in its examination of years of basketball experience as a

continuous predictor rather than treating sport participation as a dichotomous variable. By incorporating sociodemographic variables (age, sex, household income, and maternal education) alongside sport-related variables in a hierarchical regression framework, the study seeks to clarify the relative contribution of organized basketball participation beyond family-level resources. The findings are expected to contribute to the evidence base on the role of sport in adolescent development and to inform school- and community-level mental-health promotion strategies in Türkiye and comparable sociocultural settings.

Methods

Study Design

This study was designed as a cross-sectional investigation and was conducted with adolescents (aged 9–14 years, mean age 11.4 ± 1.46 years) residing in the province of Van, Türkiye, who met the inclusion criteria. Data were collected during 2026 (the exact data-collection window should be verified by the author). For the basketball group, data were collected at participants' sports clubs immediately before scheduled training sessions, in a quiet area, to minimise post-exercise fatigue effects on self-report. For the control group, data were collected during school hours under the supervision of the researcher. All participants completed the instruments individually, in a single sitting (approximately 20–25 minutes), and group administration was avoided to reduce social-influence bias. Questionnaires with more than 10% missing responses were planned to be excluded from analyses; no questionnaire met this exclusion threshold in the present sample. The research process was carried out in accordance with the principles of the Declaration of Helsinki. Ethical approval for the study was obtained from the Social and Humanities Publication Ethics Committee of Van Yüzüncü Yıl University (Decision No: 2025/23-17, Date: 13.11.2025). Participants' parents were provided with detailed information regarding the purpose and scope of the study, and their written informed consent was obtained. In addition, verbal assent was obtained from the children using age-appropriate language.

Criterion sampling, a purposive sampling method, was employed for sample selection. Two groups were formed: adolescents who played basketball and adolescents who did not. The inclusion criteria for the basketball group were: (a) being aged 9–14 years; (b) having received regular basketball training for at least one continuous year; and (c) being officially registered with a basketball sports club. The

inclusion criteria for the control group were: (a) being aged 9–14 years; and (b) not being regularly engaged in any organised sports activity. Common exclusion criteria for both groups were: presence of a diagnosed psychiatric, neurological or chronic medical condition reported by parents, and inability to read or comprehend the questionnaires.

A power analysis was conducted using G*Power 3.1 software to determine the required sample size. For an independent-samples t-test with a significance level of $\alpha = 0.05$, statistical power $(1-\beta) = 0.80$, and a medium effect size (Cohen's $d = 0.50$), a minimum of 64 participants per group was calculated. Accordingly, a total of 189 adolescents were included in the study, comprising 87 basketball players and 102 non-players. The actual sample size exceeded the calculated minimum, indicating that the study possessed sufficient statistical power.

Data Collection Instruments

Personal Information Form: This form, developed by the researcher, included items addressing participants' age, sex, maternal and paternal education levels, household income status, years of basketball participation, and weekly training frequency.

Child and Youth Resilience Measure (CYRM-28): Psychological resilience was assessed using the CYRM-28, developed by Ungar and Liebenberg (2011). The Turkish adaptation and validation of the CYRM-28 was conducted by Arslan (2015), who reported satisfactory psychometric properties in Turkish adolescent samples; the Turkish version was used in the present study. The scale comprises 28 items that evaluate resilience in adolescents across individual, relational, and contextual dimensions. Items are rated on a 5-point Likert scale (1=Does Not Describe Me At All, 5=Describes Me Completely), with possible scores ranging from 28 to 140. Higher scores indicate higher levels of psychological resilience. In the present study, the Cronbach's alpha internal consistency coefficient of the scale was calculated as 0.871.

Statistical Analysis

Data were analysed using Jamovi statistical software. Continuous variables are presented as mean $\pm$ standard deviation or median (interquartile range; 25th–75th percentile), and categorical variables as frequencies and percentages. The normality of continuous variables was assessed using the Shapiro-Wilk test. Depending on normality, Student's t-test or the Mann-Whitney U test was applied to compare continuous variables between groups; the chi-square test was used to compare

categorical variables. Cohen's d effect size was calculated to evaluate the practical significance of between-group differences. According to Cohen's (1988) classification, $d=0.20$ is interpreted as a small effect, $d=0.50$ as a medium effect, and $d=0.80$ as a large effect. Hierarchical linear regression analysis was employed to identify the predictors of psychological resilience. In Model 1, sociodemographic variables (age, sex, household income level, and maternal education level) were entered; in Model 2, years of basketball experience was added to these variables. Weekly training frequency was recorded in the data-collection form but was not included as an additional predictor in the present hierarchical model. This decision reflects two considerations: (i) weekly training frequency is, by definition, zero for the entire control group, which means that adding it as a continuous predictor would partially confound it with group membership; and (ii) years of basketball experience and weekly training frequency capture distinct dose dimensions (cumulative exposure vs. weekly volume), and a more granular dose–response analysis combining both is reserved for a planned follow-up study within the basketball subsample, where the variable shows meaningful variation. The proportion of variance explained by each model (Adjusted R^2), the change in explained variance (Δ Adjusted R^2), the F statistic, and the Akaike Information Criterion (AIC) were calculated to evaluate model fit. The multicollinearity assumption was verified using Variance Inflation Factor (VIF) values, with $VIF > 5$ accepted as an indicator of multicollinearity. A significance level of $p < 0.05$ was adopted for all analyses.

Results

A total of 189 adolescents were included in the study. Shapiro–Wilk tests indicated that CYRM-28 total scores were approximately normally distributed in both the basketball group ($W = 0.984$, $p = 0.358$) and the control group ($W = 0.982$, $p = 0.180$), supporting the use of parametric tests for between-group comparison. Of these, 87 (46.0%) constituted the basketball group and 102 (54.0%) the control group. The two groups were comparable in terms of age (11.5 ± 1.44 years vs. 11.4 ± 1.48 years, $p=0.752$). The proportion of males was significantly higher in the basketball group (82.8%) compared to the control group (55.9%) ($p<0.001$). Similarly, household income level and maternal education level were found to be significantly higher in the basketball group relative to the control group ($p<0.001$ for both). No statistically significant difference was detected between the groups with respect to paternal

education level ($p=0.068$). The demographic characteristics of the study sample are presented in Table 1.

Table 1. Demographic Characteristics of Adolescents by Basketball Participation

Variable	Total (n:189)	Basketball (n:87)	Control (n:102)	p
Age (years), Mean $\pm$ SD	11.4 $\pm$ 1.46	11.5 $\pm$ 1.44	11.4 $\pm$ 1.48	0.752
Sex, n(%)				<0.001
Male	129 (68.3)	72 (82.8)	57 (55.9)	
Female	60 (31.7)	15 (17.2)	45 (44.1)	
Household income level, n(%)				<0.001
Income < Expenditure	28 (14.8)	3 (3.5)	25 (24.5)	
Income = Expenditure	109 (57.7)	50 (57.5)	59 (57.8)	
Income > Expenditure	52 (27.5)	34 (39.1)	18 (17.6)	
Maternal education level, n(%)				<0.001
Middle school	20 (10.6)	6 (6.9)	14 (13.7)	
High school	85 (45.0)	13 (14.9)	72 (70.6)	
University	84 (44.4)	68 (78.2)	16 (15.7)	
Paternal education level, n(%)				0.068
Middle school	13 (6.9)	2 (2.3)	11 (10.8)	
High school	65 (34.4)	25 (28.7)	40 (39.2)	
University	111 (58.7)	60 (69.0)	51 (50.0)	
Basketball experience (years), median (min-max)	0 (0–5)	2 (1–5)	0	<0.001
Weekly training frequency, n(%)				<0.001
2 days	66 (34.9)	66 (75.9)	0	
3 days	13 (6.9)	13 (14.9)	0	
4+ days	8 (4.2)	8 (9.2)	0	

The overall CYRM-28 mean score for the study sample was 114 $\pm$ 14.8. Between-group comparison revealed that basketball-playing adolescents had significantly higher mean CYRM-28 scores (121 $\pm$ 10.6) compared to non-players (109 $\pm$ 15.7) ($p<0.001$). The effect size of this difference was calculated as Cohen's

$d=0.866$, corresponding to a large effect. A comparison of CYRM-28 mean scores by group is presented in Figure 1.

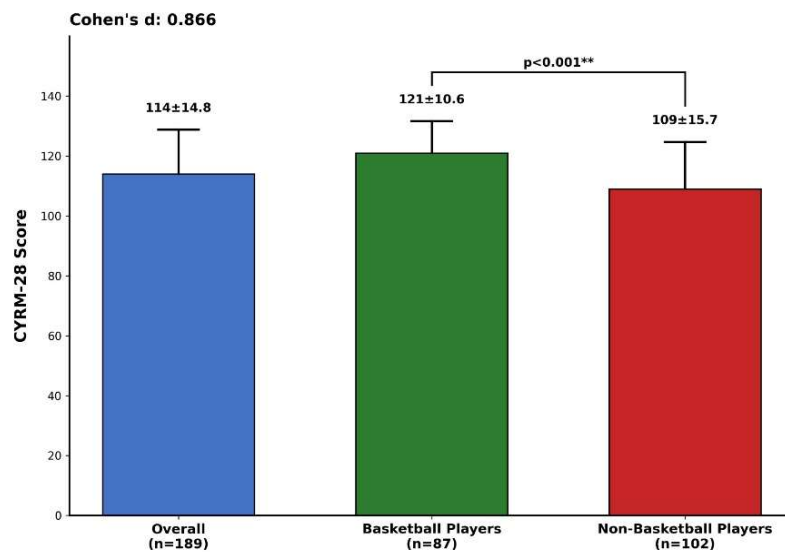


Figure 1. Comparison of CYRM-28 Scores by Basketball Participation

Hierarchical linear regression analysis was conducted to identify the predictors of psychological resilience (Table 2). Model 1, which included sociodemographic variables (age, sex, household income level, and maternal education level), significantly predicted CYRM-28 scores but explained only 15.6% of the variance (Adjusted $R^2 = 0.156$, $F(6, 182) = 6.80$, $p < 0.001$), a relatively modest proportion indicating that demographic factors alone account for a limited share of the variability in adolescent psychological resilience. In this model, age ($B=1.71$, 95% CI: 0.35–3.07, $p=0.014$) and maternal university-level education ($B=13.34$, 95% CI: 6.52–20.17, $p<0.001$) emerged as significant positive predictors of psychological resilience.

In Model 2, years of basketball experience was added to the sociodemographic variables. This model explained 21.8% of the variance (Adjusted $R^2=0.218$, $F(7,181)=8.48$, $p<0.001$) and demonstrated better model fit compared to Model 1 (AIC=1518 vs. 1532). In Model 2, years of basketball experience ($B=3.88$, 95% CI: 1.93–5.84, $p<0.001$), age ($B=1.63$, 95% CI: 0.32–2.94, $p=0.015$), and maternal university-level education ($B=10.19$, 95% CI: 3.44–16.95, $p=0.003$) remained significant predictors. Each additional year of basketball experience was associated with a 3.88-point higher mean CYRM-28 score, after adjusting for sociodemographic variables. Sex and household income level were not identified as significant predictors

in either model. VIF values for all variables were below 1.25, indicating the absence of multicollinearity.

Table 2. Results of Hierarchical Linear Regression Analysis for Predictors of Psychological Resilience (CYRM-28) in Adolescents

Variable	B (95% CI)	SE	β	p	VIF
MODEL 1 (Adjusted R²=0.156, F(6,182)=6.80, p<0.001)					
Age	1.71 (0.35–3.07)	0.689	0.168	0.014	1.01
Sex	3.12 (–1.15–7.39)	2.164	0.210	0.152	1.02
Income (Income=Expenditure)*	2.62 (–3.21–8.45)	2.954	0.177	0.376	1.02
Income (Income>Expenditure)*	6.58 (0.11–13.05)	3.279	0.445	0.046	–
Maternal education (High school)*	5.21 (–1.64–12.06)	3.471	0.352	0.135	1.02
Maternal education (University)*	13.34 (6.52–20.17)	3.459	0.901	<0.001	–
MODEL 2 (Adjusted R²=0.218, F(7,181)=8.48, p<0.001, AIC=1518)					
Age	1.63 (0.32–2.94)	0.663	0.161	0.015	1.01
Sex	1.24 (–2.97–5.46)	2.137	0.084	0.562	1.04
Income (Income=Expenditure)*	1.48 (–4.16–7.12)	2.859	0.099	0.606	1.04
Income (Income>Expenditure)*	3.64 (–2.77–10.04)	3.244	0.246	0.264	–
Maternal education (High school)*	6.49 (–0.13–13.12)	3.357	0.439	0.055	1.09
Maternal education (University)*	10.19 (3.44–16.95)	3.425	0.689	0.003	–
Basketball experience (years)	3.88 (1.93–5.84)	0.990	0.313	<0.001	1.24

B = unstandardised regression coefficient; SE = standard error of B; β = standardised regression coefficient; VIF = variance inflation factor. Model 1 includes sociodemographic variables; Model 2 adds years of basketball experience. *Reference categories: Household income = "Income < Expenditure" (lowest income group, selected to contrast against higher-income categories); Maternal education = "Middle school" (modal category in the overall sample, selected to represent the most common educational background). These reference categories were chosen to maximise interpretive clarity; all comparisons should be considered relative to these baseline groups.

Discussion

The present study aimed to compare the psychological resilience levels of adolescents with basketball experience to those of their non-playing peers and to identify the predictive factors of psychological resilience. The findings reveal that basketball-playing adolescents exhibit significantly higher levels of psychological resilience compared to non-players. Furthermore, years of basketball experience was identified as a significant predictor of psychological resilience even after controlling for

sociodemographic variables. This study contributes uniquely to the literature by examining adolescent basketball players in Türkiye, a population largely overlooked in international resilience research, and by modeling cumulative sport experience as a continuous variable rather than a dichotomy. Before interpreting the between-group differences, however, a critical methodological challenge must be addressed upfront. Because these data are cross-sectional, they support two equally plausible interpretations. The first is developmental: organized basketball participation builds psychological resilience over time through structured coping, peer bonds, and adult mentorship, mechanisms central to Positive Youth Development theory (Lerner et al., 2005; Newman et al., 2020; Li et al., 2024). The second is a selection effect: adolescents with higher baseline resilience are more likely to enroll and persist in competitive sports, while less resilient peers drop out. Hu et al. (2025) provided empirical weight to this second pathway, showing that resilience drives sport participation indirectly via exercise motivation. Consequently, these findings are best understood as bidirectional, suggesting a mutually reinforcing, self-selecting developmental loop. Future longitudinal research with repeated measures is essential to confirm the true direction of these effects (Eime et al., 2013; Hu et al., 2025).

The significantly higher mean CYRM-28 scores of basketball-playing adolescents (121 ± 10.6) compared to non-players (109 ± 15.7) (Cohen's $d=0.866$) are consistent with the beneficial-effect interpretation but, given the issues outlined above, should not be read as evidence of a unidirectional causal effect. This finding is consistent with the contemporary literature. Eather et al. (2023), although their systematic review focused predominantly on adult populations, reported that participation in team sports had favourable effects on mental health and social outcomes, and that individuals engaged in team sports demonstrated better health outcomes compared to those practising individual sports; the parallel pattern observed in the present adolescent sample suggests that this advantage may extend across developmental stages, although adolescent-specific replications such as that of Hu et al. (2025) provide more directly relevant evidence. Similarly, Zuckerman et al. (2021) demonstrated the behavioural, psychological, and social benefits of team sports in their meta-analysis. Holt and Neely (2011) reached analogous conclusions in their examination of sport's effects on positive youth development.

The hierarchical regression analysis revealed that years of basketball experience was a significant predictor of psychological resilience ($\beta = 0.313$, $p < 0.001$), with each additional year of basketball experience corresponding to an approximately 4-point higher mean CYRM-28 score after adjusting for sociodemographic variables. We interpret this association as correlational rather than causal, in line with the cross-sectional design. This finding suggests that the association between sport participation and resilience is cumulative in nature and that prolonged participation may be linked to more pronounced resilience profiles; it is also broadly consistent with the sporting-resilience framework synthesised by Gupta and McCarthy (2022) in their systematic review of resilience in sport performers. From the perspective of the Positive Youth Development framework, extended sport participation provides young people with repeated experiences of achievement, robust social bonds, and opportunities to develop constructive coping strategies (Lerner et al., 2005). Anderson-Butcher (2019) also emphasised that youth sport can serve as a vehicle for social development and that sporting environments constitute an important context for the cultivation of life skills.

A noteworthy finding was that sex did not emerge as a significant predictor of psychological resilience in either regression model, despite the basketball group comprising a substantially higher proportion of males (82.8%) than the control group (55.9%). This result is consistent with studies reporting similar resilience trajectories across sexes during early-to-middle adolescence (Llistosella et al., 2023) and suggests that the association between sport participation and resilience may not be moderated by sex in this age group. Nevertheless, the unequal sex distribution between groups constitutes a methodological limitation, and future research employing sex-stratified analyses or recruiting balanced samples would provide a more definitive assessment of this question. A particularly important observation is that the basketball group was not only more experienced in sport but also markedly more advantaged on key socioeconomic indicators, 82.8% male vs. 55.9% in the control group, a substantially higher proportion of households with income exceeding expenditure, and 78.2% vs. 15.7% university-educated mothers. This pattern raises the legitimate concern that part of the observed between-group difference in resilience may reflect selection on socioeconomic status (SES) rather than an independent contribution of basketball participation. The identification of maternal education level as a significant predictor of

psychological resilience ($\beta=0.689$, $p=0.003$) is a noteworthy finding. The significantly higher resilience scores observed among children of university-educated mothers highlight the importance of family resources and parental education level in child resilience. This finding is consistent with Ungar's (2008) argument that resilience should be understood within an ecological framework. Hoffmann et al. (2022), in a study of more than 11,000 children and adolescents in the United States, reported that organised sports participation was negatively associated with mental health difficulties and that family support played an important role in this relationship. Highly educated parents may be more likely to provide greater emotional support to their children, model effective stress management strategies, and confer advantages in accessing relevant resources.

The positive association between age and psychological resilience ($\beta=0.161$, $p=0.015$) is meaningful from a developmental perspective. During adolescence, increases in cognitive capacity with advancing age, the accumulation of experience, and the development of coping skills may account for the observed rise in resilience levels. In his updated resilience theory, Masten (2018) emphasised that resilience is an outcome of developmental processes and that protective factors are strengthened with age. Llistosella et al. (2023), in their systematic review and meta-analysis examining the effectiveness of school-based resilience interventions, likewise noted that resilience during adolescence should be understood within a developmental framework and that protective factors may vary by age. The present study is subject to several limitations. First, the use of a cross-sectional design precludes the establishment of causal relationships between variables.

The question of whether basketball participation enhances resilience or whether resilient individuals are more inclined to engage in basketball must be addressed through longitudinal research. Second, the basketball and control groups differed significantly with respect to sex, income level, and maternal education level; although these variables were controlled for in the regression analysis, complete matching was not achieved. In particular, the basketball group was 82.8% male while the control group was 55.9% male, and only 15 of 87 basketball players (17.2%) were female. This marked sex imbalance is a noteworthy limitation given evidence that boys and girls may show different resilience profiles and respond differently to organised sport during adolescence; pooling males and females in a single regression may have obscured potential sex-specific patterns. Future studies should consider employing

propensity score matching or stratified sampling to produce more comparable groups at the outset, and should explicitly conduct sex-stratified analyses or recruit balanced samples that allow for robust between-sex comparisons. Third, the control group was defined as adolescents not engaged in any organised sport; however, whether these participants engaged in informal physical activity, individual exercise, or recreational play was not assessed using a validated instrument such as accelerometry or the International Physical Activity Questionnaire. This ambiguity limits the specificity of conclusions regarding the unique contribution of structured team sport, since some of the observed effect could in principle be attributable to higher overall physical activity in the basketball group rather than to organised team-sport participation per se. Fourth, the CYRM-28 subscale scores (individual, relational, and contextual dimensions) were not examined separately; analysing which specific domains of resilience are most strongly associated with basketball experience would yield theoretically richer findings. Fifth, although weekly training frequency was recorded in the data collection form, it was not included in the regression models; incorporating this variable in future analyses would permit a more nuanced dose-response examination of sport participation and resilience. Sixth, data were collected via self-report measures, and the influence of social desirability bias cannot be excluded. Finally, the study was conducted in a specific geographic region, which limits the generalisability of the findings.

Conclusion

The present study demonstrated that basketball experience is positively associated with psychological resilience in adolescents and that years of basketball experience constitutes a significant predictor of psychological resilience after controlling for sociodemographic variables. Nevertheless, given the cross-sectional design, it is not possible to determine whether basketball participation fosters resilience or whether individuals with higher resilience are more likely to engage in and persist with organised sport. The findings suggest that participation in team sports may be considered a supportive factor for adolescent mental health, and longitudinal research is necessary to clarify the direction of this relationship.

Based on the study's findings, the following recommendations are proposed: (a) Policies should be developed to increase adolescents' access to team sports in schools and in the community; (b) Sports programmes should be designed to

encompass not only physical health goals but also psychosocial development objectives; (c) Future research should employ longitudinal designs to examine the causal effects of sport on resilience; (d) Studies comparing the relative effects of different sport disciplines on resilience should be planned; (e) Future studies should use propensity score matching or balanced group designs to account for pre-existing differences between athletes and non-athletes; (f) Subscale-level analyses of resilience instruments such as the CYRM-28 should be conducted to identify which specific domains (individual, relational, contextual) are most responsive to sport participation; (g) Weekly training frequency and intensity should be incorporated as continuous predictors to enable dose-response analyses.

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