TESIS DOCTORAL

UCAM
UNIVERSIDAD CATÓLICA DE MURCIA

ESCUELA INTERNACIONAL DE DOCTORADO

Programa de Doctorado en Ciencias del Deporte

THE INFLUENCE OF EMOTIONAL STATES ON DANCESPORT PERFORMANCE

Autor/a:

Sara Aliberti

Directores/as:

Prof. Dr. Domenico Cherubini

Prof. Dr. Gaetano Raiola

Murcia, Octubre de 2024

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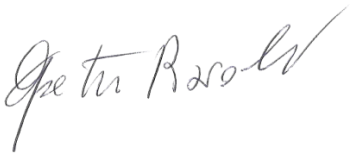
AUTHORIZATION OF THE DIRECTORS OF THE THESIS FOR SUBMISSION

Prof. Dr. Domenico Cherubini and Prof. Dr. Gaetano Raiola as Directors of the Doctoral Thesis "The Influence of Emotional States on Dancesport Performance" by Dr. Sara Aliberti in the Programa de Doctorado en Ciencias del Deporte, **authorize for submission** since it has the conditions necessary for its defense.

Lo que firmo, para dar cumplimiento al Real Decreto 99/2011 de 28 de enero, en Murcia a 26 Julio de 2024.



Domenico Cherubini

Gaetano Raiola

(1) Si la Tesis está dirigida por más de un Director tienen que constar y firmar ambos

RESUMEN

El baile deportivo competitivo (DS) es un fenómeno multifactorial influenciado por factores físicos y mentales. Las emociones experimentadas por los atletas durante la competencia están fuertemente vinculadas a su rendimiento deportivo. Las horas previas a la competencia se caracterizan por un aumento gradual tanto de emociones positivas como negativas. El control de estas emociones ayuda a los atletas a optimizar su rendimiento, ya que necesitan interpretar coreografías de competencia además de ejecutar los aspectos técnicos. Sin embargo, hasta donde sabemos, no existen estudios que hayan investigado la relación directa entre el rendimiento y los estados emocionales en DS. Los objetivos fueron cuatro: (I) investigar la influencia de la ansiedad y la autoconfianza en el rendimiento en DS; (II) examinar la influencia de los años de experiencia y la percepción de preparación sobre los resultados del rendimiento; (III) identificar los niveles óptimos de estado emocional para un rendimiento máximo; y (IV) investigar las diferencias entre distintos niveles y clases de atletas.

El diseño del estudio fue observacional. Participaron 71 atletas italianos de DS divididos en tres grupos (22 de clase B, 25 de clase C y 24 de clase D). Durante una competencia local, los participantes completaron un cuestionario en formato de papel dividido en dos secciones: la primera estaba destinada a recopilar información demográfica de los participantes, incluyendo su experiencia en el campo de DS, su percepción de preparación y victorias previas en la clase actual, mientras que la segunda sección incluía la versión italiana del Inventario Revisado de Ansiedad Competitiva Estado-2 (CSAI-2R). Para evaluar el rendimiento de los atletas, se tomó en cuenta la clasificación final de la competencia.

Los resultados mostraron que tanto las variables generales como relativas del CSAI-2R predijeron de manera significativa los resultados de rendimiento ($p<.05$), aunque la ansiedad somática lo hizo en menor medida. Surgieron diferencias significativas entre atletas de diferentes clases en términos de años de experiencia ($p=.000$), percepción de preparación ($p=.000$), ansiedad cognitiva ($p=.000$) y autoconfianza ($p=.000$). Los niveles óptimos para un buen rendimiento fueron

ansiedad cognitiva (11.61 ± 2.27), ansiedad somática (15.77 ± 1.72) y autoconfianza (15.12 ± 2.56).

Este estudio confirmó la importancia de los estados emocionales precompetitivos, en particular la ansiedad y la autoconfianza, en la influencia del rendimiento deportivo en los atletas de DS. Estos hallazgos subrayan la necesidad de intervenciones específicas para ayudar a los atletas de DS a manejar eficazmente la ansiedad cognitiva y somática, al mismo tiempo que se fomenta la autoconfianza. Las aplicaciones prácticas incluyen el entrenamiento psicológico para promover el control emocional y la preparación precompetitiva, lo cual puede contribuir a maximizar el rendimiento, especialmente en niveles competitivos avanzados. En general, este estudio contribuye a la comprensión emergente de los factores emocionales que impactan el rendimiento en DS y ofrece ideas para aplicaciones prácticas en la psicología del deporte, reforzando el valor del entrenamiento emocional para mejorar la resiliencia y los resultados de rendimiento de los atletas. Este trabajo de doctorado fue aceptado para su publicación en «Sports», una revista de alto impacto situada en el primer cuartil de las Ciencias del Deporte (Apéndice 3).

PALABRAS CLAVE

Gestión; estados emocionales; ansiedad; autoconfianza bailarines

TÉRMINOS TESAURO

Procesos perceptuales; evaluación del rendimiento

ABSTRACT

Competitive dancesport (DS) performance is a multifactorial phenomenon influenced by physical and mental factors. The emotions experienced by athletes in competition were strongly linked to their sports performance. The hours before the competition were characterized by a gradual increase in both positive and negative emotions. Their control helped athletes to optimize their performance, as they needed to interpret competition choreographies in addition to executing technical aspects. However, to our knowledge, no studies have investigated the direct relationship between performance and emotional states in DS. The aims were four: (I) to investigate the influence of anxiety and self-confidence on DS performance; (II) to examine the influence of years of experience and perceived preparedness on performance outcomes; (III) to identify the optimal emotional state levels for peak performance and (IV) to investigate differences among different athletes' level and class.

The design of the study was observational. Participants were 71 Italian DS athletes divided into three groups (22 B-class, 25 C-class, 24 D-class). During a local competition day, participants completed a questionnaire in a paper form divided into two sections: the first aimed to know demographic information of participants, including their experience in DS field, perceived preparedness and previous winnings in the current class, while the second section included the Italian version of the Revised Competitive State Anxiety Inventory-2 (CSAI-2R). To assess athletes' performance, the final classification of the competition was taken into consideration.

The results showed that both overall and relative variables from the CSAI-2R significantly predicted performance outcomes ($p<.05$), although somatic anxiety did so to a lesser extent. Significant differences emerged among athletes of different classes in terms of years of experience ($p=.000$), perceived preparedness ($p=.000$), cognitive anxiety ($p=.000$) and self-confidence ($p=.000$). The optimal levels for good performance were cognitive anxiety (11.61 ± 2.27), somatic anxiety (15.77 ± 1.72) and self-confidence (15.12 ± 2.56).

This study confirmed the importance of pre-competitive emotional states, particularly anxiety and self-confidence, in influencing athletic performance in DS athletes. These findings underscore the need for targeted interventions to help DS athletes manage cognitive and somatic anxiety effectively while enhancing self-confidence. Practical applications include psychological training to foster emotional control and pre-competitive preparation, which may contribute to maximizing performance, par-ticularly at advanced competitive levels. Overall, this study contributes to the emerging understanding of the emotional factors impacting DS performance and offers insights for practical applications in sports psychology, reinforcing the value of emotional training in enhancing athlete resilience and performance outcomes. This doctoral work was accepted for publication in 'Sports', a high-impact journal in the first quartile in Sports Science (Appendix 3).

KEYWORDS

Managing; emotional states; anxiety; self-confidence; dancers.

TESAURO TERMS

Perceptual processes; performance assessment.

ACKNOWLEDGEMENTS

Becoming a champion in competitive DS requires not only physical and technical skills but also a multidisciplinary approach involving several professionals. First, an experienced coach and technician, who can effectively teach the techniques of the discipline and design customised choreographies to highlight the athlete's best qualities. A sports psychologist is essential to provide support during high-pressure moments and help manage stress and concentration. A good nutritionist is needed to offer a proper dietary plan to ensure adequate energy intake and optimal physical fitness. A proficient physiotherapist is crucial for preventing and treating potential muscle or joint injuries and maintaining the athlete's health and optimal condition for performance. Lastly, but equally important, is the emotional and practical support from the family. Family support is fundamental in providing encouragement, facing challenges, and celebrating successes along the journey to victory.

Similarly, the completion of my doctoral thesis required a multidisciplinary approach and the support of a dedicated network of professionals. During the three intense years of research, I had the privilege of being guided by two exceptional tutors, Prof. Dr. Domenico Cherubini from the Catholic University of San Antonio in Murcia, and Prof. Dr. Gaetano Raiola from the University of Pegaso. Their support and guidance throughout the process were invaluable. Their expertise and knowledge in the Sport Sciences field significantly contributed to my professional growth and the realization of my work. Additionally, I would like to thank Prof. Dr. Francesca D'Elia, with whom I had the opportunity to collaborate during my international stay (Appendix 1) at University of Salerno. The three months spent at her institution were a period of personal and professional growth, enriched by her guidance and support. Their commitment and dedication made the completion of this significant academic milestone possible.

Beyond professional support, I wish to express my deep gratitude to my family for their constant emotional and moral support throughout my doctoral

journey. Without their encouragement and understanding, this journey would have been much more difficult. Furthermore, I would like to extend heartfelt thanks to Maria Luigia Salvatori, my colleague and companion throughout the doctoral process. Our collaboration was invaluable, and our mutual support was fundamental in overcoming obstacles and celebrating successes along the way. Her dedication, wisdom, and team spirit enriched my experience and made this journey even more meaningful.

Finally, I would like to conclude this special acknowledgment by expressing sincere appreciation to all the athletes who voluntarily participated in my research. Their involvement and dedication significantly contributed to the quality and validity of the results obtained. Their commitment and willingness to share their experiences enriched my work and contributed to the advancement of knowledge in competitive dance field.

Heartfelt thanks to everyone.

“The greatest achievement is to outperform yourself.” **Denis Waitley**

INDEX

ABBREVIATIONS

B, Intermediate competitors

C, Beginner competitors

D, Promotional level competitors

DS, Dancesport

HP, High Performance

IZOF, Individual Zones of Optimal Functioning

LP, Low Performance

INDEX OF FIGURES

INDEX OF TABLES

INDEX OF APPENDIX

I – INTRODUCTION

I - INTRODUCTION

1.1. DANCESPORT PERFORMANCE: AN OVERVIEW

DS is a competitive ballroom discipline, that requires a high level of coordination along with a foundation of endurance for rapid strength (Ljubojević et al., 2020). It demands considerable muscular effort, significant engagement of the neuro-sensory system, and the execution of complex and precise movements. Within DS, there are five standard dances: waltz, tango, slow fox, Viennese waltz and quickstep, performed in couples, and five Latin dances: samba, cha-cha, rumba, paso doble, jive, which can be performed individually, in pairs, or in formations. Performance was assessed by a panel of judges, according to technical and artistic parameters. The fundamental elements for evaluating performance in the Latin American style of DS include the following aspects:

- Timing. Timing refers to the dancer's ability to perfectly synchronize movements with the rhythm of the music. In a high-level performance, the dancer must be able to adjust the speed and intensity of the steps according to rhythmic variations in the music, demonstrating a deep connection with the tempo and dynamic shifts of the song.

- Technique. Technique is a complex neuromotor process, involving the ability to execute dance steps accurately according to the standards set by professionals in the field. Good technique requires body control, balance, precision in movements, and familiarity with the specific syllabus of the discipline. Athletes must have mastery of technical foundations to perform movements consistently and in harmony with the dance style.

- Rhythmic Interpretation / Musicality / Expression. These aspects refer to the dancer's ability to interpret choreography in sync with musical changes. Rhythmic interpretation goes beyond mere technical

execution, requiring dancers to "feel" the music and convey its emotions through expressive and engaging movements. Musicality and expression add depth to the performance, making the dance more artistic and communicative.

- Posture / Shape. Posture and shape are essential for creating harmonious lines and maintaining an elegant visual presence on stage. Good posture allows the dancer to move with fluidity and control, avoiding abrupt or disjointed movements. Shape also reflects attention to detail in executing figures and contributes to a visually appealing performance.

- Floor Craft. Floor craft refers to the ability to manage one's space and choreography on the dance floor, especially in competitions where performances are conducted alongside other dancers. Dancers must be able to navigate the space, avoiding collisions and adapting their movements and the direction of their choreography to respect the flow of the dance and the positions of other competitors.

- Choreography / Characterization. This aspect concerns the dancer's ability to correctly perform choreographies prepared in training and to interpret them appropriately according to the required dance style. Choreography must be executed accurately, without mistakes in steps or transitions, and with a characterization that reflects the spirit and character of the Latin American style, which can range from the passion of the cha-cha to the sensuality of the rumba.

- Presentation. Presentation refers to the overall aesthetic quality and elegance with which the dancer enters and exits the dance floor. The athlete must be visually harmonious, with a polished look and appropriate style, able to capture the audience's attention. Good presentation is also important during non-performance moments, such as entering and exiting the stage, as it contributes to creating a lasting impression of professionalism and grace.

The performance duration of each dance is approximately 1.20 min. However, when there are many participants in the same class and category, the athletes are divided into batteries and must go through several rounds to reach the finals and finish in the top 6/7. In the first stages of the competition, judges tend to assess the basic requirements, including correct posture, basic technical skills, timing, movement fluid applied to the dance figures. As the athletes go through the rounds, the evaluation is increasingly accurate and focuses on the accuracy of the execution from a technical and artistic point of view and the highlighting of the character of each dance style, until rewarding those who combine all the previous elements (Montero, 2012).

We can summarize, stating that DS performance was influenced by many factors such as technical ability, physiological and psychological factors (Cackovic et al., 2012). Given the dual nature of such sports-arts discipline, it was important to be prepared both physically and mentally (Sofron & Țifrea, 2022). The training for the acquisition of technique and tactics aims at the automated control of motor skills and the ability to adapt movements according to the context. The training of physiological factors includes good aerobic capacity, rapid strength, elastic-reactive strength, and strength endurance. Psychological factors include the ability to manage emotions, an aspect that is often overlooked.

Each dance requires distinct techniques and interpretations. A key skill is the ability to seamlessly link and harmonize intricate dance figures, while giving a personal interpretation defined by rhythm, coordination, strength, balance, agility, precision, and posture. Therefore, the ideal DS dancer combines technical excellence with artistic performance (Diosalan, 2023). The peculiarity of this sport and other aesthetical ones is that when the athlete performs, he must convey a series of emotions to the judges, to overcome the other competitors.

At psychological level, competition is a situation that tends to produce anxiety and stress, characterized by an increased arousal (Jarvis, 2006). The peculiarity of this sport and other aesthetical ones, is that when the athlete performs, he has to convey a series of emotions to the judges, in order to overcome the other competitors. As a result, the athlete's mental state before and during competition affects performance quality (Koral & Dosseville, 2009). Some criteria necessary for a good performance (Ermolaeva, 2015) can be:

- Resistance to Interference. This refers to the dancer's ability to maintain focus and composure despite external distractions or unexpected events. High resistance to interference allows performers to stay fully engaged with their routine, minimizing the impact of environmental or psychological disruptions.

- Work Efficiency. Efficiency in performance means executing movements precisely and effortlessly, conserving energy, and managing physical resources optimally. Efficient dancers can sustain high-quality performance over time, showing consistency in technique and timing without signs of fatigue.

- Self-Confidence. Self-confidence is a crucial psychological component, enabling dancers to perform assertively and with clarity. Confidence helps dancers communicate the emotion and character of the dance style, making their performance more convincing and compelling.

- Lack of Hesitation. This criterion involves the dancer's ability to make decisions quickly and execute movements with decisiveness. A lack of hesitation indicates full mastery of the choreography and mental clarity, which translates into smooth and assured execution during the performance.

The emotions perceived by athletes during competition can significantly influence the outcome of sport performance, as they can support the sport action or block it (Jones, 2003). The ability to monitor one's emotions is very important in competition. Very often athletes who experience defeat, lose self-confidence and stop playing sports, especially when beaten by objectively weaker athletes. In addition, athletes who perform well in training fail to reach peak performance in competition. According to Gustafsson & Skoog (2012) in competition we can have two types of athletes:

- Athletes with a high level of emotional arousal, which can negatively affect the execution of performance, leading them to make mistakes especially during the execution of technique, a fundamental parameter of the judge's assessment.

- Athletes with low level of anxiety, indicating a protective factor that does not allow them to express their full potential.

Ermolaeva (2015) showed that we need to focus not only on dancers with high level of anxiety, but also on those who show excessive calm, with low anxiety. For the first type, it is necessary to build confidence in success and in their own abilities. For the second one it's important stimulate their activity, interest and develop a sense of responsibility. Emotional resilience is a key characteristic for successfully facing adversity, better managing pressures and stress and achieving the peak performance.

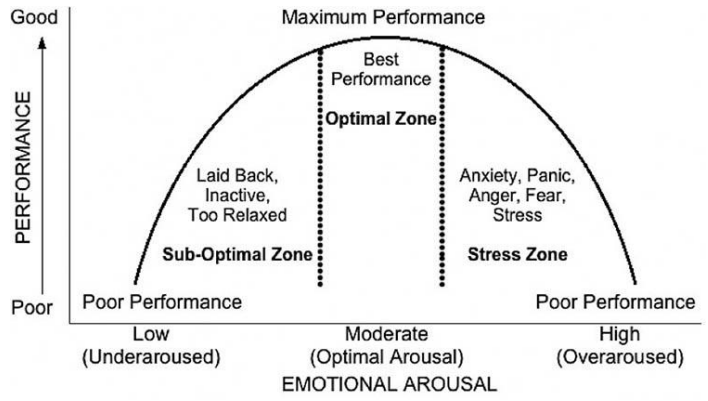
1.2. THEORIES ON THE RELATIONSHIP BETWEEN EMOTIONS AND SPORT PERFORMANCE

In terms of psychological level, competition is a situation that tends to produce anxiety and stress, characterized by an increased arousal (Jarvis, 2006). Anxiety is a natural reaction to a perceived threats or stress that leads to fight, flight, or freeze response. Sports psychologists generally differentiate trait anxiety, which refers to a more stable aspect of personality and state anxiety, related to feelings linked to a particular situation (Leal et al., 2017). Several theories explained the relationship between emotional states and performance. In the past, arousal and anxiety were seen as negative aspects of performance. Subsequently, some theories have been developed that emotional states affect performance differently.

1.2.1. The Yerkes-Dodson law

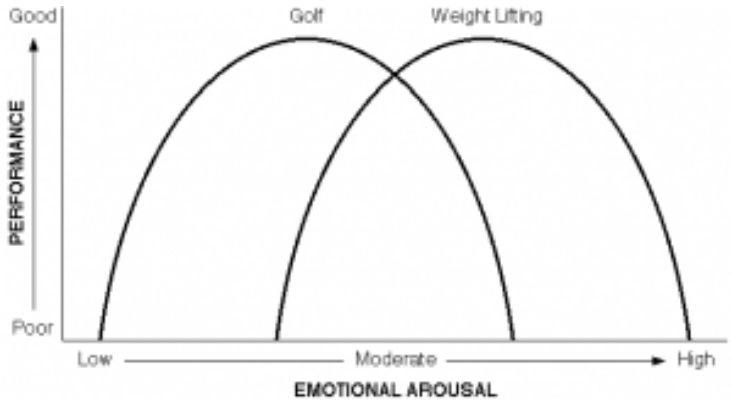
The Yerkes-Dodson law (1908) described the empirical relationship between stress and performance, that could be represented as an inverted U-shaped curve. The left side of the curve represented low arousal, while the right one high arousal. In the middle there was a medium level of arousal. The vertical line on the left side went from weak performance (bottom) to maximum performance (top). The optimal state of arousal and performance was achieved in the middle of the curve. This meant that sufficient stress was necessary to provide motivation, yet not so excessive as to overwhelm an individual.

Figure 1. The Yerkes-Dodson Law of Arousal and Performance. Available from: https://stefanoricchiuti.it/arousal-e-performance/



A second variable to consider was the type of performance. For fine tasks, a high level of arousal was not required, unlike those requiring a higher load, as in DS. A detailed description is depicted in Figure 2.

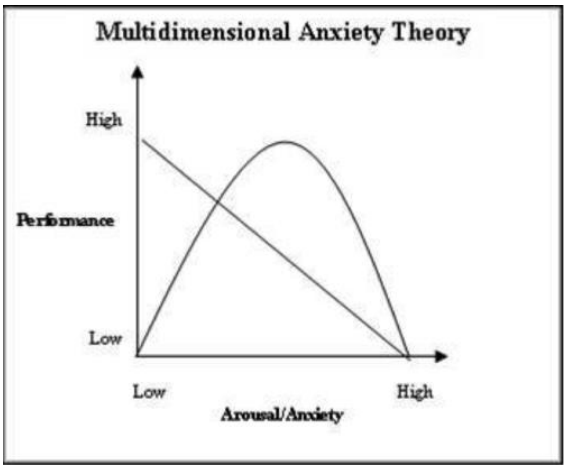
Figure 2. Representation of the athlete-specific activation-performance relationship. Available from: https://massimilianostocchi.it/ansia-pre-gara-e-prestazione-sportiva/#Modello_della_Catastrofe



1.2.2. The Multidimensional theory

Another theory said that anxiety was multidimensional (Martens et al., 1990) and contained two elements that affected performance differently: cognitive and somatic. Cognitive anxiety was represented by thoughts about performance, negative worries, and perceptions, as well as destabilizing images that led the athlete to approach competition with low self-esteem and a reduced sense of self-efficacy. Somatic anxiety, on the other hand, was represented by bodily signs such as accelerated heart rate, sweating, muscle weakness or stiffness, and shortness of breath. It typically emerged and accompanied the onset of the competition but tended to naturally dissipate over time. A detailed description is depicted in Figure 3.

Figure 3. Multidimensional anxiety theory. Available from: https://quizlet.com/100208279/chapter-8-alternative-to-inverted-u-theory-flash-cards/

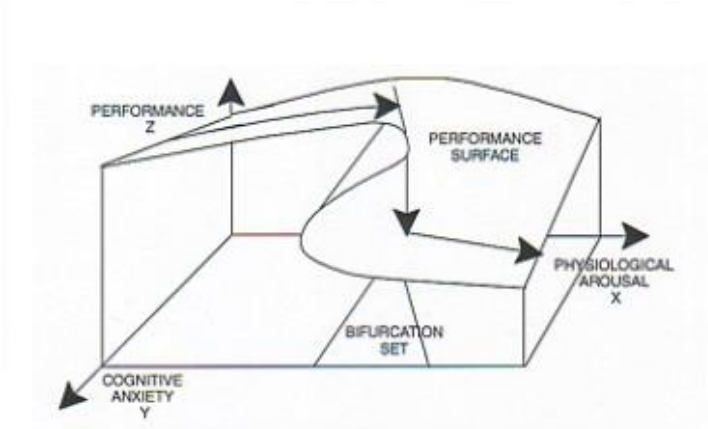


1.2.3. The Catastrophe Model

The Catastrophe Model (Hardy & Fazey, 1987; Hardy & Parfitt, 1991) offers an alternative to the inverted-U theory in describing how anxiety and physiological activation affect performance. According to this model, the interaction between cognitive and somatic anxiety is complex. With low levels of cognitive anxiety, the relationship between somatic anxiety and performance resembles an inverted U. However, once a certain level of cognitive anxiety is exceeded, there is a sharp decrease in performance, described as "catastrophic." The model suggests that

cognitive anxiety can enhance performance as long as physiological activation remains moderate. Experiments conducted to validate the model have varied levels of cognitive anxiety and physiological activation, showing that a simultaneous increase can lead to a drastic collapse in athletic performance. However, there are limitations in applying the model, such as the difficulty in recruiting athletes who have already experienced a catastrophic collapse and challenges in accurately measuring athletes' anxiety levels. However, less informations are avaible on this theory. A detailed description is depicted in Figure 4.

Figure 4. Catastrophe model. Available from: https://massimilianostocchi.it/ansia-pre-gara-e-prestazione-sportiva/



1.2.4. The Individual Zone of Optimal Functioning (IZOF)

Hanin (2000), after many research studies, concludes that athletes are very different from each other, identifying the Individual Zone of Optimal Functioning (IZOF), a zone in which the level of anxiety becomes optimal for performance The IZOF model, created in the 1970s by psychologist Juri Hanin, is a specific approach in the study of sport that examines how emotional experiences influence success in sporting activities (Ruiz et al., 2017). The IZOF model posits that an athlete performs best when their pre-event anxiety levels fall within or near their individually defined optimal zone. Performance tends to deteriorate when anxiety strays from this zone. Additionally, the model proposes that seasoned athletes have the awareness and ability to precisely remember and predict their pre-event

anxiety levels (Jokela & Hanin, 1999). The IZOF considers the importance of multidimensionality, including somatic anxiety, cognitive anxiety, and self-confidence, unlike previous simplistic and unidimensional theories. Each athlete experienced several emotions; consequently, the athlete must learn to know its optimal and non-optimal zones for achieving performance (Ruiz et al., 2017).

1.3. THE IMPORTANCE OF MOTIVATION IN THE SPORTS CONTEXT

Another aspect to consider is the athlete's motivation. According to the Theory of Motivation developed by Zajonc (1965), if an athlete is adequately prepared, then their desire to compete will help them perform well when stimulated. Therefore, years of experience could influence how athletes manage their emotional states. For a person who decides to compete, a very important role is played by motivation. One of the most important theories to explain the relationship between competition and motivation is the self-determination theory (Deci & Ryan, 2012), that argues that human behavior is motivated by three primary psychological needs: autonomy, competence, and relationship with others. In self-determination theory, we can find different kind of motivation, the main distinction of which includes extrinsic and intrinsic motivation, that differ according to personal goals ans reasons.

1.3.1. Intrinsic motivation

Intrinsic motivation refers to when people participate in activities on their own initiative, simply for the pleasure of the activity itself, without external pressure, consequently satisfying their autonomy. In fact, different people decide to play a sport or compete because of the positive experiences associated with that particular activity and the improvement of their skills (Frederick-Recascino et al., 2003). Another kind of (intrinsic) motivation is identified motivation, which occurs when a person decides to practice an activity because they consider it congruent with their values and appreciate its value as it contributes to their own development. This type of motivation is also called autonomous (Van der Kaap-Deeder et al., 2016).

1.3.2. Extrinsic motivation

On the other hand, when people are not free to choose, it means that there is another type of motivation, namely extrinsic motivation, which can be introjected or integrated. Introjected motivation is when a person decides to engage in an activity to avoid feeling guilty or to nurture their self-esteem. The integrated regulation is when a person understands the importance of practicing a certain activity, which is very close to intrinsic motivation, but since it acts to achieve other typesof outcomes, it is classified as extrinsic.

1.3.3. A-motivation

At the extreme end, we finally find amotivation, which is when a person's behavior lacks intentionality and a sense of personal causality (Ryan, 1995). Amotivation does not value the activity practiced, as it is performed simply out of demand from an external party or to obtain a reward. According to a recent study (Aliberti, 2022) there was a difference in motivation among competitive and non competitive atheltes. Specifically, competitive dancers showed high levels of internal regulation, integrated regulation, identified regulation, a medium level of introjected regulation and external regulation, and a very low level of amotivation.

1.4. THE INFLUENCE OF EMOTIONAL STATES ON DS PERFORMANCE: A SYSTEMATIC REVIEW

Competitive performance is influenced by many factors such as technical ability, physiological and psychological factors (Čačković et al., 2012a). In terms of psychological level, competition is a situation that tends to produce anxiety and stress, characterized by an increased arousal (Jarvis, 2006). Psychological states pre-competition seems to be an important factor to determine a successful performance (Sanchez et al., 2010). The emotional states experienced by the athlete before and during competition are strongly correlated with sports performance (McCarthy, 2011). The hours preceding a competition are characterized by multiple sensations united by their gradual increase of intensity, as the start of the competition approaches. All emotions, both positive and negative, release energy and can influence the sport actions (Martinent et al., 2013). Having a certain level of activation, helps the athlete to reach his maximum potential. Differently, high levels of activation can lead the athlete to overdoing, while low levels indicate a protective factor or little commitment by athlete that does not lead him to properly activate the body and its functions (Gustafsson & Skoog, 2012).

Determined levels of anxiety and arousal, as well as self-confidence, can positively influence competitive sports performance (Craft et al., 2003). A study performed by Bejek & Hagtvet (1996), conducted on gymnastics, another aesthetical sport, showed that female athletes with high performance had high self-confidence, which was positively correlated with pre-competitive anxiety in a national level competition. Thus, self-confidence has been found to be a significant predictor of performance (Tsopani et al., 2011), but also a certain level of anxiety is necessary. Achieving the state of flow, (being completely immersed in what you are doing) accompanied by peak performance, would be ideal. To achieve these conditions, mental training becomes essential.

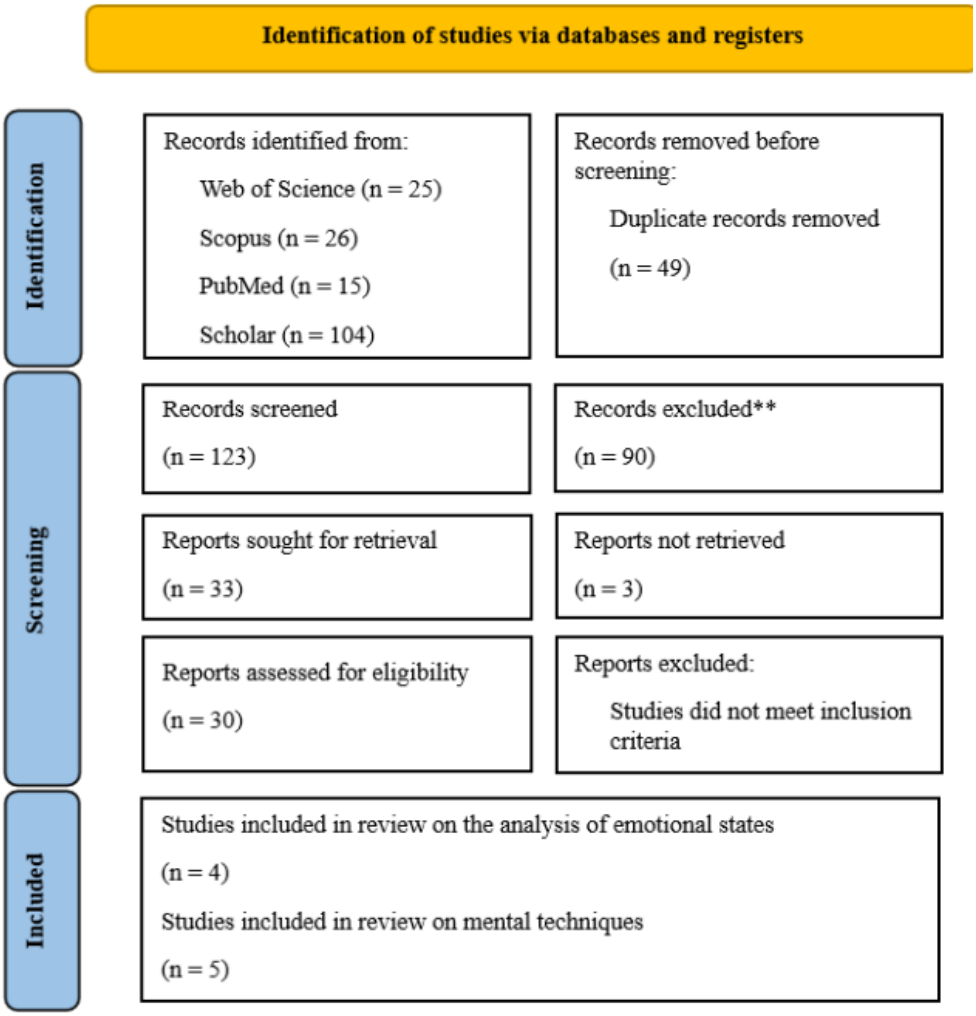
The ability to monitor one's emotions is very important in competition. Very often athletes who experience defeat, lose self-confidence, and stop playing sports, especially when beaten by objectively weaker athletes. In addition, athletes who perform well in training fail to reach peak performance in competition. The

peculiarity of DS and other aesthetical ones is that when the athlete performs, he must convey a series of emotions to the judges, to overcome the other competitors. The general components assessed by judges were technical quality, choreography, image, and show (Federazione Italiana Danza Sportiva, 2015). These last two included the ability to communicate with the audience and the judges, to create a good atmosphere and to show own personal style (Prelević, 2017).

A systematic review conducted by Aliberti et al. (2023) summarized the main studies examining the influence of emotional states on DS performance and the most mental techniques used to improve psychological preparation to face the competition. The PRISMA 2020 guidelines for systematic reviews was followed, used Web of Science, Pubmed, Scholar and Scopus as databases, to collect the articles. The following string applied were: "dancesport" AND "psychology", "dancesport" AND "anxiety", "dancesport" AND "emotions", "dancesport" AND "perfomance" AND "mental state", "dancesport" AND "stress", "dancesport" and "competitive states", dancesport" AND "mental technique".

The screening of the articles was performed following three phases: reading the title, the abstract and the full text, as reported in **Figure 5.**

Figure 5. Literature search strategy process step by step.



1.4.1. The most common emotional state experienced by DS athletes

In Table 1 an overview of the study characteristics focused on the role of emotional states on DS performance (authors, aim, sample, methods, results and suggestions for future studies) was presented.

Table 1. Psychological parameters that affect DS performance during competition.

Authors	Aim	Sample	Methods	Results	Suggestions
Andreeva & Karanauskienė (2017)	To analyze pre-competition emotional state of DSa	31 HL DSa (F = 14; M = 13)	Qualitative study. Tools: interviews and observation	Emotional state can influence performance. The most experienced was anxiety, followed by arousal, stress, self-confidence, concentration. Precompetitive states can be + (experienced by HL DSa) and -. Physical and mental technique are used to manage athletes' emotions	Low information is available on the emotional states of LL DSa
Čačković et al. (2012a)	To explain the background of the stress caused by competitions and the sources of psychological pressure, as well as the most frequent errors in preparing for the competition which can enhance the DsA perception of stress	N.A.	Theoretical analysis	DSa must cope with many stress factors that can be changeable, unchangeable, internal and external	Psychological preparation is necessary to help DSa to achieve the maximum potential on cd

Ermolaeva (2015)	To examine the personality characteristics of DSa, affecting their emotional stability	32 HL DSa (12-14 yd)	Descriptive study. Tools: SQ	State anxiety level ↑ bc (54.5±0.8)	More focus not only to DSa with HL of anxiety, but also to DSa with LL of anxiety
Pakulanon & Poomsalood (2012)	To investigate physiological and psychological states that responded to competition in DSa.	18 HL/LL DSa (F=9; M=9; 15.30±1.94 yd)	Descriptive study. Tools: Thai version of CSAI-2R, cortisol and alpha-amylase analysis, assessed dc, 1 week bc and 7-week bc.	1-week bc: ↑ somatic anxiety, cognitive anxiety, and ↓ self-confidence compared to 7-week bc ($p<.05$); ↑ salivary cortisol and salivary alpha-amylase compared to 7-week bc ($p>.05$). Cd: ↓cognitive anxiety ($p<.05$) compared to other 2 time points, ↓somatic anxiety, salivary alpha-amylase, ↑ self-confidence, salivary cortisol	DSa should be trained to reduce stress and anxiety especially 1-week bc. M and F should be separated

Note: bc, before competition; cd, competition day; DSa, DS athletes; F, female; HL, high level; LL, low level; M, male; N.A., not applicable; SQ, Spielberg questionnaire; yd, years old; +, positive; -, negative; ↑, increase; ↓, decrease.

The emotional state experienced by DS athletes were anxiety, arousal, stress, self-confidence, and concentration (Andreeva & Karanauskienė, 2017). High-level athletes interviewed in this study perceived both positive and negative emotions during competition. To overcome the negative pre-competition emotional state, such as anxiety, fear, shortening of breath, many athletes are used to listening to music, breathing exercises, enjoying with friends, or using psychological techniques such as concentrating on the performance or trying to divert the attention from the competition in general. Emotional states seemed to be influenced by years of experience: high-level athletes perceived more positive motivational states, compared to athletes with less experience (Andreeva & Karanauskienė, 2017). The type of event attended could also influence the type of emotional state (Cox, 2002). Anxiety was the most frequently identified in this systematic review. Anxiety is a natural reaction to perceived threats that leads to fights, flight or freeze response. Having a certain level of anxiety is a natural and necessary peculiarity of

an active personality. Without it, it is impossible to mobilize all body systems to achieve high sports results. However, increased anxiety level can cause negative feelings. In fact, Ermolaeva (2015) said that we could pay attention not only to the dancers with a high level of anxiety, but also to those notably showing excessive calmness. The most investigated moment was the pre-competitive state, i.e., the hours preceding the start of the competition. The main parameters identified were cognitive anxiety, somatic anxiety, and self-confidence (Vodičar et al., 2012) which are part of the multidimensional theory (Martens et al., 1990). This theory argues that anxiety contains two elements that affect performance differently: cognitive and somatic. Cognitive anxiety is represented by thoughts about performance and negative worries that lead the athlete to face competition with low self-esteem and low sense of self-efficacy. Somatic anxiety, on the other hand, is represented by bodily signs such as accelerated heart rate, breath shortness, sweating, muscle weakness or stiffness. There are others lots of theories that explain the relationship between anxiety and performance, but these have fallen into disuse because of the complexity of the phenomenon (Bali, 2015). Future research is needed to understand the relationship between the kind of anxiety and performance outcome. According to Ermolaeva (2015) state anxiety pre-competition, related to feelings linked to a particular situation, increased significantly, respect to trait anxiety, which refers to a more stable aspect of personality. Pakulanon & Poomsalood's (2012) showed that 1-week before the competition, athletes had a high level of cognitive and somatic anxiety and a lower level of self-confidence. Later, on competition day, the level of cognitive anxiety decreased to the optimal level while the level of self-confidence increased. A high level of self-confidence had a positive effect on performance and consequently on the outcome of performance (Hanton et al., 2004). Thus, 1-week before competition was a stressful period in which anxiety increased and self-confidence decreased. Coaches should work in preparing athletes psychologically, taking into consideration the results that emerged. As a result, the athlete's mental state before and during competition can affect performance quality (Koral & Dosseville, 2009). Finally, another meaningful psychological parameter is stress (Čačković et al., 2012a) caused by many factors that can be changeable, unchangeable, internal, and external. However, in aesthetical sports the effect of competing contextual factors needs to be better explored (Silva et al., 2020).

1.4.2. The most technique used to improve psychological preparation

In Table 2 an overview on the studied focused on specific technique to improve mental states in DS athletes was presented.

Table 2. Psychological technique to improve DS performance in competition.

Authors	Aim	Sample	Methods	Results	Suggestions
Čačković et al. (2012b)	To explain The Nine Step Connection Model	N.A.	Theoretical analysis	This technique can be useful to reduce stress levels	EXP study is necessary to verify the effects on this model on performance
Peris-Delcampo et al. (2017)	To examine the effects of the Cantón's Giraffe motivational coaching model	1F HL DSa (20 yd)	EXP study on Cantón's Giraffe method. Tools: RPWS, RSEQ, MFA	Improvement in self-acceptance, self-esteem, and motivational force	Increase this type of studies and the sample size
Raymond et al. (2005)	Effects of neurofeedback on DS performance	24 DSa (20.54 ± 2.38)	EXP study with 3 groups: 1) NF 2) HRV BIO 3) CON Tools: performance assessment	NF and HRV BIO improve performance	Increase the sample size and measure pre-competition anxiety
Riederová (2018)	To explore the influence of motivational self-talk on performance	28 HL DSa (29 ± 11.7)	EXP study using EXP and CON group. Tools: STAI, AMI, SES, survey, performance assessment	No difference was found	Further research is needed. Despite the non-significant result, the trend suggests a positive effect of intervention

Tay et al. (2019)	To verify if mental contrasting was a predictor of high performance	134 HL DSa (22.26 ± 5.52 yd)	Descriptive study. Division in 2 groups: HL and LL athletes. Tool: questionnaire, judges assessment	High use of spontaneous mental contrast is a predictor of successful performance	Using mental contrast as a training routine

Note: AMI, Achievement Motivation Inventory; BIO, biofeedback; CON, control group; DSa, dancesport athletes; EXP, experimental; F, female; HL, high level; MFA, ad-hoc instrument for the motivational force assessment; N.A., not applicable; NF, neurofeedback; RPWS, Ryff Psychological Wellbeing Scales; RSEQ, Rosenberg Self-Esteem Questionnaire; SES, Rosenberg's Self-esteem scale; STAI, State Trait Anxiety Inventory; yd, years old.

To manage these psychological variables, a lot of mental strategies can be used (Xiong, 2012). Mental training refers to the process training able to influence athletes 'mental process. Even athletes stated that the mental aspect was crucial to achieve a good performance (Bali, 2015; Vealey, 2007). Five mental techniques were identified from the systematic review previously showed: "The Nine Step Connection Model", "Cantón's Giraffe" motivational coaching model, neurofeedback, motivational self-talk, and mental contrasting. The "Nine Step Connection Model" proposed by the study of Čačković et al. (2012b), is a routine designed to deal with stress between rounds during competition. It consists of nine steps: focus from the end of the dance onwards, enjoy the applause of the audience, relax, focus on physical preparation of the next dance, increase energy, re-establish contact with partner if present, choose the position on the stage, establish eye and physical contact (if partner present) and start dancing. The total execution time should be about 30 seconds. In this way the athlete concentrates on thinking about the execution of the next dance to give his best, rather than thinking about the mistakes of the previous dance.

"Canton's Giraffe" model, proposed by the study of Peris-Delcampo et al. (2019) is an intervention that acts on motivational processes through thought-provoking questions based on the goal to be achieved (head), motivational strength, understood as the combination of expectation and the value attributed to the goal (neck), self-confidence, composed of self-efficacy, self-esteem and self-concept (body) and finally sources of information (legs). Sessions are held between the athlete and sports psychologist for once a month where they try to work on

strengths and weaknesses related to motivational strength through dialogue. The results showed improvements in self-acceptance, self-esteem, and motivational strength (Peris-Delcampo et al., 2019).

Raymond et al. (2005) proposed 10 sessions of 20 minuntes of Alpha/Theta neurofeedback (ATNF) and heart rate variability biofeedback (HRVBF) as a technique to improve performance by working on relaxation. ATNF is a mental training used to get the athlete to reach a state of deep relaxation with eyes closed without falling asleep, working on monitoring theta (deep sleep-related) and alpha (superficial rest) brain waves (Egner et al., 2002). It appeared that ATNF increased performance through deep relaxation. HRVBF training consists of educating on resonance frequency breathing by monitoring HRV, which varies with emotional states, and controlling breathing to find the most effective pattern (Wang et al., 2019). This allows the athlete to learn to self-regulate in various situations. Research suggested that relaxation and imagery are effective to improve performance (Amir et al., 2022). From the study of Raymond et al. (2005) it seemed that thanks to ATNF, athletes improved more on the technique parameter, while thanks to HRV BF the timing and overall execution of the performance.

Riederova (2018) used motivational self-talk to manage anxiety, improve self-esteem, energy and, as a result, dance performance. The use of self-talk has been shown to be effective in both learning new skills (Theodorakis et al., 2000) and improving old ones. The intervention consisted of an inner dialogue about positive, goal-oriented thoughts that the athlete performed before dancing and during rounds. This practice should become routine. However, the intervention did not show significant differences, although the athletes' perceptions of the benefits were positive. The results may have been influenced by the small number of participants.

Finally, the study by Tay et al. (2019) proposed the use of spontaneous mental contrasting, a technique to identify a desired future state by contrasting it with the barriers of current reality that must be broken down to achieve it (Oettigen, 2012). The acronym to explain the use of this technique is WOOP: wish (set the goal to be achieved), outcome (imagine the feelings of the goal's success), obstacle (identify the obstacles to be achieved), plan (find strategies to overcome the obstacles). Spontaneous mental contrasting is identified as the mindset champion because its high use can predict performance success and improve self-regulation (Sevincer & Oettingen, 2013; Tay et al., 2019).

This review has some limitations. The sample was quite representative. No study directly investigated the relationship between emotional states and performance outcome. In addition, the search strategy was limited only to English-language articles. There is a lack of studies focusing on the impact of emotional states on sports performance and the use of mental strategies to manage them, especially in low-mid level athletes. Future research should focus on these directions. However, the utility was to provide a comprehensive understanding of the relationship between psychological factors and athletic performance in the DS domain. By synthesizing existing research, trends, gaps, and areas for further investigation were identified. Additionally, it aimed to offer practical insights and recommendations for athletes, coaches, and sports psychologists to enhance psychological preparation strategies and optimize performance outcomes in DS competitions.

Considering the athlete's psychological state can affect DS performance, in particular anxiety and self-confidence, it is important to monitor these factors to improve one's performance. Several mental techniques can be used to improve the psychological preparation of the athlete focused on the improvement of self-esteem, self-regulation, motivation, relaxation and the decrease of anxiety and stress. Further research is needed to better understand the effects of emotional states on DS performance with a sample more representative. It would also be interesting to study the effect of competing contextual factors on stress, which may be useful information for coaches.

II – HYPOTHESIS

II - HYPOTHESIS

Summarizing, DS was a multifactorial phenomenon influenced by several factors (Pakulanon & Poomsalood, 2012). Competition could provoke both physical and mental responses, affecting performance during events. Managing emotional states represented one of the main challenges athletes had to face (Čačković et al., 2012). According to Gallwey (2000), performance could be considered as the result of one's potential minus interference. To achieve peak performance, athletes needed to minimize interference, which included factors such as anxiety, stress, or lack of self-confidence (Andreeva & Karanauskienė, 2017). Working to effectively manage these interferences could allow athletes to fully express their potential during competition. According to a recent literature review conducted by Aliberti et al. (2023), anxiety was the most frequent emotional state among DS athletes, followed by stress, arousal, and self-confidence. Accepting anxiety symptoms as a natural part of the competitive experience was fundamental so that they could contribute to facilitating performance. Instead of fighting or trying to eliminate them, it was important for athletes to learn to manage and channel anxiety positively (Ermolaeva, 2015).

Different theories analyzed the relationship between anxiety and performance, with the most accredited being the Inverted U theory, the Multidimensional theory, and the Individual Zone of Functioning (IZOF) theory. The Inverted U theory posited the existence of an inverted U-shaped relationship between arousal and performance, where increasing arousal improved performance up to the peak of the U, after which performance declined (Yerkes & Dodson, 1908). Martens et al. (1990) proposed a theory stating a linear negative relationship between cognitive anxiety and performance, an inverted U-shaped relationship between somatic anxiety and performance, and a decrease in somatic anxiety after the start of the performance, unlike cognitive anxiety, which remained high when the athlete exhibited low self-confidence. Cognitive anxiety refers to symptoms such as confusion, indecision, negative thoughts, irritability, fear, sense of failure, dissatisfaction, and avoidance. Somatic anxiety refers to symptoms including increased blood pressure and respiration rate, sweating, nausea,

muscular tension, trembling, tightness in different body parts, clammy hands, dry mouth, need to urinate, loss of appetite, and diarrhea (Mackenzie, 2002). One of the most recent theories is the IZOF, which emphasized the uniqueness of each athlete in responding to competition anxiety, identifying peak performance within an individual's optimal functioning zone, characterized by the appropriate levels of arousal or anxiety. However, how these variables influenced DS performance remained largely unexplored (Aliberti et al., 2023). Specifically, identifying the optimal ranges of anxiety and self-confidence for achieving good performance would be beneficial.

The motivational aspect and personal experience were also not to be overlooked, as they could influence an athlete's perception of security and competence, thus affecting performance outcomes (Drive theory; Taylor, 1956). A previous victory often influenced performance in subsequent competitions, especially when the competitors in the next competition were the same (Goubault & Decuigniere, 2012). Local competitions typically involved local athletes who were already familiar with each other. This familiarity created a psychological backdrop that significantly impacted the athlete's mindset and approach to the competition. When athletes competed against familiar competitors, the psychological effects of past performances became more pronounced. A previous victory could boost an athlete's confidence, creating a positive feedback loop that enhanced future performance (Siddiqa et al., 2022). Conversely, a previous defeat could lead to heightened anxiety and self-doubt, particularly if the athlete perceived the competition as a recurring challenge against the same competitors.

The perception of competence was another variable that influenced the outcome of sports performance through its impact on motivation, resilience, self-esteem, and approach to challenges. Athletes who perceived themselves as competent were more likely to fully engage in sports activities, face challenges with determination, and maintain confidence in their abilities in competition (D'Astous et al., 2020). Finally, years of experience were another useful variable, as they influenced the outcome of sports performance through the improvement of technical and tactical skills, a greater understanding of the competitive context, better stress and pressure management, and increased confidence in their abilities (Piepiora et al., 2022).

Based on previous background, the hypotheses were:

(H_1) pre-competitive anxiety and self-confidence had a significant influence on DS athletes' performance.

(H_2) Years of experience in the DS field and perceived preparedness significantly influenced the performance outcomes, mediating the effect of pre-competitive emotional states.

(H_3) There were optimal levels of anxiety and self-confidence that could maximize the performance of DS athletes.

(H_4) The levels of anxiety and self-confidence varied according to the athlete's level (high and low).

III – OBJECTIVES

III - OBJECTIVES

The emotions experienced by athletes during competitions have been found to be closely linked to their sports performance, particularly in the demanding context DS. In the hours leading up to a competition, athletes often experience a gradual increase in both positive and negative emotions, such as excitement, anticipation, anxiety, and, at times, uncertainty. Effectively managing these emotions is essential, as dancers are required not only to execute complex technical aspects of their routines but also to interpret and express choreography with precision and emotional depth. Control over their emotional states can therefore help dancers connect with the music and deliver a performance that is not only technically accurate but also expressively powerful and engaging.

Despite the importance of emotional control in DS, there remains a gap in research on the direct impact of emotions on performance in this field. Consequently, the aims were:

(I) to investigate the influence of anxiety and self-confidence on DS performance. This objective aimed to understand how levels of anxiety and self-confidence could impact athletes' performances, exploring whether specific levels of these emotional factors could support or hinder their execution in DS. Anxiety and self-confidence are key components of athletes' psychological balance and can significantly affect their ability to perform at their best.

(II) to examine the influence of years of experience, prior victories, and perceived preparedness on performance outcomes. This objective focused on the effects of practice and past success on athletes' performance. Years of experience and previous victories could positively influence self-confidence and technical skills, while perceived preparedness was an indicator of an athlete's mental and emotional readiness for the demands of competition.

(III) to identify the optimal emotional state levels for peak performance. This objective aimed to establish the optimal levels of emotional factors, such as cognitive and somatic anxiety and self-confidence, that may contribute to excellent performance in DS. Understanding these optimal levels will enable the development of tailored psychological strategies to enhance athletes' mental preparation.

(IV) to investigate differences among different athletes' level and class. This last objective focused on analyzing differences among athletes at various competition levels and skill classes. This analysis is fundamental to understanding how factors like experience, preparedness, and emotional management may vary among dancers with differing levels of training and expertise.

IV - MATERIAL AND METHODS

IV -MATERIAL AND METHODS

4.1. DESIGN AND PARTICIPANTS

The design of the study was observational. Initially, participants were 71 Italian DS (17 – 30 years old) athletes recruited through convenience sampling, divided into three group:

- 22 athletes of medium level (B-class)
- 25 athletes of low level (C-class)
- 24 athletes of promotional/starting level (D-class)

However, after a preliminary analysis of the data, 9 participants were identified and excluded, as they were identified as outliers, according to Cook's test. Therefore, the final number of analysed participants was 62, divided into three groups:

- 20 B-class athletes: medium level
- 24 C-class athletes: low level
- 18 D-class athletes: promotional/starting level

The study included participants based on the following criteria to ensure a homogeneous sample: the Italian nationality and involvement in DS as individual competitors, the age range between 17 and 30 years, classification within one of three competitive levels (B, C, D-class), active participation in official DS competitions, minimum of one year of experience and provision of written informed consent prior to participation. Participants were excluded from the study if they met any of the following conditions: existing injuries or physical conditions that could impair their performance during the competition, inaccurately completed questionnaires which could compromise the validity of the collected data, athletes of other disciplines (duo / team/ couple) and lack of informed consent or voluntary withdrawal from the study at any point. The study was conducted according to the guidelines of the Declaration of Helsinki. The study was approved by the Research Ethics Committee of the Catholic University of Murcia Code CE072315 (21/07/2023) (Appendix 2).

4.2. DATA COLLECTION

The data collection took place during a local DS competition day to capture the athletes' real-time emotional states and competitive experiences, thereby ensuring the ecological validity of the data. Data were gathered using a structured paper-based questionnaire, administered to athletes approximately 30-50 minutes before their scheduled performance. The timing aimed to capture participants' anxiety levels and self-confidence as they approached their competition, providing insights directly relevant to the first and third study objectives. The questionnaire was divided into two sections aimed to gather comprehensive demographic data and background information on each athlete, to explore factors, such as experience and preparedness, and to assess the athletes' levels of cognitive and somatic anxiety, as well as self-confidence, using the Italian-translated version of the CSAI-2R. This instrument was chosen for its validity and reliability in measuring competitive anxiety in sports contexts (Martinengo et al., 2012).

4.2.1. Demographic characteristics and personal experience

The first section of the questionnaire was designed to collect demographic information and personal experience details from each participant, offering a comprehensive understanding of their background in DS. This information aimed to contextualize each athlete's profile, which could influence their competitive anxiety and self-confidence levels. The questions were structured to gather data on gender, age, experience, perceived readiness, and past achievements, providing insights into factors that might correlate with their performance. Specifically, the section included the following questions:

1. What is your gender? (Options: male / female). This question allowed for categorization of participants by gender, which may be relevant for analysing gender differences in competitive anxiety and
2. What is your age? (Open-ended short answer). Collecting age data was essential for analysing age-related differences in anxiety and performance levels within the 17-30 age range.
3. What are your years of DS experience? (Short answer). This question assessed each participant's level of expertise, providing context for potential correlations between experience and competitive anxiety.

Longer experience in DS could be associated with lower anxiety due to familiarity with competition settings.

4. How do you perceive yourself prepared to compete from 1 (poor) to 10 (high)? (Rating scale). This question aimed to capture athletes' self-assessed confidence and readiness levels. Higher scores may indicate greater self-confidence, which could positively impact performance and reduce competitive anxiety.
5. Have you already won in your current class? (Options: yes / no). This question explored prior achievements, which could contribute to an athlete's self-assurance and affect their ability to manage pressure. A history of victories might reflect higher confidence and a better mental approach to competition.

4.2.2. Italian version of the Revised Competitive State Anxiety Inventory-2 (CSAI-2R)

The Italian version of the Revised Competitive State Anxiety Inventory-2 (CSAI-2R), developed by Martens et al. (1990), revised by Cox et al. (2003) and translated in Italian by Martinengo et al. (2012), was composed of 17-item that measured cognitive, somatic anxiety, and self-confidence. A detailed description is shown in the following Table.

Table 3. CSAI-2R and Italian version Items.

CSAI-2R	Italian version of CSAI-2R
1. I feel jittery (somatic anxiety).	1. Mi sento nervoso (ansia somatica).
2. I am concerned that I may not do as well in this competition as I could (cognitive anxiety).	2. Sono preoccupato di non riuscire a fare bene questa competizione come potrei (ansia cognitiva).
3. I feel self-confident (self-confidence).	3. Mi sento sicuro di me (fiducia in me stesso).
4. My body feels tense (somatic anxiety).	4. Il mio corpo è teso (ansia somatica).

5. I am concerned about losing (cognitive anxiety).	5. Sono preoccupato per la perdita (ansia cognitiva).
6. I feel tense in my stomach (somatic anxiety).	6. Mi sento teso allo stomaco (ansia somatica).
7. I am confident I can meet the challenge (self-confidence).	7. Sono sicuro di poter affrontare la sfida (fiducia in me stesso).
8. I am concerned about choking under pressure (cognitive anxiety).	8. Sono preoccupato per il soffocamento sotto pressione (ansia cognitiva).
9. My heart is racing (somatic anxiety).	9. Il mio cuore batte forte (ansia somatica).
10. I am confident about performing well (self-confidence).	10.Sono sicuro di riuscire a fare bene (fiducia in me stesso).
11. I am concerned about performing poorly (cognitive anxiety).	11.Sono preoccupato per le prestazioni scadenti (ansia cognitiva).
12. I feel my stomach sinking (somatic anxiety).	12. Sento il mio stomaco affondare (ansia somatica).
13. I am confident because I mentally picture myself reaching my goal (self-confidence).	13. Sono fiducioso perché mi immagino mentalmente di raggiungere il mio obiettivo (fiducia in me stesso).
14. I am concerned that others will be disappointed with my performance (cognitive anxiety).	14. Sono preoccupato che gli altri rimarranno delusi dalla mia prestazione (ansia cognitiva).
15. My hands are clammy (somatic anxiety).	15. Ho le mani appiccicose (ansia somatica).
16. I am confident of coming through under pressure (self-confidence).	16.Sono sicuro di superare la pressione (fiducia in me stesso).
17. My body feels tight (somatic anxiety).	17. Il mio corpo è rigido (ansia somatica).

Participants rated each item on a 4-point Likert scale ranging from one (not at all), two (somewhat), three (moderately so), to four (very much so). A low score indicates the athlete has low anxiety (high self-confidence), while a high score indicates high anxiety. Summing items in each subscale, dividing by the number of items, and multiplying by 10, calculate subscale scores. Score range is 10 – 40 for each subscale: cognitive anxiety, somatic anxiety and self-confidence.

Cognitive anxiety represents negative thoughts related to competition, such as concerns about the possibility of failing or disappointing others. To calculate the score for cognitive state anxiety, the scores of statements 2, 5, 8, 11, and 14 should be added together. Higher scores indicate higher levels of cognitive anxiety. Somatic anxiety measures the physiological responses to stress, such as muscle tension, increased heart rate, and a "tight" stomach sensation. To calculate the score for somatic state anxiety, the scores of statements 1, 4, 6, 9, 12, 15, and 17 should be added together. Here, higher scores also indicate greater levels of somatic anxiety. Self-confidence assesses the confidence in one's abilities to face the competition and achieve a good result. To calculate the score for self-confidence, the scores of statements 3, 7, 10, 13, and 16 should be added together. A higher score reflects greater self-confidence in oneself.

The questionnaire administration was in paper form 30 - 50 minutes before their performance. Self-report measures have limitations, both because their interpretation is subjective and because they can disrupt the pre-race condition; however, several researchers have proposed some strategies to overcome these limitations, such as modifying the timing of questionnaire administration (Stocchi, 2018). The periods are basically 4:

1) 15 minutes or less before competition

2) 16-30 min before competition

3) 31 min – 59 min before competition

4) 1 - 4 hours before up to 24 hours before competition

Administering the questionnaire too early (point 1, 2) may distract athletes from performance. Furthermore, it would not guarantee the veracity of the answers as the athletes in this time slot are not focused on answering the questionnaire as they are most likely already cognitively immersed in preparation (Craft et al., 2003; Krane, 1992). The ideal time according to the literature is 1 hour before for accurate

results (Agaoglu, 2016), example followed by Marwat et al. (2020), Hussain et al. (2021), Dallas et al. (2019) and Tsopani et al. (2011) in gymnastics, another aesthetical sport. This time frame has been consistently used in the literature on competitive anxiety and is considered acceptable as it does not interfere with preparation routines (Jones & Hanton, 2001). Balite et al. (2022) administered the CSAI-2R approximately 2 hours before the competition and one week before, while Kais & Raudsepp (2005) both 24 hours before, 2 hours before and 1 hour before, concluding that cognitive anxiety and self-confidence values did not change over 24 hours, while somatic anxiety increased up to 1 hour before competition. However, it is recommended not to go beyond 24 hours, as somatic anxiety starts to increase from 24 hours onwards. Therefore, the general range not to be exceeded as this time can affect the ability to predict performance: from 24 hours onwards (Agaoglu, 2016). The questionnaire is a valid and reliable tool for scholars and practitioners in the field of sport and applied social psychology (Martinengo et al., 2012).

4.2.3. Performance assessment

To assess each athlete's performance, their final placement in the competition was recorded, based on the official classification provided by the organizing body's database. This ranking system assigns each competitor a score, with a value of one (1) indicating the highest performance, as it represents a top placement. Consequently, lower values signify better performance, with higher-ranking athletes receiving lower numerical values.

In practical terms, when the competition is over, the rankings of the athletes who were subjected to the pre-competition questionnaire are published online. In the final round, the judges rank their athletes from most deserving (1 place) to least deserving (6/7 place). From the semi-final round onwards, the rankings are ordered according to the 'X's obtained by the judges during the competition performances. The more 'X 's an athlete obtains, the higher his or her ranking. Athletes with fewer 'X 's are placed at the end of the ranking. The judges give their votes according to criteria in the rules including timing, emotional involvement, difficulty of the choreography, and cleanliness of movements.

This approach allows for a straightforward, objective comparison of performance outcomes among participants, ensuring that the evaluation is consistent across all levels and categories of competitors. This method of using final rankings as a performance indicator was suggested by Edwards & Hardy (1996) and has been widely adopted in competitive sports research. By focusing on the final placement rather than other variables, this method provides a direct measurement of competitive success, emphasizing athletes' ability to achieve high standing relative to their peers.

4.3. STATISTICAL ANALYSIS

Descriptive statistics were used to summarize the characteristics of a data set. After verifying normality of data, linearity, multicollinearity and homogeneity of variances, simple scatter plots were created.

An assessment of data normality was a prerequisite for many statistical tests because it was a fundamental assumption in parametric tests (Aliberti et al., 2023). If $p > .05$, we fail to reject the null hypothesis and conclude that data were normally distributed. Linearity test was performed to test linearity among CSAI-2R variables. If deviation of linearity > .05, it could be concluded that there was a linear relationship between variables. A simple scatterplot was used to detect outliers and graphically present the relationship among variables. Cook's test was used to test the presence of significant outliers. This measure was used in regression analysis to identify influential data points that may negatively affect the regression model. Values that deviated significantly from the data set (values greater than 4/n, where n is the total number of data points) were considered outliers and were removed (Seo & Bae, 2013). The assumption of homogeneity of variance was tested using Levene's Test of Equality of Variances. If p was greater than .05, the variables could be treated as equal.

Subsequently, the reliability of the CSAI-2R dimensions was examined through the calculation of Cronbach's alpha. A score of .7 or above was considered good, indicating that the scale was internally consistent. A score of .5 or below meant that the questions needed to be revised or replaced, and in some cases, that the scale needed to be redesigned (Cronbach, 1951).

Pearson's correlation (r) was performed to measure the strength and the direction between two variables. The following criteria were adopted to interpret the magnitude of correlations between measurement variables: .1–.3 (small), .3–.5 (moderate), .5–.7 (large), .7–.9 (very large), and .9–1.0 (almost perfect) (Hopkins et al., 2009).

Multiple linear regression was used to predict the performance ranking (dependent variable) based on the value of cognitive anxiety, somatic anxiety, and self-confidence (independent). Simple linear regression was used to predict the performance ranking based on each variable (cognitive anxiety, somatic anxiety, and self-confidence) taken as individual.

A One-way Anova was used to analyze differences in terms of years of experience, perceived preparedness and CSAI-2R subscales among athletes of different levels (D, C, B). A Chi Square analysis was performed to analyze differences in terms of previous winning among athletes of different levels.

Mancova was performed to test the influence of years of experience and perceived preparedness (from 1 to 10) on performance (ranking) and CSAI-2R using Class (D, C, B) as fixed factors.

Additionally, as suggested by Fortes et al. (2017), participants were divided into high performance (HP) and low performance (LP) groups based on their ranking positions. This division was made using the 50th percentile of the ranking distribution. The median of this distribution was used as the cutoff point. Athletes with a ranking position above the median were classified as LP athletes, while those below the median were classified as HP athletes.

To examine the differences in CSAI-2R among athletes of different levels (D, C, B) and with different performance levels (HP, LP), a two-way ANOVA was conducted to assess the effects of class and performance level, as well as the interaction between these factors.

Significance was set at $P \leq .05$. Data analyses were performed using the Statistical Package for Social Science software (IBM SPSS Statistics for Windows, version 25.0, IBM, SPSS Inc., Armonk, NY, USA)

V – RESULTS

V - RESULTS

5.1. DESCRIPTIVE STATISTICS

Descriptive statistics were used to summarize data. A detailed description in shown in Table 4.

Table 4. Descriptive statistics of aggregated data.

Descriptive statistics				
	Min	Max	Mean	SD
Years of experience	1.00	13.00	5.50	3.08
Preparedness perception	4.00	9.00	6.79	1.13
Performance rank	1.00	24.00	11.19	6.29
Cognitive anxiety	8.00	20.00	13.79	3.38
Somatic anxiety	12.00	21.00	16.65	2.03
Self-confidence	5.00	20.00	12.65	3.85

The assumptions of normality, linearity, multicollinearity, and homogeneity of variances were not violated. The normality test result was not statistically significant ($p > .05$). Similarly, the deviation from linearity was not statistically significant ($p > .05$). However, the Cook's distance test identified some outliers, reducing the sample size from 71 to 62 athletes, comprising 18 athletes from class D, 24 athletes from class C, and 20 athletes from class B. A graphical representation is shown in the following Figures.

Figure 6. Relationship between cognitive anxiety and self-confidence.

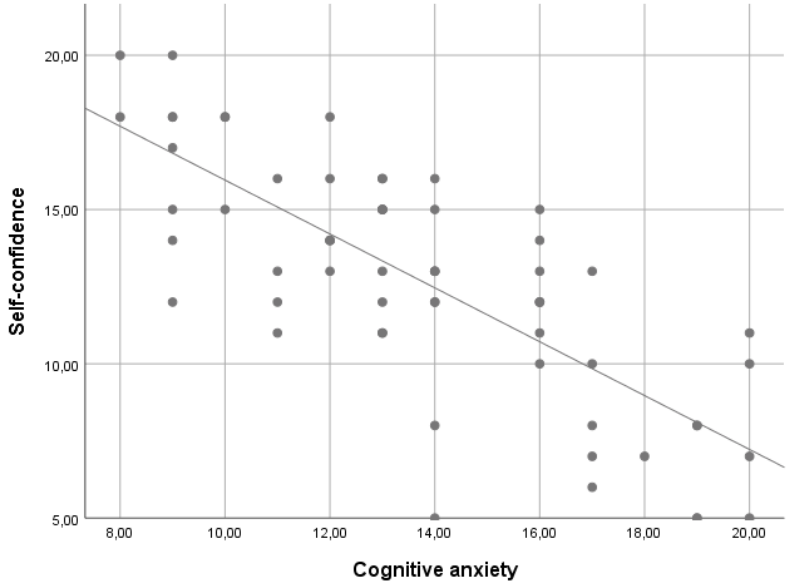


Figure 7. Relationship between somatic anxiety and self-confidence.

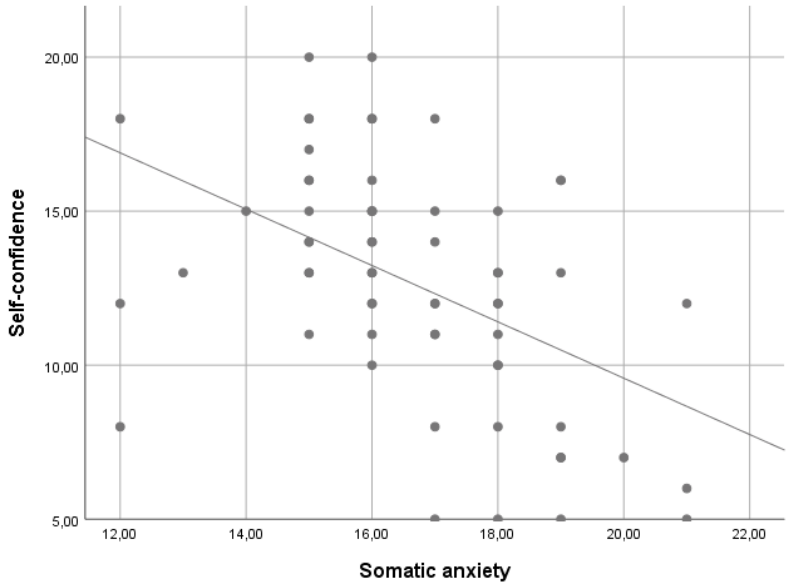


Figure 8. Relationship between cognitive anxiety and somatic anxiety.

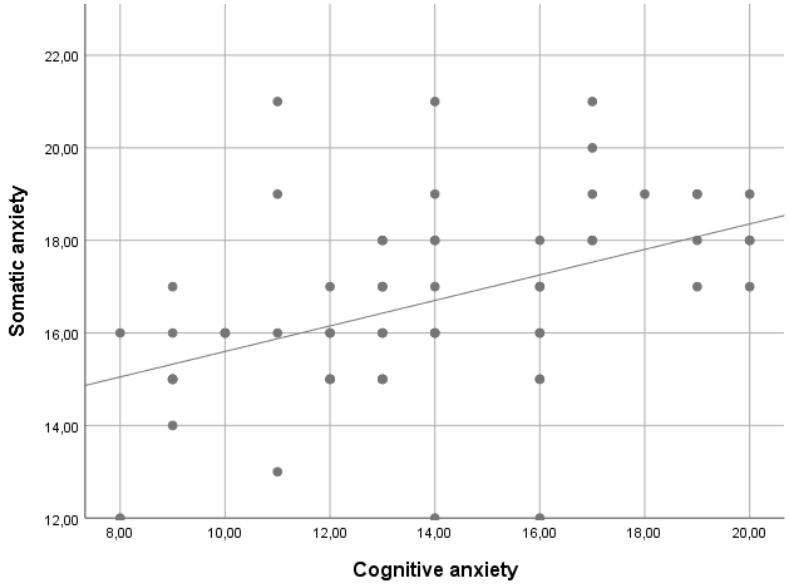


Figure 9. Relationship between performance rank (reverse) and somatic anxiety.

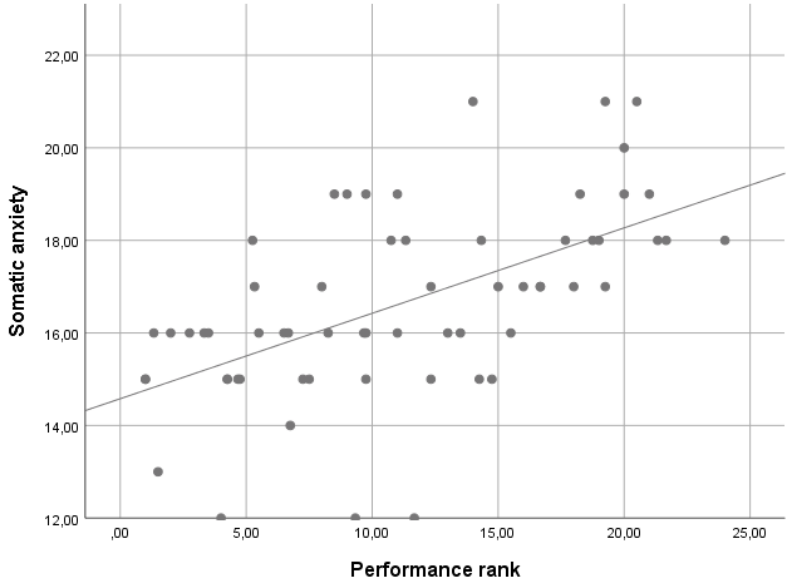


Figure 10. Relationship between performance rank (reverse) self-confidence.

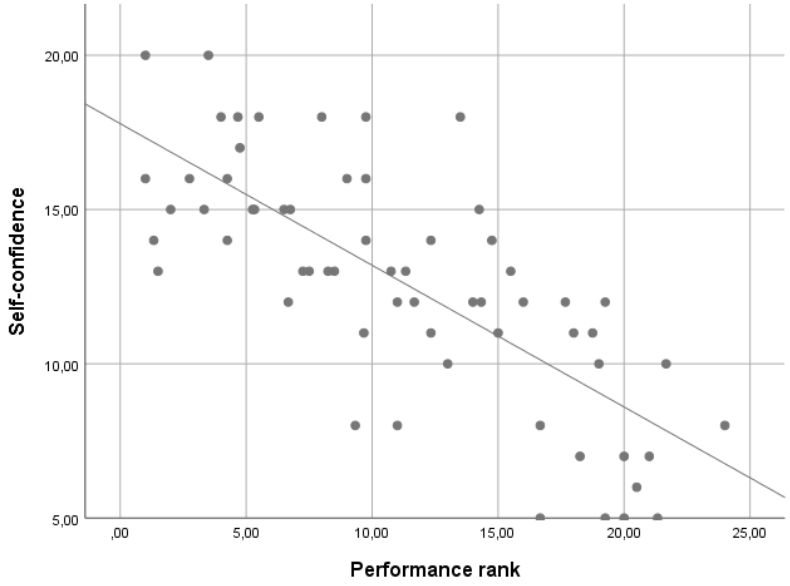
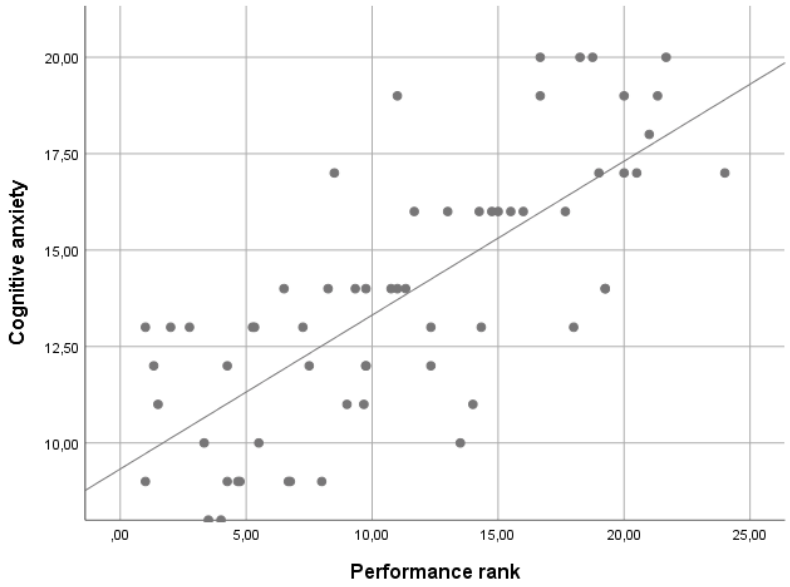


Figure 11. Relationship between cognitive anxiety and performance rank (reverse).



Significant relationships emerged from Pearson's correlation. As performance rank (reverse) increased, cognitive (r=.7) and somatic anxiety (r=.5) increased, while self-confidence decreased strongly (r=-.7). As cognitive anxiety increased, performance rank (r=.7) and somatic anxiety (r=.4) increased, while self-confidence decreased (r=-.7). As somatic anxiety increased, performance rank (r=.5) and cognitive anxiety increased (r=.4), while self-confidence decreased (r=-.4). As self-confidence increased, performance rank (r=-.7), cognitive anxiety (r=-.7) and somatic anxiety (r=-.4) decreased. As performance rank (reverse) decreased, preparedness perception increased (r=-.4) as well as the years of experience (r=-.2). As years of experience increased, preparedness perception increased (r=.3), as well as self-confidence (r=.5). As preparedness perception increased, cognitive anxiety and somatic anxiety decreased (r=-.3). A detailed description is shown in Table 5.

Table 5. Correlation between performance rank, CSAI-2R and personal variables.

	Correlations					
	1	2	3	4	5	6
Performance ranking	1					
Years of experience	-.252*	1				
Preparedness perception	-.442**	.313*	1			
Cognitive anxiety	.742**	-.399**	-.362**	1		
Somatic anxiety	.573**	-.013	-.390**	.460**	1	
Self-confidence	-.751**	.520**	.555**	-.768**	-.482**	1

*. Correlation is significant at .05 level (two-tailed).
**. Correlation is significant at .01 level (two-tailed).

5.2. HOW SELF-CONFIDENCE PREDICTED DS PERFORMANCE?

R represented the multiple correlation coefficient and could be considered a measure of the quality of the prediction of the dependent variable; in this case, a value of .7 indicated a good predictive model. R^2 (coefficient of determination)

indicated the independent variable (self-confidence) explained 56% of the variability in the dependent variable (performance rank). The independent variable predicted the dependent variable significantly, $F(1, 60) = 77.57$, $p < .001$ (i.e., the regression model fits the data well). The general formula of the equation to predict performance rank was: 26.718 – (-1.228 x self-confidence) as shown in Table 6.

Table 6. Regression analysis for predicting performance rank from self-confidence.

Variable	B	SE	β	t	p	95% CI
Constant	26.718	1.841		14.509	.000	[23.035, 30.402]
Self-confidence	-1.228	.139	-.751	-8.807	.000	[-1.507, -.949]
$R^2 = .564$, Adjusted $R^2 = .557$, $F(1, 60) = 77.571$, $p < .001$, Std. Error of Estimate = 4.18766						

Note. B, non-standardized regression coefficient; SE, standard error associated with the regression coefficient; β, the standardized regression coefficient; t, t-value of the test for the regression coefficient; p, significance level of the t-test; 95% CI, the confidence intervals for the regression coefficient; R^2 and Adjusted R^2, the proportion of variance in the dependent variable explained by the independent variable; F statistic, the overall significance of the regression model.

5.3. HOW COGNITIVE ANXIETY PREDICTED PERFORMANCE RANK?

An R value of .7 indicated a good predictive model. R^2 indicated the level of cognitive anxiety explained 55% of the variability in the performance rank level. The independent variables significantly predicted the dependent variable, $F(1, 60) = 73.43$, $p < .001$. The general formula of the equation to predict performance rank was: -7.825 + (1.379 x cognitive anxiety), as shown in Table 7.

Table 7. Regression analysis for predicting performance rank from cognitive anxiety.

Variable	B	SE	β	t	*p*	95% CI
Constant	-7.825	2.284		-3.426	.001	[-12.393, -3.257]
Cognitive anxiety	1.379	.161	.742	8.569	.000	[1.057, 1.701]
$R^2 = .550$, Adjusted $R^2 = .543$, $F(1, 60) = 73.434$, $p < .001$, Std. Error of Estimate = 4.25207						

5.4. HOW SOMATIC ANXIETY PREDICTED PERFORMANCE RANK?

A value of R of .5 indicated an acceptable predictive model. R^2 indicated that the level of somatic anxiety explained 32% of the variability in the level of performance rank. The independent variables significantly predicted the dependent variable, F(1, 60) = 29.35, $p < .001$. The general formula of the equation to predict performance rank was: -18.433 + (1.780 x somatic anxiety), as shown in Table 8.

Table 8. Regression analysis for predicting performance rank from somatic anxiety

Variable	B	SE	β	t	*p*	95% CI
Constant	-18.433	5.508		-3.347	.001	[-29.450, -7.416]
Somatic anxiety	1.780	.329	.573	5.418	.000	[1.123, 2.437]
R^2 = .328, Adjusted R^2 = .317, F(1, 60) = 29.350, p < .001, Std. Error of Estimate = 5.19621						

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5.5. HOW ALL CSAI-2R VARIABLES AFFECTED PERFORMANCE RANK?

An R value of .8 indicated a good predictive model. R^2 indicated CSAI-2R scores explained 67% of the variability in the performance rank level. CSAI-2R variables significantly predicted the performance rank level, F(58, 3) = 39.48, p <.001. The general formula of the equation to predict performance rank was: -2.284 + (.652 x cognitive anxiety) + (.727 x somatic anxiety) - (.603 x self-confidence) as shown in Table 9.

Table 9. Multiple regression analysis for csai-2r variables predicting performance rank.

Variable	B	SE	β	t	p	95% CI
Constant	-2.284	6.880		-.332	.741	[-16.055, 11.488]
Cognitive anxiety	.652	.221	.351	2.947	.005	[.209, 1.096]
Somatic anxiety	.727	.270	.234	2.689	.009	[.186, 1.268]
Self-confidence	-.603	.197	-.369	-3.055	.003	[-.998, -.208]
R^2 = .671, Adjusted R^2 = .654, F(3, 58) = 39.489, p < .001, Std. Error of Estimate = 3.69746						

5.6. DIFFERENCES AMONG DIFFERENT LEVEL ATHLETES IN TERMS OF CSAI-2R AND PERSONAL CHARACTERISTICS

The internal consistency of the CSAI-2R dimensions was calculated using Cronbach's alpha, yielding the following results: cognitive anxiety = .8 (excellent), somatic anxiety = .6 (acceptable), and self-confidence = .9 (excellent) (Tavakol & Dennick, 2011). The descriptive statistics regarding demographic characteristics are presented in the following Table. From One Way Anova significant differences emerged between athletes of different levels in terms of years of experience $F(2,68)=94.15$, $p=.00$, perceived preparedness $F(2,68) = 7.16$, $p=.00$, cognitive anxiety $F(2,68)=4.41$, $p=.000$ and self.confidence $F(2,68) = 10.97$, $p=.00$. From Chi Square analysis no difference emerged in terms of previous winning $\chi 2$ ([1], N = [71]) = [2.20], p = [.325].

Table 10. Descriptive statistics for years of experience, frequency of training, perceived preparedness, previous winning, CSAI-2R.

Item	Class D (M, SD)	Class C (M, SD)	Class B (M, SD)	p-value
Years of Experience	3.00 (1.41)	4.33 (1.55)	9.15 (2.01)	< .001
Perceived Preparedness	6.27 (1.22)	6.83 (.91)	7.20 (1.15)	.039
Previous Winning (%)	Yes (44.4) No (55.6)	Yes (50.0) No (50.0)	Yes (55.0) No (45.0)	.810
Somatic Anxiety	16.27 (2.05)	16.66 (1.92)	16.95 (2.16)	.600
Cognitive Anxiety	13.88 (3.84)	15.08 (2.50)	12.15 (3.31)	.014
Self-confidence	10.77 (3.50)	12.29 (3.16)	14.75 (4.02)	.004
Performance Rank	10.68 (6.47)	11.85 (6.73)	10.85 (5.80)	.808

Note: M = mean, SD = standard deviation, percentages indicate the proportion of participants reporting previous wins.

From Bonferroni-post hoc significant differences emerged (p <.05).

Table 11. Bonferroni post hoc comparisons for cognitive anxiety, self-confidence, years of experience, and perceived preparedness.

Dependent Variable	Comparison	Mean Difference (I-J)	Std. Error	Sig.	95% CI Lower	95% CI Upper
Cognitive Anxiety	B vs. C	-2.93*	.97	.011	-5.32	-.55
Self-confidence	B vs. D	3.97*	1.16	.003	1.12	6.82
Years of Experience	D vs. C	-1.33*	.52	.040	-2.62	-.04
	D vs. B	-6.15*	.55	< .001	-7.49	-4.81
	C vs. D	1.33*	.52	.040	.05	2.62
	C vs. B	-4.82*	.51	< .001	-6.07	-3.57
Perceived Preparedness	D vs. B	-.92*	.35	.035	-1.80	-.05
Note: *The difference in the mean is significant at the .05 level.						

Figure 12. Differences among athletes of different level in terms of year of experience.

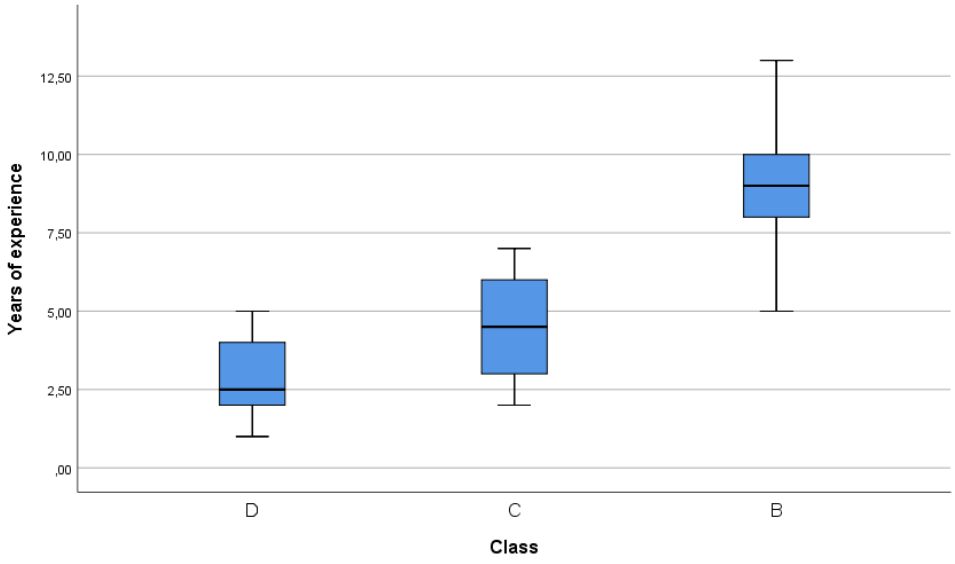


Figure 13. Differences among athletes of different level in terms of perceived preparedness.

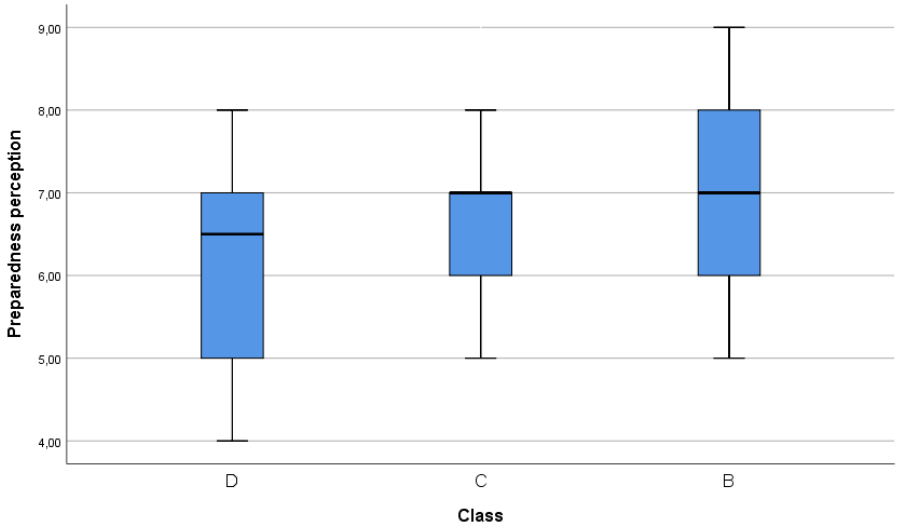


Figure 14. Differences among athletes of different level in terms of previous winning in their current class.

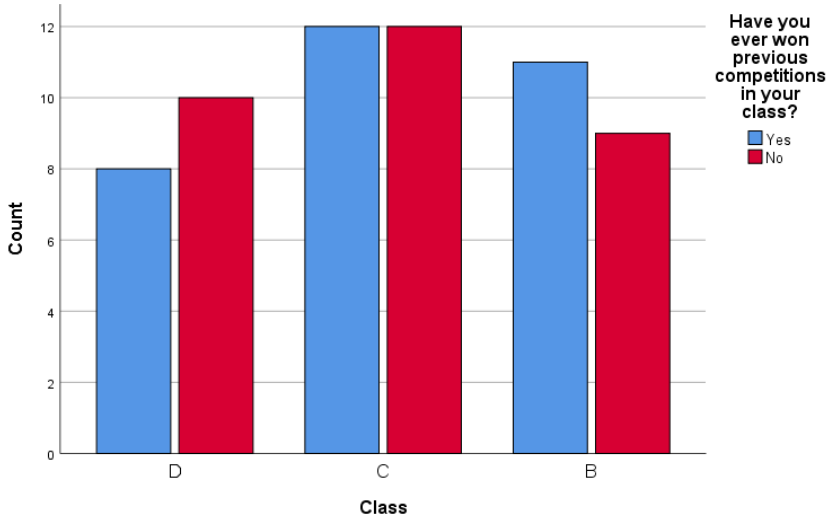


Figure 15. Differences among athletes of different level in terms of cognitive anxiety.

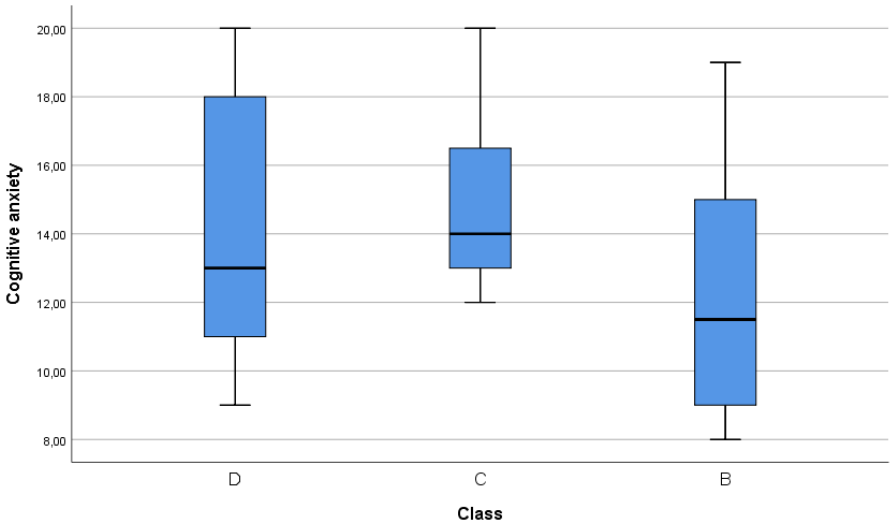


Figure 16. Differences among athletes of different level in terms of somatic anxiety.

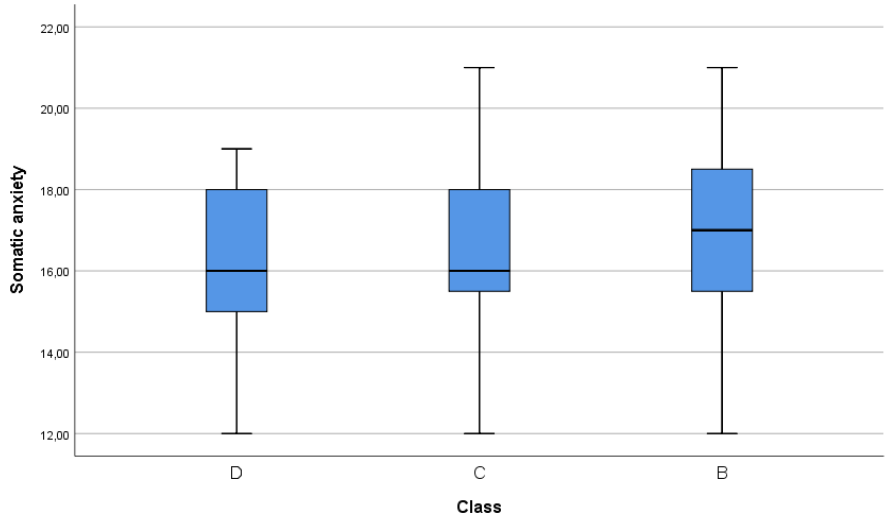


Figure 17. Differences among athletes of different level in terms of self-confidence.

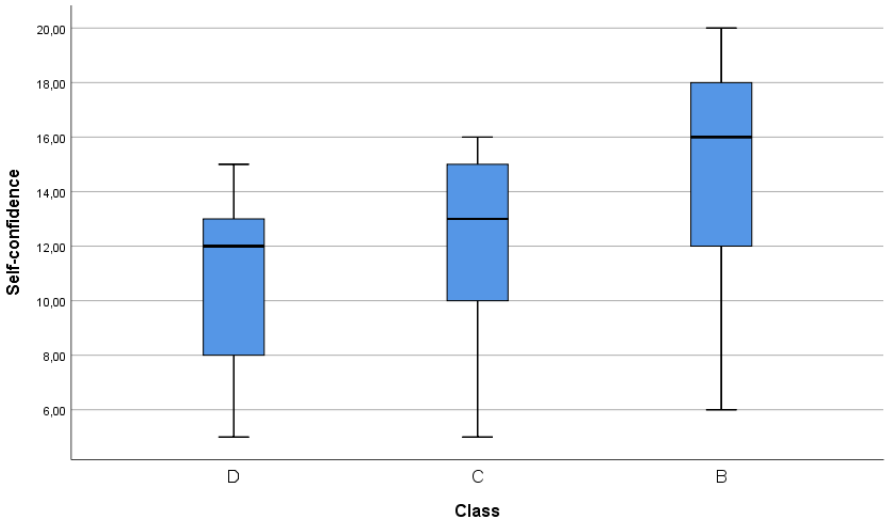


Table 12 displayed the results of multivariate tests, indicating the effect of independent variables (years of experience, perception of preparedness, and class) on combined dependent variables (cognitive anxiety, somatic anxiety, self-esteem, and final score). All tests were highly significant ($p < .001$); thus, in the overall model, there was a significant effect of the intercept on the combined dependent variables. Regarding years of experience in competitive dancing ($p = .008$), perception of preparedness ($p = .008$), and athlete level ($p = .001$), all test values were significant, indicating that these variables had a significant combined effect on cognitive anxiety, somatic anxiety, self-confidence, and final score.

Table 12. Multivariate test.

Multivariate tests[a]						
Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's trace	.853	78.403[b]	4	54	< .001
	Wilks' Lambda	.147	78.403	4	54	< .001
Years of experience in DS	Pillai's trace	.223	3.879	4	54	.008
	Wilks' Lambda	.777	3.879	4	54	.008
Preparedness perception	Pillai's trace	.279	5.223	4	54	.001
	Wilks' Lambda	.721	5.223	4	54	.001
Class	Pillai's trace	.482	4.368	8	110	< .001
	Wilks' Lambda	.57	4.376	8	108	< .001
Note. Design: Intercept + Years of experience + Perceived preparedness + Class						

To understand which dependent variables are most influenced by covariates and the fixed factor (Class), it is useful to examine the Between-Subjects Effects tests for each dependent variable separately. Years of experience had a significant impact on cognitive anxiety, self-confidence, and final score, but not on somatic anxiety. Perception of preparedness had a significant impact on all variables. These results suggest that both years of experience and perception of preparedness significantly influence anxiety (both cognitive and somatic) and athletes' final score. This data can be used to develop more targeted training programs and psychological support for athletes, taking into account their experience and perception of preparedness.

Table 13. Between subjects' tests.

Tests of Between-Subjects Effects						
Source		Type III Sum of Squares	Df	Quadratic mean	F	Sig.
Years of experience	Performance rank	411.520	1	411.520	15.381	.000
	Cognitive anxiety	44.205	1	44.205	5.368	.024
	Somatic anxiety	9.253	1	9.253	2.501	.119
	Self-confidence	81.793	1	81.793	9.851	.003
Perceived preparedness	Performance rank	404.315	1	404.315	15.112	.000
	Cognitive anxiety	82.517	1	82.517	10.021	.002
	Somatic anxiety	23.789	1	23.789	6.430	.014
	Self-confidence	176.675	1	176.675	21.278	.000
Class	Performance rank	437.238	2	218.619	8.171	.001
	Cognitive anxiety	55.490	2	27.745	3.369	.041
	Somatic anxiety	21.267	2	10.633	2.874	.065
	Self-confidence	10.788	2	5.394	0.650	.526

5.7. WHAT ARE THE IDEAL LEVELS OF THE CSAI-2R FOR HIGH PERFORMANCE?

The median (50th percentile) for the performance rank variable was calculated for each class, revealing that for class D, the performance rank median is 9.50, for class C it is 11.33, and for class B it is 10.37. Subsequently, athletes from the three classes were divided into HP (High Performance) athletes and LP (Low Performance) athletes. A detailed description is provided below.

Table 14. Means and standard deviations for self-confidence, cognitive anxiety, and somatic anxiety by group.

	B			C			D			Total		
	HP	LP	Total	HP	LP	Total	HP	LP	Total	HP	LP	Total
Self-confidence												
M	17.90	11.60	14.75	14.42	10.17	12.29	13.00	8.56	10.78	15.13	10.16	12.65
SD	1.37	3.20	4.02	1.38	3.04	3.17	2.12	3.24	3.51	2.57	3.28	3.85
Cognitive anxiety												
M	9.90	14.40	12.15	13.08	17.08	15.08	11.56	16.22	13.89	11.61	15.97	13.79
SD	1.91	2.88	3.31	0.79	1.93	2.50	2.74	3.42	3.85	2.28	2.88	3.38
Somatic anxiety												
M	15.90	18.00	16.95	16.17	17.17	16.67	15.11	17.44	16.28	15.77	17.52	16.65
SD	2.08	1.76	2.16	1.03	2.48	1.93	2.03	1.33	2.05	1.73	1.95	2.03

The Figures 18 and 19 represented the ideal levels of somatic anxiety, cognitive anxiety, and self-confidence in athletes of different levels, followed by the worst levels.

Figure 18. Best levels in HL athletes.

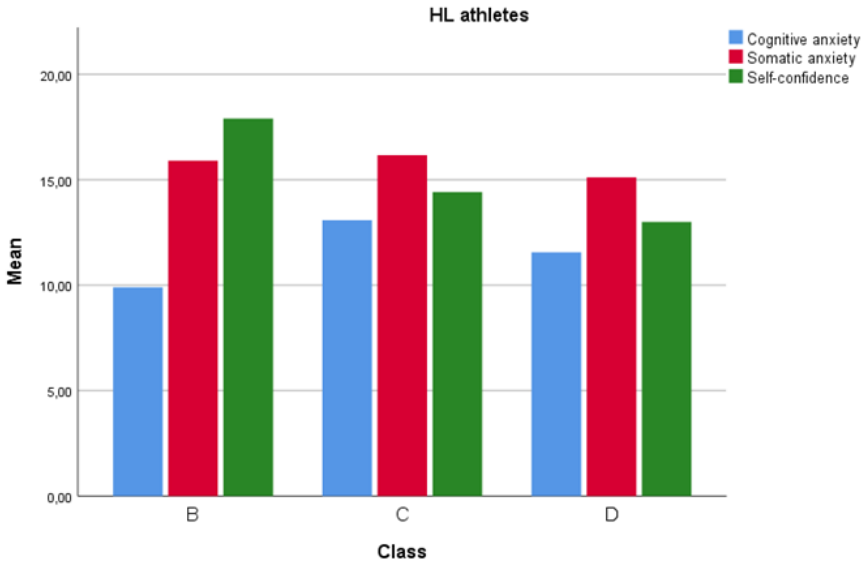
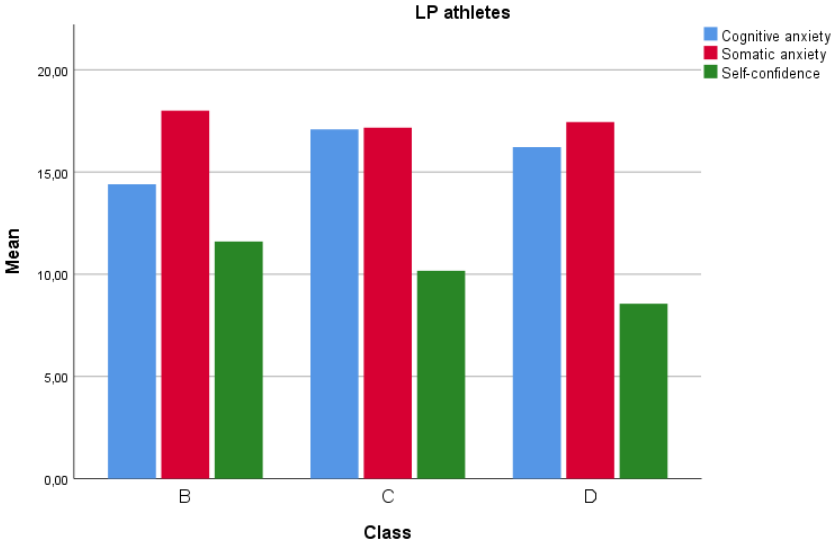


Figure 19. Worst level in LP athletes.



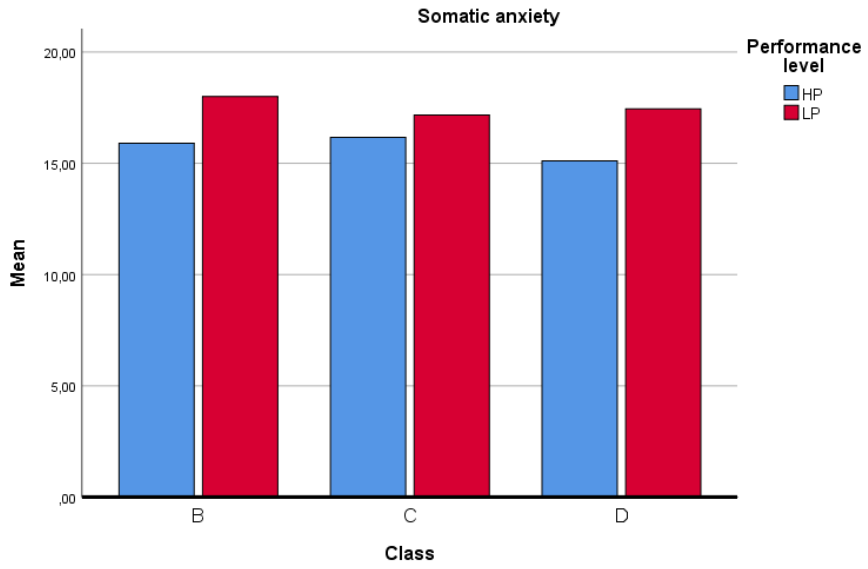
From the Two-way Anova, the overall model was significant in explaining somatic anxiety. The performance level variable had a significant effect on somatic anxiety, but the class variable did not have a significant effect. Additionally, there was no evidence of a significant interaction between class*performance level on somatic anxiety. A detailed description is shown below.

Table 15. Test of effects between subjects (somatic anxiety).

Test of effects between subjects					
Dependent variable: somatic anxiety					
Origin	Sum of type III	df	Mean square	F	Sig.
Correct model	56.849[a]	5	11.370	3.293	.011
Interceptor	16909.510	1	16909.510	4897.645	.000
Class	4.299	2	2.150	.623	.540
Performance level	50.130	1	50.130	14.520	.000
Class*performance level	5.518	2	2.759	.799	.455
Error	193.344	56	3.453		
Total	17428.000	62			

a. *R-square = .227 (Adapted R-square = .158)*

Figure 20. Somatic anxiety levels in HP e LP.

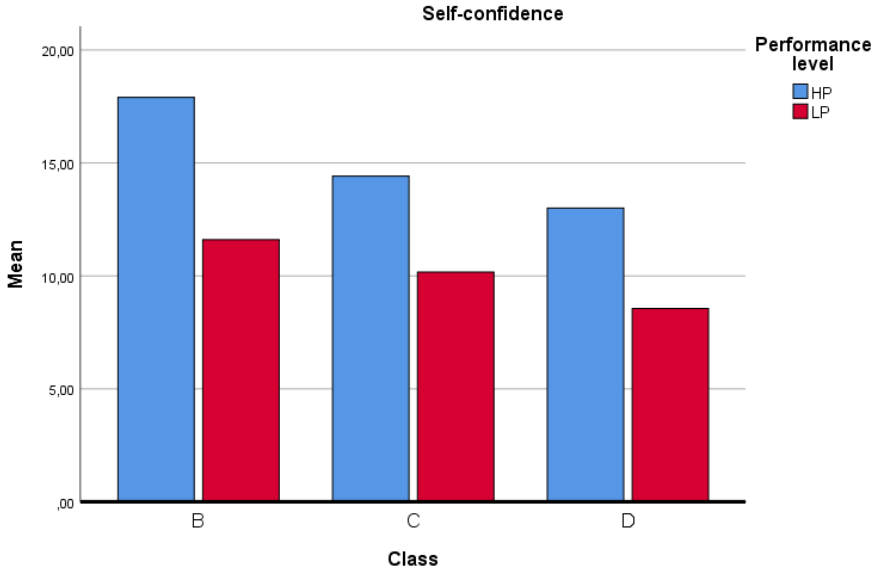


From Two-way Anova, the overall model was significant in explaining the variable self-confidence. The performance level variable had a significant effect on self-confidence, as did the class variable and the interaction between class*performance level. From Post-hoc Bonferroni significant differences emerged between B - C and B - D. A detailed description is shown below.

Table 16. Test of effects between subjects (self-confidence).

Test of effects between subjects					
Dependent variable: somatic anxiety					
Origin	Sum of type III	df	Mean square	F	Sig.
Class	154.374	2	77.187	12.276	.000
Performance level	381.793	1	381.793	60.722	.000
Class*performance level	13.198	2	6.599	1.050	.357
a. *R-square = .610 (adjusted R-square = .575)*					

Figure 21. Self-confidence levels in HP e LP.

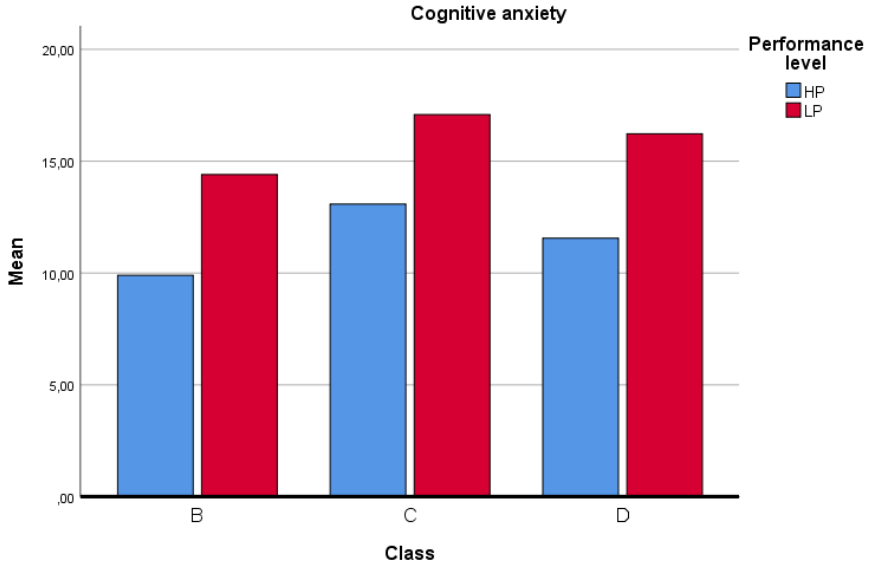


Finally, from the two-way ANOVA, the overall model was significant in explaining the variable cognitive anxiety. The performance level variable had a significant effect on cognitive anxiety, as did the class variable and the interaction between class* performance level. From Bonferroni significant difference emerged between B and C classes (p=.00). A detailed description is shown below.

Table 17. Test of effects between subjects (cognitive anxiety).

Test of effects between subjects					
Dependent variable: cognitive anxiety					
Origin	Sum of type III	df	Mean square	F	Sig.
Class	94.113	2	47.057	8.531	.001
Performance level	294.387	1	294.387	53.367	.000
Class*performance level	1.298	2	.649	.118	.889
a. R-square = .558 (adjusted R-square = .518)					

Figure 22. Cognitive anxiety levels in HP e LP.



VI – DISCUSSION

VI -DISCUSSION

The results of the present study highlighted a series of interesting findings.

6.1. RELATIONSHIP AMONG CSAI-2R, PERFORMANCE AND PERCEPTIONS

First, the relationship between CSAI-2R scores, performance rank, perception of preparation, and years of experience was examined. The results confirmed the importance of pre-competitive anxiety and self-confidence in the performance of DS athletes, supporting hypothesis H_1, which stated that pre-competitive anxiety and self-confidence significantly influenced DS athletes' performance. Specifically, the findings showed that high levels of cognitive and somatic anxiety were correlated with poorer performance and reduced self-confidence, while greater self-confidence was positively correlated with better performance. The correlations suggest that high levels of anxiety have a direct and negative impact on athletes' performance. The positive correlation between cognitive and somatic anxiety indicates that athletes experiencing mental anxiety also tend to exhibit physical symptoms of anxiety, underscoring the importance of addressing anxiety from all perspectives. Additionally, the negative correlation between self-esteem and anxiety (both cognitive and somatic) suggests that athletes with higher self-confidence tend to experience less anxiety, indicating that interventions aimed at improving athletes' self-esteem could be effective in reducing anxiety levels and enhancing performance. These findings align with multidimensional anxiety theory, which suggests a stronger impact of cognitive anxiety on performance than somatic anxiety (Edwards & Hardy; Kumar & Singh, 2018; Ichraf et al., 2013).

Beyond emotional states, the results indicated that athletes' perceived preparedness and years of experience were positively correlated with self-confidence and better performance rankings. This suggests that both experience and a strong sense of readiness may foster resilience, enabling athletes to approach competitions with greater self-assurance and control. Experienced athletes may benefit from having developed coping strategies and technical mastery over time, both of which contribute to improved performance under pressure. Perceived

preparedness, in turn, reflects the athlete's internal belief in their readiness to compete, which can enhance confidence and reduce stress, thus favourably impacting performance outcomes.

The variables analysed in this section, albeit with varying degrees of influence, significantly impacted performance rankings, emphasizing the need for a holistic approach to athlete preparation in DS. Addressing psychological factors such as self-confidence and anxiety, alongside fostering a sense of preparedness and leveraging accumulated experience, may provide a comprehensive pathway for maximizing performance.

6.2. CSAI-2R AS A PREDICTOR OF SPORTS PERFORMANCE

Regression analysis further demonstrated that cognitive anxiety, somatic anxiety, and self-confidence could influence ranking scores in DS. The regression model for self-confidence indicated a significant role in predicting DS performance. An increase in self-confidence was associated with a decrease in ranking positions, suggesting that athletes with higher self-confidence tended to achieve better results. In different sports, self-confidence has been one of the most significant predictors of performance (Tsopani et al., 2011; Javaid et al., 2016). Similarly, the regression model for cognitive anxiety showed a strong relationship with DS performance, where an increase in cognitive anxiety was associated with poorer performance, as supported by other studies (Clarke et al., 2013; Parnabas et al., 2015a). By contrast, the regression model for somatic anxiety demonstrated a significant but weaker relationship compared to cognitive anxiety and self-confidence, with an increase in somatic anxiety slightly deteriorating performance, consistent with other findings that indicate somatic anxiety has a significant impact on performance (Jana, 2020; Parnabas et al., 2015b). Overall, the regression model of CSAI-2R significantly predicted the athletes' ranking positions.

The study's findings align with a broader body of literature that consistently highlights the positive impact of self-confidence on athletic performance. For example, Hays et al. (2009) found that elite athletes across various disciplines often cited self-confidence as a crucial psychological factor for successful performance, noting that it enhances focus and resilience under pressure. Similarly, Woodman and Hardy (2000) conducted a meta-analysis which emphasized that self-

confidence generally has a medium-to-large positive effect on performance, reinforcing the idea that self-assured athletes are better equipped to handle competitive stress.

In contrast, the negative correlation found between cognitive anxiety and DS performance in this study aligns with findings by Martens et al. (1990), who noted that high levels of cognitive anxiety are often detrimental, as they disrupt athletes' concentration and decision-making abilities. This is particularly relevant in sports like DS that may require a high level of mental acuity and rapid response to changing situations. These findings are further supported by Craft et al. (2003), who noted that while cognitive anxiety can sometimes serve as a motivator, in most cases, its interference with mental clarity and emotional regulation is more likely to impair rather than enhance performance.

Regarding somatic anxiety, the findings in this study are consistent with the more moderate effect observed in other research. For instance, Mellalieu, Hanton, and Fletcher (2009) reported that while somatic anxiety may increase an athlete's physiological arousal, its effects on performance can be either positive or negative, depending on the athlete's interpretation of these physiological symptoms. Hardy and Parfitt (1991) also suggested that somatic anxiety's impact is often more situational and tends to be less predictive of performance outcomes than cognitive anxiety. These results echo the current study's findings, where somatic anxiety shows a weaker but still significant relationship with DS performance.

The consistency of these findings with the broader literature underscores the nuanced role of self-confidence, cognitive anxiety, and somatic anxiety in influencing sports performance. Given that both self-confidence and cognitive anxiety appear to be significant predictors, they could serve as primary targets for psychological training interventions across various sports, not limited to DS. Meanwhile, somatic anxiety's variable impact suggests that it may be context-dependent, reinforcing the need for individualized approaches that consider each athlete's unique responses to anxiety symptoms.

6.3. DIFFERENCES AMONG HIGH AND LOW LEVEL ATHLETES IN TERMS OF CSAI-2R

Dividing the sample into two groups revealed significant differences between HP and LP athletes in cognitive anxiety, somatic anxiety, and self-

confidence. Hypothesis H_3 was partially confirmed by the analysis of optimal levels of anxiety and self-confidence for maximizing performance. Data showed that HP athletes had significantly lower levels of cognitive anxiety (M = 11.61, SD = 2.27) compared to LP athletes (M = 15.96, SD = 2.88), suggesting that top-ranking athletes experienced lower cognitive anxiety. High cognitive anxiety can interfere with concentration and decision-making, whereas lower levels of cognitive anxiety allow athletes to maintain mental calm and focus. Regarding somatic anxiety, HP athletes exhibited slightly low-er levels (M = 15.77, SD = 1.72) than LP athletes (M = 17.51, SD = 1.94). Somatic anxiety levels did not vary by class within the HP and LP groups, indicating that regardless of class, athletes who keep somatic anxiety at moderate levels tend to perform better. HP athletes also had significantly higher self-confidence (M = 15.12, SD = 2.56) than LP athletes (M = 10.16, SD = 3.27). In summary, optimal performance is associated with moderate somatic anxiety, moderate self-confidence, and lower cognitive anxiety. The findings reinforce the IZOF theory by Hanin (2000), which suggests that each athlete has a unique "optimal range" of anxiety and self-confidence that promotes peak performance. Specifically, the lower cognitive anxiety and moderate somatic anxiety levels observed in HP athletes align with IZOF's assertion that individual athlete's function best within a specific range of arousal and stress levels. This indicates that coaches and sports psychologists should identify and nurture each athlete's optimal levels to enhance performance, rather than targeting uniform anxiety reduction strategies across all athletes. The significant difference in cognitive anxiety levels between HP and LP athletes highlights cognitive anxiety as a key factor differentiating performance levels. Cognitive anxiety often interferes with decision-making and concentration, which are crucial in competitive settings. Studies by Raglin and Hanin (2000) have shown that athletes who can effectively manage cognitive anxiety are often more adaptable and resilient, suggesting that intervention strategies focused on cognitive relaxation techniques, like mindfulness and cognitive restructuring, could be particularly beneficial for LP athletes. The slightly lower but still moderate somatic anxiety levels in HP athletes suggest that some physical arousal might be beneficial for performance, supporting Yerkes-Dodson's arousal-performance theory (1908). While high somatic anxiety can impair fine motor control, moderate levels may enhance alertness and readiness for competition. This balance is essential for HP athletes, as an overly

relaxed physical state could reduce competitive drive, while excessive arousal could undermine motor precision. Therefore, somatic techniques like controlled breathing or progressive muscle relaxation could be used to maintain arousal within this beneficial range. The significantly higher self-confidence observed in HP athletes is consistent with findings from Hays et al. (2009), who identified self-confidence as a robust predictor of performance across various sports. Self-confidence contributes to a positive mindset, enabling athletes to visualize successful outcomes and recover quickly from setbacks. For LP athletes, confidence-building strategies like positive self-talk, visualization, and goal setting could be key in enhancing performance. This reinforces the need for individualized psychological training to elevate confidence to levels like those observed in HP athletes. These findings suggest a multi-faceted approach to developing LP athletes, focusing on reducing cognitive anxiety, achieving moderate somatic anxiety, and building self-confidence. Coaches and sports psychologists might use assessments like the CSAI-2R to track athletes' anxiety and confidence levels and then personalize training programs based on each athlete's psychological profile.

6.4. THE ROLE OF EXPERIENCE AND PERCEIVED PREPAREDNESS ON PERFORMANCE OUTCOMES AND EMOTIONAL STATES

The data for hypothesis H_2 also indicated that experience and perceived preparedness significantly affected performance outcomes, mediating the effect of pre-competitive emotional states. Athletes with greater experience reported lower levels of cognitive anxiety and higher self-confidence, suggesting that emotional management improves with experience. This suggested that athletes with more experience tended to better manage cognitive anxiety, enhancing their self-esteem and performance. These results were consistent with findings from other studies (Mellalieu et al., 2009; Hanton et al., 2008) indicating that athletes with high levels of experience exhibited lower levels of cognitive anxiety and higher levels of self-confidence compared to those with lower levels of experience. Additionally, a positive perception of one’s preparedness was associated with lower anxiety and elevated self-confidence, supporting focus during competition. These results align with the competence perception theory, which suggests that confidence in one's abilities promotes more effective anxiety management and better performance (Parnabas et al., 2015; Uçan & Çağlayan, 2012). Somatic anxiety appeared less

influenced by experience, indicating that the physiological stress response may be more resistant to the effects of time and practice. Perception of preparedness had a significant impact on all dependent variables: cognitive anxiety, somatic anxiety, self-esteem and final performance, indicating that feeling well-prepared was crucial for anxiety management and performance enhancement. Athletes who felt more prepared tended to experience less anxiety and have greater self-confidence, leading to better competitive outcomes.

The findings that experienced athletes exhibit lower cognitive anxiety and higher self-confidence highlight the developmental role of competitive exposure in emotional regulation. Experience appears to strengthen athletes' ability to cope with pre-competitive stressors, likely because exposure to varied competitive scenarios builds familiarity and resilience. Hanton, Mellalieu, and Hall (2004) noted that experience enhances an athlete's coping strategies, particularly in managing cognitive anxiety, as athletes learn to interpret anxiety as a normal part of competition rather than a hindrance. This aligns with findings from the current study, which indicate that emotional self-regulation and confidence are skills honed through repeated exposure to competitive settings. The strong association between perceived preparedness and reduced cognitive anxiety is consistent with competence perception theory, which posits that belief in one's capabilities buffers against stress (Bandura, 1997). Feeling well-prepared likely provides a sense of control, reducing uncertainty and allowing athletes to focus on executing their skills without distraction from anxiety. This suggests that coaches might focus on tailored preparation programs that not only build physical skills but also reinforce athletes' confidence in their readiness, potentially improving both mental and performance outcomes. The data indicating that somatic anxiety is less affected by experience suggests that physiological responses to stress (e.g., increased heart rate, sweating) may be more stable over time than cognitive responses. This observation aligns with research by Jones and Swain (1992), which found that while cognitive anxiety decreases with experience, somatic anxiety often requires specific training to manage, as it is less responsive to simply "getting used to" competition. Techniques such as biofeedback, breathing exercises, and relaxation training may therefore be more effective than experience alone in helping athletes control somatic symptoms during competition.

6.5. DIFFERENCES AMONG ATHLETES OF D, C AND B CLASSES

Concerning hypothesis H_4, comparisons among athletes of different classes showed significant differences in years of experience, perceived preparedness, cognitive anxiety, and self-confidence. Specifically, B-class athletes had more years of experience than C-class and D-class athletes, and C-class athletes had more experience than D-class athletes. This suggested that experience gradually increased with progression through classes.

Regarding perceived preparedness, no substantial differences were found between C-class and B-class athletes or between D-class and C-class athletes, but there was a notable difference between D-class and B-class athletes. D-class athletes perceived themselves as less prepared to compete compared to B-class athletes. This suggested that D-class athletes might have felt less prepared than their more experienced counterparts. Regarding levels of cognitive anxiety, it appeared that C-class athletes experienced higher levels compared to B-class, followed by D-class, with the difference not being significant. B-class athletes showed lower levels of cognitive anxiety. The perception of higher mental pressure by C-class athletes could be attributed to the fact that they were in an intermediate phase between D-class, which was promotional and potentially less competitive, and B-class, where athletes had already demonstrated the ability to compete effectively and thus the environment was more established. Regarding self-confidence, B-class athletes experienced high levels of self-confidence compared to D-class athletes. B-class athletes, having accumulated a greater number of years of experience compared to athletes in lower classes, had had more opportunities to develop and consolidate their skills, face and overcome challenges, and achieve positive results (Uçan & Çağlayan, 2012). Finally, regarding levels of somatic anxiety, they did not seem to vary according to the athlete's class. Thus, somatic anxiety could have been a common physiological response for all athletes, regardless of their level of competition.

The gradual increase in experience from D-class to B-class athletes highlights experience as a key determinant for advancing through classes. This aligns with skill acquisition theories, which emphasize that accumulated practice and exposure

to competitive scenarios foster skill development and psychological resilience (Ericsson et al., 1993). Over time, experience enables athletes to refine both their technical and mental strategies, supporting progression through competitive levels. Thus, the observed differences in experience between classes reinforce the view that extended practice and exposure to competition are crucial for reaching higher athletic classes.

The significant difference in perceived preparedness between D-class and B-class athletes suggests that more advanced athletes, with greater experience, may develop a heightened sense of readiness. This aligns with the competence perception theory, which posits that confidence in one's abilities reduces stress and enhances focus (Bandura, 1997). This may imply that preparedness is not merely a physical state but a mental asset that strengthens with experience. For D-class athletes, the relative lack of preparedness could result from fewer competitive encounters, which can limit confidence and familiarity with higher-pressure settings. Coaches and trainers might focus on bolstering this sense of preparedness in lower-class athletes through tailored mental training, including simulation of competitive conditions to improve familiarity and comfort.

The finding that C-class athletes experience higher cognitive anxiety compared to both D-class and B-class athletes may reflect their intermediate competitive status. Positioned between D-class, where competition is less intense, and B-class, where athletes have demonstrated greater competitive success, C-class athletes might feel a unique pressure to prove their competence. This could be associated with the notion of a "transitional phase," where athletes face increased expectations but have yet to reach full stability in their performance levels (Hanton et al., 2008). This finding aligns with IZOF theory, suggesting that anxiety levels fluctuate with changing competitive demands and environmental pressures (Hanin, 2000). Coaches could support C-class athletes by implementing cognitive restructuring techniques or relaxation exercises aimed at managing this transitional anxiety.

The higher self-confidence in B-class athletes compared to D-class athletes suggests that confidence develops alongside experience and competitive success. This echoes findings by Hays et al. (2009), which indicate that accumulated success and skill mastery reinforce an athlete's belief in their abilities. Over time, repeated positive outcomes build a foundation for self-confidence, making athletes more

resilient under pressure and promoting a positive outlook in competition. For D-class athletes, confidence-building exercises, such as visualization and goal-setting, could be especially beneficial, helping to foster self-belief and emotional stability.

The lack of variation in somatic anxiety levels across classes implies that physiological responses to competition may be consistent regardless of class. Somatic anxiety, characterized by physical sensations like increased heart rate and sweating, might reflect a shared response to the demands of competition rather than a variable trait linked to experience or class. This finding is consistent with studies indicating that somatic responses are often stable across different competitive levels (Jones & Swain, 1992). It suggests that while cognitive anxiety and self-confidence may change with experience and preparedness, somatic anxiety might require specific interventions to be effectively managed, as it is not mitigated by increased experience alone.

6.6. DIFFERENCES AMONG ATHLETES IN TERMS OF CLASS AND PERFORMANCE LEVEL

The two-way ANOVA results provide insightful distinctions on how performance level (HP, LP) and athletic class impact psychological variables, specifically somatic anxiety, self-esteem, and cognitive anxiety. The finding that HP athletes experience significantly lower somatic anxiety than LP athletes ($p < .001$) aligns with previous literature suggesting that elite athletes often exhibit better control over their physiological responses in high-pressure scenarios (Jones & Swain, 1992). Lower somatic anxiety in HP athletes could reflect more refined arousal management skills, which can help maintain physical control and reduce detrimental effects of excessive physiological arousal on performance. This result is also consistent with Yerkes-Dodson's law, which suggests that moderate levels of arousal are optimal for performance, while too high or low arousal may impair performance (Yerkes & Dodson, 1908). The absence of significant differences in somatic anxiety across athlete classes indicates that this variable is more strongly associated with performance level than with class, which could mean that somatic anxiety management develops primarily through competitive experience and performance-related training rather than classification status.

Both the class and performance level significantly impact self-esteem ($p < .001$), suggesting that higher performance levels and possibly more advanced

classes are associated with greater self-esteem. This could reflect the notion that higher-ranking athletes and those in advanced classes are more likely to have experienced repeated success and skill reinforcement, which boosts self-esteem. Self-esteem in athletes has been linked to their sense of competence and achievement (Hays et al., 2009), which can be fostered through challenging and progressive training environments often associated with high-level performance. The lack of interaction between class and performance level suggests that while both factors independently contribute to self-esteem, they do not amplify or diminish each other's effects. This finding indicates that while self-esteem can vary by both the athlete's rank and classification level, the impact is additive rather than synergistic.

Cognitive anxiety is significantly influenced by both performance level and class ($p < .001$), meaning that athletes with higher performance levels and higher classifications tend to experience less cognitive anxiety. This may reflect greater mental resilience and familiarity with competitive environments, which can lessen cognitive anxiety through habituation to stress-inducing conditions (Craft et al., 2003). Lower cognitive anxiety among HP athletes and those in higher classes may facilitate clearer thinking, improved focus, and better decision-making under pressure, all of which are crucial for competitive success. This finding aligns with IZOF theory, which posits that individuals have specific ranges of optimal arousal levels (Hanin, 2000). The absence of a significant interaction effect here suggests that while both performance level and class independently influence cognitive anxiety, the impact of one does not depend on the other. In practice, this could mean that each factor's effect on cognitive anxiety remains consistent regardless of variations in the other factor. The distinct impacts of performance level and class on these psychological variables highlight the importance of individualized training and mental conditioning.

VII – CONCLUSIONS

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The study explored in detail the relationship between pre-competitive emotional states, particularly anxiety and self-esteem, and performance in competitive dancesport (DS). The four hypotheses formulated enabled a structured and in-depth exploration of specific aspects of competitive psychology in DS athletes, providing a more precise view of the emotional dynamics influencing their performance. Below are the conclusions for each hypothesis.

H_1: Pre-competitive anxiety and self-esteem significantly influence DS athletes' performance.

The results fully confirm this hypothesis, highlighting that both anxiety, in its somatic and cognitive components, and self-esteem play a decisive role in performance. Moderate levels of anxiety were found to have a stimulating effect on concentration, while excessive anxiety led to distraction and insecurity, compromising expressive and technical quality. In contrast, high self-esteem is associated with better emotional control, greater confidence during competition, and improved execution, facilitating the mental approach necessary for success.

H_2: Years of experience and perceived preparedness influence performance outcomes, mediating the effect of pre-competitive emotional states.

This hypothesis was significantly confirmed. Athletes with more experience showed higher levels of self-esteem and lower levels of pre-competition anxiety, which facilitated their performance. Additionally, perceived preparedness proved to be a mediating factor between emotional states and performance, indicating that a strong perception of preparedness helps mitigate the negative effects of anxiety and sustain self-esteem, minimizing psychological interference before competition.

H_3: There are optimal levels of anxiety and self-esteem that maximize DS athletes' performance.

The data collected indicate that optimal performance is achieved with moderate levels of cognitive and somatic anxiety and high levels of self-esteem. Athletes within these levels showed an improved ability to manage competition pressure and maintain focus on technical aspects. Outside these optimal levels, excessive anxiety leads to rigidity and lack of fluidity in movements, while too low anxiety levels may indicate insufficient competitive activation. Knowledge of these optimal ranges provides a guide for psychological interventions, with the aim of keeping athletes within ideal activation levels.

H_4: anxiety and self-esteem levels vary depending on the athletes' level and class.

The analysis also confirmed this hypothesis, showing significant differences between athletes from different classes (B, C, and D) and with varying levels of experience. Higher-level athletes (class B) reported higher levels of self-esteem and more effective anxiety control compared to lower-class athletes, suggesting that experience in more intense competitions helps build greater psychological resilience. This finding indicates that emotional and anxiety management skills can improve progressively with career advancement, especially if systematically integrated into athletes' preparation.

Study highlights

This study stands out for its originality and contributes to the field of sports psychology applied to DS, examining the relationship between emotional states, particularly pre-competitive anxiety and self-esteem, and athletic performance. As one of the first studies to investigate the impact of these psychological variables in such a specific competition context, it provided crucial insights for enhancing DS athletes' performance. The results highlight four key points that form the foundation for targeted practical interventions:

1) Management of somatic anxiety

The somatic component of anxiety, manifesting through physical symptoms such as muscle tension, increased heart rate, and stiffness, is particularly present in DS athletes, as this discipline requires precise body control and fluid performance.

Physiological regulation techniques, such as deep breathing, progressive muscle relaxation, and autogenic training, have proven effective in reducing somatic anxiety. These tools allow athletes to stabilize their physical responses to stress, improving concentration and movement control during performance. Regular implementation of these techniques in training routines can lead to reduced physical tension before competition, allowing for a more relaxed and optimal performance.

2) Building self-esteem

Self-esteem was found to be a fundamental element for success in DS. Good self-esteem allows athletes to approach competition with greater confidence and focus, reducing the likelihood of self-sabotage and improving psychological resilience. To strengthen athletes' self-esteem, specific interventions such as positive visualization, self-affirmation, and realistic goal setting can be employed, helping maintain a positive attitude and realistic view of one's abilities. Building a stable and strong self-esteem enables athletes to express their potential to the fullest, increasing performance quality not only from a technical but also from an interpretative perspective.

3) Reducing cognitive anxiety

Cognitive anxiety, which manifests as mental worry and negative thoughts, can interfere with concentration and focus, hindering effective performance. The study emphasized the importance of targeted interventions to reduce cognitive anxiety, such as mindfulness, cognitive restructuring, and visualization. Mindfulness helps athletes focus on the present moment, reducing attention to thoughts of failure or fear, while cognitive restructuring aims to replace negative thoughts with positive and realistic beliefs. Finally, visualization allows athletes to create a detailed mental image of success, reinforcing confidence and mentally preparing them for competition. These techniques are crucial for improving thought control and maintaining a positive focus, essential elements for strong DS performance.

4) Monitoring perceptions and experiences

Experience and personal perception of preparedness emerged as critical variables influencing how athletes manage pre-competitive anxiety and approach competition. Athletes with more years of experience tend to show greater control over their emotional states, having developed anxiety and pressure management strategies over time. Additionally, subjective perception of one's preparedness significantly impacts self-esteem and performance: athletes who perceive themselves as well-prepared tend to manage pre-competition stress better, positively impacting performance. Incorporating periodic and individual evaluations of perceived preparedness and self-efficacy during training allows athletes to monitor and improve their level of psychological readiness, ensuring more complete preparation.

VIII - LIMITATIONS AND FUTURE DIRECTIONS

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The strength of the study lay in its originality, as it was one of the first to address the relationship between anxiety and performance in the world of competitive DS.

However, the study had several limitations. One of the main limitations was the sample size, which restricts the generalizability of the findings. Expanding the study to include a larger and more diverse sample, particularly from A-class athletes, would provide further insights into how anxiety and self-esteem function at the highest levels of competition.

Additionally, a longitudinal study design could shed light on how these psychological variables change over the course of an athlete's career, from initial competition through to peak performance years. This could help clarify whether the relationship between anxiety, self-esteem, and performance remains consistent over time or whether different phases of an athlete's career present unique psychological challenges.

It would also be valuable to investigate whether the athletes' psychological responses vary depending on the context of the competition. Future studies could include a repeated-measures design, where athletes are assessed not only before competition but also after, to gauge how anxiety levels fluctuate throughout the competitive process. This would allow for a more dynamic understanding of the interplay between anxiety and performance and provide clearer indications of when interventions might be most effective.

Another avenue for further exploration is the role of trait versus state anxiety. While this study focused primarily on pre-competitive state anxiety, understanding whether athletes tend to experience anxiety consistently (trait anxiety) or whether it spikes in specific situations (state anxiety) could provide deeper insights into how anxiety impacts performance. Differentiating between these types of anxiety could help develop more targeted psychological interventions aimed at both long-term anxiety management and short-term competitive anxiety reduction.

Building on the findings of this study, several areas of future research could provide additional value to understanding the complex relationship between anxiety, self-esteem, and performance. For example, investigating how gender differences influence the experience of anxiety in competitive sports could reveal important insights. Research has suggested that male and female athletes may differ in their responses to competitive pressure, with female athletes sometimes reporting higher levels of anxiety (Weinberg & Gould, 2018). Understanding these differences could lead to more personalized interventions aimed at supporting athletes based on their individual psychological profiles.

Furthermore, exploring the role of social support systems in reducing anxiety and enhancing self-esteem could provide valuable insights. The presence of a supportive network, including coaches, teammates, and family members, has been shown to buffer against the negative effects of anxiety (Freeman & Rees, 2008). Future studies could examine how different forms of social support contribute to psychological resilience in competitive athletes, potentially leading to improved performance outcomes.

Lastly, it may be worthwhile to explore how technological advancements, such as virtual reality (VR) training, could be used to simulate high-pressure competition scenarios and help athletes develop coping strategies in a controlled environment. VR technology has already been used in sports training to replicate the stress of real-world competition, providing athletes with a safe space to practice mental and emotional regulation under pressure. Integrating this kind of innovative technology into training programs could offer new ways to address performance anxiety before it becomes a limiting factor in real competitions.

IX - REFERENCES

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X – APPENDIX

X - APPENDIX

Appendix 1. International stay

UNIVERITÀ DEGLI STUDI
DI SALERNO

UCAM Sports Sciences Doctorate Commission

UCAM Director of the International Doctoral School

Subject: International Stay completed (*Estancia Internacional*) - Dr. Sara Aliberti (224968).

The undersigned, Professor Francesca D'Elia, as Scientific Director of the Laboratory of Physical, Movement and Sport Education (Academic Discipline: Methods and Teaching of Movement Activities) at the University of Salerno, with legal seat in Via Giovanni Paolo II, 132, 84084 Fisciano, Salerno, Italy,

I declare that Dr Sara Aliberti, CA52143FE - NIP 123774, completed her International Stay (*estancia internacional*) at my Research Laboratory. The stay lasts from 1st November 2023 to 15th February 2024, during which time in-depth children movement assessment and statistical analyses of data recruited were performed.

Salerno 20/04/2024

The Scientific Director
of the Research Laboratory of
Physical, Movement and Sport Education
University of Salerno
Prof. Francesca D'Elia

The doctoral student

Appendix 2. Ethical approval

UCAM
UNIVERSIDAD CATÓLICA SAN ANTONIO

UCAM ETHICS COMMITTEE

PROJECT DATA

Title:	"The influence of emotional states on dancesport performance"

Principle Researcher	**Name**	**Email**
PhD.	Domenico Cherubini	dcherubini@ucam.edu

COMITTEE REPORT

Date	**21/07/2023**	**Code**	**CE072315**

Type of Experimentation

Experimental clinical research involving human subjects	
Non-clinical experimental research with humans	
Using human tissues from patients, healthy people, embryonic or fetal tissue	
Using human tissues, embryonic or fetal tissue from banks or tissue samples	
Observational research with humans or use of personal data	X
Animal studies	
Use of biological agents of risk to human health, animal or plant	
Use of genetically modified organisms (GMOs)	

Comments regarding the type of experimentation
No comments

Comments regarding the methodology of experimentation
No comments

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Appendix 3. Certificate of acceptance of the final work by Sports

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CERTIFICATE OF ACCEPTANCE

The certificate of acceptance for the manuscript (**sports-3262471**) titled:
Impact of pre-competitive emotional states on dancesport performance

Authored by:
Sara Aliberti; Gaetano Raiola; Francesca D'Elia; Domenico Cherubini

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Stefan Tochev
Chief Executive Officer