International Journal of
Mental Health Promotion

Tech Science Press

http://doi.org/10.32604/ijmhp.2026.077338

ARTICLE

Post-Earthquake Well-Being, Trauma, and Physical Activity Motivations in Young Adults

Yalin Aygun[1,*], Şakir Tufekci[1], Burak Canpolat[2], Fatih Harun Turhan[3], Burak Yagin[4], Sacide Tufekci[5], Georgian Badicu[6], Moazzam Tanveer[7,8], İsmet Seval[1] and Hülya Berktaş[1]

[1]Department of Sport Management, Faculty of Sport Sciences, İnönü University, Malatya, Türkiye
[2]Department of Physical Education and Sport on Disabilities, Faculty of Sport Sciences, İnönü University, Malatya, Türkiye
[3]Department of Sport Management, Hasan Dogan Faculty of Sport Sciences, Karabuk University, Karabuk, Türkiye
[4]Department of Biostatistics and Medical Informatics, Faculty of Medicine, Inonu University, Malatya, Türkiye
[5]Department of Physical Education and Sport, Faculty of Sport Sciences, Kahramanmaras Sutcu Imam University, Kahramanmaras, Türkiye
[6]Department of Physical Education and Special Motricity, Faculty of Physical Education and Mountain Sports, Transilvania University of Brasov, Brasov, Romania
[7]School of Physical Education and Sport Training, Shanghai University of Sport, Shanghai, China
[8]Department of Allied Health Sciences, Health Services Academy, Islamabad, Pakistan
*Corresponding Author: Yalin Aygun. Email: yalin.aygun@inonu.edu.tr

Received: 07 December 2025; Accepted: 29 May 2026; Published: 30 July 2026

ABSTRACT: Background: Large-scale earthquakes may substantially affect university students' psychological functioning, motivation, and overall well-being. Understanding these multidimensional psychosocial processes is essential for developing effective post-disaster mental health and physical activity interventions. This study examined psychological well-being, post-earthquake trauma symptoms, recreational sport well-being, and sport motivation among university students studying in Türkiye's earthquake-affected region. In addition, demographic and contextual factors were explored to better understand psychosocial differences in post-disaster adaptation. **Methods:** A cross-sectional design was employed with 651 sport sciences students from two universities located in the 2023 earthquake zone. Data were collected using an online questionnaire including the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS), Post-Earthquake Trauma Assessment Scale (PETAS), Recreational Sport Well-Being Scale (RSWBS), and Sport Motivation Scale–6 (SMS-6). Group comparisons and associations were examined using nonparametric tests and Spearman correlations. Additional multivariate regression, mediation, and moderation analyses were conducted to clarify relationships among key variables. **Results:** Female students reported significantly higher trauma-related symptoms, whereas male students demonstrated higher psychological well-being ($p = 0.047$, $r = 0.077$). Higher income and advanced academic year were associated with higher well-being and recreational well-being scores ($\eta^2 = 0.014–0.028$). Trauma symptoms were negatively associated with well-being indicators, while psychological and recreational well-being showed positive correlations ($p < 0.001$). Multivariate analyses indicated that emotional restriction and behavioral problems were the strongest negative predictors of well-being. **Conclusion:** The findings suggest that post-disaster psychosocial functioning among university students reflects a multidimensional structure in which trauma symptoms, well-being, motivation, and recreational engagement coexist in meaningful associations. Emotional processes, behavioral functioning, and socioeconomic resources appear particularly relevant for understanding well-being differences, supporting the importance of multidimensional, resource-sensitive post-disaster interventions in university settings.

KEYWORDS: Psychological well-being; post-earthquake trauma; physical activity; sport motivation; university students

1 Introduction

Natural disasters are extraordinary events that profoundly affect individuals' lives physically, economically, and psychologically [1–3]. As a country that frequently experiences earthquakes due to its geological structure, Turkey faces recurring challenges that can adversely influence the psychological well-being of young people living or studying in affected regions [4–6]. Large-scale earthquakes not only cause material losses but also substantially disrupt individuals' emotional balance, social relations, and overall life satisfaction [7–9]. Numerous studies have documented increases in anxiety, stress, motivational decline, and behavioral symptoms among students in the aftermath of such disasters [10–12].

University students represent a particularly relevant population in post-disaster contexts because they simultaneously navigate developmental, academic, and social transitions while maintaining performance expectations [13,14]. Consequently, disaster-related disruptions may have pronounced effects on student-specific outcomes, including psychological well-being, academic motivation, and behavioral adjustment [15,16]. In addition, educational interruptions such as university closures and disruptions to academic continuity may further increase stress and compromise academic engagement, underscoring the need for targeted psychosocial and educational support following natural disasters [17–19]. Within this context, students in sport sciences occupy a distinctive position. Sport sciences education encompasses not only physical performance but also psychological resilience, motivation, and self-regulation [14,20]. Psychological well-being includes dimensions such as meaning in life, self-acceptance, environmental mastery, positive relations, personal growth, and autonomy [21,22]. Disruptions in these domains can negatively affect students' academic and athletic performance. Furthermore, motivational structures, particularly intrinsic and extrinsic motivation, are fundamental determinants of students' participation in academic and sport-related activities [23]. Behavioral symptoms, as observable indicators of stress, anxiety, or depressive tendencies, provide crucial insights into an individual's psychological state [24,25].

Positive emotions generated through physical activity, teamwork, and personal development may support sport sciences students' psychological recovery and enhance their resilience following a disaster [26]. This perspective aligns with findings suggesting that regular physical exercise serves as an effective strategy for coping with trauma, facilitating both post-traumatic growth and psychological resilience [20,27]. Evidence on post-traumatic growth demonstrates that some individuals may achieve personal development through the challenges they experience, a process particularly meaningful for athletes [28]. The discipline and goal-oriented structure inherent in sports may offer a supportive framework for processing trauma and rebuilding psychological resources [26].

The present study adopts a resource–adaptation–motivation perspective in which disaster-related resource loss forms the contextual background, motivational processes represent the central explanatory mechanism, and psychological well-being constitutes the primary outcome.

Accordingly, this study aimed to examine the psychological well-being, post-earthquake trauma symptoms, recreational sport well-being, and sport motivation profiles of university students studying in Türkiye's earthquake-affected region. In addition, the study investigated how demographic factors (gender, academic year, socioeconomic status, and prior earthquake exposure) shape these psychological and motivational outcomes.

In this regard, examining the psychological well-being, motivational structures, and behavioral symptom levels of sport sciences students studying in earthquake-affected regions is essential. Such research holds significant value both for developing post-disaster psychosocial support policies and for improving educational practices within sport sciences programs.

2 Conceptual Framework

University students living in disaster-affected regions constitute a vulnerable population, as they must simultaneously maintain academic responsibilities while coping with the psychological consequences of trauma [29,30]. The conceptual framework of the present study is organized around Self-Determination Theory (SDT) [23] as the primary explanatory perspective linking motivational processes with psychological well-being. Complementary theoretical perspectives are integrated to contextualize disaster-related resource loss, adaptation mechanisms, emotional processes, and demographic influences.

In disaster contexts, individuals frequently experience losses in personal, social, and material resources. Conservation of Resources (COR) Theory [31] provides the contextual foundation for understanding how such losses may weaken perceptions of control, competence, and security, thereby increasing vulnerability to psychological distress. Resource loss is particularly salient because its psychological impact is often stronger than resource gain [32,33]. Among university students, this process may manifest as reduced motivation and increased behavioral symptoms following earthquakes [6]. The ability to preserve or rebuild resources, therefore, plays a central role in maintaining psychological well-being in disaster-prone environments [20,32,34,35].

Within this context, adaptive recovery processes are conceptualized through Resilience Theory, which emphasizes individuals' capacity for positive adaptation despite adversity [36]. Resilience reflects normative adaptive processes rather than extraordinary traits, allowing individuals to regain psychological stability following traumatic experiences [37]. For sport sciences students, participation in physical activity, teamwork, and athletic discipline may serve as important resilience resources that facilitate post-disaster recovery [4,38,39].

Beyond adaptation, positive emotional experiences may contribute to rebuilding psychological resources. According to Broaden-and-Build Theory [40,41], positive emotions expand individuals' cognitive and behavioral repertoires, enabling the development of enduring psychological resources. This perspective supports the idea that emotional experiences related to sport participation may strengthen coping capacity and contribute to well-being following adversity.

Building on these contextual foundations, SDT [23] serves as the central explanatory mechanism of the present study. The theory conceptualizes motivation along a continuum ranging from amotivation to external and intrinsic motivation, proposing that more self-determined forms of motivation are associated with greater psychological well-being, persistence, and adaptive functioning. In this study, intrinsic motivation, integrated regulation, and identified regulation represent self-determined motivational orientations, whereas external regulation and amotivation represent less autonomous forms. The nature of students' motivation toward sport participation in the post-disaster context may therefore play a key role in shaping psychological well-being [42,43].

Psychological well-being itself is conceptualized within the Warwick–Edinburgh Psychological Well-Being Model [44], which integrates both hedonic and eudaimonic dimensions of well-being, including positive emotions, effective functioning, and meaningful social relationships. This framework provides a holistic conceptualization suitable for examining psychological adaptation among sport science students living in earthquake-affected regions.

Finally, demographic and contextual characteristics are incorporated as supporting explanatory dimensions. The Social Determinants of Health approach emphasizes socioeconomic factors such as income and living conditions as key influences on mental health and well-being [45]. Similarly, Gender Role Theory highlights differences in emotional expression and coping strategies [46], while Developmental Psychology and Self-Regulation frameworks suggest that advancing academic experience may strengthen self-regulatory capacities and adaptive functioning [47]. In sport contexts, gender roles, competitive expectations, and developmental factors may further shape motivational and emotional processes.

This integrated framework can position disaster-related resource loss and resilience as contextual foundations, positive emotional processes as supportive mechanisms, and self-determined motivation as the central pathway linking individual and contextual factors to psychological well-being among sport sciences students in earthquake-affected regions.

3 Methods

3.1 Study Design

This study employed a quantitative cross-sectional survey design to investigate the psychological well-being, motivational structures, and behavioral symptom levels of sport sciences students studying at two universities located in earthquake-affected provinces of Türkiye (Kahramanmaraş and Malatya). Data were collected using an online questionnaire administered during a single data-collection period.

The overall research framework was structured around three interrelated components: (a) demographic and contextual variables, including age, gender, marital status, academic year, socioeconomic indicators, active sport participation, earthquake-related experiences, and personal habits; (b) standardized psychometric instruments assessing psychological well-being, post-earthquake trauma symptoms, recreational sport-related well-being, and sport motivation; and (c) an analytical framework examining associations among demographic factors, motivational structures, behavioral symptoms, and psychological well-being within a post-disaster context.

Psychological well-being was assessed using the Warwick–Edinburgh Mental Well-Being Scale (WEMWBS), post-earthquake trauma symptoms were assessed with the Post-Earthquake Trauma Assessment Scale (PEAS), recreational sport-related well-being was measured using the Recreational Sport Well-Being Scale (RSWBS), and motivational orientations were measured using the Sport Motivation Scale-6 (SMS-6).

Fig. 1 presents a schematic overview of the study design, illustrating the measured constructs, data flow, and analytical structure used to examine relationships among the study variables.

3.2 Participants

Participants were recruited from the Faculties of Sport Sciences at two universities located in the earthquake-affected region of Türkiye: Kahramanmaraş Sutcu Imam University (Kahramanmaraş) and Inonu University (Malatya). Recruitment was conducted using a voluntary convenience sampling approach. Students were informed about the study during class sessions and invited to participate if they met the inclusion criteria. Participation was entirely voluntary, and no incentives were provided.

A total of 651 sport sciences students participated in the study. The mean age of the participants was 21 years, and the majority were male. Among the academic programs, the highest representation was from the Sports Management department. Most students reported a monthly family income between TRY 10,000 and 30,000, and more than half indicated that they were actively engaged in sport.

An a priori power analysis was conducted for the primary multiple regression model (k = 19 predictors) using an alpha level of 0.05, a statistical power of 0.95, and a medium effect size (Cohen's f^2 = 0.15) [48,49].

The analysis indicated a minimum required sample size of N = 218 participants. The final sample (N = 651) substantially exceeded this threshold, confirming adequate statistical power to detect medium effects within the primary regression model.

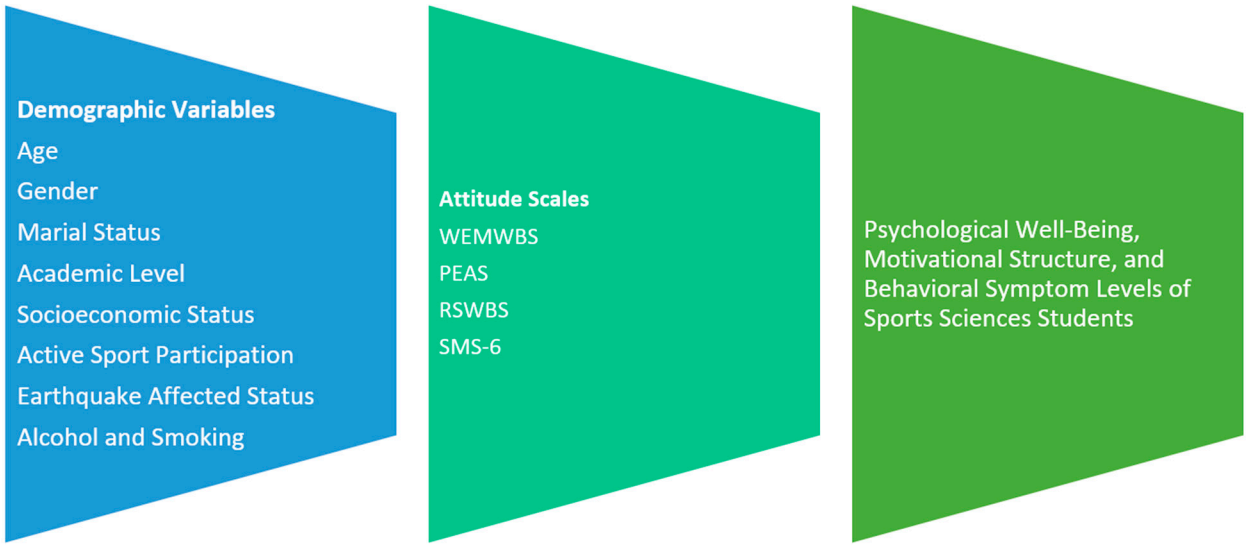

Figure 1: Study design. **Note:** WEMWBS, Warwick-Edinburgh Mental Well-Being Scale; PETAS, Post-Earthquake Trauma Assessment Scale; RSWBS, Recreational Sports Well-Being Scale; SMS-6, Sport Motivation Scale.

Additionally, a substantial proportion of students (41.32%) had previously experienced a major earthquake, while a smaller proportion (5.22%) reported losing a first-degree relative in the most recent disaster. Although the rate of receiving psychological support was relatively low, tobacco and alcohol use appeared to be at notable levels. These descriptive characteristics provide an important contextual foundation for interpreting the psychological well-being, motivational structures, and behavioral processes of young individuals living in the earthquake-affected region.

3.3 Data Collection

Participants' demographic characteristics were assessed using questions covering gender, age, marital status, university of enrollment, academic department, year of study, family income, regular sport participation, earthquake-related experiences (including location during the earthquake and loss of a first-degree relative), prior earthquake exposure, receipt of psychological support within the past year, and cigarette and alcohol use.

Psychological well-being was assessed using the WEMWBS [44]. The scale consists of 14 items and is scored using a total score, with higher scores indicating better mental well-being. The Turkish adaptation was conducted by Demirtaş and Baytemir [50].

Post-earthquake trauma symptoms were assessed using the PEAS [51]. The scale includes subdimensions related to behavioral problems, emotional restriction, affective symptoms, cognitive restructuring, and sleep problems, with higher scores reflecting higher trauma severity.

Recreational sport–related well-being was assessed using the RSWBS, originally developed by Pi et al. [52] and later adapted into Turkish by Koç [53]. The scale includes subdimensions related to physical and mental health, life satisfaction, family relationship development, and positive emotion, with higher scores indicating greater sport-related well-being.

Sport motivation was assessed using the SMS-6, originally developed by Mallett et al. [54] and later adapted and revised for Turkish samples by Demir [55]. The scale measures amotivation, identified regulation, external regulation, integrated regulation, introjected regulation, and intrinsic motivation.

The internal consistency of the instruments was evaluated using Cronbach's alpha coefficients calculated from the current sample (N = 651). The Cronbach's alpha values were 0.866 for the WEMWBS, 0.933 for the PETAS, 0.948 for the RSWBS, and 0.935 for the SMS-6. These values indicated acceptable to good internal consistency for the measures used in this study.

3.4 Data Analysis

No missing data were identified in the dataset. All 651 participants provided complete responses across all variables; therefore, no missing data treatment or imputation procedures were required. Normality was examined using the Shapiro-Wilk test, and homogeneity of variances was assessed using Levene's test. Descriptive statistics were reported as mean and standard deviation for quantitative variables meeting parametric assumptions, and as median and interquartile range (IQR) for those not meeting these assumptions. Categorical variables were summarized using frequencies and percentages.

For group comparisons, the Mann-Whitney U test was employed for two-group analyses, and the Kruskal-Wallis H test was used for comparisons involving three or more groups. When significant differences were detected, Bonferroni-corrected post hoc analyses were performed.

Correlation analyses were conducted using Spearman's rho coefficient to visualize relational patterns among variables, and results were presented through heatmap correlation matrices. A significance level of $p < 0.05$ was considered statistically significant. All results were reported in accordance with APA formatting guidelines. Data analysis was conducted using SPSS version 28.0 (IBM Corp., Armonk, NY, USA) and Python version 3.10.

3.4.1 Supplementary Multivariate Analyses

In addition to the primary nonparametric analyses described above, three supplementary multivariate analyses were conducted to more rigorously address confounding variables and to examine indirect and conditional effects on participants' Wellbeing Score. All supplementary analyses were performed using Python (version 3.10) with the statsmodels library (version 0.14).

3.4.2 Multivariate OLS Regression

A multivariate Ordinary Least Squares (OLS) regression model was estimated to examine the simultaneous effects of multiple predictor variables on Well-being Score. The model included the following predictor blocks: (a) demographic variables (gender, marital status, age, university name, department, class, family income, active sport participation, smoking, and alcohol use); (b) earthquake-related variables (province during earthquake, loss of a first-degree relative, prior earthquake experience, receipt of psychological support); (c) trauma composite scores derived from the PETAS (sleep problems, cognitive structure, behavioral problems, and emotional restriction); (d) post-earthquake appraisal items (increased attention to behavior/relationships, understood value of life more, need for help hurts honor, became emotional/cried easily); and (e) sport motivation subscales (external regulation, amotivation, introjected regulation, and intrinsic motivation). Categorical province variables were dummy-coded with a reference category. Model fit was evaluated using R-squared, Adjusted R-squared, and the overall F-statistic (significance level $p < 0.05$).

3.4.3 Mediation Analysis

A mediation analysis was conducted following the Baron and Kenny [56] causal steps approach to test whether Emotional Restriction Composite mediated the relationship between Lost Relative in Earthquake (independent variable) and Well-being Score (dependent variable). Three sequential OLS regression models were estimated: (a) regressing Well-being Score on Lost Relative in Earthquake to obtain the total effect (Path c); (b) regressing Emotional Restriction Composite on Lost Relative in Earthquake to obtain Path a; and (c) regressing Well-being Score simultaneously on Lost Relative in Earthquake and Emotional Restriction Composite to obtain Path b (mediator on outcome) and Path c' (direct effect of the independent variable controlling for the mediator). The indirect effect was evaluated by inspecting the pattern of significance across these three models. Where a significant total effect was absent but individual paths (a and b) were significant, supplementary bootstrapping methods (e.g., Hayes' PROCESS macro) are recommended to directly quantify the indirect effect and its confidence intervals.

3.4.4 Moderation Analysis

A moderation analysis was conducted to test whether Active Sport moderated the association between Behavioral Problems Composite (independent variable) and Well-being Score (dependent variable). An OLS regression model was estimated including: (a) the mean-centered Behavioral Problems Composite, (b) the binary Active Sport indicator, and (c) their product interaction term (Behavioral Problems × Active Sport). Mean-centering of the continuous predictor was applied prior to computing the interaction term to reduce multicollinearity. The interaction term coefficient and its statistical significance ($p < 0.05$) were interpreted as evidence of moderation. Significant main effects of both predictors were also reported to characterize the additive contributions of each variable to Well-being Score.

3.5 Use of Artificial Intelligence

Artificial intelligence (AI)-assisted tools (ChatGPT, OpenAI, San Francisco, CA, USA) were used exclusively for language polishing and improving grammar/fluency in the preparation of this manuscript. No AI tools were used for data collection, statistical analysis, or interpretation of results. The authors take full responsibility for the scientific content of the article.

3.6 Ethical Approval and Informed Consent

Ethical approval for this study was obtained from the Scientific Research and Publication Ethics Committee of Inonu University (Social and Human Sciences Ethics Committee) (Approval No.: E.587342, Decision No.: 28). The study was conducted in accordance with the principles of the Declaration of Helsinki. All participants were informed about the purpose and procedures of the study, and informed consent was obtained prior to participation. Participation was voluntary and anonymous, and participants had the right to withdraw from the study at any time without penalty.

4 Results

The study sample consisted of 651 students (age: Mean = 21, SD = 3), including 364 males (55.91%) and 287 females (44.09%) (Table 1). Most participants were single (94.62%). The majority were enrolled at İnönü University (83.87%), whereas 16.13% were studying at Kahramanmaraş Sütçü İmam University.

Regarding academic departments, 42.86% were students in the Sports Management Department, followed by Physical Education and Sports for the Disabled (19.35%), Physical Education and Sports

Teaching (19.05%), and Coaching Education (18.74%). Year of study distribution indicated that third-year students constituted the largest group (31.95%), followed by first-year (26.57%), second-year (25.35%), and fourth-year (16.13%) students.

Table 1: Participant characteristics.

Variable/Category	Values
Total Number of Participants, N	651
Age, Mean ± SD	21 ± 3
Gender, n (%)	
Male	364 (55.91%)
Female	287 (44.09%)
Marital Status, n (%)	
Single	616 (94.62%)
Married	29 (4.45%)
Divorced	6 (0.92%)
University, n (%)	
Inonu University	546 (83.87%)
Kahramanmaras Sutcu Imam University	105 (16.13%)
Department, n (%)	
Coaching Education	122 (18.74%)
Physical Education and Sports Teaching	124 (19.05%)
Sports Management	279 (42.86%)
Physical Education and Sports on Disabilities	126 (19.35%)
Year of Study, n (%)	
1st year	173 (26.57%)
2nd year	165 (25.35%)
3rd year	208 (31.95%)
4th year	105 (16.13%)
Family Income Level, n (%)	
TRY 10,000–20,000	209 (32.10%)
TRY 20,000–30,000	133 (20.43%)
TRY 30,000–40,000	105 (16.13%)
TRY 40,000–50,000	77 (11.83%)
TRY 50,000–60,000	60 (9.22%)
TRY 60,001+	67 (10.29%)
Regular Participation in Sports, n (%)	
No	276 (42.40%)
Yes	375 (57.60%)
Loss of a First-Degree Relative in the Earthquake, n (%)	
No	617 (94.78%)
Yes	34 (5.22%)
Previous Experience of a Major Earthquake, n (%)	
No	382 (58.68%)
Yes	269 (41.32%)
Receiving Psychological Support in the Last Year, n (%)	
No	599 (92.01%)
Yes	52 (7.99%)
Smoking, n (%)	
No	437 (67.13%)
Yes	214 (32.87%)

Table 1: *Cont.*

Variable/Category	Values
Alcohol Use, n (%)	
No	575 (88.33%)
Yes	76 (11.67%)

Note: Percentages may not total 100% due to rounding.

Monthly family income was most frequently reported as TRY 10,000–20,000 (32.10%), followed by TRY 20,000–30,000 (20.43%). A smaller proportion reported income levels above TRY 60,001 (10.29%). Regular participation in sports was reported by 57.60% of the participants.

Regarding earthquake-related variables, 5.22% reported losing a first-degree relative in the earthquake, and 41.32% reported previous experience of a major earthquake. Psychological support within the past year was reported by 7.99% of participants. Smoking was reported by 32.87% of participants, while alcohol use was reported by 11.67%.

Gender-based comparisons were conducted using the Mann–Whitney U test, and effect sizes were reported using the r coefficient (Table 2). Analysis of WEMWBS scores revealed a significant gender difference, with male participants demonstrating higher psychological well-being scores than females (U = 57,086, p = 0.047, r = 0.077). The effect size indicated a small effect.

Table 2: Comparison of scale scores by gender.

Scale/Subscale	Male, Median (IQR)	Female, Median (IQR)	*p*-Value	*U*	*r*
WEMWBS	25 (7.5)	24 (6)	0.047	57,086	0.077
PETAS					
Sleep Problems	8 (4)	9 (4)	<0.001	43,813	0.140
Cognitive Restructuring	11 (6)	13 (5)	<0.001	37,854	0.238
Behavioral Problems	8 (6)	10 (5)	<0.001	43,150	0.151
Affective Symptoms	11 (4)	12 (4)	<0.001	40,496	0.195
Emotional Restriction	11 (7.5)	13 (6)	<0.001	44,347	0.132
RSWBS					
Physical & Mental Health	15 (4)	15 (4)	0.134	48,954	0.056
Life Satisfaction	16 (4.5)	16 (3)	0.461	50,752	0.027
Family Relationship Development	12 (3)	12 (3)	0.891	52,186	0.003
Positive Emotion	12 (3)	12 (3)	0.968	52,592	0.004
SMS-6					
Integrated Regulation	16 (6)	16 (5)	0.299	54,955	0.042
External Regulation	14 (5)	14 (5)	0.013	58,384	0.099
Amotivation	12 (7)	12 (5)	0.191	49,321	0.050
Identified Regulation	16 (5)	16 (5)	0.497	54,110	0.028
Introjected Regulation	16 (5)	16 (4)	0.817	51,956	0.007
Intrinsic Motivation	16 (5.5)	15 (4)	0.360	54,670	0.038

Note: Gender differences were examined using the Mann-Whitney U test. U = Mann-Whitney U statistic; r = effect size ($Z/\sqrt{N}$). $p < 0.05$ indicates statistical significance. WEMWBS, Warwick-Edinburgh Mental Well-Being Scale; PETAS, Post-Earthquake Trauma Assessment Scale; RSWBS, Recreational Sports Well-Being Scale; SMS-6, Sport Motivation Scale.

Regarding PETAS subdimensions, female participants scored significantly higher than males on sleep problems (U = 43,813, $p < 0.001$, r = 0.140), cognitive restructuring difficulties (U = 37,854, $p < 0.001$, r = 0.238), behavioral problems (U = 43,150, $p < 0.001$, r = 0.151), affective symptoms (U = 40,496, $p < 0.001$,

r = 0.195), and emotional restriction (U = 44,347, p < 0.001, r = 0.132). Effect sizes ranged from small to moderate, with the largest effect observed in cognitive restructuring difficulties.

No significant gender differences were observed in the RSWBS subdimensions, including physical and mental health (U = 48,954, p = 0.134, r = 0.056), life satisfaction (U = 50,752, p = 0.461, r = 0.027), family relationship development (U = 52,186, p = 0.891, r = 0.003), and positive emotion (U = 52,592, p = 0.968, r = 0.004). Effect sizes were negligible across these dimensions.

Within the motivation subscales, only external regulation showed a significant gender difference, with female participants scoring higher than males (U = 58,384, p = 0.013, r = 0.099), reflecting a small effect size. No significant gender differences were found for integrated regulation (U = 54,955, p = 0.299, r = 0.042), amotivation (U = 49,321, p = 0.191, r = 0.050), identified regulation (U = 54,110, p = 0.497, r = 0.028), introjected regulation (U = 51,956, p = 0.817, r = 0.007), or intrinsic motivation (U = 54,670, p = 0.360, r = 0.038). Effect sizes for these comparisons were negligible to small.

Comparisons based on marital status were conducted using the Kruskal-Wallis H test, and effect sizes were reported using η^2 coefficients (Table 3). Age differed significantly across marital status groups (H = 53.012, p < 0.001, η^2 = 0.079), with married participants showing higher median age scores than single and divorced participants, indicating a moderate effect size.

Table 3: Comparison of scale scores by marital status.

Scale/Subscale	Single, Median (IQR)	Married, Median (IQR)	Divorced, Median (IQR)	*p*-Value	*H*	η^2
Age	21 (2)	30 (10.5)	20.5 (9)	<0.001	53.012	0.079
WEMWBS	24 (7)	26 (10)	23.5 (9.5)	0.938	0.129	0.000
PETAS						
Sleep Problems	8.5 (4)	8 (5)	9 (1.5)	0.641	0.875	0.000
Cognitive Restructuring	12 (6)	14 (6)	12.5 (2)	0.030	6.884	0.008
Behavioral Problems	9 (6)	10 (6.5)	12 (1.5)	0.063	5.444	0.005
Affective Symptoms	11 (4)	12 (5.5)	12 (3.75)	0.456	1.533	0.000
Emotional Restriction	12 (6)	12 (8.5)	14.5 (6.25)	0.919	0.158	0.000
RSWBS						
Physical & Mental Health	15 (4)	16 (5)	12 (1.75)	0.261	2.685	0.000
Life Satisfaction	16 (4)	16 (3.5)	12 (3.75)	0.346	2.141	0.000
Family Relationship Development	12 (3)	12 (2.5)	9 (5.25)	0.655	0.822	0.000
Positive Emotion	12 (3)	12 (3)	9 (4.25)	0.771	0.532	0.000
SMS-6						
Integrated Regulation	16 (5)	16 (4.5)	12 (7.75)	0.175	3.511	0.002
External Regulation	14 (4)	14 (5.5)	12 (3.75)	0.343	2.161	0.000
Amotivation	12 (6)	11 (7.5)	12 (8.25)	0.955	0.091	0.000
Identified Regulation	16 (5)	16 (3)	11.5 (9)	0.345	2.143	0.000
Introjected Regulation	16 (4)	16 (2.5)	13 (8.25)	0.460	1.574	0.000
Intrinsic Motivation	16 (4)	16 (2.5)	12 (4)	0.131	4.087	0.003

Note: Group differences according to marital status were examined using the Kruskal–Wallis H test. H = Kruskal-Wallis test statistic; η^2 = effect size. p < 0.05 indicates statistical significance. WEMWBS, Warwick-Edinburgh Mental Well-Being Scale; PETAS, Post-Earthquake Trauma Assessment Scale; RSWBS, Recreational Sports Well-Being Scale; SMS-6, Sport Motivation Scale.

WEMWBS scores did not differ significantly according to marital status (H = 0.129, p = 0.938, η^2 = 0.000), suggesting a negligible effect.

For PETAS, a significant difference was observed only for cognitive restructuring (H = 6.884, p = 0.030, η^2 = 0.008), with married participants demonstrating higher median scores compared to the other groups, reflecting a small effect size. No significant differences were found for sleep problems (H = 0.875, p = 0.641, η^2 = 0.000), behavioral problems (H = 5.444, p = 0.063, η^2 = 0.005), affective symptoms (H = 1.533, p = 0.456, η^2 = 0.000), or emotional restriction (H = 0.158, p = 0.919, η^2 = 0.000).

RSWBS scores did not show significant marital status differences for physical and mental health (H = 2.685, p = 0.261, η^2 = 0.001), life satisfaction (H = 2.141, p = 0.346, η^2 = 0.000), family relationship development (H = 0.822, p = 0.655, η^2 = 0.000), or positive emotion (H = 0.532, p = 0.771, η^2 = 0.000). Effect sizes across RSWBS dimensions were negligible.

SMS-6 subdimensions also showed no significant differences according to marital status, including integrated regulation (H = 3.511, p = 0.175, η^2 = 0.002), external regulation (H = 2.161, p = 0.343, η^2 = 0.000), amotivation (H = 0.091, p = 0.955, η^2 = 0.000), identified regulation (H = 2.143, p = 0.345, η^2 = 0.000), introjected regulation (H = 1.574, p = 0.460, η^2 = 0.000), and intrinsic motivation (H = 4.087, p = 0.131, η^2 = 0.003). Effect sizes ranged from negligible to small.

Overall, marital status was associated only with age and cognitive restructuring, whereas WEMWBS, most PETAS subdimensions, RSWBS, and SMS-6 scores did not show meaningful differences, with effect sizes remaining small or negligible.

Comparisons across academic year levels were conducted using the Kruskal-Wallis H test, and effect sizes were reported using η^2 coefficients (Table 4).

Table 4: Comparison of scale scores by year of study.

Scale/Subscale	1st Year, Median (IQR)	2nd Year, Median (IQR)	3th Year, Median (IQR)	4th Year, Median (IQR)	*p*-Value	*H*	η^2
WEMWBS	24 (6.5)	25 (7)	25 (8)	24 (6.5)	0.332	3.423	0.000
PETAS							
Sleep Problems	9 (4)	8 (4)	8 (4)	9 (5)	0.909	0.546	0.000
Cognitive Restructuring	12 (5)	12 (6.5)	12 (4)	13 (7)	0.475	2.356	0.000
Behavioral Problems	9 (6)	9 (7)	9 (6)	9 (6)	0.712	1.299	0.000
Affective Symptoms	11 (4)	11 (4)	12 (4.75)	11 (5)	0.650	1.424	0.000
Emotional Restriction	11 (6)	12 (8)	12 (7)	12 (7)	0.869	0.602	0.000
RSWBS							
Physical & Mental Health	14^a (4)	14^a (4)	15^a (4)	16^b (4.5)	0.001	19.217	0.025
Life Satisfaction	16^a (4)	16^a (4)	16^a (4)	16^b (6)	0.001	14.778	0.018
Family Relationship Development	10^a (3)	11^a (3)	12^a (3)	12^b (3.5)	0.001	14.986	0.018
Positive Emotion	11^a (3)	12^a (3)	12^a (3)	12^b (2.5)	0.005	12.256	0.014
SMS-6							
Integrated Regulation	16 (7)	16 (4)	16 (5)	16 (4.5)	0.677	1.293	0.000
External Regulation	14 (4.5)	14 (4)	14.5 (4)	14 (5)	0.479	2.365	0.000
Amotivation	12 (7)	12 (6)	12 (5)	12 (7)	0.321	3.352	0.000
Identified Regulation	16 (5.5)	16 (5)	16 (5)	16 (3)	0.839	0.778	0.000
Introjected Regulation	16 (6)	16 (4)	16 (4)	16 (4)	0.593	1.698	0.000
Intrinsic Motivation	15 (5.5)	16 (2)	16 (5)	16 (4)	0.444	2.413	0.000

Note: Different superscript letters (a, b) indicate statistically significant pairwise differences between groups based on post-hoc comparisons. $p < 0.05$ indicates statistical significance. WEMWBS, Warwick–Edinburgh Mental Well-Being Scale; PETAS, Post-Earthquake Trauma Assessment Scale; RSWBS, Recreational Sports Well-Being Scale; SMS-6, Sport Motivation Scale. Group differences according to year level were examined using the Kruskal-Wallis H test. H = Kruskal-Wallis test statistic; η^2 = effect size.

WEMWBS scores did not differ significantly across year levels (H = 3.423, p = 0.332, η^2 = 0.000), indicating a negligible effect.

For PETAS, no significant differences were observed among academic year groups for sleep problems (H = 0.546, p = 0.909, η^2 = 0.000), cognitive restructuring (H = 2.356, p = 0.475, η^2 = 0.000), behavioral problems (H = 1.299, p = 0.712, η^2 = 0.000), affective symptoms (H = 1.424, p = 0.650, η^2 = 0.000), or emotional restriction (H = 0.602, p = 0.869, η^2 = 0.000), with effect sizes remaining negligible.

RSWBS scores showed significant differences across year levels in physical and mental health (H = 19.217, p = 0.001, η^2 = 0.025), life satisfaction (H = 14.778, p = 0.001, η^2 = 0.018), family relationship development (H = 14.986, p = 0.001, η^2 = 0.018), and positive emotion (H = 12.256, p = 0.005, η^2 = 0.014). Post-hoc comparisons indicated that fourth-year students demonstrated higher median scores compared with lower academic year groups. Effect sizes for these differences were small.

SMS-6 subdimensions did not show significant differences across academic year levels, including integrated regulation (H = 1.293, p = 0.677, η^2 = 0.000), external regulation (H = 2.365, p = 0.479, η^2 = 0.000), amotivation (H = 3.352, p = 0.321, η^2 = 0.000), identified regulation (H = 0.778, p = 0.839, η^2 = 0.000), introjected regulation (H = 1.698, p = 0.593, η^2 = 0.000), and intrinsic motivation (H = 2.413, p = 0.444, η^2 = 0.000). All effect sizes were negligible.

Overall, differences across academic year levels were limited to RSWBS dimensions, where fourth-year students exhibited higher well-being-related outcomes; however, effect sizes remained small, suggesting modest practical differences despite statistical significance.

Comparisons across family income levels were conducted using the Kruskal-Wallis H test, and effect sizes were reported using η^2 coefficients (Table 5).

Table 5: Comparison of scale scores by family income level.

Scale/Subscale	10–20, Median (IQR)	20–30, Median (IQR)	30–40, Median (IQR)	40–50, Median (IQR)	50–60, Median (IQR)	60+, Median (IQR)	*p*-Value	*H*	η^2
WEMWBS	23^{a} (6.5)	24^{ab} (6)	25^{bc} (7)	26^{bc} (6.5)	26^{c} (6)	27^{c} (9)	0.001	23.222	0.028
PETAS									
Sleep Problems	8 (4)	8 (4)	9 (4.5)	9 (4)	8.5 (4)	9 (6)	0.335	5.620	0.000
Cognitive Restructuring	12 (5)	12 (6)	12 (5)	11 (5)	12 (7.75)	13 (9)	0.517	4.140	0.000
Behavioral Problems	10 (5)	8 (5)	9 (6)	9 (6.5)	9 (6.75)	10 (9)	0.248	6.839	0.003
Affective Symptoms	12 (3.5)	11 (4)	12 (4)	11 (4)	12 (4.75)	11 (6)	0.867	1.998	0.000
Emotional Restriction	13 (5)	11 (7)	12 (8)	12 (7)	11 (8)	13 (12)	0.281	6.571	0.002
RSWBS									
Physical & Mental Health	14^{a} (4)	15^{abc} (4)	15^{bc} (5)	14^{ab} (4)	15^{abc} (4)	16^{c} (5)	0.011	14.563	0.015
Life Satisfaction	16 (4)	16 (3.5)	16 (5)	16 (4)	16 (5.5)	16 (7)	0.083	9.399	0.007
Family Relationship Development	11^{a} (3)	12^{a} (3)	12^{ab} (3)	11^{a} (3)	10.5^{a} (3)	12^{b} (4)	0.021	12.994	0.012
Positive Emotion	11^{a} (3)	12^{ab} (3)	12^{b} (4)	12^{ab} (3)	12^{ab} (3)	12^{c} (5)	0.004	16.633	0.018
SMS-6									
Integrated Regulation	16^{a} (6)	16^{ab} (5.5)	16^{bc} (5)	16^{abc} (4.5)	15.5^{a} (4.75)	16^{c} (4)	0.013	13.987	0.014
External Regulation	14 (5)	14 (4)	14 (5)	14 (4)	14 (4)	16 (5)	0.112	8.636	0.006
Amotivation	12 (6)	12 (4)	12 (7.5)	12 (7)	12 (5)	12 (8)	0.867	1.831	0.000

Table 5: *Cont.*

Scale/Subscale	10–20, Median (IQR)	20–30, Median (IQR)	30–40, Median (IQR)	40–50, Median (IQR)	50–60, Median (IQR)	60+, Median (IQR)	*p*-Value	*H*	η^2
Identified Regulation	16 (5)	16 (4.5)	16 (5.5)	16 (5)	16 (4.25)	16 (4)	0.103	8.750	0.006
Introjected Regulation	16^{a} (6)	16^{ab} (5.5)	16^{bc} (6)	16^{bc} (3)	16^{ab} (3.75)	16^{c} (3)	0.018	13.091	0.013
Intrinsic Motivation	15^{a} (5)	16^{ab} (4)	16^{bc} (6)	16^{abc} (2)	15^{abc} (3.75)	16^{c} (5)	0.021	12.784	0.012

Note: Different superscript letters (a, b, c) indicate statistically significant pairwise differences between groups based on post-hoc comparisons. $p < 0.05$ indicates statistical significance. Values are presented as median (IQR). Income categories represent monthly family income in thousand Turkish Lira (TRY): 10–20 = TRY 10,000–20,000; 20–30 = TRY 20,001–30,000; 30–40 = TRY 30,001–40,000; 40–50 = TRY 40,001–50,000; 50–60 = TRY 50,001–60,000; and 60+ = TRY 60,001 and above. Group differences were examined using the Kruskal-Wallis *H* test. *H* = Kruskal-Wallis test statistic; η^2 = effect size. WEMWBS, Warwick-Edinburgh Mental Well-Being Scale; PETAS, Post-Earthquake Trauma Assessment Scale; RSWBS, Recreational Sports Well-Being Scale; SMS-6, Sport Motivation Scale.

WEMWBS scores differed significantly across income groups ($H = 23.222$, $p = 0.001$, $\eta^2 = 0.028$), with higher-income groups demonstrating higher median psychological well-being scores. Although statistically significant, the effect size indicated a small effect.

For PETAS, no significant differences were observed across income levels for sleep problems ($H = 5.620$, $p = 0.335$, $\eta^2 = 0.000$), cognitive restructuring ($H = 4.140$, $p = 0.517$, $\eta^2 = 0.000$), behavioral problems ($H = 6.839$, $p = 0.248$, $\eta^2 = 0.003$), affective symptoms ($H = 1.998$, $p = 0.867$, $\eta^2 = 0.000$, or emotional restriction ($H = 6.571$, $p = 0.281$, $\eta^2 = 0.002$). Effect sizes across PETAS dimensions were negligible.

RSWBS scores showed significant differences across income levels in physical and mental health ($H = 14.563$, $p = 0.011$, $\eta^2 = 0.015$), family relationship development ($H = 12.994$, $p = 0.021$, $\eta^2 = 0.012$), and positive emotion ($H = 16.633$, $p = 0.004$, $\eta^2 = 0.018$), with higher-income groups generally displaying higher median scores. Life satisfaction did not differ significantly across income categories ($H = 9.399$, $p = 0.083$, $\eta^2 = 0.007$). Effect sizes for significant RSWBS differences were small.

SMS-6 subdimensions revealed significant differences for integrated regulation ($H = 13.987$, $p = 0.013$, $\eta^2 = 0.014$), introjected regulation ($H = 13.091$, $p = 0.018$, $\eta^2 = 0.013$), and intrinsic motivation ($H = 12.784$, $p = 0.021$, $\eta^2 = 0.012$), indicating higher median scores among students in higher income groups. No significant differences were observed for external regulation ($H = 8.636$, $p = 0.112$, $\eta^2 = 0.006$), amotivation ($H = 1.831$, $p = 0.867$, $\eta^2 = 0.000$), or identified regulation ($H = 8.750$, $p = 0.103$, $\eta^2 = 0.006$). Effect sizes across SMS-6 dimensions were small.

Overall, income level was associated with higher WEMWBS scores, several RSWBS subdimensions, and selected SMS-6 motivational components; however, effect sizes remained small, indicating modest practical differences despite statistical significance.

Fig. 2 presents Spearman correlation coefficients (r) and significance levels among all study variables.

Positive correlations were observed among well-being–related measures, including WEMWBS, RSWBS subdimensions (physical and mental health, life satisfaction, family relationship, and positive emotion), and related indicators (r range = 0.43–0.63, $p < 0.001$).

PETAS subdimensions (sleep problems, cognitive difficulties, behavioral problems, affective symptoms, and emotional limitation) showed positive correlations with one another (r range = 0.36–0.74, $p < 0.001$). Negative correlations were observed between PETAS variables and several well-being indicators (e.g., WEMWBS and emotional limitation: $r = -0.35$, $p < 0.001$).

Positive correlations were also found among SMS-6 motivation subdimensions, including integrated regulation, identified regulation, introjected regulation, intrinsic motivation, and external regulation (r range = 0.58–0.88, $p < 0.001$).

All coefficients represent bivariate associations and should be interpreted as correlational findings.

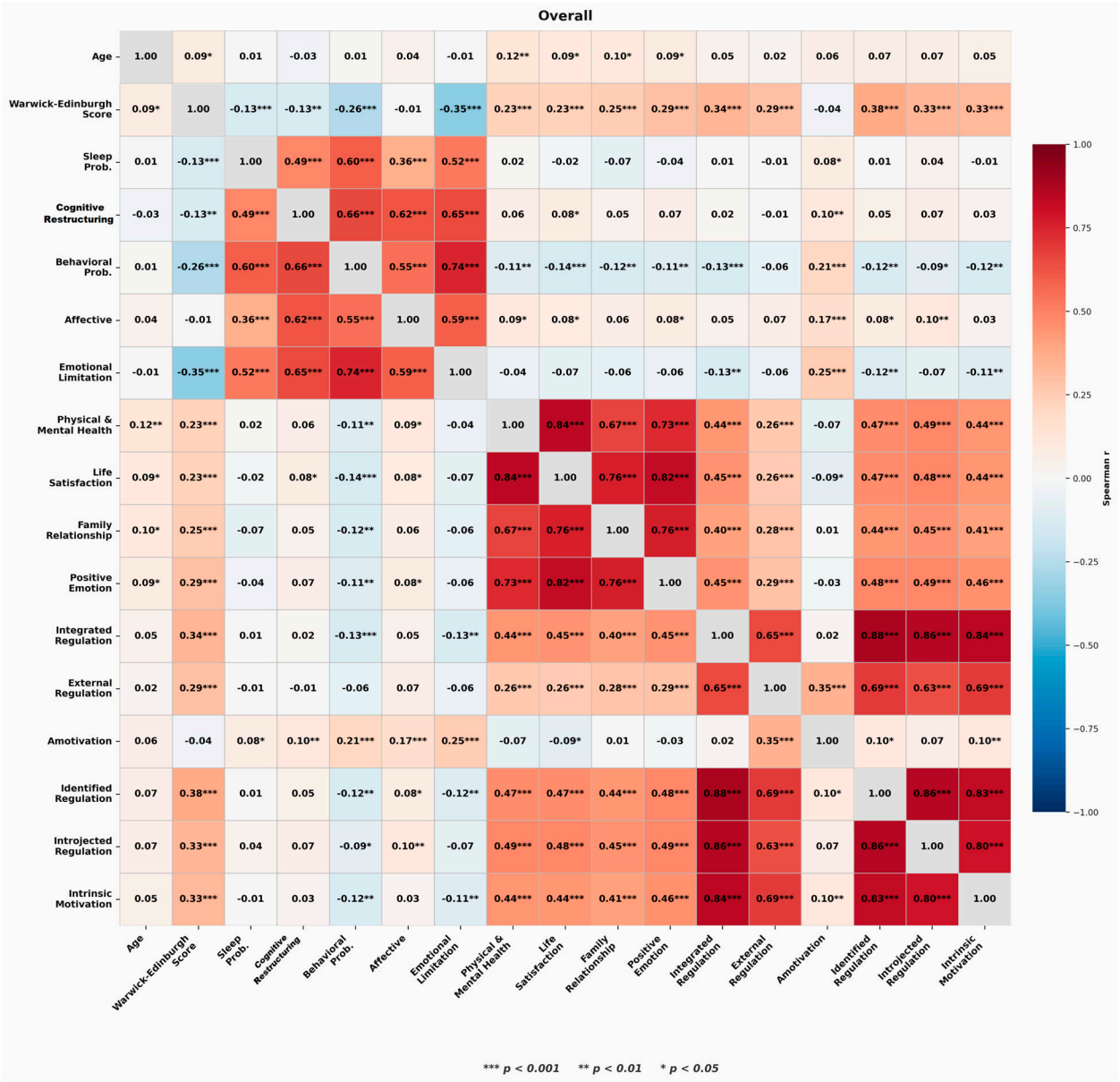

Figure 2: Spearman correlation heatmap for all participants.

Fig. 3 presents Spearman correlation coefficients (r) and significance levels among study variables for female participants.

Positive correlations were observed among well-being–related variables, including WEMWBS and RSWBS subdimensions (physical and mental health, life satisfaction, family relationship, and positive emotion) (r range = 0.45–0.68, $p < 0.001$). For example, life satisfaction was positively correlated with

positive emotion (r = 0.68, p < 0.001), and WEMWBS was positively correlated with life satisfaction (r = 0.60, p < 0.001).

PETAS subdimensions (affective, cognitive, behavioral, and emotional limitation symptoms) showed positive correlations with one another and negative correlations with several well-being indicators (e.g., WEMWBS and emotional limitation: r = −0.30, p < 0.001).

Positive correlations were also observed among SMS-6 motivation subdimensions, including integrated regulation, identified regulation, introjected regulation, and intrinsic motivation (r range = 0.65–0.75, p < 0.001).

All coefficients represent bivariate associations and should be interpreted as correlational findings.

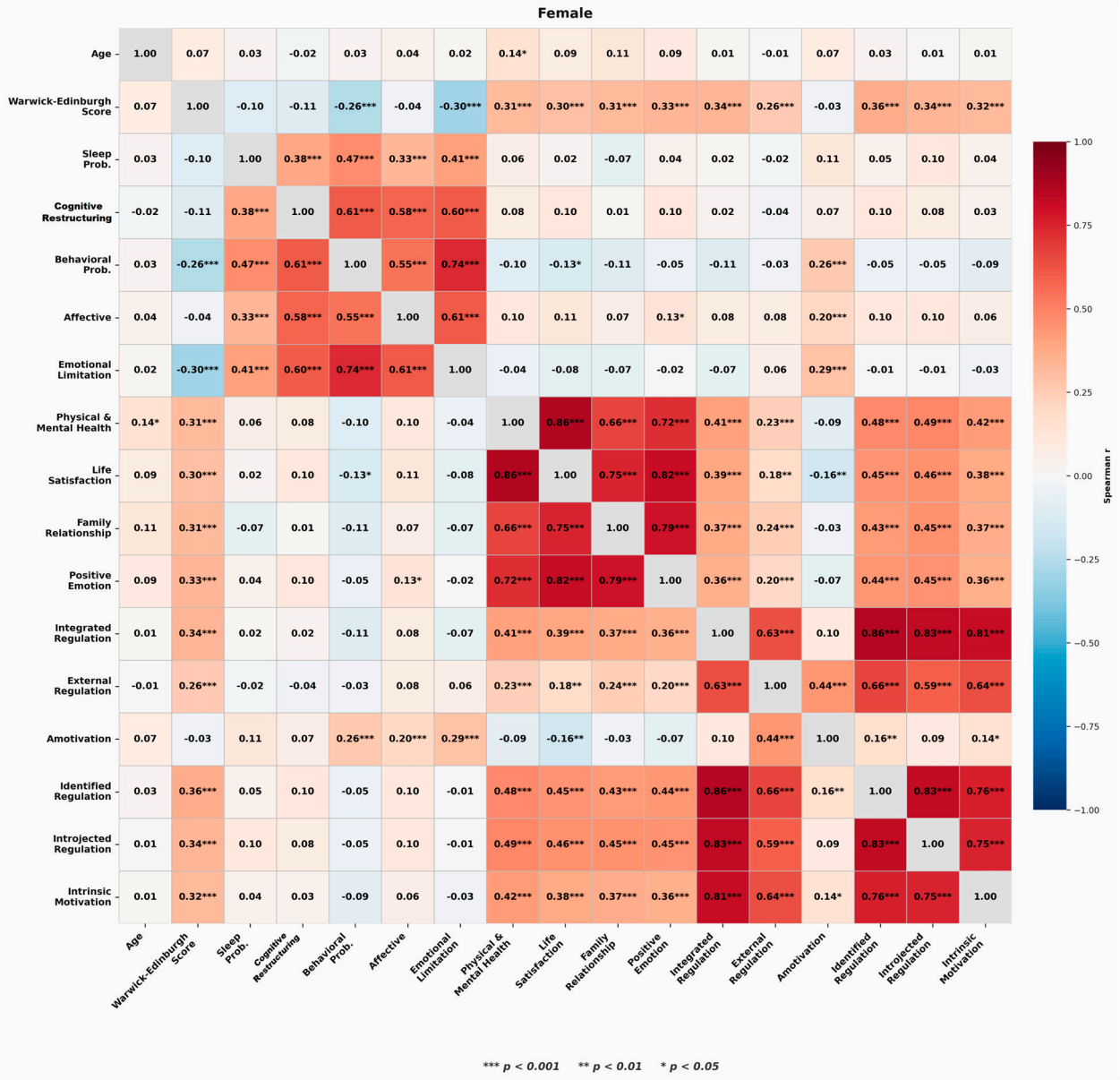

Figure 3: Spearman correlation heatmap for female participants.

Fig. 4 presents Spearman correlation coefficients (r) and significance levels among study variables for male participants.

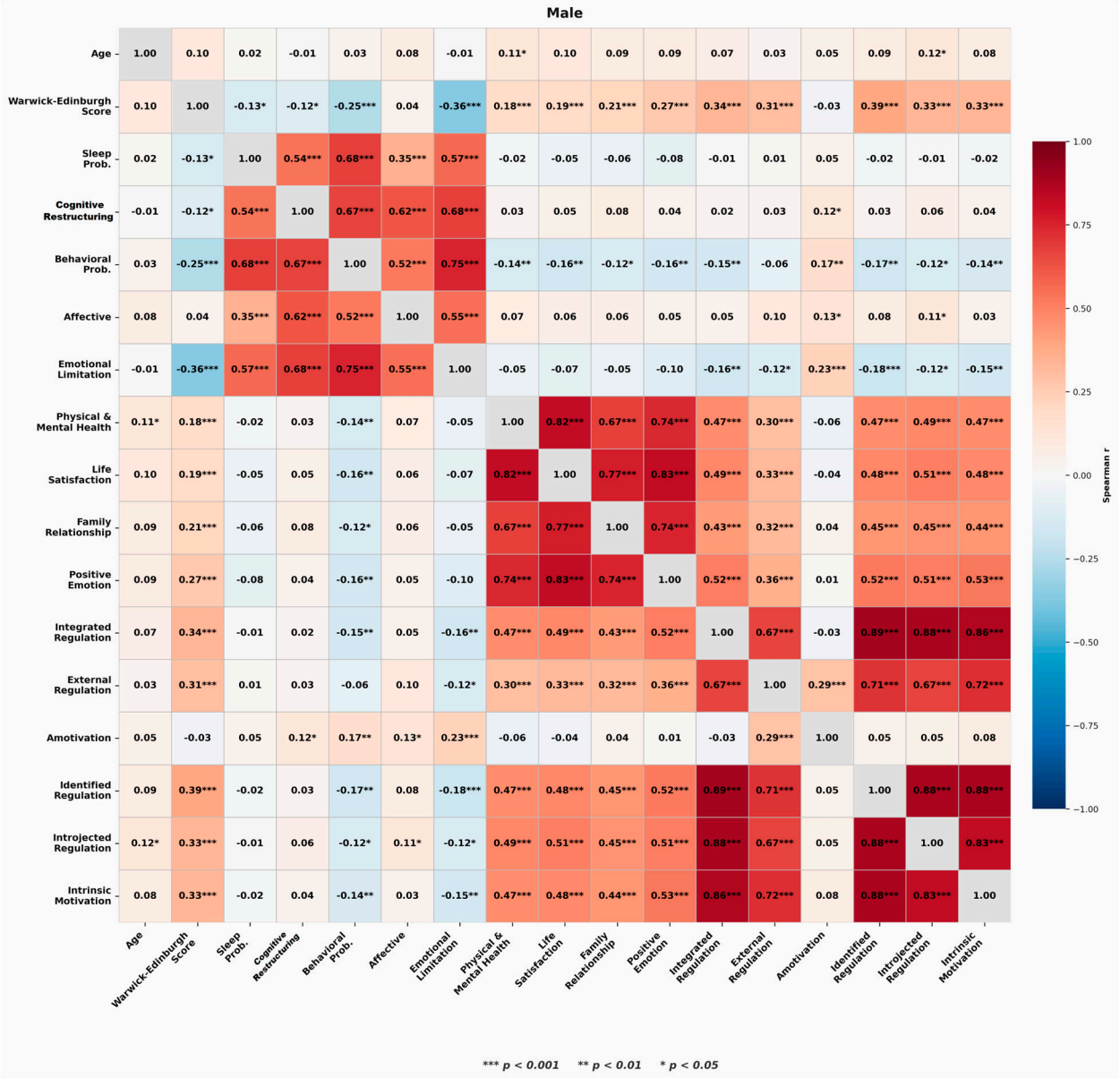

Figure 4: Spearman correlation heatmap for male participants.

Positive correlations were observed among well-being–related variables, including WEMWBS and RSWBS subdimensions (physical and mental health, life satisfaction, family relationship, and positive emotion) (r range = 0.40–0.60, $p < 0.001$). For example, life satisfaction was positively correlated with positive emotion ($r = 0.64$, $p < 0.001$), and WEMWBS was positively correlated with life satisfaction ($r = 0.54$, $p < 0.001$).

PETAS subdimensions (sleep problems, cognitive difficulties, behavioral problems, affective symptoms, and emotional limitation) showed positive correlations with one another and negative correlations with

several well-being indicators. For instance, WEMWBS was negatively correlated with emotional limitation ($r = -0.36$, $p < 0.001$).

Positive correlations were also observed among SMS-6 motivation subdimensions, including integrated regulation, identified regulation, introjected regulation, and intrinsic motivation (r range = 0.70–0.83, $p < 0.001$).

All coefficients represent bivariate associations and should be interpreted as correlational findings.

4.1 Multivariate Regression Analysis of Wellbeing

This section reports the results of the multivariate OLS regression analysis examining associations between demographic variables, earthquake-related factors, resilience indicators, motivational variables, and Wellbeing Score.

The overall model showed a significant fit to the data ($R^2 = 0.356$, adjusted $R^2 = 0.296$, $F = 5.887$, $p < 0.001$), indicating that the included predictors explained 35.6% of the variance in Wellbeing Score (Table 6).

Table 6: Overall model fit statistics for all analyses.

Model	R^2	Adj. R^2	F-Statistic	Prob (F-Stat.)
Multivariate Regression	0.356	0.296	5.887	<0.001
Mediation-Path c (Total)	0.001	−0.000	0.773	0.380
Mediation-Path a	0.026	0.025	17.619	<0.001
Mediation-Path b & c’	0.084	0.082	29.939	<0.001
Moderation Model	0.082	0.077	19.203	<0.001

Note: OLS, Ordinary Least Squares; R^2, coefficient of determination; Adj. R^2, adjusted coefficient of determination; F, overall model test statistic; p values indicate model significance. Path c = total effect; Path a = effect of the independent variable on the mediator; Path b = effect of the mediator on the dependent variable; Path c’ = direct effect of the independent variable on the dependent variable.

As shown in Table 7, significant predictors ($p < 0.05$) included Province During Earthquake 5 ($\beta = 11.972$, $p = 0.016$), Province During Earthquake 20 ($\beta = -3.265$, $p = 0.029$), Province During Earthquake 26 ($\beta = -5.109$, $p = 0.043$), Family Income ($\beta = 0.349$, $p = 0.004$), Active Sport ($\beta = 1.334$, $p = 0.002$), Behavioral Problems Composite ($\beta = -0.419$, $p = 0.001$), Emotional Restriction Composite ($\beta = -0.505$, $p < 0.001$), Increased Attention Behavior Relationships ($\beta = 0.518$, $p = 0.031$), and Understood Value of Life More ($\beta = 0.806$, $p < 0.001$).

Table 7: Multivariate regression coefficients for well-being score.

Variable	Coef.	Std. Err.	t	$p > \|t\|$
Intercept	13.994	2.069	6.763	<0.001
Province During Earthquake 5	11.972	4.956	2.416	0.016
Province During Earthquake 20	−3.265	1.492	−2.189	0.029
Province During Earthquake 26	−5.109	2.513	−2.033	0.043
Gender	0.012	0.467	0.026	0.979
Marital Status	0.460	0.788	0.584	0.559
Age	0.046	0.063	0.738	0.461
Family Income	0.349	0.122	2.870	0.004
Active Sport	1.334	0.438	3.044	0.002
Lost Relative in Earthquake	0.314	0.923	0.340	0.734
Sleep Problems Composite	0.020	0.083	0.240	0.811
Cognitive Structure Composite	−0.029	0.083	−0.353	0.724

Table 7: *Cont.*

Variable	Coef.	Std. Err.	t	$p > \|t\|$
Behavioral Problems Composite	−0.419	0.123	−3.410	<0.001
Emotional Restriction Composite	−0.505	0.051	−9.852	<0.001
Increased Attention Behavior Relationships	0.518	0.239	2.166	0.031
Understood Value of Life More	0.806	0.203	3.963	<0.001
External Regulation	−0.063	0.046	−1.355	0.176
Amotivation	−0.125	0.083	−1.507	0.132
Introjected Regulation	0.016	0.046	0.339	0.735
Intrinsic Motivation	0.049	0.056	0.884	0.377

Note: OLS regression coefficients are unstandardized (β). Std. Err. = standard error; t = t statistic; p values indicate statistical significance. Significant effects are highlighted at $p < 0.05$.

Gender, marital status, age, loss of a relative during the earthquake, sleep problems, cognitive structure, and motivational subdimensions (external regulation, amotivation, introjected regulation, and intrinsic motivation) were not significantly associated with Well-being Score within the multivariate model ($p > 0.05$).

Table 6 presents overall model fit statistics across analyses, and Table 7 presents the regression coefficients for Wellbeing Score. All estimates represent associations within the fitted model.

4.2 Mediation Analysis: Lost Relative, Emotional Restriction, and Well-Being

This section reports the mediation analysis examining associations among Lost Relative in Earthquake, Emotional Restriction Composite, and Wellbeing Score using regression-based models following the Baron and Kenny approach [56].

In the first model (Path c; total effect), Wellbeing Score was regressed on Lost Relative in Earthquake. The total effect was not statistically significant ($\beta = -0.886$, $p = 0.380$).

In the second model (Path a), Emotional Restriction Composite was regressed on Lost Relative in Earthquake. The predictor showed a significant positive association with the mediator ($\beta = 3.730$, $p < 0.001$).

In the final model (Paths b and c'), Wellbeing Score was regressed simultaneously on Lost Relative in Earthquake and Emotional Restriction Composite. Emotional Restriction Composite was significantly associated with Wellbeing Score ($\beta = -0.327$, $p < 0.001$), whereas Lost Relative in Earthquake was not statistically significant ($\beta = 0.335$, $p = 0.732$).

Table 8 presents the regression coefficients for the mediation analysis models. All estimates represent associations within the fitted models.

Table 8: Mediation analysis regression coefficients.

Model	Variable	Coef.	Std. Err.	t	$p > \|t\|$
Path c (Total Effect)	Intercept	24.408	0.230	106.086	<0.001
	Lost Relative in Earthquake	−0.886	1.008	−0.879	0.380
Path a	Intercept	12.251	0.203	60.420	<0.001
	Lost Relative in Earthquake	3.730	0.889	4.198	<0.001
Path b & c'	Intercept	28.419	0.567	50.149	<0.001
	Lost Relative in Earthquake	0.335	0.979	0.342	0.732
	Emotional Restriction Composite	−0.327	0.043	−7.684	<0.001

Note: OLS regression coefficients are unstandardized (β). Std. Err., standard error; t, t statistic; p-values indicate statistical significance. Path c = total effect; Path a = effect of the independent variable on the mediator; Path b = effect of the mediator on the dependent variable; Path c' = direct effect of the independent variable on the dependent variable.

4.3 Moderation Analysis: Behavioral Problems, Active Sport, and Well-Being

This section reports the moderation analysis examining whether Active Sport moderates the association between Behavioral Problems Composite and Well-being Score.

The overall moderation model was statistically significant (R^2 = 0.082, adjusted R^2 = 0.077, F = 19.20, p < 0.001).

As shown in Table 9, the interaction term Behavioral Problems by Active Sport was not statistically significant (β = −0.008, Std. Err. = 0.111, t = −0.074, p = 0.941).

Table 9: Moderation analysis regression coefficients.

Variable	Coef.	Std. Err.	*t*	*p* > |*t*|
Intercept	25.627	0.858	29.874	<0.001
Behavioral Problems Composite	−0.281	0.084	−3.342	0.001
Active Sport	2.399	1.120	2.141	0.033
Behavioral Problems by Active Sport	−0.008	0.111	−0.074	0.941

Note: OLS regression coefficients are unstandardized (β). Std. Err., standard error; t, t statistic; p values indicate statistical significance. Behavioral Problems by Active Sport denotes the interaction term included in the moderation model.

Behavioral Problems Composite showed a significant negative association with Well-being Score (β = −0.281, p = 0.001), whereas Active Sport showed a significant positive association (β = 2.399, p = 0.033).

Table 9 presents the regression coefficients for the moderation analysis model. All estimates represent associations within the fitted model.

5 Discussion

The present study offers a multidimensional perspective on university students' psychological, motivational, and recreational well-being following a major earthquake. Crucially, the findings revealed a closely interconnected psychosocial pattern broadly consistent with existing trauma, well-being, and motivation literature. Trauma symptoms, psychological well-being, motivational regulation, and recreational well-being appeared closely associated, with these relationships unfolding alongside sociodemographic characteristics such as gender, academic year, and income level.

Consistent with prior research, female students reported higher levels of trauma-related symptoms, including cognitive restructuring difficulties, affective disturbances, sleep problems, and behavioral symptoms. Importantly, this pattern aligns with evidence suggesting heightened psychological vulnerability among women following disasters [57,58]. Similar observations have been reported among students directly exposed to earthquakes [59]. In parallel, the higher psychological well-being scores observed among male students correspond with studies documenting stronger trauma-related symptom severity among women in post-earthquake contexts [60–63]. These findings reinforce the presence of gender-related variations in post-disaster psychological responses.

The inverse association observed between trauma symptoms and psychological well-being converges with a well-established body of literature. Research employing the WEMWBS [64–68] consistently highlights income level as a relevant correlate of well-being, underscoring the broader role of social determinants in post-disaster adjustment. Likewise, lower income has repeatedly been associated with increased vulnerability to trauma-related responses [69,70]. Viewed collectively, these findings emphasize the importance of accounting for socioeconomic and gender-related inequalities when considering psychosocial support strategies after disasters [71–73].

A progressive increase in psychological well-being across higher academic year levels was also observed, aligning with developmental perspectives emphasizing growing maturity, self-efficacy, and coping capacity. Comparable tendencies have been reported in both post-pandemic and post-earthquake contexts [68,73]. Within this framework, traditional gender-role expectations emphasizing caretaking and emotional responsibility may be linked to stronger distress responses among women during crisis situations [74]. In cultural settings such as Türkiye, where social and economic resources may vary, these dynamics may become more pronounced in relation to psychological outcomes [69,71].

Findings from the motivational dimension indicated that motivational regulation was closely linked with both individual and contextual resources. Higher income levels corresponded with higher intrinsic motivation, integrated regulation, and introjected regulation, suggesting that motivational orientations may coexist with structural opportunities as well as personal characteristics. Furthermore, the higher external regulation scores observed among female students align with literature describing reduced motivational autonomy under trauma-related conditions [75,76]. Similarly, prior trauma exposure was associated with lower psychological functioning and weaker motivational profiles, echoing studies linking socioeconomic disadvantage and trauma burden to reduced resilience [58,77–79].

With regard to recreational well-being, higher scores were observed among students with advanced academic year levels and higher income, consistent with evidence demonstrating positive associations between recreational engagement and well-being [80]. At the same time, its negative association with trauma symptoms and positive association with psychological well-being suggest that recreational participation may coexist with more adaptive functioning in post-disaster contexts. The absence of gender or marital-status differences further indicates that recreational well-being may be more strongly related to participation intensity and environmental opportunities than to biological factors [79]. This interpretation is also consistent with literature emphasizing the roles of social support, motivation, and access to facilities in shaping sport participation [81].

When considered holistically, findings across all four scales suggest a strongly interconnected psychosocial structure in which trauma symptoms, well-being, motivation, and recreational functioning co-occur in meaningful ways. Higher trauma levels were associated with lower well-being and reduced autonomous motivation, whereas higher well-being and recreational engagement tended to coincide with lower trauma symptom levels and stronger intrinsic motivation. Importantly, the consistent associations observed with academic year and income further highlight the relevance of social determinants in shaping post-disaster adjustment.

From a theoretical standpoint, these patterns align closely with the conceptual frameworks introduced earlier in the study. Social Comparison Theory provides a useful lens for contextualizing gender-related differences in trauma responses, while SDT helps interpret the co-occurrence of stronger intrinsic motivation and higher well-being. In addition, Positive Psychology perspectives suggest that higher academic year and income may correspond with accumulated psychological resources, whereas Self-Regulation Theory frames recreational participation as part of adaptive regulatory processes. Collectively, these converging interpretations indicate that the findings remain theoretically coherent while fully consistent with the associative nature of a cross-sectional design.

5.1 Interpreting Multivariate Analysis

Multivariate analysis refined the psychosocial landscape of post-disaster wellbeing by isolating the unique contributions of interrelated factors. After accounting for shared variance, emotional restriction and behavioral problems emerged as the strongest negative correlates, suggesting these trauma-related

processes are centrally implicated in maladaptation. In contrast, Province 5 showed a positive association with psychological well-being, whereas Provinces 20 and 26 were associated with lower well-being levels. Conversely, family income and active sport participation demonstrated independent positive associations, highlighting the concurrent salience of socioeconomic resources and behavioral engagement. Provincial differences further underscored the role of contextual conditions, supporting an ecological perspective wherein wellbeing reflects individual-environment interplay [58].

These findings align with prior research indicating that while direct effects of academic stress may not always be statistically evident, its influence likely operates indirectly through emotional and behavioral pathways [82]. Within this framework, psychological resilience appears as a positive correlate, potentially coexisting with adaptive functioning among trauma-exposed students [82,83]. The independent role of sports participation suggests behavioral activation may facilitate stress regulation and resilience, consistent with evidence linking physical activity to reduced distress [84,85].

Socioeconomic gradients further contextualize these patterns. Higher income and education likely confer cumulative advantage through differential resource access [86], while demographic variations in gender and residential context indicate that post-disaster adjustment differs meaningfully across social groups [87]. Collectively, these results support a multidimensional interpretation wherein emotional regulation, contextual resources, and behavioral engagement concurrently shape well-being, while remaining mindful of the cross-sectional design, which precludes causal inference.

5.2 Interpreting Mediation and Moderation Analysis

Mediation analysis revealed a theoretically significant indirect pathway from trauma exposure to well-being through emotional restriction. Although the total effect was non-significant, the presence of constituent paths suggests that post-disaster well-being is more proximally tied to emotion dysregulation than to the objective burden of loss itself. This pattern aligns with contemporary process-oriented models wherein indirect effects may exist independently of total effects, particularly in complex psychosocial ecologies where exposure exerts influence through intervening mechanisms rather than direct linear impact [88]. The application of bootstrapped confidence intervals strengthens confidence in this indirect pathway by circumventing normality assumptions [5,89].

Moderation analyses clarified the functional role of behavioral engagement. Active sport participation demonstrated a positive main effect on wellbeing, yet failed to moderate the relationship between behavioral problems and wellbeing. This differential pattern suggests that sport participation functions as a generalized positive correlate rather than a targeted buffer against specific maladaptive processes. Such findings resonate with evidence that physical activity confers broad mental health benefits without necessarily attenuating condition-specific risks [85,90].

Synthesized with the main multivariate findings, these analyses converge on a coherent psychosocial architecture: emotional regulation processes emerge as the more proximal determinant of post-disaster wellbeing, while active sport participation and contextual resources operate as independent positive correlates rather than conditional modifiers. This underscores that adaptive recovery hinges primarily on the capacity to process trauma-related emotions, with behavioral engagement and socioeconomic resources providing concurrent but distinct contributions. The absence of moderation effects further suggests these domains function additively rather than synergistically within this post-disaster context.

6 Study Limitations

Despite the strengths of this study, several limitations should be acknowledged. First, although the sample size was statistically adequate as confirmed by an a priori power analysis, participants were recruited through convenience sampling from **two universities** located in earthquake-affected regions; therefore, the findings cannot be generalized to all university populations or different cultural and regional contexts.

Second, all variables were assessed using self-report measures, which may introduce social desirability bias and subjective interpretation. In addition, the cross-sectional design precludes causal inference; findings should therefore be interpreted as **associative rather than predictive or causal** relationships.

Third, although supplementary multivariate analyses were conducted to control for potential confounders, several contextual variables were not directly measured. In particular, post-earthquake environmental conditions such as displacement status, housing instability, and variability in living arrangements may have influenced psychological outcomes but were not examined explicitly.

Finally, while validated quantitative scales enabled systematic comparisons, they do not fully capture the complexity of individual post-disaster experiences. Future research using longitudinal and mixed-method designs would provide a more comprehensive understanding of recovery trajectories and contextual adaptation processes.

7 Theoretical and Practical Implications

The findings contribute to a more integrated theoretical understanding of post-disaster wellbeing by showing that emotional and behavioral processes are closely associated with psychological adjustment alongside contextual resources. The consistent associations of emotional restriction and behavioral problems with lower well-being support trauma-informed and self-regulation perspectives emphasizing emotional processing as a central dimension of adaptation. At the same time, the independent positive associations of active sport participation and family income highlight the complementary roles of behavioral engagement and socioeconomic resources, suggesting that post-disaster well-being reflects a multidimensional psychosocial structure rather than a single pathway. In addition, the mediation pattern, characterized by significant indirect paths despite a non-significant total effect, points toward more complex relational mechanisms and supports the consideration of indirect and context-sensitive models in future theoretical work.

From a practical perspective, these findings suggest that interventions targeting emotional regulation and behavioral difficulties may be particularly relevant for students exposed to disaster-related stress. Active sport participation appears to be associated with higher well-being as a general supportive resource, indicating its potential value within broader well-being promotion strategies. At the same time, observed contextual differences, including provincial variation and socioeconomic disparities, highlight the importance of resource-sensitive and context-aware support approaches. Overall, post-disaster interventions may benefit from combining psychological support, opportunities for structured physical activity, and policies addressing socioeconomic inequalities in order to support more comprehensive recovery processes.

8 Conclusions

This study advances understanding of post-disaster psychosocial functioning by empirically integrating trauma symptomatology, psychological well-being, motivational regulation, and recreational engagement within a single analytical framework applied to university students affected by the 2023 Kahramanmaraş earthquakes. The findings collectively indicate that post-disaster adjustment is associated with a multidimensional structure wherein trauma-related processes, intrapersonal resources, and contextual conditions

interrelate. Importantly, female students reported elevated trauma symptoms, while variations in well-being and motivational indicators across academic year and income strata suggest that pre-existing developmental and socioeconomic disparities may be more pronounced in disaster contexts.

Trauma symptoms were inversely associated with psychological well-being, whereas recreational engagement and motivational factors exhibited consistent positive associations. These patterns imply that adaptive recovery may involve more than symptom attenuation, potentially encompassing the preservation of motivational structures and social-behavioral engagement. Multivariate extensions refined this picture, revealing emotional restriction and behavioral problems as the most robust negative correlates, while family income and active sport participation contributed independently and positively. Mediation analyses further identified emotional processing as a key relational link, whereas moderation tests indicated that sport participation is associated with generalized benefits rather than condition-specific buffering.

Synthesized, these findings suggest that post-disaster recovery among university students may be conceptualized as a process involving resource maintenance across psychological, motivational, and behavioral domains, not merely clinical symptom reduction. From an intervention standpoint, this implies that effective support architectures may benefit from integrating trauma-informed psychological care with structured physical activity, motivational reinforcement, and equity-oriented policies that address socioeconomic vulnerabilities.

By offering an integrated, contextually grounded portrayal of post-disaster functioning, this study reinforces the relevance of holistic, resilience-oriented perspectives that acknowledge the complexity of student well-being in the aftermath of collective trauma.

Acknowledgement: We extend our sincere gratitude to all university students who participated in this study and shared their experiences following the 2023 earthquakes. We also thank the individuals and institutions that facilitated data collection and supported the research process. The authors acknowledge the use of an AI-assisted tool (ChatGPT, OpenAI, GPT-5) solely for language editing and clarity improvements.

Funding Statement: The authors received no specific funding for this study.

Author Contributions: Conceptualization, Yalin Aygun, Şakir Tufekci and Burak Canpolat; methodology, Burak Canpolat and Fatih Harun Turhan; software, Burak Canpolat and Burak Yagin; validation, Yalin Aygun, İsmet Seval and Hülya Berktaş; formal analysis, Burak Canpolat and Burak Yagin; investigation, Şakir Tufekci, Sacide Tufekci, Georgian Badicu and Moazzam Tanveer; resources, Burak Canpolat and Hülya Berktaş; data curation, Burak Canpolat, Yalin Aygun and Burak Yagin; writing—original draft preparation, all authors; writing—review and editing, Yalin Aygun, Georgian Badicu, Moazzam Tanveer and Burak Canpolat; visualization, Burak Yagin and Şakir Tufekci; supervision, Yalin Aygun; project administration, Yalin Aygun and Burak Canpolat; field coordination and participant communication, Şakir Tufekci and Sacide Tufekci; physical activity program implementation, Burak Canpolat and Yalin Aygun; statistical consultation, Burak Yagin and Burak Canpolat; funding acquisition, not applicable. All authors reviewed and approved the final version of the manuscript.

Availability of Data and Materials: The data that support the findings of this study are available from the Corresponding Author, Yalin Aygun, upon reasonable request.

Ethics Approval: Ethical approval for this study was obtained from the Scientific Research and Publication Ethics Committee of Inonu University (Social and Human Sciences Ethics Committee) (Approval No.: E.587342, Decision No.: 28). The study was conducted in accordance with the principles of the Declaration of Helsinki. All participants were informed about the purpose and procedures of the study, and informed consent was obtained prior to participation. Participation was voluntary and anonymous, and participants had the right to withdraw from the study at any time without penalty.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Ying LH, Lin CD, Wu XC, Chen C, Greenberger E, An YY. Trauma severity and control beliefs as predictors of posttraumatic growth among adolescent survivors of the Wenchuan earthquake. Psychol Trauma Theory Res Pract Policy. 2014;6(2):192–8. [CrossRef].
2. Yakşi N, Eroğlu M. Determinants of Posttraumatic Stress Disorder (PTSD) among children and adolescents in the subacute stage of Kahramanmaras earthquake, Turkey. Arch Public Health. 2024;82(1):199. [CrossRef].
3. Sahin NH, Batigün AD, Yilmaz B. Psychological symptoms of Turkish children and adolescents after the 1999 earthquake: Exposure, gender, location, and time duration. J Trauma Stress. 2007;20(3):335–45. [CrossRef].
4. Demirci H, Bilge Y, Emiral E, Şen S. Enhancing recovery in post-earthquake adolescents: Examining the impact of a psychoeducational intervention on traumatic stress symptoms and coping strategies. Curr Psychol. 2024;43(33):26983–96. [CrossRef].
5. Okur S, Satıcı SA, Erdinç B, Akyıl Y. Longitudinal serial mediation study after the 2023 earthquake in türkiye: Associations between difficulties in emotion regulation, psychological distress, resilience and mental well-being. Psychiatr Q. 2025;96(3):577–91. [CrossRef].
6. Şam M, Sever G, Yildiz Yüksel H, Aliyev R. Earthquake effects on youth: Understanding psychological challenges and support needs. BMC Psychol. 2025;13(1):72. [CrossRef].
7. Shui A, Mierau J, van den Berg GJ, Viluma L. The impact of induced earthquakes on mental health: Evidence from the Dutch Lifelines Cohort Study. Eur J Public Health. 2023;33(Supplement_2):ckad160.1186. [CrossRef].
8. Koçak HS, Kiliç FE, Kaplan Serin E. Post-traumatic symptoms and sleep problems in children and adolescents after twin earthquakes in Turkey. Disaster Med Public Health Prep. 2025;18:e322. [CrossRef].
9. Shi X, Yu NX, Zhou Y, Geng F, Fan F. Depressive symptoms and associated psychosocial factors among adolescent survivors 30 months after 2008 Wenchuan earthquake: A follow-up study. Front Psychol. 2016;7:467. [CrossRef].
10. Morales-Rodríguez FM, Espigares-López I, Brown T, Pérez-Mármol JM. The relationship between psychological well-being and psychosocial factors in university students. Int J Environ Res Public Health. 2020;17(13):4778. [CrossRef].
11. Piñeiro-Cossio J, Fernández-Martínez A, Nuviala A, Pérez-Ordás R. Psychological wellbeing in physical education and school sports: A systematic review. Int J Environ Res Public Health. 2021;18(3):864. [CrossRef].
12. Nopiyanto YE, Raibowo S, Prabowo A, Ibrahim I. Psychological well-being: A study of physical education students. Altius J Ilmu Olahraga Dan Kesehat. 2022;11(2):160–6. [CrossRef].
13. Scott BG, Sanders AF, Graham RA, Banks DM, Russell JD, Berman SL, et al. Identity distress among youth exposed to natural disasters: Associations with level of exposure, posttraumatic stress, and internalizing problems. Identity. 2014;14(4):255–67. [CrossRef].
14. Ozenen G. Exploring the psychological consequences and coping strategies of architecture students following the massive earthquakes in Turkey. Preprint. 2023. [CrossRef].
15. Dağ İ, Olğaç K. Analysis of adaptation processes and anxiety levels of university students staying with earthquake survivor families in state dormitories. BMC Psychiatry. 2025;25(1):792. [CrossRef].
16. Wang J. Impact of natural disasters on student enrollment in higher education programs: A systematic review. Heliyon. 2024;10(6):e27705. [CrossRef].
17. Di Pietro G. The academic impact of natural disasters: Evidence from L'Aquila earthquake. Educ Econ. 2018;26(1):62–77. [CrossRef].
18. Tuazon ACA. Campus displacement Experiences of the University of the Philippines students and teachers Affected by typhoon Haiyan: Perceived needs for Mental health and Psychosocial support. Acta Med Philipp. 2018;52(4):326–31. [CrossRef].
19. Aloğlu N, Güllü A. An investigation of the strategies for coping with earthquake stress of nursing students who have experienced the 2023 Kahramanmaraş centered earthquakes. Eurasian J Health Sci. 2024;7:75–83. [CrossRef].
20. Çakır Z, Erbaş Ü, Gönen M, Ali Ceyhan M, Öktem T, Kul M, et al. Examination of trauma levels and earthquake stress coping strategies of university students who exercise and do not exercise after an earthquake. BMC Psychol. 2025;13(1):867. [CrossRef].

21. Ryff CD, Singer B. Psychological well-being: Meaning, measurement, and implications for psychotherapy research. Psychother Psychosom. 1996;65(1):14–23. [CrossRef].
22. Mustafa MB, Rani NHM, Bistaman MN, Salim SSS, Ahmad A, Zakaria NH, et al. The relationship between psychological well-being and university students academic achievement. Int J Acad Res Bus Soc Sci. 2020;10:518–25. [CrossRef].
23. Deci EL, Ryan RM. Intrinsic motivation and self-determination in human behavior. New York, NY, USA: Springer Science & Business Media; 2013.
24. Attia M, Ibrahim FA, Elsady MA, Khorkhash MK, Rizk MA, Shah J, et al. Cognitive, emotional, physical, and behavioral stress-related symptoms and coping strategies among university students during the third wave of COVID-19 pandemic. Front Psychiatry. 2022;13:933981. [CrossRef].
25. Place S, Blanch-Hartigan D, Rubin C, Gorrostieta C, Mead C, Kane J, et al. Behavioral indicators on a mobile sensing platform predict clinically validated psychiatric symptoms of mood and anxiety disorders. J Med Internet Res. 2017;19(3):e75. [CrossRef].
26. Chen LH, Kuo CC, Ni YL, Hsu SC. A longitudinal and multilevel investigation of grateful climate in cultivating psychological resilience: The mediating role of athlete's gratitude. Appl Res Qual Life. 2024;19(2):665–82. [CrossRef].
27. Wagstaff CRD, Leach J. The value of strength-based approaches in SERE and sport psychology. Mil Psychol. 2015;27(2):65–84. [CrossRef].
28. Hikichi H, Shiba K, Jun A, Kondo K, Kawachi I. Association between sense of coherence and health and well-being among older survivors of a natural disaster: A prospective outcome-wide study. Sci Rep. 2023;13(1):16385. [CrossRef].
29. Alfuqaha OA, Al-Masarwah UM, Farah RI, Yasin JA, Alkuttob LA, Muslieh NI, et al. The impact of Turkey and Syria earthquakes on university students: Posttraumatic stress disorder symptoms, meaning in life, and social support. Behav Sci. 2023;13(7):587. [CrossRef].
30. Pereira JL, Guedes-Carneiro GM, Netto LR, Cavalcanti-Ribeiro P, Lira S, Nogueira JF, et al. Types of trauma, posttraumatic stress disorder, and academic performance in a population of university students. J Nerv Ment Dis. 2018;206(7):507–12. [CrossRef].
31. Hobfoll SE. Conservation of resources: A new attempt at conceptualizing stress. Am Psychol. 1989;44(3):513–24. [CrossRef].
32. Löw A, Lotar Rihtarić M, Vrselja I. Resource loss, coping strategies and post-traumatic stress disorder symptoms in survivors of the 2020 Croatia earthquake. BMC Psychol. 2023;11(1):128. [CrossRef].
33. Bakić H. Resilience and disaster research. Psihol Teme. 2019;28:529–47. [CrossRef].
34. Stang-Rabrig J, Vogel SNT, Forciniti M, McElvany N. Students' school success in challenging times: Importance of central personal and social resources during the COVID-19 pandemic. Eur J Psychol Educ. 2024;39(2):1261–81. [CrossRef].
35. Bonanno GA. Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? Am Psychol. 2004;59(1):20–8. [CrossRef].
36. Masten AS. Ordinary magic: Resilience processes in development. Am Psychol. 2001;56(3):227–38. [CrossRef].
37. Bayram H. The effect of drama-based social studies education on psychological resilience and well-being levels of secondary school students affected by the earthquake. Alberta J Educ Res. 2024;70(1):60–82. [CrossRef].
38. Giménez-Meseguer J, Ferriz-Valero A, Baena-Morales S. Impact of sport education model on sports lifestyle and attitudes of vocational education training students. Educ Sci. 2022;12(12):896. [CrossRef].
39. Trigueros R, Aguilar-Parra JM, Álvarez JF, González-Bernal JJ, López-Liria R. Emotion, psychological well-being and their influence on resilience. a study with semi-professional athletes. Int J Environ Res Public Health. 2019;16(21):4192. [CrossRef].
40. Fredrickson BL. What good are positive emotions? Rev Gen Psychol. 1998;2(3):300–19. [CrossRef].
41. Fredrickson BL. The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. Am Psychol. 2001;56(3):218–26. [CrossRef].
42. Antunes R, Monteiro D, Silva C, Filipe D, Cordeiro F, Frontini R. Motivation and anxiety during the second COVID-19 lockdown in gym exercisers: The mediating role of affects and satisfaction with life. Curr Psychol. 2023;42:20301–11. [CrossRef].

43. Guinto ML, Logan IL. Harnessing the power of sport for disaster recovery. Qual Res Sport Exerc Health. 2022;14(2):326–43. [CrossRef].
44. Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S, et al. The Warwick-Edinburgh mental well-being scale (WEMWBS): Development and UK validation. Health Qual Life Outcomes. 2007;5(1):63. [CrossRef].
45. Marmot M, Wilkinson R. Social determinants of health. 2nd ed. Oxford, UK: Oxford University Press; 2005 [CrossRef].
46. Zimmerman BJ. Attaining self-regulation: a social cognitive perspective. In: Handbook of self-regulation. Amsterdam, The Netherlands: Elsevier; 2000. p. 13–39. [CrossRef].
47. Özdemir Ç, Özbaş Gençarslan D. The relationship between the intolerance to uncertainty and the well-being conditions of university students who experienced the Turkey-Syria earthquake—Turkey example. J Higher Edu Sci. 2025;15(1):126–33. [CrossRef].
48. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behav Res Meth. 2009;41(4):1149–60. [CrossRef].
49. Cohen J. Statistical power analysis for the behavioral sciences. New York, NY, USA: Routledge; 2013. [CrossRef].
50. Demirtaş AS, Baytemir K. Adaptation of the Warwick-Edinburgh mental well-being scale short form into Turkish: Validity and reliability study. Electron J Soc Sci. 2019;18:689–701. (In Turkish). [CrossRef].
51. Tanhan F, Kayri M. Deprem sonrası travma düzeyini belirleme ölçeğinin geçerlik ve güvenirlik çalışması [Validity and reliability study of the post-earthquake trauma level determination scale]. Educ Sci Theory Pract. 2013;13(2):1013–25. (In Turkish).
52. Pi LL, Chang CM, Lin HH. Development and validation of recreational sport well-being scale. Int J Environ Res Public Health. 2022;19(14):8764. [CrossRef].
53. Koç MC. Recreational sports well-being scale (RSWBS) Turkish version: Validity and reliability study. J Recreat Tour Res. 2022;9:86–97. (In Turkish).
54. Mallett C, Kawabata M, Newcombe P, Otero-Forero A, Jackson S. Sport motivation scale-6 (SMS-6): A revised six-factor sport motivation scale. Psychol Sport Exerc. 2007;8(5):600–14. [CrossRef].
55. Demir H. Validity and reliability of motivation scale in sports: Turkish adaptation study. Spormetre J Phys Educ Sport Sci. 2022;20:56–68. [CrossRef].
56. Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. J Pers Soc Psychol. 1986;51(6):1173–82. [CrossRef].
57. Kardaş F, Tanhan F. Investigating posttraumatic stress, posttraumatic growth and hopelessness levels of university students exposed to the Van earthquake. YYU J Educ Fac. 2018;15:1–36. (In Turkish).
58. Çınaroğlu M, Yılmazer E, Noyan Ahlatcıoğlu E, Ülker SV, Hızlı Sayar G. Psychological impact of the 2023 Kahramanmaraş earthquakes: A systematic review and meta-analysis of PTSD, depression, and anxiety among Turkish adults. Front Public Health. 2025;13:1664212. [CrossRef].
59. Bahar A, Çuhadar D. Trauma level, coping with stress and post-traumatic change in university students experiencing kahramanmaraş centered earthquake: A cross-sectional study. Disaster Med Public Health Prep. 2023;17:e549. [CrossRef].
60. Feria-Madueño A, Montoya C, López L, Gónzalez-Carballido LG. Gender differences in physical performance and psychological assessment among Cuban national athletics team. Mhsalud Rev En Cienc Del Movimiento Humano Y Salud. 2024;21:e19168. [CrossRef].
61. Solmaz S, Şİmşek B. The role of emotional intelligence in athletes psychological resilience: An examination of gender and sport type. Int J Sport Cult Sci. 2025;13:76–89. [CrossRef].
62. Dell'Osso L, Carmassi C, Massimetti G, Daneluzzo E, di Tommaso S, Rossi A. Full and partial PTSD among young adult survivors 10 months after the L'Aquila 2009 earthquake: Gender differences. J Affect Disord. 2011;131(1–3):79–83. [CrossRef].
63. Rahman MZ, Atun F, Martinez J. Earthquake and fire hazard risk perception: A study on the emerging rangpur city of Bangladesh. IDRiM J. 2021;11:1–25. [CrossRef].
64. Bellibaş MŞ, Polatcan M, Berkovich I, Boz A. The role of responsible leadership in teacher resilience and wellbeing in earthquake-affected and non-affected regions. Educ Adm Q. 2026;62(2):237–74. [CrossRef].
65. Çimen F, Seçer İ, Pakiş AK. Assessment of PTSD and CPTSD symptoms in children and adolescents exposed to earthquakes: An evaluation using latent profile. Clin Psychol Psychother. 2025;32(6):e70168. [CrossRef].

66. Kartol A, Üztemur S, Yaşar P. Development and validation of the earthquake obsession scale. Death Stud. 2025;49(3):219–27. [CrossRef].
67. Aksakal A, Aksakal E, Kaya F, Kerget B, Afşin DE, Araz Ö. Psychological resilience as a mediator between sleep quality and mental well-being in patients with obstructive sleep apnea syndrome. BMC Psychol. 2025;13(1):979. [CrossRef].
68. Bırni G. Exploring the effects of academic achievement, class engagement, and its motivations on university students' mental well-being. Eur J Psychol Educ Res. 2023;6:205–15. [CrossRef].
69. Eren Gümüş A, Karaırmak Ö. Comparison of traumatic symptoms severity of adolescents educated in some state high schools in Istanbul and exposed to traumatic and distressing events (tur). J Clin Psy. 2018;21(3):261–70. [CrossRef].
70. Knight BG, Gatz M, Heller K, Bengtson VL. Age and emotional response to the Northridge earthquake: A longitudinal analysis. Psychol Aging. 2000;15(4):627–34. [CrossRef].
71. Aslan B, Önal Ö. Prevalence of probable post-traumatic stress disorder among survivors of the 2023 earthquakes in Türkiye. East Mediterr Health J. 2024;30(9):622–31. [CrossRef].
72. Boztas MH, Aker AT, Munir K, Çelik F, Aydin A, Karasu U, et al. Post traumatic stress disorder among adults in the aftermath of 2011 Van-Ercis earthquake in Turkey. J Clin Psychiatry. 2019;22:380–8. [CrossRef].
73. Zenker ML, Bubeck P, Thieken AH. Always on my mind: Indications of post-traumatic stress disorder among those affected by the 2021 flood event in the Ahr valley, Germany. Nat Hazards Earth Syst Sci. 2024;24(8):2837–56. [CrossRef].
74. Kocoglu E, Demir FB, Oteles UU, Ozeren E. Post-earthquake trauma levels of university students evaluation: Example of 6 February Kahramanmaras earthquake. High Educ Stud. 2023;13(2):121. [CrossRef].
75. Dereceli Ç, Zorba E, Dereceli E, Kaşka F, Caniklitemel N. The impact of university students' sports participation motivation on their life satisfaction. Int J Mt Climbing. 2024;7:65–76. (In Turkish). [CrossRef].
76. Ermiş SA, Dereceli E, Kaşka F. Üniversite öğrencilerinin sporda motivasyon düzeyleri ile yaşam tatminleri arasındaki ilişki [Relationship between university students' motivation levels in sports and life satisfaction]. Bozok Int J Sport Sci. 2025;6:150–65. (In Turkish).
77. Bağcı AG, Atak H. The relationships among childhood mental trauma, agency and resilience among college students. MAUN J Educ. 2022;2:104–22. (In Turkish).
78. Ayhan Z. The traumatic effect and consequences of the earthquake in the political context. Rev Gestão e Secr. 2023;14(10):17727–42. [CrossRef].
79. Koçer A, Koçak O. The relationship between recreational sports well-being and quality of life in faculty of sports sciences students. Açıköğretim Uygulamaları Ve Araştırmaları Derg. 2024;10:71–91. [CrossRef].
80. Bayram A, Yalcin I, Sahin E, Ekinci NE, Talaghir LG, Iconomescu TM. The role of recreational flow experience and well-being on re-participation intention: Recreational sport participants. Front Psychol. 2025;16:1574337. [CrossRef].
81. Han Y, Wang S, Zhang Z, Fan J. The impact of wearable sports equipment on college students' physical exercise persistence: A mediated model of physical exercise motivation moderated by social support. Front Sports Act Living. 2025;7:1691032. [CrossRef].
82. Liu M, Shi B, Gao X. The way to relieve college students' academic stress: The influence mechanism of sports interest and sports atmosphere. BMC Psychol. 2024;12(1):327. [CrossRef].
83. Joseph G. Mental health, resilience, and physical activity in civilians affected by conflict-related trauma: A cross-sectional study. Healthcare. 2025;13(15):1781. [CrossRef].
84. Campoamor-Olegario L, Camitan DS 4th, Guinto MLM. Beyond the pandemic: Physical activity and health behaviors as predictors of well-being among Filipino tertiary students. Front Psychol. 2025;16:1490437. [CrossRef].
85. Gündüz A, Avcu E, Ada G, Hazar S. Investigation of the relationship between physical activity level and body composition, happiness and depression levels of university students affected by 6 February 2023 Kahramanmaraş earthquakes. Sivas Cumhuriyet Univ J Sport Sci. 2024;5:20–6. (In Turkish).
86. Çınaroğlu M, Yılmazer E, Alpugan Z, Sayar GH. Psychological impact of the 2023 Kahramanmaraş earthquakes on non-victims. MedRxiv. 2024. [CrossRef].
87. Hassan NM, Kassim ES, Yunus NBM, Mat Ali SA, Said YMU. Navigating the COVID-19 storm: Assessing well-being in university students from lower-income backgrounds. Inf Manag Bus Rev. 2023;15:206–15. [CrossRef].

88. Akkaya M, Dursun A. Earthquake fear, sleep quality and intolerance of uncertainty: A Study of adults with earthquake experience. J Clin Psychiatry. 2025;28(1):59–70. [CrossRef].
89. Wang S, Shi X, Chen X, Zhu Y, Chen H, Fan F. Earthquake exposure and PTSD symptoms among disaster-exposed adolescents: A moderated mediation model of sleep problems and resilience. Front Psychiatry. 2021;12:577328. [CrossRef].
90. Derelioğlu M, Vural M, Çimen E, Saki Ü, Yağız Saraçoğlu Y, Karataş B, et al. Exploring how cognitive-behavioral physical activity links ruminative thinking and mental wellbeing in sports high school adolescents. Front Psychol. 2025;16:1665882. [CrossRef].