



Journal Website

Article history:

Received 04 August 2025

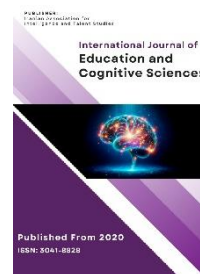
Revised 27 November 2025

Accepted 02 December 2025

Published online 01 April 2026

International Journal of Education and Cognitive Sciences

Volume 7, Issue 2, pp 1-10



E-ISSN: 3041-8828

Functional Choking Under Pressure in Volleyball: The Effect of Skill Level and Gender on the Functional and Mental Performance of Young Players

Hassan Abdulrazzaq Hassan. Al-hargani¹, Hamid. Zahedi^{2*}, Amer Rashid Shayyal. Al-zubaidi³, Rokhsareh. Badami⁴

¹ PhD Student, Department of Motor Behaviour and Sport Psychology, Isf.C., Islamic Azad University, Isfahan, Iran

² Department of Sports Science, Na.C., Islamic Azad University, Najafabad, Iran

³ Assistant Professor, College of Physical Education and Sports Sciences, University of Wasit, Wasit, Iraq

⁴ Department of Motor Behaviour and Sport Psychology, Isf.C., Islamic Azad University, Isfahan, Iran

* Corresponding author email address: hamidzhd@iau.ac.ir

Article Info

Article type:

Original Research

How to cite this article:

Al-hargani, H. A. H., Zahedi, H., Al-zubaidi, A. R. S., & Badami, R. (2026). Functional Choking Under Pressure in Volleyball: The Effect of Skill Level and Gender on the Functional and Mental Performance of Young Players. *International Journal of Education and Cognitive Sciences*, 7(2), 1-10.

<https://doi.org/10.61838/kman.ijecs.323>



© 2026 the authors. Published by Iranian Association for Intelligence and Talent Studies, Tehran, Iran. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

ABSTRACT

Purpose: The objective of this study was to examine the effects of gender and skill level on the functional and psychological performance of young Iraqi volleyball players under experimentally induced psychological pressure.

Methods and Materials: This causal-comparative field study employed a 2×2 factorial design, with gender (male/female) and skill level (high/low) as independent variables. Forty right-handed university volleyball students (20 males, 20 females) were selected through purposive sampling after initial screening with the SCAT. Functional performance was assessed using vertical jump and reaction time tests based on the Repeated Effort protocol, while psychological performance was measured using the CSAI-2 and the OMSAT-3. Psychological pressure was induced using the virtual comparison method, informing participants that their performance would be evaluated in relation to peers and used for team selection and monetary reward decisions. Data were analyzed using mixed two-way ANOVA with significance set at $p < .05$, and effect sizes and statistical power were calculated.

Findings: Analysis showed a significant main effect of gender on vertical jump height under pressure ($F=238.45$, $p<.001$, $\eta^2=.86$), with males outperforming females, while skill level had no significant effect ($p=.41$). Reaction time was significantly influenced by both gender ($F=58.08$, $p<.001$) and skill level ($F=5.37$, $p=.02$), with a significant interaction ($F=9.53$, $p=.004$) indicating greater skill-based differences among males. For basic mental skills, neither gender nor skill level alone reached significance ($p=.11$ and $p=.08$, respectively), but their interaction was significant ($F=5.50$, $p=.02$). Psychomotor skills showed a significant gender effect ($F=22.63$, $p<.001$) but no significant effect of skill level ($p=.94$) or the interaction ($p=.36$).

Conclusion: Functional and psychological performance under pressure is shaped by a complex interplay of gender, skill level, and cognitive-emotional factors, underscoring the importance of integrating targeted mental skills training into volleyball development programs to reduce performance decrements under stress.

Keywords: choking, gender, skill level, functional ability, mental skill, volleyball.

1. Introduction

Performance under pressure has long been recognized as a central challenge in competitive sport, influencing not only technical execution but also the psychological stability of athletes in demanding contexts. In dynamic team sports such as volleyball, athletes are frequently confronted with situations in which their functional and mental capacities must rapidly adjust to environmental stressors, competitive uncertainty, and elevated expectations. The phenomenon commonly described as “choking under pressure” reflects a performance decrement that occurs despite adequate skill level or prior training, driven primarily by heightened cognitive anxiety, attentional disruption, and compromised motor control (Ehrlenspiel, 2006). Understanding how psychological pressure alters performance has become a core focus in contemporary sport science, particularly as developmental programs increasingly emphasize the integration of mental skills with physical and technical preparation.

A robust body of research has documented the relationship between anxiety, confidence, and motor performance, illustrating that cognitive and somatic components of anxiety exert distinct effects on athletes’ execution of complex skills (Woodman & Hardy, 2003). According to meta-analytic evidence, cognitive anxiety tends to impair performance, whereas confidence functions as a protective factor that can buffer the detrimental impacts of pressure. This dynamic suggests that athletes’ responses to pressure are neither uniform nor solely determined by physical skill but rather represent an interaction between psychological preparedness and contextual demands. Recent investigations further emphasize the role of individual differences such as self-efficacy and goal orientation in shaping the relationship between anxiety and performance, highlighting that athletes with stronger mastery orientations may be better equipped to maintain stability in high-pressure environments (Peng & Zhang, 2021).

In addition to psychological traits, cultural and contextual factors critically shape athletes’ ability to respond effectively under pressure. The International Society of Sport Psychology emphasizes that culturally competent practices are essential to understanding athletes’ behavior, development, and mental health (Ryba et al., 2013). Similarly, contemporary research underscores the need to acknowledge the socio-cultural systems that influence athletes’ learning, motivation, and stress responses (Schinke et al., 2018). For example, young athletes in regions such as

the Middle East, including Iraq, often operate within educational and sporting environments characterized by limited psychological support systems, differing gender norms, and varying access to structured talent development programs. These cultural layers shape how male and female athletes interpret pressure, internalize expectations, and mobilize mental skills.

The role of cultural capital in sport also contributes to disparities in performance outcomes, especially when examining differences across gender and skill levels. From a Bourdieusian perspective, variations in access to resources, social support, and sport-specific opportunities strongly influence athletes’ capacities to navigate competitive pressures (Aquilina, 2013). When applied to volleyball, such frameworks help explain why athletes with similar technical abilities may display differential performance patterns under stress, depending on their established cultural and psychological environments.

Another essential dimension in understanding performance under pressure lies in talent development research, which underscores the importance of holistic training environments. According to ecological models of talent development, athletes’ progression is influenced by the interaction of personal, interpersonal, and environmental factors, all of which contribute to the formation of adaptive psychological skills (Henriksen et al., 2010). Within these environments, coaches play a crucial role by designing training conditions that not only improve physical capabilities but also cultivate resilience, attentional control, and coping mechanisms against stress. Studies in multiple sporting disciplines reveal that structured psychological skills training can help young athletes better regulate emotions, sharpen focus, and enhance decision-making accuracy during competitive pressure (Thompson & Hilliard, 2021).

In volleyball specifically, performance depends heavily on rapid information processing, anticipatory skills, and neuromuscular coordination. Technical elements such as spiking, blocking, or serving require stability and precision that may deteriorate drastically under pressure. Research examining adolescent female volleyball players demonstrates that functional training programs targeting both technical and psychological dimensions can significantly improve performance indices, underscoring the interconnectedness between physical and mental readiness (Nemati et al., 2021). Moreover, the unique structure of volleyball—where continuous transitions, unpredictable ball trajectories, and rapid tactical exchanges occur—places

athletes at heightened vulnerability to pressure-induced motor disruption.

From a motor control perspective, choking under pressure is believed to emerge when attention shifts from automated skill execution toward conscious control, resulting in a breakdown of fluid movement patterns. This shift is particularly problematic in skills requiring high-speed coordination, such as those observed in volleyball, where momentary lapses in timing can dramatically affect outcomes. Insights from elite golf reveal similar patterns, where experienced athletes report that pressure causes an internal focus on mechanics rather than on task execution, disrupting automaticity and degrading performance (Gucciardi et al., 2010). Applied to volleyball, this suggests that even highly skilled young athletes may suffer performance declines when competitive evaluations, public comparisons, or selection pressures are introduced.

In this regard, repeated-effort testing has emerged as a reliable field-based metric for assessing how athletes perform under fatigue and stress. Research developing such measures in elite volleyball contexts highlights the importance of simulating real-game demands to examine performance stability across multiple bursts of effort (Sheppard, 2007). These forms of testing reflect not only physical endurance but also psychological perseverance, attentional control, and the capacity to maintain motor precision despite elevated stress. As a result, integrating repeated-effort tests with psychological assessment tools can offer a comprehensive understanding of how athletes respond to pressure.

More recent interdisciplinary work has shown that mental skills training is not limited to athletic performance but extends to fields such as medical education, military training, and emergency response. For instance, studies conducted among emergency medicine residents demonstrate that brief mental skills interventions can reduce stress reactivity and improve decision-making performance in high-stakes simulations (Aronson et al., 2022). Likewise, research in health professions education highlights that applying principles from sport psychology can significantly enhance learners' capacity to manage performance anxiety, maintain concentration, and regulate emotions (Sandars et al., 2022). Such findings reinforce the broader applicability of psychological skills training and its importance in any performance domain characterized by time pressure and high cognitive load.

In youth sports, mental skills are particularly critical because young athletes are simultaneously navigating

developmental, cognitive, and emotional transitions. Systematic reviews and intervention studies show that incorporating structured training programs for skills such as goal setting, emotional regulation, attentional control, and relaxation techniques contributes positively to both performance and psychological well-being (Corrado et al., 2024). In volleyball, the enhancement of fundamental skills and specific physical attributes through targeted training interventions has also been documented, particularly among young athletes striving to adapt to competitive challenges (Lect. Dr. Mahmmad Ali & Hamza, 2024).

The cognitive and psychological challenges children face in early training environments demonstrate that motor and mental skill development are deeply interlinked. Extracurricular sport activities play a meaningful role in strengthening both cognitive and motor skills among primary school students, shaping their long-term engagement and performance trajectories (Călinescu & Rață, 2022). Similarly, mental skills have been shown to influence learning performance across educational contexts, suggesting their generalizable importance beyond athletic competition (Aziz et al., 2022). Such findings indicate that psychological competencies represent foundational elements of performance that begin early and continue to manifest through adolescence and young adulthood.

A growing area of interest relates to gender differences in sport performance, particularly in relation to motor coordination, perceptual skills, and susceptibility to stress. Comparative studies in volleyball reveal that males often demonstrate higher coordination scores than females at young ages, although the underlying factors may include differences in physical development, training exposure, and cultural expectations (Dervishi & Shehu, 2025). Gender-based differences also emerge in psychological responses to stress, with women in some contexts demonstrating higher anxiety sensitivity and less stable confidence levels during competitive tasks. These patterns intersect with socio-cultural norms that shape how girls and boys are socialized into athletic roles.

In addition to gender, motivation remains a key determinant of performance outcomes. Research comparing athletes across team sports highlights that achievement motivation varies significantly between groups and may influence how athletes respond to stress, regulate emotional states, and maintain performance consistency (Maurya & Mishra, 2025). Motivation interacts with psychological skills, cultural background, and coaching environments,

influencing overall resilience and the likelihood of choking under pressure.

Meanwhile, qualitative work exploring the lived experiences of athletes adds depth to the understanding of how individuals interpret pain, constraints, and pressure. For example, research focused on female sitting volleyball players reveals that physical and psychological challenges profoundly shape their sense of corporeality and identity in sport, contributing to their adaptive strategies in stressful contexts (Maria Denise Dourado da et al., 2025). Such phenomenological insights offer important reflections for interpreting performance under pressure among broader volleyball populations.

Mental skills research in football also highlights the specificity required in psychological training for elite sport environments. Studies identifying key mental skills among national-level athletes emphasize that attributes such as emotional control, confidence, activation regulation, and attentional focus are indispensable for maintaining performance stability under competitive pressure (Piravani et al., 2022). Similarly, investigations of mental skills and performance in both team and individual sports reinforce the importance of developing psychological competencies across diverse athletic settings (Zamani Sani et al., 2022).

The integration of sport psychology and motor performance science thus indicates that understanding the interaction of gender, skill level, and psychological pressure in volleyball requires a multilayered perspective. When athletes face evaluative conditions, time constraints, or social comparison—such as those introduced through virtual comparison methods developed to induce pressure in experimental contexts—their attentional focus, confidence, and physiological arousal may shift in ways that either enhance or undermine performance. These dynamics align with broader theoretical models of anxiety–performance relationships, including those observing how self-efficacy moderates the impact of cognitive anxiety on motor outcomes (Peng & Zhang, 2021).

Taken together, the existing literature underscores that performance under psychological pressure reflects a complex interaction between cognitive processes, emotional regulation, motor control, cultural environments, and gender-based experiences. Despite clear advancements in understanding choking mechanisms, relatively few studies have examined these dynamics among young volleyball players in Middle Eastern contexts, particularly in Iraq, where cultural expectations, training systems, and gender

norms may uniquely shape athletes' psychological and functional responses.

Therefore, the aim of the present study is to investigate the effects of gender and skill level on functional performance and psychological abilities of young Iraqi volleyball players under conditions of induced psychological pressure.

2. Methods and Materials

2.1. Study Design and Participants

This research employed a causal–comparative design with a field-based and applied approach. The study design was structured according to a two-factor model (2×2), in which skill level (high/low) and gender (male/female) were considered independent variables, while functional and psychological abilities were treated as dependent variables. The choice of this design enabled the researchers to examine not only the main effects but also the interaction between skill and gender under conditions of psychological pressure.

The statistical population consisted of physical education students at the University of Baghdad during the 2024–2025 academic year. To control confounding variables, only right-handed students who had completed the practical volleyball course and were familiar with basic serving and spiking skills were included in the study. In the first stage, using a public call for participation, 68 volunteers (35 females and 33 males) expressed willingness to participate. Following initial screening with the Sport Competition Anxiety Test (SCAT) and the exclusion of individuals with very high or very low trait anxiety, as well as preliminary evaluations by coaches, 40 eligible participants were purposefully selected and grouped into four ten-person groups based on gender (female/male) and skill level (high/low). The criterion for determining skill level was achieving at least 70% of the score on basic tests for the high-skill group and less than 30% for the low-skill group.

2.2. Measures

Functional ability was measured using the “Repeated Effort Test” based on the Shepard and Gabbett (2007) protocol. This test included a combination of offensive and defensive jumps, lateral movements, and rapid reactions similar to real volleyball situations, and possessed sufficient sensitivity to differentiate between skilled and less-skilled athletes. The test consisted of four 20-second repetitions

with rest intervals of 4 to 8 seconds, and its pattern was designed in accordance with real game demands.

The Ottawa Mental Skills Assessment Tool (OMSAT-3) was used to evaluate cognitive–psychological skills. The Persian–Arabic version of this questionnaire had previously demonstrated acceptable validity and reliability.

The Competitive State Anxiety Inventory-2 (CSAI-2) was used to measure state anxiety and its related components. This questionnaire includes three subscales: cognitive anxiety, somatic anxiety, and self-confidence.

To create stress-inducing conditions, the virtual comparison method developed by Ehrlenspiel (2006) was used (Ehrlenspiel, 2006). In this method, participants were informed that their performance would be compared with their peers and that results would influence university team selection and monetary rewards. Additionally, experienced volleyball coaches were present in the hall to create a more realistic competitive environment.

2.3. Procedure

In the first step, participants completed an informed consent form and provided demographic information. The trait anxiety test (SCAT) and the OMSAT-3 questionnaire were then completed in a calm and pressure-free environment, after which vertical jump and reaction time for court movement were measured and scored. In the next stage, a baseline skill test consisting of 10 serves and 10 spikes under standard conditions was conducted to determine participants' skill levels.

One week later, the main session was held in the sports hall of the University of Baghdad. To create stressful conditions, the virtual comparison method of Erlenshpill

(2006) was used. In this method, each participant was informed that their performance would be competitively compared with one of their peers, and that achieving a 20% improvement compared to their baseline score (along with improvement by their hypothetical teammate) would result in a bonus score, monetary reward, and athletic points for university team selection. Participants were also told that their hypothetical teammate had already succeeded in improving their score.

Following the induction of psychological pressure, the state anxiety questionnaire was first completed, followed by the OMSAT-3 questionnaire, and then the maximum-effort functional ability test was performed. All performances were recorded and evaluated using video cameras and expert coaches.

2.4. Data Analysis

The collected data were analyzed using SPSS-23 at a significance level of $p < .05$. To examine the main and interaction effects of the independent variables on the dependent variables, a two-factor mixed ANOVA (2×2) was used. Additionally, effect size was calculated for a more precise interpretation of the results.

3. Findings and Results

Before conducting the main analyses, the collected data were examined for normal distribution and homogeneity of variances. The Kolmogorov–Smirnov test confirmed the normality of variable distributions, and Levene's test showed that group variances were homogeneous ($p > .05$). Therefore, the use of a two-factor mixed ANOVA (2×2) was justified.

Table 1

Comparison of Mean (SD) Demographic Components

Variable	Men – High Skill	Men – Low Skill	Women – High Skill	Women – Low Skill
Age (years)	20.10 (1.37)	21.30 (1.23)	21.20 (1.13)	21.12 (1.18)
Height (m)	1.77 (0.02)	1.76 (0.04)	1.61 (0.02)	1.61 (0.03)
Weight (kg)	78.20 (4.28)	78.80 (5.45)	65.00 (2.94)	67.40 (2.67)
Body Mass Index	24.84 (1.01)	25.14 (0.75)	25.06 (0.66)	25.83 (0.48)
Trait Anxiety	17.10 (1.37)	17.00 (1.15)	17.50 (1.50)	16.30 (0.94)

Analysis of the participants' demographic indicators showed that, on average, men were taller (by approximately 16 cm) and heavier (by approximately 13 kg) than women. However, Body Mass Index (BMI) for all groups fell within

the normal range (24.84 to 25.83). Moreover, the mean trait anxiety scores ranged from 16 to 17.5, indicating a moderate level of anxiety across the sample.

Table 2

Comparison of Mean (SD) of the Measured Variables

Variable	Condition	Men – High Skill	Men – Low Skill	Women – High Skill	Women – Low Skill
Vertical Jump (cm)	Baseline	42.53 (1.91)	41.46 (2.51)	36.70 (1.60)	36.85 (1.77)
	Psychological Pressure	40.40 (1.57)	39.30 (2.31)	30.40 (1.83)	30.50 (1.90)
Reaction Time (s)	Baseline	7.10 (0.30)	7.12 (0.27)	8.13 (0.34)	8.20 (0.24)
	Psychological Pressure	7.60 (0.49)	8.44 (0.47)	9.26 (0.57)	9.14 (0.39)
Self-Confidence	Baseline	21.50 (0.08)	21.00 (0.94)	21.90 (0.73)	21.60 (1.26)
	Psychological Pressure	19.50 (3.50)	19.60 (0.84)	19.50 (1.08)	18.40 (1.17)
Commitment	Baseline	21.90 (1.68)	22.70 (2.05)	23.70 (1.33)	23.20 (1.31)
	Psychological Pressure	19.60 (1.71)	19.60 (1.95)	20.70 (3.26)	18.40 (1.07)
Goal Setting	Baseline	21.30 (2.05)	22.40 (1.57)	23.40 (1.07)	22.90 (1.44)
	Psychological Pressure	20.70 (1.82)	21.30 (2.11)	20.50 (1.17)	18.70 (1.41)
Stress Reactivity	Baseline	15.40 (0.84)	15.50 (1.08)	16.10 (0.31)	15.10 (0.73)
	Psychological Pressure	17.30 (0.82)	18.40 (0.84)	19.00 (0.00)	18.60 (0.69)
Relaxation	Baseline	18.80 (1.54)	19.80 (0.78)	20.90 (1.10)	19.70 (0.67)
	Psychological Pressure	16.90 (1.44)	17.00 (0.81)	17.70 (0.82)	15.50 (0.52)
Fear Control	Baseline	19.30 (0.82)	19.60 (0.84)	19.50 (0.84)	19.70 (0.82)
	Psychological Pressure	17.00 (0.66)	16.90 (0.87)	15.50 (0.52)	15.30 (0.82)
Activation	Baseline	19.80 (1.31)	20.40 (1.07)	21.90 (1.37)	21.60 (0.96)
	Psychological Pressure	17.90 (1.10)	17.50 (0.97)	16.20 (1.03)	16.40 (0.69)
Basic Mental Skills	Baseline	64.60 (3.89)	66.10 (3.87)	69.00 (2.21)	67.70 (2.90)
	Psychological Pressure	59.80 (4.66)	60.50 (4.60)	60.70 (3.62)	55.50 (2.67)
Psychomotor Skills	Baseline	73.30 (3.45)	75.30 (2.45)	77.40 (1.77)	76.10 (1.91)
	Psychological Pressure	69.10 (5.03)	69.80 (1.98)	66.40 (1.71)	65.80 (1.61)
Competitive Anxiety	Baseline	48.80 (2.04)	50.90 (1.59)	50.00 (1.41)	49.70 (1.33)
	Psychological Pressure	50.80 (1.98)	52.10 (1.37)	51.60 (1.89)	53.10 (1.10)

Based on the maximum-effort test scores in the vertical jump and reaction time components, for both genders and across skill levels, a comparison of baseline (non-pressure) and psychological pressure conditions shows a decrease in vertical jump height and an increase in reaction time. Basic mental skills and psychomotor skills in both genders, across skill levels, declined under psychological pressure compared

with baseline (non-pressure) conditions, and this decline was more pronounced among women. Furthermore, it was found that under psychological pressure, all participants perceived higher levels of state-competitive anxiety than under baseline conditions, indicating that the pressure manipulation effectively influenced the participants' psychological and mental states.

Table 3

Results of ANOVA Examining the Effects of Gender and Skill Level on the Measured Components Under Psychological Pressure

Variable	Source	Sum of Squares	df	Mean Square	F	p	η^2	Power
Vertical Jump	Gender	883.60	1	883.60	238.45	.000	.86	1.00
	Skill Level	2.50	1	2.50	0.67	.41	.01	.12
	Gender $\times$ Skill Level	3.60	1	3.60	0.97	.33	.02	.16
	Error	133.40	36	3.70				
Reaction Time	Gender	13.88	1	13.88	58.08	.000	.61	1.00
	Skill Level	1.28	1	1.28	5.37	.02	.13	.61
	Gender $\times$ Skill Level	2.28	1	2.28	9.53	.004	.20	.85
	Error	8.60	36	0.23				
Basic Mental Skills	Gender	42.02	1	42.02	2.66	.11	.06	.35
	Skill Level	50.62	1	50.62	3.20	.08	.08	.41
	Gender $\times$ Skill Level	87.02	1	87.02	5.50	.02	.13	.62
	Error	568.70	36	15.79				
Psychomotor Skills	Gender	112.22	1	112.22	22.63	.000	.36	.99
	Skill Level	0.02	1	0.02	0.005	.94	.00	.05
	Gender $\times$ Skill Level	4.22	1	4.22	0.85	.36	.02	.14
	Error	178.50	36	4.95				

The results of the ANOVA indicated that the effect of gender on vertical jump height under stressful conditions was significant ($F = 238.45$, $p < .001$, $\eta^2 = .86$), with men performing better than women. In contrast, the effect of skill level on this index was not significant ($p = .41$), and the interaction between gender and skill level was also non-significant ($p = .33$).

For reaction time, both gender and skill level had significant effects. Men showed faster reaction times compared to women ($F = 58.08$, $p < .001$), and individuals with high skill levels demonstrated faster reactions than those with lower skill levels ($F = 5.37$, $p = .02$). The gender $\times$ skill interaction was also significant ($F = 9.53$, $p = .004$), indicating that skill-related differences were more pronounced in men than in women.

Regarding basic mental skills, the difference between men and women alone was not statistically significant ($p = .11$). The effect of skill level was near the threshold of significance ($p = .08$). However, the interaction between gender and skill level was significant ($F = 5.50$, $p = .02$), showing that high-skilled men demonstrated the highest level of mental readiness under psychological pressure.

For psychomotor skills, the effect of gender was significant, with men outperforming women ($F = 22.63$, $p < .001$). In contrast, no significant differences were observed between skill levels ($p = .94$), and the gender $\times$ skill interaction was also non-significant ($p = .36$).

4. Discussion and Conclusion

The findings of the present study offer important insights into how young volleyball players respond to psychological pressure and how gender and skill level interact to influence both functional and psychological performance outcomes. The results clearly indicated that male athletes demonstrated superior performance in vertical jump outcomes under pressure compared with female athletes, confirming a significant main effect of gender. This aligns with evidence showing that physical attributes such as muscular strength, neuromuscular activation patterns, and anthropometric characteristics often differ between male and female athletes, influencing their capacity to maintain performance under stress (Nemati et al., 2021). In volleyball-specific contexts, physical power is a key determinant of skills such as spiking, blocking, and jumping, and previous studies suggest that adolescent male volleyball players tend to outperform female players on explosive tasks due to developmental differences and training exposures (Dervishi

& Shehu, 2025). These physiological differences may also help explain why males in the current study retained higher vertical jump performance despite heightened anxiety.

However, the non-significant effect of skill level on vertical jump height challenges the assumption that athletes with higher technical proficiency necessarily maintain better performance under stress. Instead, this supports the notion that choking under pressure is not simply a function of technical mastery but can occur regardless of expertise when attentional control is disrupted (Ehrlenspiel, 2006). The absence of a significant skill effect further resonates with findings from precision and coordination sports indicating that pressure may interfere with automaticity even in well-trained athletes, shifting their focus toward conscious monitoring of movements in ways that degrade performance (Gucciardi et al., 2010). The fact that vertical jump height declined for all groups under pressure reflects the central premise of attentional control theory: anxiety consumes working memory resources and limits athletes' ability to execute fast, explosive actions in an automatic manner (Woodman & Hardy, 2003).

The results related to reaction time showed a more complex pattern. Both gender and skill level significantly affected performance, and notably, there was a significant interaction between the two factors. This interaction suggests that high-skilled males demonstrated a more pronounced advantage over low-skilled males compared with the difference observed between high-skilled and low-skilled females. This finding aligns with research demonstrating that skilled athletes tend to have more efficient perceptual-cognitive systems, enabling them to anticipate and respond more quickly during dynamic game scenarios (Sheppard, 2007). Similarly, studies among Chinese collegiate basketball players reveal that individuals with higher self-efficacy and achievement orientation maintain faster reaction times and more stable performance under pressure (Peng & Zhang, 2021). The significant interaction also implies that pressure may amplify or attenuate performance gaps depending on how athletes' psychological skills—such as confidence, attentional control, and activation regulation—develop across gender lines.

The decline in both basic mental skills and psychomotor skills under pressure was evident for all groups, though the decrease was more substantial in female participants. These results underscore the vulnerability of cognitive and emotional processes to pressure among young athletes, particularly females who may have higher sensitivity to

evaluation, competitiveness, or social comparison in sporting environments (Aquilina, 2013). Cultural and contextual factors may play an important role in this variability, as research in sport psychology highlights that gendered expectations, cultural capital, and societal norms influence how male and female athletes interpret stress and cope with competitive demands (Ryba et al., 2013). Research on athletes' mental health further supports the importance of culturally competent approaches in understanding how contexts shape psychological readiness and performance responses (Schinke et al., 2018).

The significant interaction between gender and skill level for basic mental skills suggests that psychological resilience, confidence, and attentional stability may be especially well developed among high-skilled male athletes. Studies on talent development environments indicate that exposure to supportive, holistic, and well-structured training systems fosters stronger psychological resources, particularly in athletes who receive high-quality coaching and performance feedback (Henriksen et al., 2010). Moreover, evidence from systematic reviews on mental skills training in sports and health professions education shows that practice in areas such as goal setting, self-regulation, and emotional control leads to improved stress tolerance and reduced performance deterioration under pressure (Sandars et al., 2022). The current findings for high-skilled males mirror these insights, suggesting that athletes with more advanced mental skillsets may be better equipped to maintain cognitive clarity and emotional stability under stress.

Furthermore, interdisciplinary evidence demonstrates that mental skills training enhances not only performance but also the neurocognitive resilience of athletes. Research on neurofeedback-based interventions in precision sports emphasizes the importance of psychological adaptability in overcoming stress and optimizing performance stability (Corrado et al., 2024). Similar benefits have been found in team sports, where targeted cognitive-psychological programs strengthen the emotional readiness and attentional control required to mitigate choking risks (Piravani et al., 2022). These findings suggest that the reduced psychological readiness observed in low-skilled or female athletes in this study may be tied to underdeveloped mental skills or insufficient exposure to structured psychological training programs.

The universal rise in competitive state anxiety across all groups in pressure conditions further confirms that the experimental manipulation successfully induced stress, which is consistent with theoretical and empirical research

on pressure-induced decrements in performance (Ehrlenspiel, 2006). Studies examining simulated emergency response environments have similarly demonstrated that performance anxiety rises significantly under evaluative conditions, regardless of baseline skill level, but its impact varies depending on the presence of coping mechanisms and mental skills training (Aronson et al., 2022). These parallels highlight the robustness of psychological pressure as a determinant of performance variability.

The overall pattern of results reinforces the complex interplay of physical, cognitive, and cultural factors in shaping performance under psychological pressure. For instance, observed gender differences in both functional and psychological variables are consistent with research identifying developmental disparities in motor and cognitive maturation among youth athletes (Călinescu & Rață, 2022). Moreover, team sport studies show that motivational orientation, self-confidence, and emotional regulation differ across sports, genders, and cultural environments, which may further explain the greater instability observed among young female athletes in the present study (Maurya & Mishra, 2025). In contexts such as Iraq, where opportunities, expectations, and support systems may differ significantly between genders, these disparities may become even more salient.

Finally, research exploring embodied experiences of athletes contends that stress, pain, and identity intersect in shaping how athletes navigate challenging performance conditions (Maria Denise Dourado da et al., 2025). This perspective helps contextualize the psychological vulnerability observed among participants, especially females, as it reflects broader socio-cultural and developmental constraints that influence how athletes internalize pressure and regulate their responses.

Collectively, the findings contribute to a growing literature emphasizing that performance under psychological pressure cannot be understood solely through physiological or technical lenses. Instead, it requires an integrated framework that considers skill level, gender, cultural environment, and psychological competencies. The evidence presented here, aligned with established research across sport psychology, physical performance science, and cultural sport studies, suggests that interventions aimed at enhancing both functional and psychological readiness should be tailored to these multidimensional influences.

This study, despite its contributions, had several limitations. First, the sample size was relatively small, which

may limit the generalizability of the results to broader volleyball populations or to other age groups and competitive levels. Additionally, the study relied on induced psychological pressure in a controlled environment, which may not fully replicate real competitive match conditions where emotional, social, and physiological factors are more complex. Another limitation concerns the homogeneity of the sample, as all participants were university-level athletes from a single cultural context, reducing the potential for wider cross-cultural comparison. Finally, although psychological skills and anxiety were measured, the study did not include qualitative data that could offer deeper insight into athletes' subjective experiences of pressure.

Future research should consider expanding the sample to include athletes from different regions, competitive backgrounds, and cultural environments. Longitudinal designs would also provide valuable insights into how psychological and functional responses to pressure develop over time with training and maturation. Including qualitative interviews or mixed-method approaches could further clarify how athletes perceive and cope with performance pressure. Additionally, future studies could examine the effectiveness of specific mental skills training programs in reducing pressure-induced performance decrements and whether gender-specific interventions yield different outcomes.

Practitioners and coaches should consider integrating structured mental skills training programs into regular volleyball practice sessions to strengthen athletes' psychological resilience. Emphasizing confidence-building, attentional control, and anxiety management may enhance performance stability under pressure. Coaches should also tailor training approaches to account for individual differences in skill level and psychological readiness. Developing supportive, culturally sensitive training environments can further help both male and female athletes build the mental fortitude necessary to avoid choking under pressure.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We hereby thank all individuals for participating and cooperating us in this study.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

References

- Aquilina, D. (2013). The role of cultural capital in sport: A Bourdieusian analysis. *International Review for the Sociology of Sport*, 48(4), 421-437. <https://doi.org/10.1177/1012690212448240>
- Aronson, M., Henderson, T., Dodd, K. W., Cirone, M., Putman, M., Salzman, D. H., Lovell, E., & Williamson, K. (2022). Effects of Brief Mental Skills Training on Emergency Medicine Residents' Stress Response During a Simulated Resuscitation: A Prospective Randomized Trial. *Western Journal of Emergency Medicine*, 23(1), 79-85. <https://doi.org/10.5811/westjem.2021.10.53892>
- Aziz, A., Haryani, E., & Siregar, N. I. (2022). Education psychology and learning performance: does mental skills and mental techniques influences learning performance? A survey study on Indonesian educational institutions. *Revista De Psicología Del Deporte (Journal of Sport Psychology)*, 31(1), 26-39. <https://ibecs.isciii.es/cgi-bin/wxislind.exe/iah/online/?IsisScript=iah/iah.xis&src=google&base=IBECS&lang=e&nextAction=lnk&exprSearch=206013&indexSearch=ID>
- Călinescu, M. L. B., & Rață, G. (2022). Role of Extracurricular Activities in Developing the Motor and Mental Skills of Primary School Students. *Discobolul – Physical Education Sport and Kinetotherapy Journal*, 319-331. <https://doi.org/10.35189/dpeskj.2022.61.3.5>
- Corrado, S., Tosti, B., Mancone, S., Di Libero, T., Rodio, A., Andrade, A., & Diotaiuti, P. (2024). Improving Mental Skills in Precision Sports by Using Neurofeedback Training: A Narrative Review. *Sports (Basel, Switzerland)*, 12(3), 70. <https://doi.org/10.3390/sports12030070>
- Dervishi, R., & Shehu, A. (2025). A Comparative Study Between Genders in Ball Coordination Skills in Children in the Volleyball Discipline. *Innovative Technologies in Sport and*

- Physical Activity, 4(1), 3-7.
<https://doi.org/10.56886/itspa.250603>
- Ehrlenspiel, F. (2006). *Choking under Pressure: Attention and Motor Control in Performance Situations*. Humanwissenschaftlichen Fakultät der universität Potsdam]. https://www.researchgate.net/publication/37367957_Choking_under_pressure_attention_and_motor_control_in_performance_situations
- Gucciardi, D. F., Longbottom, J. L., Jackson, B., & Dimmock, J. A. (2010). Experienced golfers' perspectives on choking under pressure. *Journal of Sport and Exercise Psychology*, 32(1), 61-83. <https://doi.org/10.1123/jsep.32.1.61>
- Henriksen, K., Stambulova, N., & Roessler, K. K. (2010). Holistic approach to athletic talent development environments: A successful sailing milieu. *Psychology of Sport and Exercise*, 11(3), 212-222. <https://doi.org/10.1016/j.psychsport.2009.10.005>
- Lect. Dr. Mahmmad Ali, H., & Hamza, L. A. H. (2024). The Impact of Utilizing Pendulum Training in Enhancing Specific Physical Attributes and Fundamental Skills for Young Football Players. *American Journal Of Social Sciences And Humanity Research*, 4(10), 30-45. <https://doi.org/10.37547/ajsshr/volume04issue10-04>
- Maria Denise Dourado da, S., Bittar, A. J., Sá, N. M. d., & Dulce Maria Filgueira de, A. (2025). Corporeality Marked by Pain: Experiences of Female Sitting Volleyball Players. *Saúde E Sociedade*, 34(1). <https://doi.org/10.1590/s0104-12902025240442en>
- Maurya, M. A. K., & Mishra, M. K. A. (2025). A comparative analysis of sports achievement motivation among football, handball, and volleyball players of Lucknow University. *International Journal of Engineering Technology Research & Management*, 9(5), 1-5. <https://ijobsms.org/index.php/ijobsms/article/view/413>
- Nemati, J., Omidvari, A., Hemmati Far, M., EftekhariFar, F., & Taherizadeh, T. (2021). The effect of a functional training program on skill and physical indices in adolescent female volleyball players. *Journal of Physiology and Sports Management*, 13(3), 211-222. https://www.sportrc.ir/article_147592.html?lang=en
- Peng, F., & Zhang, L.-W. (2021). The Relationship of Competitive Cognitive Anxiety and Motor Performance: Testing the Moderating Effects of Goal Orientations and Self-Efficacy Among Chinese Collegiate Basketball Players. <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2021.685649/full>
- Piravani, A., Mola Norouzi, K., Kashi, A., & Mousavi Sadati, S. K. (2022). Identifying Specific Mental Skills of Elite Players of the Iranian Men's National Under-23 Football Team. *Razi Journal of Medical Sciences (Journal of Iran University of Medical Sciences)*, 29(12), 61-70. <https://rjms.iums.ac.ir/article-1-7554-en.html>
- Ryba, T. V., Stambulova, N. B., Si, G., & Schinke, R. J. (2013). ISSP position stand: Culturally competent research and practice in sport and exercise psychology. *International Journal of Sport and Exercise Psychology*, 11(2), 123-142. <https://doi.org/10.1080/1612197X.2013.779812>
- Sandars, J., Jenkins, L., Church, H., Patel, R., Rumbold, J., Maden, M., & Brown, J. (2022). Applying sport psychology in health professions education: A systematic review of performance mental skills training. *Medical Teacher*, 44(1), 71-78. <https://doi.org/10.1080/0142159X.2021.1966403>
- Schinke, R. J., Stambulova, N. B., Si, G., & Moore, Z. (2018). International society of sport psychology position stand: Athletes' mental health, performance, and development. *International Journal of Sport and Exercise Psychology*, 16(6), 622-639. <https://doi.org/10.1080/1612197X.2017.1295557>
- Sheppard, J. M. (2007). Development of a repeated-effort test for elite men's volleyball. *International Journal of Sports Physiology and Performance*, 2(3), 292-304. <https://doi.org/10.1123/ijsp.2.3.292>
- Thompson, M., & Hilliard, A. (2021). Developing Mental Skills in Youth Athletes. *Strategies*, 34(3), 23-28. <https://doi.org/10.1080/08924562.2021.1896920>
- Woodman, T., & Hardy, L. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: A meta-analysis. *Journal of Sports Sciences*, 21(6), 443-457. <https://doi.org/10.1080/0264041031000101809>
- Zamani Sani, S. H., Eskandarnejad, M., & Jafarzadeh, Z. (2022). The Relationship Between Mental Skills and Sports Performance in Athletes of Team and Individual Sports. The 8th National Conference on Sports Science and Physical Education of Iran, Tehran.