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The role of emotional states and mental techniques in dancesport: A systematic review

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Abstract

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Keywords

ballroom; performance; anxiety; mental state; competition; psychological preparation

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Review

The role of emotional states and mental techniques in dancesport: A systematic review

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Keywords: ballroom; performance; anxiety; mental state; competition; psychological preparation.

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1. Introduction

1.1 DS performance profile

Dancesport (DS) means competitive ballroom dancing, classified by Dal Monte [1] and Lubich & Cesaretti [2] as a sport of dexterity. It requires significant muscular effort, important solicitation of the neuro-sensory system and complex and extremely precise movement acts. Among the disciplines of DS, there are five standard dances (waltz, tango, slow fox, Viennese waltz, quick step) that can be performed in a couple, and five Latin dances (samba, cha-cha, rumba, paso doble and jive) that can be performed solo, in a couple or in formation. Each dance differs in technique and interpretation. One of the fundamental skills is linking and harmonizing complex dance figures, personally interpreted by athletes, in space and time, determined by rhythm, coordination, strength, balance, agility, precision, posture. For this reason, the technical quality combined with artistic performance forms the ideal DS dancer [3]. Performance can be evaluated by a panel of judges, according to technical and artistic parameters. Given the dual nature of such

a sports-arts discipline, it is important to be prepared both physically and mentally. Competitive performance is influenced by many factors, such as technical ability or physiological and psychological factors [4].

1.2 Competitive states

In terms of the psychological level, competition is a situation that tends to produce anxiety and stress, characterized by an increased arousal [5]. Anxiety is a natural reaction to a perceived threat or stress that leads to a 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. 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. The Yerkes-Dodson law [6] describes the empirical relationship between stress and performance, which can be represented as an inverted U-shaped curve. The left side of the curve represents low arousal, while the right one high arousal. In the middle, there is a medium level of arousal. The vertical line on the left side goes from weak performance (bottom) to maximum performance (top). The optimal state of arousal and performance is achieved in the middle of the curve. This means that enough stress is needed to provide motivation, but not so much that one is overwhelmed. A second variable to consider is the type of performance. For fine tasks, a high level of arousal is not required, unlike those requiring a higher load, as in DS. The third and final variable is the level of the athlete: for beginners, low levels of activation are required, unlike for elite athletes. [6]. Another theory says that anxiety is multidimensional [7] and contains two elements that affect performance differently: cognitive and somatic. Cognitive anxiety is represented by thoughts about performance, negative worries and perceptions, and de-structuring images that lead the athlete to face competition with low self-esteem and a low sense of self-efficacy. Somatic anxiety, on the other hand, is represented by bodily signs, such as an accelerated heart rate, sweating, muscle weakness or stiffness, and shortness of breath. It usually arises and accompanies the start of the competition but tends to dissolve naturally. Hanin [8], 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 considers the importance of multidimensionality, including somatic anxiety, cognitive anxiety, and self-confidence, unlike previous simplistic and unidimensional theories. Each athlete experiences several emotions; consequently, athletes must learn to know their optimal and non-optimal zones for achieving performance [9]. Based on the aforementioned theories, psychological states during competition seem to be an important factor to determine successful performance [10]. The emotional states experienced by the athlete before and during competition are strongly correlated with sports performance [11]. 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 [12]. Having a certain level of activation helps the athlete to reach his maximum potential. However, high levels of activation can lead the athlete to overdoing, while low levels indicate a protective factor or athlete's little commitment that does not lead him to properly activate the body and its functions [13–14]. A study performed by Bejek & Hagtvet [15] conducted on gymnastics, another aesthetic sport, showed that female athletes with high performance had high self-confidence, which was positively correlated with precompetitive anxiety. Thus, self-confidence has been found to be a significant predictor of performance [16], but also a certain level of anxiety is necessary. Achieving the state of flow (being completely immersed in what you are doing) [17], accompanied by peak performance, would be ideal. To achieve these conditions, mental training becomes essential.

1.3 The importance of mental training

The ability to monitor one's emotions is very important in competition. Very often athletes who experience defeat lose self-confidence and quit sport [18], especially when beaten by objectively weaker athletes. On the other hand, athletes who perform well in training very often fail to reach peak performance in competition. This can lead to their mental state. The peculiarity of DS and other aesthetic disciplines is that when the athlete performs, he must convey a series of emotions to the judges to beat other competitors. The general components assessed by judges are technical quality, choreography, image, and show [19]. These last two include the ability to communicate with the audience and the judges, to create a good atmosphere and to show one's own personal style [20]. To manage these psychological variables, a lots of mental strategies can be used. Mental training refers to the process training that can influence the athletes' mental process. Even athletes state that the mental aspect is crucial to achieve good performance [21]. Imagination, goal setting, inner dialogue and relaxation techniques are the four most commonly used basic mental techniques [22]. Psychological training varies according to the type of sport, athlete and event. There is no uniform standard, but there are different methods that can be adopted [23]. However, the field of DS is generally quite unexplored, especially in the area of dancer's mental preparation [24].

1.4 Aim of the study

Briefly, 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 [25]. Therefore, the analysis of emotions and the use of mental techniques to monitor them are essential to understand how they can affect DS performance [26]. The aim of this systematic review is to summarize the studies examining the influence of emotional states on DS performance and the use of mental techniques to improve psychological preparation to face the competition. A meta-analysis was not conducted due to a lack of consistent variables across studies and populations..

2. Materials and Methods

2.1. Literature search strategy

The PRISMA 2020 guidelines for systematic reviews were followed. To conduct this review, Web of Science, Pubmed, Scholar and Scopus databases were explored to collect articles. The following string was applied: "dancesport" AND "psychology", "dancesport" AND "anxiety", "dancesport" AND "emotions", "dancesport" AND "performance" 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..

2.2. Inclusion and exclusion criteria

Only original articles written in English were considered for inclusion in this review. The cut-off date for the publication period was set from the January 2000 to December 2022. Systematic reviews, meta-analyses, abstracts and books were excluded. Eligible items were studies, either theoretical, descriptive or experimental, that had DS athletes as the sample and addressed topics such as the psychological parameters that could influence competition and the use of mental techniques to improve psychological preparation to face the competition. Both qualitative and quantitative articles were considered. The screening process is summarized within the PRISMA flowchart, as shown in Figure 1.

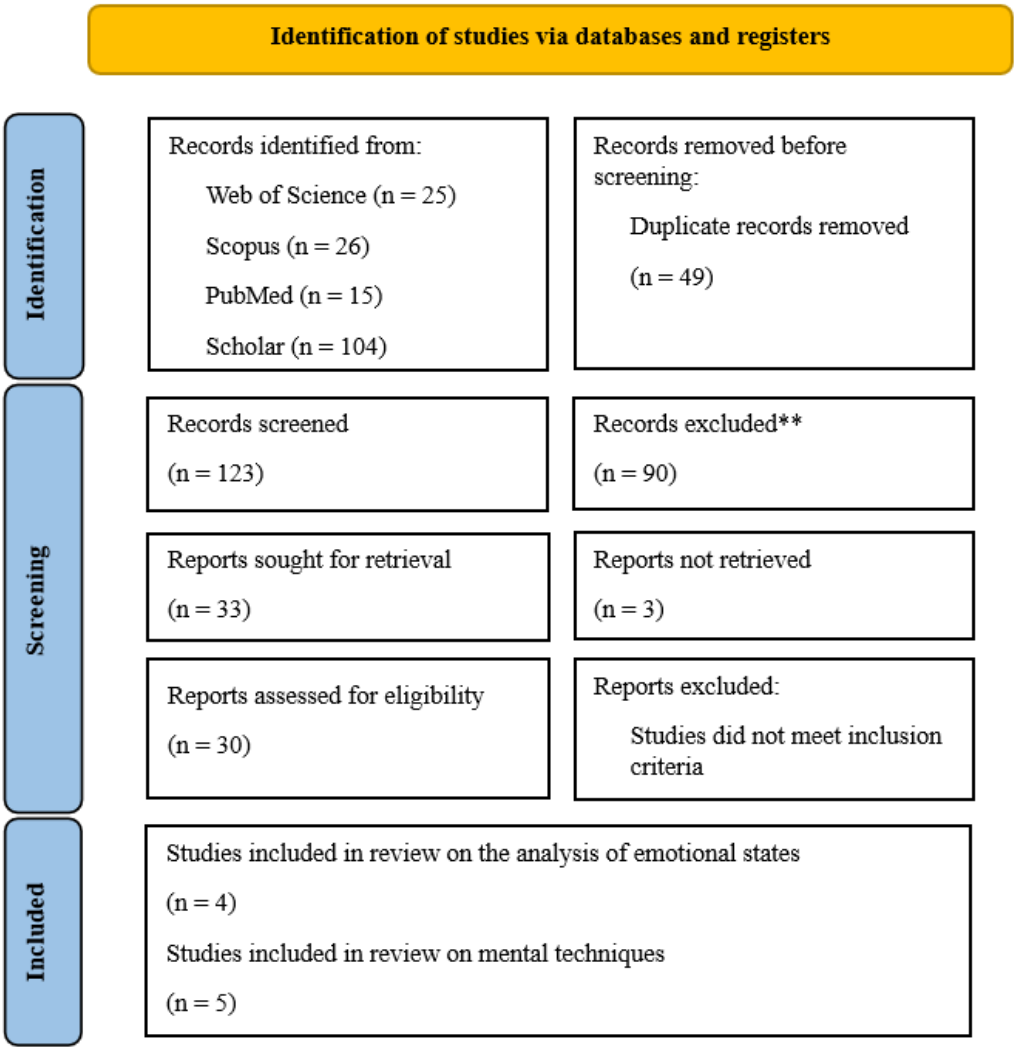

Figure 1. Literature search strategy process step by step using the PRISMA flowchart

3. Results

Database search returned a total of 170 records matching the search criteria. Removal of 49 duplicate items left 123 items for analysis. The titles and abstracts were then screened for relevance to the inclusion criteria, which resulted in the removal of additional 90 items. The full texts of the remaining 30 articles were screened for eligibility. This resulted in a final sample of 9 relevant articles. Specifically, 4 articles focused on the emotional states experienced by athletes in competition that could affect performance quality and 5 articles on mental strategies used for psychological preparation. Table 1 presents 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).

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 observations.	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 techniques are used to manage athletes' emotions.	Little 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.	NA	Theoretical analysis	DSa have to 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 yo)	Descriptive study. Tool: SQ.	State anxiety level ↑ bc (54.5 ±0.8).	More focus not only on DSa with HL of anxiety, but also on 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 yo)	Descriptive study. Tools: 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, dancesport athletes; F, female; HL, high level; LL, low level; M, male; NA, not applicable; SQ, Spielberg questionnaire; yo, years old; +, positive; -, negative; ↑, increase; ↓, decrease.

To manage psychological parameters, five mental techniques were identified in DS field: the nine-step connection model, Cantón's Giraffe motivational coaching model, neurofeedback, motivational self-talk, and mental contrasting. Table 2 showed an overview of studies focusing on a specific technique to improve mental states in DS athletes.

Table 2. Psychological techniques to improve DS performance in competition

Authors	Aim	Sample	Methods	Results	Suggestions
Čačković et al. (2012b)	To explain the nine-step connection model.	NA	Theoretical analysis	This technique can be useful to reduce stress levels.	EXP study is necessary to verify the effects of this model on performance.
Peris-Delcampo et al. (2017)	To examine the effects of Cantón's Giraffe motivational coaching model.	1F HL DSa (20 yo)	EXP study on Cantón's Giraffe method. Tools: RPWS, RSEQ, MFA.	Improvement in self-acceptance, self-esteem, and motivational force.	Increase the number of this type of studies and the sample size.
Raymond et al. (2005)	To test the effects of neurofeedback on DS performance.	24 DSa (20.54 ± 2.38)	EXP study with 3 groups: 1) AT-NF 2) HRV-BF 3) CON Tools: performance assessment.	AT-NF and HRV-BF 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 yo)	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; HRV-BF, heart rate variability biofeedback; CON, control group; DSa, dancesport athletes; EXP, experimental; F, female; HL, high level; MFA, ad-hoc instrument for the motivational force assessment; NA, not applicable; AT-NF, alpha-theta neurofeedback; RPWS, Ryff Psychological Wellbeing Scales; RSEQ, Rosenberg Self-Esteem Questionnaire; SES, Rosenberg's Self-esteem scale; STAI, State Trait Anxiety Inventory; yo, years old.

4. Discussion

The results of the present study were divided into two sections: the first one aimed to summarize the psychological states experienced by athletes during competition that could affect performance, while the second one focused on the mental technique applied to improve psychological preparation.

4.1 The role of emotional states on DS performance

The emotional state experienced by DS athletes were anxiety, arousal, stress, self-confidence, and concentration [27]. 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 listen to music, do breathing exercises, enjoy their time with friends, or use psychological techniques such as concentrating on the performance or trying to divert the attention from the competition in general. Emotional states seem to be influenced by years of experience: high-level athletes perceived more positive motivational states [28] compared to athletes with less experience [27]. More information is required concerning athletes with disabilities [29] to have a complete overview. The kind of event in which athletes participated could also influence the type of their emotional state [30]. Anxiety was the most frequently identified in this systematic review. Having a certain level of anxiety is necessary to mobilize all body systems to achieve sports results [31–32]. However, an increased anxiety level can cause negative feelings. Finally, Ermolaeva [32] said that attention should be paid not only to 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 [33], which are part of the multidimensional theory [7]. 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 [34]. Somatic anxiety, on the other hand, is represented by bodily signs such as accelerated heart rate, breath shortness, sweating, muscle weakness or stiffness [34]. There are many others theories that explain the relationship between anxiety and performance, but these have fallen into disuse because of the complexity of the phenomenon [21]. Future research is needed to understand the relationship between the kind of anxiety and performance outcome. According to Ermolaeva [32], pre-competition state anxiety, related to feelings linked to a particular situation, significantly increased respect to trait anxiety, which refers to a more stable aspect of personality. Pakulanon & Poomsalood [35] 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 the 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 [36], and this also influenced motivation [37]. Thus, 1-week before competition was a stressful period in which anxiety increased and self-confidence decreased. Coaches should work on preparing athletes mentally [38] taking into consideration the results that emerged. Finally, another meaningful psychological parameter is stress [4] caused by many factors that can be changeable, unchangeable, internal, and external. However, in aesthetic sports the effect of competing contextual factors needs to be better explored [39]. As a result, the athlete's mental state before and during competition can affect the performance quality [40].

4.2 Mental technique used in DS

To manage these psychological parameters, five mental techniques were identified: the nine-step connection model, Cantón's Giraffe motivational coaching model, neurofeedback, motivational self-talk, and mental contrasting.

The first technique described in the review is the nine-step connection model, proposed by Čačković et al. [41]. This technique is a routine designed to deal with stress between rounds during competition. It consists of nine steps: focusing from the end of the dance onwards, enjoying the applause of the audience, relaxing, focusing on physical preparation of the next dance, increasing energy, re-establishing contact with partner if present, choosing the position on the stage, establishing eye and physical contact (if partner present) and starting to dance. In this way, the athlete concentrates on thinking about the execution of the next dance to give his best, rather than on thinking about the mistakes of the previous dance.

The second technique is Canton's Giraffe model, proposed by Peris-Delcampo et al. [42], 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 once a month, when 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 [42].

The third technique focuses on Alpha/Theta neurofeedback (AT-NF) and the heart rate variability biofeedback (HRV-BF). Specifically, Raymond et al. [43] proposed 10 sessions of 20 minutes of AT-NF and HRV-BF as a technique to improve performance by working on relaxation. AT-NF 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 [44]. It seemed that AT-NF

increased performance through deep relaxation. HRV-BF 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 [45]. This allows the athlete to learn to self-regulate in various situations. Research suggested that relaxation and imagery are effective to improve performance [46]. It follows from the study by Raymond et al. [43] that thanks to AT-NF, athletes improved more on the technique parameter, while thanks to HRV-BF on the timing and overall execution of the performance.

The fourth technique proposed by Riederova [24] is the motivational self-talk, used 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 [47] and improving the 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 (maybe for small sample) although the athletes' perceptions of the benefits were positive.

Finally, the last technique is the mental contrasting, proposed by the study of Tay et al. [48]. The spontaneous mental contrasting is used to identify a desired future state by contrasting it with the barriers of current reality that must be broken down to achieve it [49]. 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 [50, 48].

4.3 Limitation of the study

This review has some limitations. Many of the included studies had small sample sizes, measured different outcomes, and were not experimental, making it difficult to conduct a meta-analysis. No study directly investigated the relationship between emotional states and the 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 mid-low-level athletes and with disabilities. Future research should focus on these directions. The number of collected articles seems to be a limitation, but it was a strength because only studies treating DS were involved and not dance in general, understood as an art form and theatre, which was quite different and more widely treated in the literature. The review was specific and selective in terms of the chosen sport, and, to our knowledge, there had been no other reviews that addressed this topic before.

5. Conclusions

The emotional states can affect DS performance in both positive and negative sense; therefore, it is important to monitor these factors [36] 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 more representative sample. It would also be interesting to study the effect of competing contextual factors on stress, which may be useful information for coaches.

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