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COGNITIVE FLEXIBILITY AS A PROTECTIVE SHIELD? THE MEDIATING EFFECT OF INJURY ANXIETY ON PSYCHOLOGICAL WELL-BEING IN ACTIVE ATHLETES

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Abstract: The present investigation examines the mediating role of cognitive flexibility in the relationship between injury anxiety and psychological well-being among active athletes. A predictive correlational design within the relational survey framework guided the methodological approach. Data collection involved 384 licensed athletes competing across diverse sporting disciplines throughout Turkey. The primary measurement instruments were the Sport Injury Anxiety Scale, Psychological Well-being Scale, and Cognitive Flexibility Scale. Statistical analyses employed SPSS and PROCESS Macro (Hayes, Model 4) through Jamovi 2.6.2 software, with structural equation modeling constructed following assumption testing procedures. The findings demonstrate that injury anxiety exerts a significant negative effect on cognitive flexibility, while cognitive flexibility significantly and positively predicts psychological well-being. Injury anxiety also exhibits a direct negative influence on psychological well-being. Mediation analysis indicates that cognitive flexibility assumes a partial mediating role in the relationship between injury anxiety and psychological well-being. The total effect within the model comprises 38.2% indirect effects and 61.8% direct effects. The results show that a substantial portion of injury anxiety's impact on psychological well-being operates through cognitive flexibility mechanisms. In conclusion, the development of psycho-educational programs designed to enhance athletes' cognitive flexibility represents a critical intervention domain for strengthening psychological well-being. The evidence suggests that cognitive flexibility functions as a protective psychological resource, buffering the deleterious effects of injury-related concerns on athletes' overall mental health.

Anahtar Kelimeler: Bilişsel esneklik, psikolojik iyi oluş, yaralanma kaygısı, sporcular

BİLİŞSEL ESNEKLİK BİR KALKAN MI? AKTİF SPORCULARDA YARALANMA KAYGISININ PSİKOLOJİK İYİ OLUŞ ÜZERİNDEKİ ARACILIK ETKİSİ

Öz: Bu araştırmanın amacı, aktif sporcularda yaralanma kaygısı ile psikolojik iyi oluş arasındaki ilişkide bilişsel esnekliğin aracı rolünü incelemektir. Araştırma, ilişkisel tarama modellerinden yordayıcı korelasyonel desen kullanılarak yürütülmüştür. Veriler, Türkiye genelinde farklı branşlarda spor yapan 384 lisanslı sporcudan elde edilmiştir. Veri toplama araçları olarak Spor Yaralanması Kaygı Ölçeği, Psikolojik İyi Oluş Ölçeği ve Bilişsel Esneklik Ölçeği kullanılmıştır. Araştırma, SPSS, PROCESS Macro (Hayes, Model 4) Jamovi 2.6.2 yazılımı aracılığıyla gerçekleştirilmiş olup, sayıltı analizleri sonrası yapısal eşitlik modellemesi oluşturulmuştur. Ulaşılan bulgular, yaralanma kaygısının bilişsel esneklik üzerinde negatif ve anlamlı bir etkiye sahip olduğunu; bilişsel esnekliğin ise psikolojik iyi oluşu pozitif yönde ve anlamlı şekilde yordadığını ortaya koymuştur. Yaralanma kaygısının psikolojik iyi oluş üzerindeki doğrudan etkisi de negatif yönlü anlamlıdır. Aracılık analizine göre, bilişsel esneklik bu ilişki üzerinde kısmi bir aracı rol üstlenmektedir. Modeldeki toplam etkinin %38.2'si dolaylı, %61.8'i ise doğrudan etkiden oluşmaktadır. Sonuçlar sporcuların yaralanma kaygısının psikolojik iyi oluş üzerindeki etkisinin önemli bir kısmının bilişsel esneklik yoluyla gerçekleştiğini göstermektedir. Araştırma bulguları doğrultusunda, sporcuların bilişsel esnekliğini desteklemeye yönelik psiko-eğitim programlarının geliştirilmesi, psikolojik iyi oluşlarını güçlendirmek açısından önemli bir müdahale alanı olarak değerlendirilmektedir.

Keywords: Cognitive flexibility, psychological well-being, injury anxiety, athletes

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INTRODUCTION

The enhancement of psychological, affective, and social life skills exerts beneficial effects on individual functioning and overall quality of existence. Competencies within these domains assume a determinative role in regulating and sustaining interpersonal relationships. The effective utilization of cognitive abilities, in particular, generates positive influences on emotional regulation, decision-making processes, and psychological resilience. Cognitive flexibility emerges as a pivotal construct in governing such psychological phenomena, representing an individual's capacity to adapt to changing environmental conditions and modify behavioral responses when circumstances demand alternative perspectives (Dajani & Uddin, 2015; Hohl & Dolcos, 2024). This cognitive competency facilitates adaptation to diverse situations while enabling the generation of multiple solution pathways. Moreover, cognitive flexibility assumes a fundamental role in executing critical cognitive functions including problem-solving, decision-making, and emotion regulation (Hohl & Dolcos, 2024; Kara et al., 2019). Within sporting contexts, where rapid and effective decision-making under changing conditions becomes imperative, cognitive flexibility emerges as an essential mental skill deserving careful examination.

The critical role of cognitive flexibility in psychological functioning warrants investigation, particularly within athletic contexts where decision-making under pressure and adaptation to variable conditions predominate. Athletes' adaptation to intensive training regimens and competitive stress depends upon both physical capabilities and cognitive flexibility levels. Cognitive flexibility supports athletes' abilities to respond rapidly to sudden changes, develop strategic approaches, and identify alternative solutions (Kellmann & Beckmann, 2018). Cognitively flexible athletes demonstrate superior decision-making processes and exhibit greater resilience when confronting challenges, which enhances their overall well-being (Gabrys et al., 2018).

Injury anxiety represents another significant factor influencing athletes' psychological processes and performance, potentially creating both physical and mental risks (Wiese-Bjornstal et al., 1998; Walker et al., 2007). Cognitive flexibility may prove effective in minimizing the impact of such anxieties. Athletes with elevated cognitive flexibility can re-evaluate threat perceptions regarding injury probability, develop more adaptive coping techniques, and regulate stress levels (Kellmann & Beckmann, 2018; Tranaeus et al., 2015; Maddison & Prapavessis, 2005). This cognitive competency enables athletes to respond flexibly to stress-inducing conditions, particularly within uncertain and high-pressure competitive environments (Kellmann & Beckmann, 2018; Laborde et al., 2014). Through effective anxiety management, excessive reactions can be prevented while strengthening psychological resilience. Such processes support not only stress management capabilities but also overall psychological well-being levels. Although cognitive flexibility's influence on psychological well-being requires separate consideration, the manner in which cognitive flexibility functions as an intermediary mechanism in the relationship between injury anxiety and psychological well-being remains insufficiently clarified.

Cognitive flexibility demonstrates intimate connections with both injury anxiety and psychological well-being as higher-order mental functions. Within this framework, cognitive flexibility may be conceptualized as a mediating variable between these constructs. Cognitively flexible athletes can evaluate sudden situations encountered during training or competition from multiple perspectives (Kashdan & Rottenberg, 2010; Kellmann & Beckmann, 2018; Genet &

Siemer, 2011). Rather than engaging in self-blame following errors, they can restructure situations and maintain emotional equilibrium (Kashdan & Rottenberg, 2010; Aldao et al., 2010). When athletes encounter stressful situations such as defeat or injury risk, flexible thinking enables healthier coping mechanisms (Fletcher & Sarkar, 2012; Gustafsson et al., 2017). The capacity to manage such situations enhances psychological resilience during both training and competitive phases, influencing not merely stress management but overall psychological health positively. Ultimately, cognitive flexibility correlates positively with athletes' psychological well-being and life satisfaction levels (Tugade & Fredrickson, 2004; Southwick et al., 2005). Flexible perspectives toward sporting challenges can render athletes' performance and psychological well-being sustainable (Johles et al., 2020; Sabzevari & Samadi, 2023).

From a theoretical perspective, cognitive flexibility assumes a mediating role in individuals' coping processes with stressful situations (Kashdan & Rottenberg, 2010). This construct enables the development of more adaptive responses through alternative perspectives on stressful circumstances (Dajani & Uddin, 2015). Cognitive flexibility serves as an important resource not only in daily life but also within high-pressure, variable sporting environments. Athletes encounter various psychological challenges in mentally demanding competitive contexts (Fletcher & Sarkar, 2012). Injury anxiety, frequently encountered in sport, represents one such challenge (Wiese-Bjornstal et al., 1998; Walker et al., 2007).

Sport-related injury anxiety constitutes a stress source that can negatively influence psychological well-being and motivation, particularly among athletes under performance pressure (Wiese-Bjornstal et al., 1998; Walker et al., 2007). Cognitive flexibility potentially assists in coping with such negative emotions while alleviating anxiety. Research indicates that cognitive flexibility not only correlates directly with psychological well-being but may also assume a mediating role between concepts such as anxiety, stress, and burnout with psychological well-being (Gabrys et al., 2018; Genet & Siemer, 2011). Although existing literature extensively examines cognitive flexibility's effects on psychological well-being, the manner in which this relationship develops within injury anxiety contexts and cognitive flexibility's role in this process requires further clarification. Although existing literature extensively examines cognitive flexibility's effects on psychological well-being, emerging evidence suggests that cognitive processes such as flexible appraisal, cognitive reorganization, and adaptive coping play a critical role in athletes' psychological adjustment to injury-related stressors. Studies focusing on sport injury contexts indicate that athletes who can cognitively reframe injury risk or rehabilitation demands demonstrate lower anxiety levels and better psychological adjustment during injury recovery (Tripp et al., 2007; Wiese-Bjornstal, 2010; Ivarsson et al., 2017). However, empirical research directly examining cognitive flexibility as an explanatory mechanism linking injury anxiety and psychological well-being in actively competing athletes remains limited.The present study therefore aims to examine cognitive flexibility's mediating role in the relationship between sport injury anxiety and psychological well-being. The research hypotheses were as follows:

H_1: Athletes' injury anxiety levels significantly predict psychological well-being levels.
H_2: Athletes' injury anxiety levels significantly predict cognitive flexibility levels.
H_3: Athletes' cognitive flexibility levels significantly predict psychological well-being levels.
H_4: Cognitive flexibility assumes a significant mediating role in injury anxiety's indirect effect on psychological well-being.

METHOD

Research Design
Data collection for the present investigation occurred between June 15, 2025, and July 5, 2025, involving licensed athletes from various regions throughout Turkey. The research design employed convenience sampling, a non-probabilistic sampling technique particularly suited to situations where equal inclusion probability for all population members cannot be achieved and access to extensive populations presents challenges (Palinkas et al., 2015). A predictive correlational model within the relational research framework was implemented to examine inter-variable relationships and determine the predictive capacity of one variable upon another. The predictive correlational design establishes the predictive power of one or multiple independent variables on a dependent variable (Karasar, 2022). The investigation employed a quantitative methodology within a relational survey design framework. The mediating role of cognitive flexibility in the relationship between injury anxiety and psychological well-being was tested through structural equation modeling.
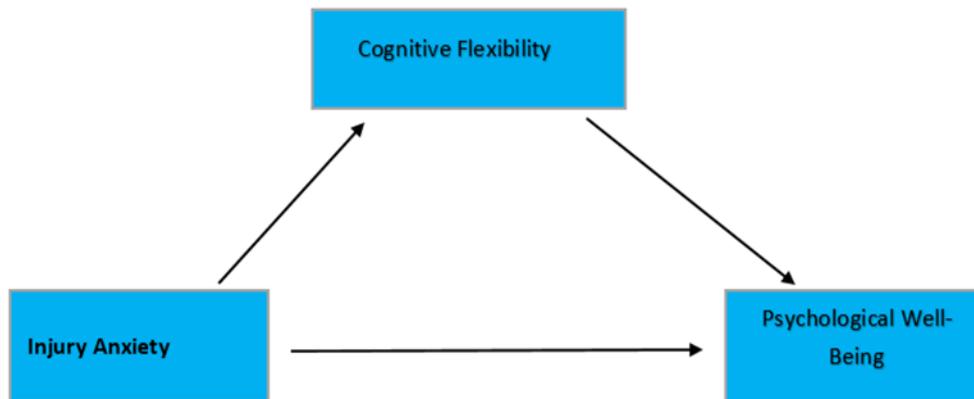

Figure 1. Conceptual model depicting the mediating role of cognitive flexibility in the relationship between sport injury anxiety and psychological well-being

Ethical Approval
The investigation adhered to the ethical principles and standards outlined in the 2008 Helsinki Declaration. Ethical approval was obtained from the Social and Human Sciences Scientific Research and Publication Ethics Committee of Hatay Mustafa Kemal University on May 20, 2025, under protocol number 07-14. Artificial intelligence tools provided support for reference verification and typographical corrections, which did not influence the original content of the research.

Participants
The research sample comprised 384 licensed athletes who participated voluntarily. Among participants aged 18 years and above, 171 (44.5%) were female and 213 (55.5%) were male. Athletic involvement included 194 (50.5%) individual sport athletes and 190 (49.5%) team sport athletes. Regarding competitive experience, 134 (34.9%) athletes had 1-3 years of experience, 83 (21.6%) had 4-6 years, 77 (20.1%) had 7-9 years, and 90 (23.4%) had 10 or more years of athletic participation.

Data Collection Instruments
Cognitive Flexibility Scale
Dennis and Wal (2010) developed this instrument to assess individuals' cognitive flexibility levels when confronting events and situations. Turkish validation and reliability studies were

performed by Sapmaz and Doğan (2013). The scale comprises 20 items utilizing a 5-point Likert format (1 = Not at all appropriate, 5 = Completely appropriate). Factor analysis revealed a two-factor structure encompassing Control and Alternatives dimensions. Cronbach's alpha reliability coefficients demonstrated .90 for the complete scale, .90 for the Alternatives subscale, and .84 for the Control subscale. Confirmatory factor analysis conducted to examine construct validity indicated satisfactory model-data fit. Goodness-of-fit indices were GFI = .92, AGFI = .90, CFI = .98, RMSEA = .054, and χ^2/df = 2.44, confirming the two-factor structure's validity.

Psychological Well-being Scale

Developed by Diener et al. (2010), this instrument is used to assess individuals' subjective perceptions regarding their ability to maintain meaningful, purposeful, relational, and competence-oriented lives. The Turkish adaptation was completed by Telef (2013). The scale comprises 8 items utilizing a 7-point Likert format (1 = Strongly disagree, 7 = Strongly agree). Scores range from 8 to 56, with elevated scores indicating higher psychological well-being levels. Validity analyses employed exploratory factor analysis (EFA), which revealed a unidimensional structure accounting for 41.94% of total variance. Factor loadings ranged from .54 to .76. Confirmatory factor analysis (CFA) demonstrated acceptable model fit indices: GFI = .96, NFI = .94, RFI = .92, CFI = .95, IFI = .95, RMSEA = .08, and SRMR = .04. Reliability analyses yielded a Cronbach's alpha internal consistency coefficient of .80 and test-retest correlation of r = .86 (p < .01). Item-total correlations ranged from .41 to .63, with 27% upper-lower group comparisons showing significant differences across all items. The evidence demonstrates that the scale constitutes a valid and reliable measurement instrument.

Sport Injury Anxiety Scale

It was originally developed by Rex and Metzler (2016) to determine injury-related anxiety levels among athletes, and the Turkish validation and reliability studies were performed by Caz, Kayhan, and Bardakçı (2019). The scale encompasses 19 items utilizing a 5-point Likert format (1 = Strongly disagree, 5 = Strongly agree). Factor analysis revealed six subscales: ability loss anxiety, weakness perception anxiety, pain suffering anxiety, disappointment anxiety, re-injury anxiety, and social support loss anxiety. Validity analyses commenced with exploratory factor analysis (EFA), which confirmed the factor structure's sampling adequacy through KMO = .874 and Bartlett's Test χ^2 = 2336.20 (df = 171, p < .001). The structure accounts for 65.47% of total variance, with factor loadings ranging from .57 to .87. Confirmatory factor analysis (CFA) subsequently validated the six-factor structure. Goodness-of-fit indices demonstrated acceptable model fit: χ^2/df = 1.909, GFI = .928, IFI = .942, CFI = .941, and RMSEA = .049. Reliability analyses indicated an overall Cronbach's alpha internal consistency coefficient of .88, with subscale alpha coefficients ranging from .70 to .85. The findings establish the scale as a valid and reliable instrument for assessing injury anxiety among athletes.

Data Analysis Procedures

The data collection phase yielded 425 observations from licensed athletes through online survey administration. Prior to analysis, the dataset underwent missing data inspection, outlier analysis, and statistical assumption testing. The online data collection format eliminated missing data concerns. Following assumption testing procedures, the final sample comprised 384 observations.

The dataset was transferred to statistical analysis software for examination of mode, median, and arithmetic mean values. The convergence of these three central tendency measures supports distributional normality, consistent with Kara, Kara, and Öğraş (2025), who indicated that

proximity among these measures constitutes a normal distribution indicator. Outlier analysis initially identified and removed 11 observations generating extreme values, reducing the dataset to 414 observations.

Subsequent analysis examined Mahalanobis distances and Z-scores. Z-score analysis identified 2 additional observations exceeding ±3 boundaries (Tabachnick & Fidell, 2013), which were excluded, yielding 412 observations for continued analysis. Remaining observations produced Z-scores ranging from -2.73 to 2.14. Mahalanobis distance evaluation, utilizing the critical value $\chi^2(47;0.001) = 73.402$, identified 28 observations exceeding the threshold value, which were subsequently excluded. The initial 425 observations were thus reduced to 384 valid cases. Final outlier analysis employed box-plot and scatter-plot visualization techniques, confirming the absence of singular outliers within Tabachnick and Fidell's (2013) ±3 boundaries.

The Durbin-Watson test assessed autocorrelation among residuals, yielding a comprehensive D-W value of 2.007, indicating independence among error terms. Kalaycı (2010) establishes that Durbin-Watson coefficients between 1.5 and 2.5 indicate absence of autocorrelation. Multicollinearity assessment examined Variance Inflation Factors (VIF) and tolerance values. VIF values ranged from 1.48 to 4.37 (<.5), while tolerance values ranged from 0.675 to 2.08 (>0.20). VIF values below 5 demonstrate absence of multicollinearity problems (Raheem et al., 2019; Makrakis et al., 2024). Data analysis employed SPSS, PROCESS Macro (Hayes, Model 4), and Jamovi 2.6.2 software for mediation analysis. Mediation effect significance was tested using bootstrap methodology with 5,000 samples. Inter-variable relationships were examined through Pearson correlation coefficients and linear regression analyses.

Table 1. Normality test results for the measurement instruments

Variable	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	p	Statistic	df	p
Psychological Well-being	.094	384	.001	.972	384	.001
Injury Anxiety	.045	384	.055	.992	384	.031
Cognitive Flexibility	.047	384	.043	.985	384	.001

Note. Exact p-values are reported. Values less than .001 are shown as p < .001. df = degrees of freedom

Variable normality was initially evaluated statistically through the Kolmogorov-Smirnov (K-S) test (Table 1). The results indicated p-values below 0.05 for psychological well-being (K-S = 0.094; p = 0.000) and cognitive flexibility (K-S = 0.047; p = 0.043), suggesting deviations from normal distribution. Injury anxiety results (K-S = 0.045; p = 0.055) exceeded the significance threshold, satisfying normality assumptions. However, normality tests demonstrate excessive sensitivity in large samples (n > 300) and may identify even minor deviations as statistically significant (Ghasemi & Zahediasl, 2012; Tabachnick & Fidell, 2013).
Parametric test applicability requires consideration of distributional criteria beyond p-values alone, including skewness and kurtosis measures (George & Mallery, 2003). Rather than relying exclusively on p-value determinations, additional parametric indicators such as skewness, kurtosis, and standardized z-scores warrant examination (Table 2).

Table 2. Normality test results for measurement instruments

Variable	*N*	*M*	Skewness	SE	Std. Z
Psychological Well-being	385	5.73	-.216	.125	-1.72
Injury Anxiety	385	2.46	.058	.125	0.46
Cognitive Flexibility	385	3.91	.082	.125	0.65

Note. N = sample size; M = mean; SE = standard error; Std. Z = standardized Z-score.

The findings listed in Table 2 indicate skewness values of -0.216 for psychological well-being, 0.058 for injury anxiety, and 0.082 for cognitive flexibility. According to George and Mallery (2003), skewness coefficients within the ±1 range demonstrate sufficient approximation to normal distribution. Additionally, all standardized Z-values remained within ±1.96 boundaries (psychological well-being Z = -1.72, injury anxiety Z = 0.46, cognitive flexibility Z = 0.65), indicating distributional conformity to normality. George and Mallery (2003) establish that skewness and kurtosis values within ±1 ranges satisfy normal distribution assumptions, particularly in large samples. Accordingly, all variables demonstrate adequate normality levels for parametric test implementation, providing a suitable foundation for statistical analyses.

Table 3. Confirmatory Factor Analysis Results for Data Collection Instruments

Variable	CMIN/DF (x^2/df)	CFI	TLI	SRMR	RMSEA
Psychological Well-being	76/20 = 3.80	.85	.82	.06	.09
Injury Anxiety	307/137 = 2.24	.97	.96	.05	.04
Cognitive Flexibility	574/169=3.39	.90	.88	.08	.07

Note. **CMIN/DF = minimum discrepancy divided by degrees of freedom; χ² = chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; SRMR = Standardized Root Mean Square Residual; RMSEA = Root Mean Square Error of Approximation**.

Table 3 shows that model fit indices from confirmatory factor analysis for all three measurement instruments generally demonstrate acceptable levels. Psychological well-being model fit values were: $\chi^2/df = 3.80$, CFI = 0.85, TLI = 0.82, SRMR = 0.06, and RMSEA = 0.09. Injury anxiety indices showed: $\chi^2/df = 2.24$, CFI = 0.97, TLI = 0.96, SRMR = 0.05, and RMSEA = 0.04. Cognitive flexibility demonstrated: $\chi^2/df = 3.39$, CFI = 0.90, TLI = 0.88, SRMR = 0.08, and RMSEA = 0.07. The χ^2/df ratios below 5 (Kline, 2023), SRMR values predominantly below 0.08, and CFI and TLI values approaching or exceeding .90 for injury anxiety and cognitive flexibility structures indicate acceptable model fit (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003). RMSEA values within the 0.05-0.08 range signal satisfactory model-data correspondence (Browne & Cudeck, 1992). The confirmatory factor analysis findings establish that the measurement instruments demonstrate generally acceptable construct validity levels.

RESULTS

Table 4 presents the correlation analysis results regarding the variables.

Table 4. *Correlation analysis results for factors*

Variable	*M*	SD	1	2	3	Cronbach's Alpha (α)
1. Psychological Well-Being	5.73	0.76	1	-.325**	.425**	.84
2. Injury Anxiety	2.46	0.62		1	-.350**	.91
3. Cognitive Flexibility	3.91	0.53			1	.91

*Note. N = 384. **p < .01.*

Detailed examination of Table 4 reveals a positive, moderate, and significant relationship between psychological well-being and cognitive flexibility (r = 0.425, p < .01), indicating that elevated cognitive flexibility levels correspond with enhanced psychological well-being. Conversely, psychological well-being demonstrates a negative, low-level significant relationship with injury anxiety (r = -0.325, p < .01), suggesting that individuals with heightened injury anxiety experience diminished psychological well-being levels. Similarly, cognitive flexibility exhibits a negative, low-level significant relationship with injury anxiety (r = -0.350, p < .01), indicating that increased cognitive flexibility corresponds with reduced injury anxiety levels.

Cronbach's alpha reliability coefficients for internal consistency were calculated as .84 for psychological well-being, .91 for injury anxiety, and .91 for cognitive flexibility. George and Mallery (2003) characterize values of .80 and above as "very good" reliability, while values of .90 and above represent "excellent" reliability levels. Accordingly, the measurement instruments demonstrate high reliability standards. The observed relationships support the fundamental research model while confirming hypotheses H1, H2, and H3, thereby satisfying the prerequisite conditions for mediation analysis (Hayes, 2017).

Table 5. Mediation effect analysis for the model

Path	Label	Estimate (B)	SE	Z	*p*	Effect (%)
Injury Anxiety → Cognitive Flexibility	a	-0.298	0.0407	-7.33	<.001	
Cognitive Flexibility → Psychological Well-Being	b	0.503	0.0684	7.36	<.001	
Injury Anxiety → Psychological Well-Being	c	-0.243	0.0583	-4.16	<.001	
Indirect Effect	a × b	-0.150	0.0289	-5.19	<.001	38.2
Direct Effect	c	-0.243	0.0583	-4.16	<.001	61.8
Total Effect	c + a × b	-0.393	0.0584	-6.73	<.001	100.0

Note. **SE = standard error; "Estimate" refers to the unstandardized regression coefficient (B).**

As in Table 5, injury anxiety exerts a significant negative effect on cognitive flexibility (B = -0.298, Z = -7.33, p < .001), indicating that individuals with elevated injury anxiety demonstrate

diminished cognitive flexibility levels. Similarly, cognitive flexibility demonstrates a positive and significant effect on psychological well-being (B = 0.503, Z = 7.36, p < .001), establishing that individuals with more flexible cognitive structures exhibit enhanced psychological well-being levels. The direct effect of injury anxiety on psychological well-being proves negative and significant (B = -0.243, Z = -4.16, p < .001). The indirect effect testing cognitive flexibility's mediating role also demonstrated significance (B = -0.150, × 0.503, Z = -5.19, p < .001). The indirect effect comprises 38.2% of the total effect, while the direct effect accounts for 61.8%. These results indicate that approximately one-third of injury anxiety's impact on psychological well-being operates through cognitive flexibility pathways.

The analysis demonstrates that cognitive flexibility assumes a partial mediating role in the relationship between injury anxiety and psychological well-being. According to Preacher and Hayes (2008), when both direct and indirect effects achieve significance, the mediating variable provides partial mediation within the model. The statistical significance of all pathways supports the model's structural validity (Hayes, 2017). This finding demonstrates that cognitive flexibility not only contributes to individual well-being but also functions as a regulatory variable for stress-related psychological effects, thereby supporting H4. The visual representation of the standardized coefficients of indirect, direct and total effects in the model and the confidence intervals of these effects are presented in Figure 2.
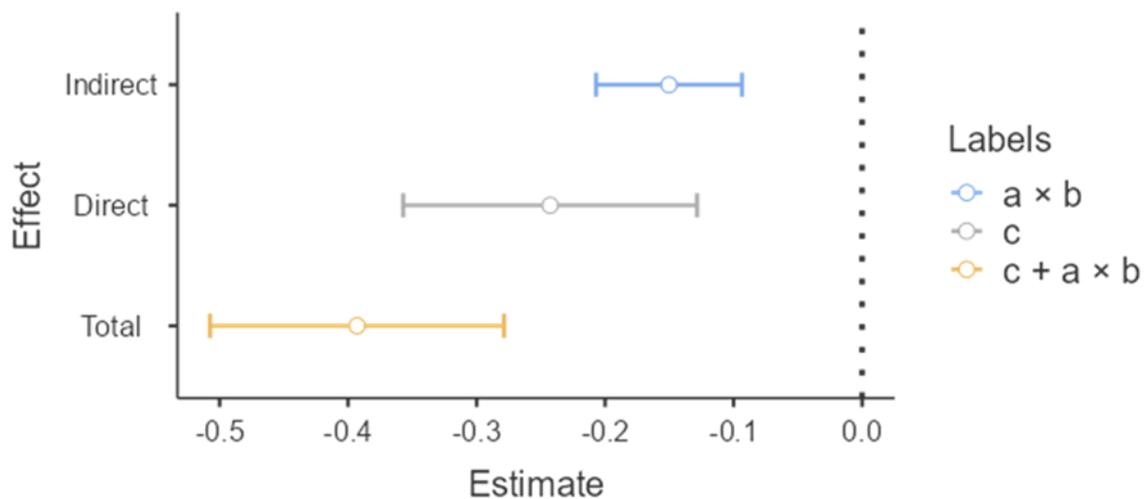
Figure 2. Effect size diagram illustrating cognitive flexibility's mediating effect in the relationship between injury anxiety and psychological well-being

Figure 2. Effect size diagram illustrating cognitive flexibility's mediating effect in the relationship between injury anxiety and psychological well-being

The effect coefficient graph presented in Figure 2 demonstrates that injury anxiety's total, direct, and indirect effects on psychological well-being are negative and significant. The confidence intervals for all three effects exclude zero, indicating statistical significance of these pathways and confirming cognitive flexibility's partial mediating role. MacKinnon et al. (2004) establish that indirect effects require confidence intervals excluding zero for significance determination.

DISCUSSION

The present investigation examined cognitive flexibility's mediating role in the relationship between sport injury anxiety and psychological well-being. Research findings demonstrate that cognitive flexibility contributes positively not only to subjective well-being but also to stress management approaches. Table 4 correlation analysis reveals positive associations between psychological well-being and cognitive flexibility, alongside negative relationships with injury anxiety. Enhanced cognitive flexibility corresponds with elevated psychological well-being, while increased injury anxiety correlates with diminished well-being levels. Cognitive flexibility, representing individuals' capacity to adapt to challenging and stressful life events, emerges as a significant determinant of psychological well-being (Genet & Siemer, 2011; Martin & Rubin, 1995). Cognitive flexibility enables alternative event evaluation and healthier emotional regulation, thereby enhancing positive affect (John & Gross, 2004; Troy & Mauss, 2011; Parsons et al., 2016). Individuals with flexible cognitive structures demonstrate superior problem restructuring capabilities, potentially achieving higher psychological well-being levels. Moen and Federici (2013) found that athletes with elevated cognitive flexibility demonstrated both enhanced subjective well-being and superior performance. Similarly, research indicates that cognitively flexible individuals develop more adaptive responses to stressful life events, supporting psychological well-being (John & Gross, 2004; Troy & Mauss, 2011).

The observed decrease in psychological well-being accompanying increased injury anxiety suggests that athletes' perceptions of physical integrity threats elevate anxiety levels while negatively influencing psychological well-being (Walker et al., 2007; Wiese-Bjornstal, 2010). Tripp et al. (2007) define injury anxiety as the comprehensive cognitive, emotional, and behavioral responses athletes develop regarding potential injuries during training or competition. Persistent injury concerns can negatively affect training quality and life satisfaction, reducing psychological well-being. Madrigal et al. (2014) identified significant psychological well-being decreases among athletes with elevated injury anxiety. Likewise, Appaneal et al. (2009) found that post-injury anxiety increases among competitive athletes, combined with depressive symptoms, substantially diminished psychological well-being.

Examination of the cognitive flexibility-injury anxiety relationship reveals a significant negative association, indicating that enhanced cognitive flexibility corresponds with reduced injury anxiety levels. Cognitively flexible athletes possess adaptive capabilities and solution-generation skills for stressful training and competitive situations, potentially reducing threat perceptions of risky circumstances such as injuries. According to stress and coping theory, athletes' situational evaluations determine emotional responses (Lazarus & Folkman, 1984). Cognitively flexible athletes can address potential injury risks calmly without magnification, thereby reducing anxiety levels (Kashdan & Rottenberg, 2010). Ross and Berger (1996) found that athletes receiving cognitive restructuring training experienced post-injury anxiety reductions. Ivarsson et al. (2017) demonstrated that athletes with low cognitive flexibility experienced more frequent injuries.

The results of mediation analysis (Table 5) indicate that cognitive flexibility assumes a partial mediating role in the injury anxiety-psychological well-being relationship. The findings suggest that injury anxiety's impact on psychological well-being varies according to athletes' cognitive flexibility levels. Cognitively flexible athletes can manage anxiety-provoking situations more effectively, thereby better maintaining psychological well-being. Bonanno's (2004) psychological resilience model establishes that adaptation to challenging situations depends

upon emotional flexibility, appropriate response capabilities, and cognitive restructuring abilities. Within athletic contexts, strengthening these competencies through cognitive flexibility can reduce anxiety levels while supporting psychological well-being. Moore and Malinowski (2009) indicate that cognitive flexibility enables more adaptive responses to stressful life experiences, positively influencing mental health. Athletic research demonstrates similar findings. Sarkar and Fletcher (2014) identified cognitive flexibility-like mental competencies as determinants of athletes' psychological resilience, with such individuals demonstrating more adaptive stress responses. Wilson et al. (2019) established that cognitively flexible athletes manage competitive stress more effectively while maintaining more stable psychological well-being.

CONCLUSIONS AND RECOMMENDATIONS

Our study demonstrates that cognitive flexibility assumes a partial mediating role in the relationship between injury anxiety and psychological well-being. While elevated levels of injury anxiety are associated with diminished psychological well-being among athletes, this adverse effect can be substantially alleviated through higher levels of cognitive flexibility. Based on these findings, it is recommended that cognitive flexibility be systematically targeted within applied sport psychology interventions. Specifically, sport-specific mental training programs should incorporate structured components aimed at enhancing flexible thinking, cognitive reappraisal, and adaptive coping skills. Group-based psycho-educational interventions, as well as individualized psychological counseling programs, may be particularly effective in strengthening athletes' cognitive flexibility and reducing injury-related anxiety. Coaches, sport psychologists, and athletic trainers are therefore encouraged to integrate cognitive flexibility–oriented strategies into regular training and rehabilitation processes. The evidence positions cognitive flexibility as a protective psychological resource capable of buffering the detrimental effects of injury anxiety on athletes' psychological well-being. Future research should employ longitudinal and experimental designs to examine the causal development of these relationships and to evaluate the effectiveness of targeted cognitive flexibility interventions across different sport types, competitive levels, and injury contexts.

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