BALTIC JOURNAL OF SPORT & HEALTH SCIENCES
No. 1(134); 2025; 22–33; ISSN 2351-6496 / eISSN 2538-8347
DOI: https://doi.org/10.33607/bjshs.v1i134.1572

Exploring the Resilience–Performance Relationship in Volleyball Players: A Pilot Study on Problem-Solving Strategies

[1]Asterios Patsiaouras, [1]Konstantinos Tsetsilas, [1]Eirini Politi, [2]Konstantinos Charitonidis
[1]Department of Physical Education and Sport Science, University of Thessaly, Trikala, Greece
[2]Department of Physical Education and Sport Science, Aristotle University of Thessaloniki, Thermi, Greece

ABSTRACT

Background: The purpose of this study was to investigate the relationship between resilience and the coping problems process in volleyball athletes. It is important for coaches and athletes to understand in depth the mechanisms underlying resilience, the effect of problem-solving strategies and the impact of these factors on the development of athletic performance.

Methods: Participants included in the study were 52 volleyball players (male and female) across all national divisions in Greece, with the STARS (State – Trait Assessment of Resilience Scale, GR version) and the Problems Experienced Inventory (COPE, Greek version) used as evaluation instruments. A key requirement for participation in the study was that the participants must be over 14 years old and active athletes. The statistical data were analyzed with the statistical package SPSS IBM Statistics 27.0., using Pearson's r, Cronbach's' α, and one-way ANOVA test with Bonferroni adjustments for independent samples.

Results: No statistically significant differences were observed between the two genders of the participating athletes for resilience or for the coping problem strategies. Additionally, adding as a variable the training experience of participants, statistically significant differences were observed when the athletes had training experience of 8 years or more compared to athletes with less experience.

Conclusion: It seems that years of training experience is a critical point for the formation of a mentally resilient profile as well as for the improvement of the ability to develop a strategic plan to address problems for volleyball players. Additionally, it seems that the factor that remained unaffected by the coaching process was the active problem-solving approach, which seems to be influenced by athletes' personality already developed in the earlier years of their life. Future studies should investigate further these relationships between resilience and coping strategies using more participants and/or from other sport etc., or distinguish between individual and team sports.

Keywords*:* volleyball players, resilience, coping with problems, problem solving strategies

INTRODUCTION

In sports like volleyball, athletes' performance is influenced by a combination of physiological and psychological factors. One key aspect is their ability to maintain mental focus and not be distracted or emotionally affected by surrounding circumstances. This mental ability – resilience – is crucial for success, as both training and competition can present stressful situations that may challenge an athlete's focus and determination (Sarkar, & Fletcher, 2014). Sports psychologists, particularly in recent years, have increasingly focused on helping athletes manage these stressful situations effectively (Patsiaouras, 2020; Patsiaouras & Stirbu, 2020; Patsiaouras, Nounos, Stirbu, 2021). Athletes must develop the capacity to solve problems quickly, not only during matches but also in various situations that could disrupt their concentration and performance, whether in the short or long term.

This is vital in volleyball, where players face high-pressure moments and must make swift decisions. The ability to cope with adverse conditions and stress is not limited to a particular category

of competition or gender. All athletes, regardless of the level at which they compete, must navigate these psychological challenges to remain focused on their goals and perform at their best.

Adverse situations for athletes can arise from both internal and external sources. Internally, this might include technical or tactical errors that cause frustration or self-doubt. Externally, athletes may face pressures from a variety of sources, such as the spectators, coaches, teammates, or even refereeing errors. Additionally, the presence of someone whose opinion is highly valued, such as a mentor or influential figure, can heighten stress, as athletes worry about their performance being judged (Lazarus & Folkman, 1984; Hatzigeorgiadis, 2006).

Resilience, according to the literature, refers to an individual's ability to resist and ultimately overcome obstacles. In high-level athletes, it is considered one of the most critical factors in achieving success (Morgan, Fletcher, & Sarkar, 2013; Patsiaouras, 2020; Patsiaouras, Nounos, Stirbu, 2021; Sarkar & Fletcher, 2014). Mentally resilient athletes are those who can handle the demands of daily life, intense training, and competitive pressures – such as the pressure from fans or high-stakes competition. Moreover, resilience is marked by the ability to remain composed and focused even under stressful conditions (Jones, Hanton, & Connaughton, 2002).

Research by Crust (2007) highlighted resilience as the single most important factor for improving performance in sports. This underscores how resilience is not just about coping with challenges but about excelling in the face of them, allowing athletes to recover from setbacks, stay focused, and continue striving toward their goals, regardless of the adversity they face.

Participation in competitive events, whether official matches, friendly games, or even practice sessions, often causes stress for volleyball players. This stress can lead to performance challenges that require immediate attention and problem-solving. Rapidly finding solutions to these challenges is crucial for achieving positive outcomes in matches. Coaches and sports psychologists can leverage insights from studies on stress and resilience to modify their approaches, enhancing the mental resilience of athletes and, consequently, improving their performance.

Resilience is broadly defined as a process of successful adaptation to difficult and challenging experiences. It involves mental, psychological, and behavioral flexibility, allowing individuals to adjust to both external and internal demands (García Secades et al., 2017). Several factors influence how well a person adapts to adversity, including: a) The individual's worldview and interactions with their environment: How they perceive challenges and respond to stress, b) Social support: The availability and quality of resources, such as support from teammates, coaches, or friends., and c) Coping strategies: Techniques or methods used to manage stress effectively.

Resilience is also recognized as an individual skill (Lock, Rees, & Heritage, 2020) that involves maintaining a relatively consistent level of performance, even in the face of significant challenges. In volleyball, which demands quick decision-making and adaptability, resilience is particularly vital. In volleyball, the fast-paced, high-stakes nature of competitive matches demands quick decision-making and adaptability (Patsiaouras, 2020; 2021). Every rally is unpredictable, and players must rapidly adjust their strategies in response to their opponents' movements and game situations. This intensity, coupled with the pressure to perform well in critical moments, amplifies the stress athletes experience. The ability to maintain composure, make split-second decisions, and execute skills under pressure is what makes resilience so vital in this environment. Players who can handle these high-pressure situations effectively are more likely to perform consistently and contribute to the team's success. By understanding these factors and integrating resilience training into coaching strategies, both coaches and sports psychologists can help athletes cope better with stress and adversity, ultimately enhancing their overall performance.

Resilience in sports, particularly volleyball, comprises two essential components: the ability to respond effectively to prolonged exposure to significant adversity (Machida, Irwin, & Feltz, 2013) and the capacity to positively adapt to varying levels of competition, whether during training or in matches (Patsiaouras, 2020; Belem, Cruz, & Tavares, 2021). Every volleyball player faces these challenges, requiring both immediate and long-term coping strategies. Resilience can be understood both as a trait and a state-process: Trait resilience refers to the stable, unchanging characteristics that enable an individual to adapt to stressful situations. These characteristics act as protective factors, providing a consistent buffer against stress. It is seen as an enduring aspect of personality, reflecting an individual's long-term capacity to withstand adversity. Trait resilience is relatively unaffected by short-term influences like training sessions or specific matches,

making it a more distal and constant feature of a person's psychological makeup. In this context, a mentally resilient volleyball player possesses an enduring capacity to maintain composure and perform well under pressure, regardless of the immediate challenges they face. This enduring nature of resilience supports athletes in navigating the inevitable highs and lows of a sports career.

On the other hand, state resilience is seen as a dynamic, adaptive response that enables athletes to adjust positively to adversity in real time. Unlike trait resilience, the influence of individual characteristics in state resilience can change based on the specific situation or moment. This interaction between the person and their environment determines how they react to stressors, which can fluctuate throughout life. Factors like the intensity of the risk, the availability of protective factors, and the specific context in which the individual finds themselves play key roles in shaping their response (Patsiaouras, 2020; 2021; Garrido-Muñoz, et al., 2024). State resilience is thus considered proximal and more sensitive to immediate experiences, meaning that how resilient a person feels or behaves in a given situation can vary greatly depending on recent life events and the demands of the moment. It is more fluid and variable, responding to short-term challenges such as a particular stressful match or training session.

Despite the distinction between trait and state resilience, both share a common underlying construct: a core sense of resilience. This suggests that whether resilience is viewed as a stable personality trait or as a situational response, it ultimately represents the same essential quality – the capacity to adapt to challenges. The difference lies in how that resilience is expressed, with trait resilience being more consistent over time and state resilience more influenced by immediate circumstances. Both forms contribute to an athlete's ability to cope with the various stressors encountered in competitive sports.

In our understanding, trait resilience reflects a person's overall, long-term capacity for resilience, while state resilience captures how this capacity is activated in response to recent or immediate circumstances, such as those encountered during volleyball training or matches. Both are linked to the same fundamental resilience but differ in how and when they operate, with trait resilience providing a more stable foundation, and state resilience manifesting in real-time to adapt to specific challenges.

In volleyball, athletes frequently face various stressors, such as technical or tactical issues, that can affect their performance. How they cope with these problems plays a crucial role in their ability to maintain focus and perform under pressure. The concept of coping processes, as defined by Lazarus and Folkman (1984), refers to the cognitive, emotional, and behavioral strategies a person uses to manage the external or internal demands created by a stressor (Folkman & Moskowitz, 2004). These coping strategies are essential in sports, where stressors arise from both the environment (such as the intensity of the match or the actions of opponents) and internal factors (such as self-doubt or pressure to perform).

Coping is inherently dynamic and multidimensional, evolving as athletes interact with stressful stimuli. This interaction, described by Folkman and Moskowitz (2004), involves identifying the threat and mobilizing available resources to manage or mitigate it. In volleyball, this might include adjusting technical skills, modifying tactics, or employing mental strategies such as positive self-talk, breathing techniques, or refocusing after an error. Coping thus evolves during the match or training, reflecting how athletes continuously adapt to maintain their performance levels despite the stressors they face.

Gould, Dieffenbach, and Moffett (2002) found that high-level athletes (e.g., female Olympians) demonstrated greater ability to cope with obstacles, stress, and adversity than lower-level athletes. Consequently, they suggested that the ability to persevere and overcome disappointments and adverse circumstances is a key component that helps athletes achieve their goals. Even pessimistic and insecure athletes can be resilient, however, they may find it more difficult to deal with stressful situations and therefore may weaken psychologically if the demands of the sport, such as during volleyball training and matches, are too high. Therefore, being upbeat or positive during training and matches is always desirable for a volleyball player, but it is not a necessary condition that determines resilience. Undoubtedly, the result of the match is very important for every player, however, adopting a positive mindset is also important in the process of personal development, leading an athlete to feel comfortable with himself (Patsiaouras, 2020).

Another study by García Secades, Molinero, Salguero, Ruiz, de la Vega, & Márquez (2017) states that resilience is a factor-barometer for achieving optimal performance in sports. Specifically, it was studied how the resilience profile of athletes contributes to recovery after a stressful situation, using the Recovery-Stress Questionnaire for

Athletes (RESTQ-Sport, Spanish version), and the Resilience Scale. They concluded that athletes with high resilience scored higher on recovery factors and lower scores on stress factors. Thus, the results state that the higher the athlete's resilience level, the more the stress recovery processes will be positively affected.

In some situations, just to be resilient is not enough, as the problems can overwhelm him or her and affect their performance on the sport court. For this reason, it is important for the athlete to develop problem-solving skills as they are skills that are taught, trained and improved, and can directly affect their personal and professional health (Cosma et al., 2020). The coping skills of high-performance athletes have been studied in many studies and they have been observed to be associated with various psychological variables, such as performance (Mahoney, 1989) or accident vulnerability (Hanson, McCullagh, & Tonymon, 1992). Furthermore, coping skills are essential when designing personal development programs for athletes, aiming to increase motivation, engagement, resistance to failure and, indirectly, sports performance and work-life balance (Cosma et al., 2020). Therefore, in this research we want to delve deeper into the relationship of problem-solving skills with mental resilience, and give volleyball coaches a direction, a path to follow when designing their programs for both high-level athletes and beginners.

According to Lazarus and Folkman (1984), athletes due to the nature of their activity face many stressful situations, during training and match, such as pain, pressure, fear, frustration, fatigue, uncertainty, fear of the coach or someone important watching from the stands. Being weak in dealing with these problems is widely accepted as leading to a decrease in performance (Lazarus, 2000). Therefore, it is a necessity that athletes not only who compete at the highest level but athletes who compete to developmental categories should develop strategies that create solutions to the problems they face (Cosma et al., 2020). Lazarus (2000) defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the individual's resources." A study by Crocker, Kowalski, and Graham (1998) found that there are many strategies one can use to cope with the stressful situations one experiences. Specifically, they report that the most common strategies are those that focus on the problem and those that focus on the emotion.

Problem-focused strategies aim to change the stressful situation while emotion-focused strategies focus primarily on the emotional distress associated with the situation. Krohne (1993), had observed that athletes use more avoidance strategies. Avoidance strategies include both behavioral avoidance and psychological avoidance.

Through training, coaches try to help the athletes to manage and build a strong personality with some specific characteristics. The profile of the athletes will be structured around a strong coping behavior which will lead them in the right direction to deal with the problems they face. According to the American Psychological Association (APA), coping behaviors are a personal characteristic and often automatic set of actions or actions taken to deal with stressful or threatening situations. Coping behaviors can be both positive (adaptive), such as making time for relaxation technics or light exercise during a hard training day, and negative (maladaptive, avoidant), such as not consulting a specialist when symptoms or persisting serious unsolved problems occur.

Gould, Dieffenbach, and Moffett (2002) found that high-level athletes – like female Olympians – demonstrated a greater ability to cope with obstacles, stress, and adversity compared to lower-level athletes. They suggested that perseverance and overcoming adversity are key traits for achieving athletic goals. Interestingly, even pessimistic or insecure athletes can exhibit resilience, though they may struggle more with stressful situations. In such cases, extreme demands during volleyball training or matches can lead to psychological strain. Therefore, while a positive mindset is advantageous, it is not a prerequisite for resilience. However, adopting an optimistic attitude can contribute to personal development, allowing athletes to feel more at ease and fulfilled (Patsiaouras, 2020).

A study by García Secades et al. (2016) identified resilience as a critical factor for optimal sports performance. Using tools like the Recovery-Stress Questionnaire for Athletes (RESTQ-Sport) and the Resilience Scale, they found that athletes with higher resilience levels scored better in recovery and lower in stress. These findings suggest that the higher an athlete's resilience, the more effectively they recover from stress, enhancing their ability to perform.

That said, resilience alone is not always enough to prevent performance setbacks. Sometimes, problems can overwhelm athletes, diminishing their ability to compete effectively. Therefore,

developing problem-solving skills is essential, as these skills can be learned, trained, and refined over time. Problem-solving skills are critical not only for performance but also for the athlete's personal and professional well-being (Cosma et al., 2020). Coping skills, which have been linked to psychological variables like performance (Mahoney, 1989) and accident vulnerability (Hanson, McCullagh, & Tonymon, 1992), are vital in enhancing athletes' resilience and mental health.

Coping skills also play an essential role in personal development programs for athletes, promoting motivation, engagement, and resilience to failure, which ultimately improve both sports performance and life balance (Cosma et al., 2020). This research aims to explore the relationship between problem-solving skills and mental resilience, providing volleyball coaches with insights on how to integrate these elements into training programs for both high-level athletes and beginners.

Athletes frequently encounter stressful situations, including pain, pressure, fear, frustration, and uncertainty, all of which can negatively impact performance if not managed properly (Lazarus, 2000). Developing effective coping strategies is essential for all athletes, not just those competing at elite levels, but also for those in developmental stages (Cosma et al., 2020).

Lazarus (2000) defines coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the individual's resources." A study by Kowalski and Crocker (2001), highlights two main coping strategies: problem-focused coping (strategies aim to change the situation causing stress, such as adjusting a tactic during a volleyball match), and emotion-focused coping (strategies focus on managing emotional distress, such as calming oneself down during high-pressure moments).

Krohne (1993) also noted that athletes often rely on avoidance strategies, which include both behavioral and psychological avoidance, such as ignoring a problem rather than confronting it directly.

Coaches play a crucial role in helping athletes develop strong coping behaviors through training, building resilience, and fostering characteristics like adaptability and perseverance. According to the American Psychological Association (APA), coping behaviors are personal characteristics and can either be automatic or deliberate actions to manage stressful situations. These behaviors can be positive (adaptive), such as incorporating relaxation techniques or light exercise to manage stress during intense training days, and/or negative (maladaptive or avoidant), such as failing to seek help for persistent issues or neglecting problems that require attention.

Building a resilient mindset and effective problem-solving skills enables athletes to navigate both the immediate challenges on the court and the broader stresses of their sports careers, ultimately leading to better performance and personal growth.

Therefore, it is important for coaches and athletes to understand in depth the mechanisms underlying resilience, the effect of problem-solving strategies and the impact of these factors on the development of athletic performance.

The purpose of this study was to investigate the relationship between resilience factors and the problem-solving process in both male and female volleyball players. The study aims to identify potential differences between genders in terms of resilience and problem-solving abilities and to examine the connection between mental resilience factors and problem-solving strategies based on the training age (experience level) of volleyball players.

By exploring these dimensions, the research will provide valuable insights that can help coaches tailor their training programs to enhance both resilience and problem-solving skills, ultimately improving the performance and psychological well-being of their athletes. Understanding these differences will allow for more personalized coaching approaches that cater to the unique needs of male and female athletes, as well as players at different stages of their volleyball careers.

METHODS

PARTICIPANTS

According to the study's purpose, the research focused on active, mentally healthy male and female volleyball players aged 14 years and older. Participants were drawn from all national divisions, specifically involving teams from clubs in Larissa (non-probability sampling). The study included athletes from the following categories: men participants from the 2nd national category (4th national category), and women participants from the 2nd national category (Pre League). The total sample size of the teams in this study was 264 players, of which 52 players participated in the present study. The required sample size was calculated to ensure a confidence level of 95% and a margin of error of 5%, yielding an ideal sample size of 58 players. This

value is very close to the actual participant number (52 players). However, due to the small sample size and the experimental nature of this study, the results should be interpreted with caution and not generalized to the entire population of volleyball players. This focused sample enabled a detailed examination of resilience and problem-solving strategies across various competitive levels within sport. However, a potential limitation is that the findings are drawn from a group of participants who were more willing to take part in the research, which may affect the generalizability of the results.

By including both genders and various divisions, the study aimed to offer a comprehensive analysis of the factors influencing athletic performance and development (Table 1). Participants under the age of 14 were excluded, as they were considered to lack sufficient training experience within their team category. Additionally, individuals who were not currently active players were excluded, as the research team believed their inactivity could potentially interfere with the study's results.

Table 1. **Mean age-SD and training years of the participants**

	Gender	N	Mean	SD
Age	Men	30	25.20	10.56
	Women	22	18,23	3.13
Training age	Men	30	2.33	.758
	Women	22	2.32	.716

The participants were 52 active athletes (Table 1), 30 men and 22 women: (N=30 men, M age = 25.20, SD = 10.56; and N=22 women, M age = 18.2, SD = 3.13) with sufficient training years' experience. For their participation in the research, they completed two questionnaires, the STARS and the COPE (from which specific only 8 sentences were used). The questionnaires were distributed to the participants through the Google Forms platform *(non-probability sampling)* with the snowball research design, maintaining absolute anonymity and thus reaching the entire Greek territory. Inside the form, the participants gave their consent for participation in the research, while they were assured that the completion of the questionnaires was anonymous and confidential. The research was approved by the bioethics committee of the University of Thessaly/DPESS.

MEASURING INSTRUMENTS

To assess the resilience of the athletes, the STARS questionnaire (State – Trait Assessment of Resilience Scale, Lock, Rees, & Heritage, 2020) – Greek version (Patsiaouras, Nounos & Stirbu, 2021) was used. The questionnaire measures resilience using a state and trait approach, based on the conceptualization of resilience as being influenced by a combination of state and trait factors. The questionnaire consists of 13 sentences, of which the first 6 (1–6) focus on the existing state status as perceived by participant, for example, "Right now I can face any difficulties that I may encounter in my life," while the remaining 7 (7–13) relate to the perceived trait status, for example "In general, I believe that I am a resilient person." Participants were asked to indicate on a 4-point Likert-type scale (1 = Strongly disagree, 4 = Strongly agree) whether they agree or disagree with the statements.

For the evaluation of the problems coping strategy, the Coping Orientations to Problems Experienced Inventory (COPE) questionnaire by Carver and colleagues (1989) was used, adapted in Greek language by Roussi (2001), (Stalicas et al., 2002). In their questionnaire, Carver et al. (1989) based on the Lazarus mode (1966) and Carver and Scheier's behavioral self-regulation theory, included 13 subscales, each describing a different stress coping strategy, so that they could examine in terms of the theoretical as well as the empirical background (Carver et al., 1989). It consists of 53 proposals, of which in this research, due to the research questions and the nature of the sport, the following 8 were chosen to be used, which investigated the factors of solving problems. The first 4 are about actively dealing with problems (e.g., "I focus my efforts on doing something about the problem"), and the other 4 are about formulating a plan of action to deal with a problem (e.g., "I'm trying to figure out a strategy for what to do.'" Participants were asked to indicate on a 5-point Likert-type scale (1 = I do not act this way at all, 5 = I act this way very often) how often they act this way.

STATISTICAL DATA ANALYSIS

Statistical analysis of the research data used the statistical tests of Pearson r correlation index, the internal consistency of the questions with the Cronbach's α index, and t test for independent variables. Additionally, One-way ANOVA with Bonferroni adjustment was used to distinguish the training age among the research participants. The alpha level for statistical significance was set at $p < .05$ for all tests. Statistical analysis was carried out using IBM SPSS Statistics 27.0 software.

RESULTS

Using correlation analysis of Pearson r index, it was found that state resilience has a positive linear moderate relationship with trait resilience as expected, at a statistically significant level of $p < 0.01$. No statistically significant linear relationship was found between state resilience and problem-solving factors. Furthermore, it was found that trait resilience has a positive linear moderate relationship with state resilience and with both problem-solving factors (dealing with the problem & creating a strategic plan) at a statistically significant level of $p < 0.01$ (Table 2). Additionally, it was found that the factor of dealing with the problem is statistically significantly correlated, having a positive linear relationship with the factor of creating a strategic plan with $p < 0.01$ as expected (Table 2).

All the factors due to the experimental nature of the study showed an acceptable Cronbach's α internal consistency (Table 2).

Table 2. **Correlation index and reliability of research factors.**

Factors	State	Trait	Cope problem	Strategic plan	Cronbach's α
State	-	.394**	.213	.151	.542
Trait		-	.358**	.471**	.636
Cope problem			-	.516**	.724
Strategic plan				-	.632

**. *Correlation is significant at the 0.01 level (2-tailed).*

Additionally, all variables demonstrated almost perfect symmetry, with skewness values close to 0 for state, trait, coping problem, and strategic planning. The kurtosis values for trait, coping problem, and strategic planning indicate flatter peaks and lighter tails compared to a normal distribution (negative kurtosis). This "platykurtic" distribution suggests fewer extreme data points than typically observed in a bell-shaped normal distribution, but the values remain within an acceptable range for analysis (Table 3).

Table 3. **Mean, SD, Skewness and Kurtosis values for all research factors.**

Factors	Mean	SD	Skewness	Kurtosis
State	17.39	2.82	.053	.114
Trait	21.90	2.37	-.008	-.519
Cope problem	12.58	2.31	-.359	-.600
Strategic plan	12.60	2.19	-.205	-.849

No statistically significant differences were found in the research factors regarding the two genders (Table 4). It seems that the gender of the participants does not differ statistically significantly in the research factors, either for resilience (state and trait) or for problem solving process (dealing with the problem & creating a strategic plan).

Table 4. **Mean differences and SD for t-test according to the gender of the participants in the research factors.**

	Sex	N	Mean	SD	t	df	p
State	Men	30	17.43	2.30	.17	50	.43
	Women	22	17.32	2.51			
Trait	Men	30	22.23	2.81	.99	50	.17
	Women	22	21.45	2.82			
Cope_problem	Men	30	12.60	2.11	.08	50	.47
	Women	22	12.55	2.61			
Strategic_plan	Men	30	12.30	2.39	-1.14	50	.13
	Women	22	13.00	1.85			

No statistically significant differences were found in the state resilience factor between the groups depending on the training experience (years) of the participants. However, the Bonferroni adjustment found statistically significant differences. Statistically significant differences were found between the participants who had 0–3 years of training experience and those who had more than 8 years of training experience in the state resilience factor. It seems that athletes who have been involved in the sport of volleyball for more years develop the ability to adapt to stressful situations better than those who are beginners or have less experience in the sport of volleyball. These statistically significant differences were not found between participants who had 0–3 and 4–7 years of training experience. Also, no statistically significant differences were found in the participants who had 4–7 and over 8 years of training experience. There appears to be a linear ascending relationship between the training experience of beginners and advanced players that peaks after 8 years (Table 5).

No statistically significant differences were found in the trait resilience factor between the groups according to the training experience (years) of the participants. However, the Bonferroni adjustment found statistically significant differences between participants who had 0–3 years of training experience and those who had more than 8 years of training experience on the trait resilience factor. It seems that athletes from both genders who have been involved in volleyball for more years develop the ability to adapt to stressful situations that helps them in an improved level of trait resilience in their personality better than those who are beginners or have less experience in volleyball. These statistically significant differences were not found between participants who had 0–3 and 4–7 years of training experience. Additionally, no statistically significant differences were found in the participants who had 4–7 and over 8 years of training experience (Table 5).

Statistically significant differences were found between participants with 0–3 years of training experience and those with more than 8 years of training experience on the factor of active coping after Bonferroni adjustment. It seems that volleyball athletes who have been involved in sport for more years develop the ability to solve problems better than those who are beginners or have less experience. These statistically significant differences were found between participants who had 0–3 and 4–7 years of training experience. No statistically significant differences were found in the participants who had more than 8 years of training experience. There appears to be a linear upward-relationship between the training age of beginners and advanced players that ceases to hold after 7 years (Table 5).

Bonferroni adjustment found statistically significant differences on the strategic plan creation factor between participants who had 0–3 years of training experience and those who had more than 8 years of training experience. It seems that athletes who played volleyball for more years develop the ability to create a strategic plan either through training or through the competitive process. These statistically significant differences were not found between participants who had 0–3 and 4–7 years of training experience. Furthermore, no statistically significant differences were found in the participants who had 4–7 and over 8 years of training experience (Table 5).

Table 3. **One-way ANOVA with Bonferroni adjustment for the comparison of the factors according to the training experience of the participants.**

Factor	Group	Sum of Squares	df	Mean Square	F	η^2	p	I-J p
State	Between Groups	2.29	2	1.15	.20	.039	.82	ac = .05
	Within Groups	284.01	49	5.80				
	Total	286.30	51					
Trait	Between Groups	12.86	2	6.43	.80	.122	.45	ac = .01
	Within Groups	391.66	49	7.99				
	Total	404.52	51					
Cope problem	Between Groups	.20	2	.10	.02	.176	.98	ab = .01
	Within Groups	272.49	49	5.56				
	Total	272.69	51					
Strategic plan	Between Groups	17.49	2	8.74	1.89	.163	.16	ac = .05
	Within Groups	227.03	49	4.63				
	Total	244.52	51					

a=0-3 yrs. b=4-7 yrs., c=8+ yrs.

**The mean difference is significant at the 0.05 level.*

DISCUSSION

The purpose of the study was to examine the relationship between resilience and problem-solving orientation among volleyball athletes. Data were collected from over 50 volleyball players of both genders, representing various national divisions and leagues, using the snowball sampling method and distributing questionnaires. As anticipated, statistically significant correlations were found between resilience and problem-solving abilities. This indicates a positive linear relationship between these factors, suggesting that as one improves, the other does as well. These findings warrant further investigation to solidify this connection.

The results of the study indicated that higher levels of trait resilience were associated with better problem-solving abilities and the selection of appropriate strategic plans in volleyball athletes. Conversely, athletes who excelled at problem-solving also showed improvements in their trait resilience, demonstrating a reciprocal relationship. This phenomenon seems to be universal, as Li, Eschenauer, and Yang (2013) pointed out. Not only in sports settings, but also in general, people with high levels of trait resilience tend to have effective and efficient problem-solving skills. They are able to accurately understand a situation, identify the correct issue, and develop the best solution. They are less likely to misread the situation, misidentify the problem, or generate an incorrect solution – qualities that are crucial in various sports settings, including volleyball. Additionally, a significant correlation was also observed between an athlete's problem-solving ability and their capacity to develop strategic plans. The results suggest that athletes who are more adept at solving problems are also more skilled at creating coping strategies. This relationship appears to be bidirectional, where improving one skill positively influences the other.

The study found no statistically significant differences between male and female athletes in terms of mental resilience in line with Blanco-García, Acebes-Sánchez, Rodriguez-Romo, and Mon-López (2021), or problem-solving abilities. This contrasts with findings from other studies (e.g., Patsiaouras, 2020), which may be influenced by the relatively small sample size of the present study. Further research with a larger sample may be needed to confirm these findings. Nevertheless, the current results suggest that gender does not affect resilience or problem-solving in volleyball players, meaning that both men and women benefit equally from training aimed at enhancing these skills.

The study identified the training period of 8 years as a critical threshold for both state and trait resilience, as well as for the development of strategic problem-solving plans. Athletes with less than 8 years of training showed no significant differences in these abilities. However, it remains unclear whether athletes continue to improve after reaching this 8-year mark, or if they plateau. We are not aware of any relevant research studies in this area that specifically focus on the differences and the effect of training experience on these factors. Therefore, future research could explore whether these characteristics continue to improve with further training or stabilize after reaching a certain point. To build on these findings, future studies should increase the sample size to strengthen statistical power and verify the absence of gender differences, and should examine whether the level of competition (national category) influences resilience and problem-solving abilities. Furthermore, future studies should try to identify the primary predictive factors driving the correlation between resilience and problem-solving. For instance, if an improvement in trait resilience leads to a corresponding enhancement in strategic planning, understanding this causality could guide more effective training interventions. Based on the results, the effect sizes indicated a large effect for trait, problem-solving, and strategic plan variables, with approximately 16.3% of the variance in the dependent variable explained by the independent variables. This suggests a strong relationship between these variables.

In contrast, the η^2 value of the state variable (.039) falls into the small effect category, explaining only 3.9% of the variance in the dependent variable. As a result, the findings for this variable should be interpreted with caution. Another limitation of this study is its reliance on a convenience sample, meaning the participants were not randomly selected. This inherently restricts the generalizability of the results. A further limitation is the unsatisfactory Cronbach's α reliability of the state variable, which may be attributed to the limited number of items in the state scale or the small sample size. Given the exploratory nature of this study, as a preliminary attempt to connect resilience with problem-solving strategies, future research should address these issues to improve reliability and robustness.

Mental resilience plays a vital role in athletic success, particularly as the athlete's skill level increases. However, the ability to address problems in real-time – such as during the fast-paced environment of a volleyball match – is equally critical. This study highlights the importance of developing both resilience and problem-solving skills, as they are intertwined and mutually reinforcing. For coaches, this means that training programs should target both factors to maximize athletic performance. Additionally, the 8-year training period may represent a key milestone in the development of these abilities, though further research is needed to determine whether athletes can continue improving beyond this point.

CONCLUSIONS

After evaluating the results, it was found that resilience and the ability to cope with problems are closely linked to the length of the athlete's training. Specifically, athletes improve both state and trait resilience, as well as their ability to create strategic plans for problem-solving through accumulated experience from games and training. This suggests that with more experience, athletes become better equipped to manage stress and adversity in a structured way.

However, the findings also indicate that athletes struggle to develop the skill of active problem-solving, likely because this ability is more influenced by their personality traits rather than the sport itself. In other words, while coaching and training significantly enhance an athlete's resilience and capacity for creating strategies to solve problems, they do not seem to have as strong an impact on the athlete's intention to actively address problems. This appears to be more tied to the individual's inherent personality and character traits, which are less malleable through external influences such as coaching. Thus, while the coaching process effectively builds resilience and problem-solving strategies, it has a more limited effect on an athlete's intrinsic motivation or inclination to tackle problems, which may be deeply rooted in personal characteristics.

REFERENCES

American Psychological Association. APA. Retrieved from https://www.apa.org/

Blanco-García, C., Acebes-Sánchez, J., Rodriguez-Romo, G., & Mon-López, D. (2021). Resilience in Sports: Sport Type, Gender, Age and Sport Level Differences. *International Journal of Environmental Research and Public Health, 18(5)*, Article 2624.

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56(2)*, 267.

Cosma, G., Chiracu, A., Stepan, R., Cosma, A., Nanu, C., & Paunescu, C. (2020). Impact of coping strategies on sport performance. *Frontiers in Psychology, 11*, Article 559488.

Crocker, P. R. E., Kowalski, K. C., & Graham, T. R. (1998). Measurement of coping strategies in sport. In J. L. Duda (Ed.), *Advances in sport and exercise psychology measurement* (pp. 149 –161). Morgantown, WV: Fitness Information Technology.

Crust, L. (2007). Mental toughness in sport: A review. *International Journal of Sport and Exercise Psychology, 5(3)*, 270–290. https://doi.org/10.1080/1612197X.2007.9671836

Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and Promise. *The Annual Review of Psychology, 55*, 745–774. http://dx.doi.org/10.1146/annurev.psych.55.090902.141456

García Secades, X., Molinero, O., Ruíz Barquín, R., Salguero, A., De La Vega, R., & Márquez, S. (2017). Resilience and recovery-stress in competitive athletes. *Journal of Sports Science & Medicine, 16(2)*, 163–171.

García Secades, X., Molinero, O., Salguero, A., Ruíz Barquín, R., De La Vega, R., & Márquez, S. (2016). Relationship Between Resilience and Coping Strategies in Competitive Sport. *Perceptual and Motor Skills, 122(1),* 336–349.

Garrido-Muñoz, M. & Blanco-García, C. & Diez-Vega, I. & García Merino, S. & Acebes Sánchez, J. & Rodriguez, G. (2024). Psychological resilience, athletic experience, and competitive level of judokas. A transversal study. *Frontiers in Psychology. 15.* https://doi.org/*10.3389/fpsyg.2024.144041*

Gould, D., Dieffenbach, K., & Moffett, A. (2002). Psychological Characteristics and Their Development in Olympic Champions. *Journal of Applied Sport Psychology, 14(3),* 172–204. http://dx.doi.org/10.1080/10413200290103482

Hanson, S. J., McCullagh, P., & Tonymon, P. (1992). The relationship of personality characteristics, life stress, and coping resources to athletic injury. *Journal of Sport & Exercise Psychology, 14*(3), 262–272.

Hatzigeorgiadis, A. (2006). Approach and avoidance coping during task performance in young men: The role of goal attainment expectancies. *Journal of Sports Sciences, 24*, 299–307

Johnson, U. (2007). Coping strategies among long-term injured competitive athletes. A study of 81 men and women in team and individual sports. *Scandinavian Journal of Medicine & Science in Sports, 17(2)*, 223–230.

Jones, G. & Hanton, S. & Connaughton, D. (2002). What Is This Thing Called Mental Toughness? An Investigation of Elite Sport Performers. *Journal of Applied Sport Psychology, 14.* 205–218. http://dx.doi.org/10.1080/10413200290103509

Kowalski, K. & Crocker, P. (2001). Development and Validation of the Coping Function Questionnaire for Adolescents in Sport. *Journal of Sport & Exercise Psychology, 23,* 136–155. http://dx.doi.org/10.1123/jsep.23.2.136

Krohne, H. W. (1993). Vigilance and Cognitive Avoidance as Concepts in Coping Research. In H. W. Krohne (Ed.), *Attention and Avoidance* (pp. 19–50). Seattle, WA: Hogrefe & Huber. http://dx.doi.org/10.1037/0021-9010.73.4.621

Lazarus, R. S. (2000). How emotions influence performance in competitive sports. *The Sport Psychologist, 14*(3), 229–252.

Lazarus, R. S. (1966). *Psychological Stress and the Coping Process*. McGraw-Hill, New York.

Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York: Springer Publishing Company.

Li, M., Eschenauer, R. & Yang, Y. (2013). Influence of Efficacy and Resilience on Problem Solving in the United States, Taiwan, and China. *Journal of Multicultural Counseling and Development, 41*, http://dx.doi.org/10.1002/j.2161-1912.2013.00033.x

Lock, S., Rees, C. S., & Heritage, B. (2020). Development and validation of a brief measure of psychological resilience: The state–trait assessment of resilience scale. *Australian Psychologist, 55(1),* 10–25.

Machida, M., Irwin, B. & Feltz, D. (2013). Resilience in Competitive Athletes With Spinal Cord Injury: The Role of Sport Participation. *Qualitative health research, 23*, http://dx.doi.org/10.1177/1049732313493673

Mahoney, M. J. (1989). Sport psychology. In I. S. Cohen (Ed.), *The G. Stanley Hall lecture series* (pp. 101–134). American Psychological Association. https://doi.org/10.1037/10090-004

Morgan, PB, Fletcher, D., & Sarkar, M. (2013). Defining and characterizing team resilience in elite sport. *Psychology of Sport and Exercise, 14(4),* 549–559.

Patsiaouras Asterios, Nounos G., Stirbu Ilie-Catalin (2021). Cross-Cultural Adaptation of the STARS Questionnaire for Greek-Speaking Athletes. *7th International Conference of The Univeritria Consortium in Physical Education, Sports and Physiotherapy*. November 12–13. 201 at Iasi Romania.

Patsiaouras, A. (2020). The Relationship between Resilience and the Perceived Importance of Match Outcome for Volleyball Player. *Journal of Sports and Games, 2(2)*, 20–26.

Patsiaouras, A. (2021). Team category and gender differences of resilience among high-level volleyball players. *Journal of Human Kinetics, 78(1)*, 259–268.

Patsiaouras, A., & Stirbu, C. (2020). Assessing Resilience in Youth (U16) Volleyball National Teams. *International Journal of Physical Education, Fitness and Sports, 9(3)*, 39–45. https://doi.org/10.34256/ijpefs2036

Sarkar, M., & Fletcher, D. (2014). Psychological resilience in sport performers: A review of stressors and protective factors. *Journal of Sports Sciences, 32(15*), 1419–1434.

Received on September 25, 2024
Accepted on February 25, 2025