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ORIGINAL ARTICLE

Importance of mental health in the sports environment: Influence of outcome on anxiety in young female volleyball players in home and away conditions

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ABSTRACT

The objectives of this study are focused, firstly, on understanding the levels of cognitive anxiety, self-confidence, and pre- and post-match somatic anxiety. Secondly, to analyse the impact of the match outcome (win-loss) on the mentioned dimensions according to the Home-Away condition. The research involved 70 volleyball players (28 home and 42 away) belonging to cadet categories from different volleyball teams competing in the School Sports Program in the province of Araba, specifically in the city of Vitoria Gasteiz. Participants completed the Competitive State Anxiety Inventory in Sport (CSAI-2) (Martens et al., 1990), consisting of 27 items, adapted and validated in Spanish by Capdevila (1997), and subsequently reviewed and used by other researchers (Arruza et al., 2001; Telletxea, 2008). The results show that somatic anxiety significantly decreased between pre and post-match in the home condition, and there are significant differences between home players and away players in response to a victory outcome. The ability of coaches, monitors, and fitness trainers to understand and address athletes' anxiety states is crucial for optimizing their performance and overall well-being, as well as adherence to physical activity.
Keywords: Health, Mental health, Physical activity, Sports initiation, Volleyball, Anxiety.

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INTRODUCTION

The realm of affects, emotions, feelings, and moods plays a crucial role in the human experience. These aspects are fundamental for understanding human behaviour, interpersonal relationships, decision-making, and mental health (Martínez-Sánchez et al., 2002; André, 2010; Totterdell, 1999). Anxiety, as a construct related to the aforementioned aspects, is another phenomenon influencing human behaviour. It can be understood as a set of experientials, physiological, and expressive manifestations in response to a situation or stimulus that the individual perceives as potentially threatening, even if objectively it may not be dangerous (Cano Vindel, 1989).

The relationship between physical activity, sports, and mental health, including anxiety, has been an area of interest for researchers in various fields. Competitive state anxiety is defined as an immediate emotional situation characterized by feelings of apprehension and tension associated with the activation of the organism in competitive situations (Martens, 1977). Following the development of the Multidimensional Anxiety Theory (Martens et al., 1990), this variable began to be considered a multidimensional construct distinguishing cognitive and somatic aspects that influence sports performance differently. It is primarily used in the context of sports performance to understand and measure the anxiety experienced by athletes. This theory asserts that anxiety is not a single entity but has multiple dimensions that must be considered for a comprehensive understanding (Sierra et al., 2003).

In the sports context, research on anxiety has explored various directions, addressing how anxiety can affect both performance and the mental health of athletes. The relationship between anxiety (both state and trait) and sports injuries is complex and often inconclusive in all cases (Fernández et al., 2014, and Ríos et al., 2021). Although studies suggest an association between elevated anxiety levels and a higher risk of injuries (Olmedilla et al., 2009; García-Mas et al., 2014, and Catalá et al., 2020), research in this field has produced mixed results.

It is well-known that physical activity can play a significant role in stress and anxiety management (Sánchez-Bañuelos et al., 2000; Arribas et al., 2007; Marco et al., 2020), supported by a growing body of scientific evidence indicating that regular physical activity may be associated with lower anxiety levels (McAuley et al., 2002). Numerous studies have explored this relationship and found results suggesting that sports participation and exercise can have significant mental health benefits, including anxiety reduction (Castro et al., 2019; Chacón et al., 2016; Espejo et al., 2017; Olmedilla et al., 2011).

Furthermore, in the realm of sports performance, León-Prados et al. (2016) found that the relative contribution of anxiety and self-confidence in explaining group performance weakly and partially supported the established multidimensional anxiety theory. In other words, it predicts a negative linear relationship between cognitive state anxiety and performance and, with lesser strength, an inverted U-shaped relationship between somatic anxiety and performance. Regarding high sports performance, some researchers suggest that confidence levels modulate the effects of anxiety, thus avoiding significant performance fluctuations for athletes (Sánchez et al., 2017).

Due to the interaction between technical-tactical, psychological, affective, and social factors, volleyball, like other sports, provides a conducive scenario for studying psychological phenomena. The numerous factors interacting during practice and competition, such as resilience (Patsiaouras et al., 2021), decisional profile according to expertise level (García-Coll et al., 2009), self-esteem in relation to position (Stanovic et al., 2020), gender (Milavic et al., 2013; Machado et al., 2016; Da Silva et al., 2022), the Individual Zone of Optimal

Functioning (IZOF) (Nogueira et al., 2019), and the condition of playing as the home and/or away team (Menegolli et al., 2014). This anxiety-condition (home-away) relationship is the focus of our study. Therefore, our research is framed within the context of sports in formative ages, and its dual objective is to firstly understand the levels of cognitive anxiety, self-confidence, and somatic anxiety between home and away teams before the competition begins. Secondly, to analyse the impact of the match outcome (victory-defeat) on the mentioned dimensions for both home and away teams.

MATERIAL AND METHOD

The design of this study, following Ato et al. (2013), responds to an empirical investigation that has adopted an associative strategy for a comparative study, as it aims to analyse the relationship between variables by examining differences between groups created by different independent variables generated by the studied situation, such as the condition (home and away) and the match outcome (in this particular case, victory or defeat). It is both a retrospective and prospective ex post-facto study.

The research adheres to ethical principles (respect, justice, and beneficence) for the protection of human research subjects, as established by the Belmont Report (1979) and the Declaration of Helsinki (WMA, 2021).

Participants

The sample consisted of 70 female athletes belonging to the cadet category from different volleyball teams competing in the School Sports Program in the province of Araba, specifically in the city of Vitoria Gasteiz during the 2021-2022 season. The ages of the subjects ranged from 14 to 15 years (14.50 ± 0.50), with 28 under the "*home*" condition and 42 under the "*away*" condition. This is a sample of volleyball players in developmental categories selected for convenience (Otzen and Manterola, 2017).

Instruments

The Competitive State Anxiety Inventory in Sport (CSAI-2) was used (Martens et al., 1990), consisting of 27 items, adapted and validated in Spanish by Capdevila (1997) and subsequently reviewed and used by other researchers (Arruza et al., 2001; Telletxea, 2008) with satisfactory results. In this version, the scales that make up the test are Cognitive Anxiety, Self-Confidence, and Somatic Anxiety.

The measurement scale is Likert-type with a range from zero to four (0 to 4) distributed as follows: zero, 0 (Nothing); one, 1 (A little); two, 2 (Moderately); three, 3 (Quite); four, 4 (A lot).

The reliability of the scales calculated using Cronbach's Alpha coefficient, in this research yielded values of .84 for cognitive anxiety, .81 for somatic anxiety, and .85 for self-confidence, prior to the match. After the match, the values were .77 for cognitive anxiety, .77 for somatic anxiety, and .71 for self-confidence.

Procedure

To intervene and apply the test before and after matches to non-professional athletes (volleyball), permission was sought from club coordinators, team coaches, and the parents of the participants. A pre-session was conducted to explain the necessary information to participants regarding the objective and purpose of the research, as well as its anonymous, voluntary, and confidential nature, from data collection to statistical treatment. Doubts raised by players from different teams were also clarified during this session. The tests (data collection) were conducted thirty minutes before the start of the match and after its completion. The research design spanned from October 2021 to May 2022.

Statistical analysis

Firstly, it is noteworthy that all variables involved met the normality condition, except for the Post Somatic Anxiety variable (As = -0.5; Cur = 2.9), so we cannot assert the existence of multivariate normality. However, the assumption of homoscedasticity of variances, tested using the Levene's Test, yielded non-significant values. Given these data, Student's t-tests for related and independent samples were decided to be employed. Some researchers (Montilla and Kromrey, 2010) suggest that under these conditions, the t-Student test is robust. The Box's M test used to check the equality of covariance matrices yielded significant values, so the performance of multivariate analyses was dismissed. To measure the effect size (ES), Cohen's (1994) estimator was used. This estimator calculated the degree of population generality of an effect based on the observed difference between two sample means. A value of 0.2 is considered a poor ES, 0.5 a moderate ES, and starting from 0.7, it is considered a strong ES. Statistical analyses were conducted using the SPSS 29.0 statistical program.

RESULTS

Study 1. Pre-match anxiety in home and away conditions

Through the comparison of means for independent samples, the difference in various dimensions of anxiety between the home and away conditions was examined at the moment before the match (pre-competition) in the entire sample. None of the dimensions showed statistically significant differences between playing at home or away (CA (p = .922;) CONF (p =.445) and SA (p =.158)) -Table 1-.

Table 1. Pre-competition home-away comparison.

	PreL (n = 28)	PreV (n = 42)	Mean Diff	CI 95%	$t_{(df)}$	*p*	*d*
CA	54.60 ± 6.95	54.78 ± 4.48	-.1785	[-3.79,3.44]	$-0.98_{(68)}$	.922	
S	47.78 ± 8.02	46.30 ± 7.76	1.476	[-2.35,5.30]	$.768_{(68)}$	.445	
SA	52.07 ± 8.74	54.88 ± 6.84	-2.809	[-3.20,1.81]	$-1.432_{(68)}$	.158	

Note. Table of Own Elaboration. CA = Cognitive Anxiety, S = Self-confidence, SA = Somatic Anxiety, Pre = Previous, Post = Posterior, Mean Diff. = Mean Difference, CI = Confidence Interval, df = degrees of freedom, p = significance, d = Cohen's d.

Study 2. Pre and post-match anxiety when the outcome is a victory.

Through the comparison of means for related samples, the difference in various dimensions of anxiety between the pre-match (pre) and post-match (post) moments was examined when the result was a victory in the entire sample (home and away). Only somatic anxiety decreased after the match, although not significantly (t(35) = 1.925; p = .062) -Table 2-.

Table 2. Pre-Post comparison with victory outcome (home and away).

	Pre(n = 36)	Post(n = 36)	Mean Diff	CI 95%	$t_{(df)}$	*p*	*d*
CA	53.19 ± 6.99	53.13 ± 7.35	.0555	[-1.82,1.94]	$.060_{(35)}$	.953	
S	46.94 ± 7.88	46.91 ± 8.70	.5277	[-2.43,3.48]	$.362_{(35)}$	.719	
SA	54.97 ± 6.29	52.86 ± 7.91	2.111	[.-115,4.33]	$1.92_{(35)}$	.062	

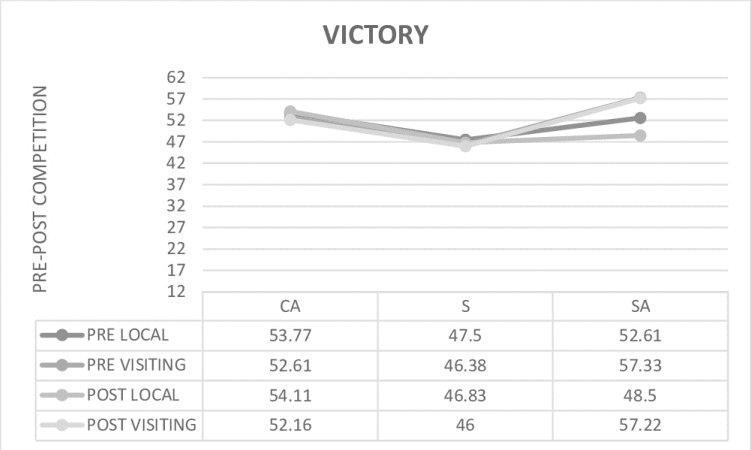
Note. Table of Own Elaboration. CA = Cognitive Anxiety, S = Self-confidence, SA = Somatic Anxiety, Pre = Previous, Post = Posterior, Mean Diff. = Mean Difference, CI = Confidence Interval, df = degrees of freedom, p = significance, d = Cohen's d.

In relation to the home condition (Figure 1), it is worth noting that only somatic anxiety significantly decreased between pre and post-match (t(17) = -.289; p = .048) and to a moderate extent (d = 0.4).

Regarding the away condition (Figure 1), no significant variation is observed in any dimension of anxiety.

Considering the pre-post competition comparison between the home and away conditions when the outcome is a victory, the results indicate that only the somatic anxiety dimension shows statistically significant differences both before (p = .025) and after competing (p = .001).

In pre-competition, it is much higher in away players (57.33 ± 3.28) than in home players (52.61 ± 7.67), while in post-competition, the result is reversed, being lower in the case of home players (48.50 ± 9.03) than in the condition of competing away (57.22 ± 2.62).



Note: Figure prepared by the authors.

Figure 1. Comparative graph of the average CSAI-2 scales, showing the differences Pre-Post Competition Victory in home and away condition.

Study 3. Pre and post-match anxiety when the outcome is a defeat.

Through the comparison of means for related samples, the difference in various dimensions of anxiety between the pre-match (pre) and post-match (post) moments was examined when the result was a defeat in the entire sample (home and away). Only self-confidence (t(32) = -.911; p = .343) and somatic anxiety (t(32) = .282; p = .780) decreased after the match, though not significantly -Table 3-.

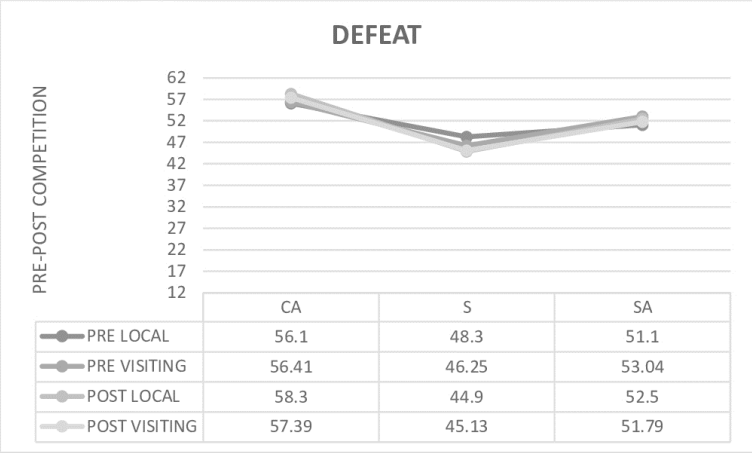
Table 3. Pre-Post comparison with defeat outcome (home and away).

	Pre$_{(n = 34)}$	**Post$_{(n = 34)}$**	**Mean Diff**	**CI 95%**	**t$_{(df)}$**	***p***	***d***
CA	56.42 ± 7.63	57.66 ± 8.38	-1.242	[-4.01, 1.53]	-.911$_{(32)}$	.369	
S	46.81 ± 8.05	45.06 ± 7.59	1.757	[-1.96, 5.47]	.963$_{(32)}$	.343	
SA	52.47± 8.91	52 ± 7.08	.4705	[-2.92, 3.86]	.282$_{(32)}$	.780	

Note. Table of Own Elaboration. CA = Cognitive Anxiety, S = Self-confidence, SA = Somatic Anxiety, Pre = Previous, Post = Posterior, Mean Diff. = Mean Difference, CI = Confidence Interval, df = degrees of freedom, p = significance, d = Cohen's d.

In the case of the home condition, it is noteworthy that only self-confidence decreased non-significantly between pre and post-match (t(9) = .922; p = .381). Meanwhile, cognitive anxiety (t(9) = -.665; p = .523) and somatic anxiety (t(9) = -.353; p = .732) increased but not significantly.

On the other hand, regarding the away condition, it is worth mentioning that none of the anxiety dimensions experienced a significant decrease, but it did not follow the same trend as the home condition. Among the dimensions that decreased, in addition to self-confidence, somatic anxiety is also included -Figure 2-.



	CA	S	SA
PRE LOCAL	56.1	48.3	51.1
PRE VISITING	56.41	46.25	53.04
POST LOCAL	58.3	44.9	52.5
POST VISITING	57.39	45.13	51.79

Note: Figure prepared by the authors.

Figure 2. Comparative graph of the CSAI-2 average scales, showing the differences Pre-Post Competition Home and Away Defeat.

DISCUSSION

The present study aimed to (1) first understand the type of anxiety profile exhibited by non-professional volleyball players just before competition and (2) examine the effect that match outcome variables have on the anxiety profile of both home and away players.

The anxiety profile of home players before competition is characterized by scores reflecting cognitive and somatic anxiety higher than self-confidence. Regarding the three anxiety dimensions analysed in this study—cognitive anxiety, self-confidence, and somatic anxiety—the results differ from those obtained in other research conducted in individual sports such as tennis (Rodríguez et al., 2017), amateur golfers (Pinto & Vázquez, 2013), as well as team sports like handball players (Baro et al., 2016; Ortín-Montero et al., 2013), footballers (Castillo-Rodríguez et al., 2022), and volleyball (Milavic et al., 2013; Patsiaouras et al., 2017; Do Amaral et al., 2016), where self-confidence scores were lower.

On the other hand, the anxiety profile of away players before competition in this research shows a similar profile to home players, with slightly higher scores. This differs from the results found by the mentioned researchers (Rodríguez et al., 2017; Morcillo, Baro et al., 2016, Ortín-Montero et al., 2013), who obtained an anxiety profile where self-confidence scores were higher than cognitive and somatic anxiety. It is also worth noting that no statistically significant differences were found between the self-confidence scores of home and away players.

Pre and post-match anxiety when the outcome is a victory

Regarding the total sample, it is worth noting that the scores of the three dimensions of the anxiety variable, both before and after the match, remain constant, and no statistically significant differences are detected.

However, when we analyse the home player sample separately, it is noteworthy that somatic anxiety significantly decreases between the pre-match and post-match moments despite winning. In contrast, cognitive anxiety decreases from pre to post, as expected.

As for away players, it should be mentioned that none of the anxiety dimensions experienced a significant decrease between pre and post when the outcome is a victory.

In relation to the home-away comparison, victory shows statistically significant differences both before and after competing in somatic anxiety. In pre-competition, the manifestation of anxiety through physical (somatic) symptoms such as muscle tension, nervousness, etc., is much higher in away players compared to home players, while the post-competition test results show a reversal of the results. In this case, home players reflect lower somatic anxiety, which could be translated as a sense of greater relaxation, joy, etc., for having achieved a positive result in front of their fans.

Pre and post-match anxiety when the outcome is a defeat

In the total sample, as mentioned throughout the study, the scores of the three dimensions of anxiety remain stable, and no statistically significant differences were found between pre and post. However, it can be highlighted that cognitive anxiety is slightly higher after competing (post). Cognitive anxiety has recently been empirically associated with personal responsibility and commitment (García-Mas et al., 2011). Therefore, this increase in cognitive anxiety levels may indicate a perception of responsibility and personal commitment by players after the negative result obtained. On the other hand, self-confidence decreases significantly after the match, but somatic anxiety shows similar scores before and after. This can also be interpreted as a reasonable result. After the match, the athlete experiences persistent physiological activation after a sporting event, even though the competitive tension phase has passed. This sustained activation can be part of the stress and excitement response that accompanies competition. In addition, the decrease in belief in one's own abilities after a recent defeat may contribute to feelings of discomfort or dissatisfaction (Prieto, 2016; Castro-Sánchez et al., 2019).

CONCLUSIONS

The two objectives pursued in this research were to understand the levels of cognitive anxiety, self-confidence, and somatic anxiety between home and away players before the competition and to analyse the impact of the match outcome (victory-defeat) on the mentioned dimensions for both home and away players.

After the analyses performed and the results obtained, it can be stated that, of the three dimensions analysed—cognitive anxiety, self-confidence, and somatic anxiety—it is the second dimension (self-confidence) that varies between pre-competition and post-competition, both in home and away players, decreasing significantly in both cases. Meanwhile, the other two dimensions, cognitive anxiety and somatic anxiety, do not show statistically significant differences between them.

This study has some limitations that should be considered. Firstly, anxiety in athletes was evaluated only once, and data were not collected throughout several matches. Periodic assessments could provide a completer and more dynamic picture of anxiety and other psychological variables related to performance. Secondly, the role of being a starter or substitute can have significant implications in terms of pressure, expectations, and anxiety levels in the sports context. Thirdly, and in the same line, monitoring the number of minutes played throughout the season is a significant variable that can influence a player's anxiety state. This metric can not only affect the player's perception of their contribution to the team but also have implications for their development, confidence, and emotional well-being.

Therefore, future research should address these limitations. Firstly, by controlling a greater number of variables (starter-substitute status, playing time, team ranking) to include them in explanatory models of

player anxiety states both before and after the match. Also, considering the circumstances surrounding a particular match can shape the player's anxiety state. Therefore, variables such as the importance the player assigns to the match, the team's position in the standings, or the significance of the match could be dimensions to consider in future studies on anxiety.

Moreover, future research could conduct cross-sectional studies between different theoretical constructs such as mastery climate and anxiety (Papaioannou & Kouli, 1999; Yoo, 2003).

On an applied level, the presented results, especially those related to playing time, anxiety, and other psychological variables, can be valuable for informing the design of intervention programs aimed at coaches (Soriano et al., 2014; Sousa et al., 2007). This study can be of great utility for coaches and fitness trainers in adapting their communication and support strategies. Crucial aspects in team management, player performance, as well as in promoting physical activity.

This work calls for the attention of monitors and coaches to integrate psychological variables into training programs, essential for the growing understanding of the importance of mental preparation in sports performance. Integrating the psychological dimension into training can have significant benefits for the well-being of athletes and their ability to face challenges.

AUTHOR CONTRIBUTIONS

The authors' contribution to the study has been:

a) The idea and conceptualisation of the study (Dr. Rubén Arroyo).
b) The collection of the data, together with the second author (Dr. Paula San Martin).
c) Methodological structuring, together with Dr. Mario Amatria.
d) The reading of the scientific literature and writing (introduction, interpretation of results, discussion and conclusions of the study) (Active participation by the three authors).

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DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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