PHYSICAL EDUCATION AND SPORTS SCIENCES

Influence of Mental Imagery on Competitive Anxiety among Wushu and Wrestling Athletes

Dr. Sujisha T G
Department of Psychology,
Sri. C Achutha Menon Govt.College, Kuttanellur,
Thrissur, Kerala, India - 680014
E-mail: drujisha@govtcollegethrissur.ac.in

Muhammed Unais
Post Graduate Student,
Department of Psychology
Sri. C Achutha Menon Govt.College, Kuttanellur
Thrissur, Kerala, India - 680 014
E-mail: epunais111@gmail.com

Abstract

The present study investigates the influence of mental imagery on competitive anxiety among junior-level athletes in the combat sports of Wushu and Wrestling. It is believed that applying mental imagery, a psychological task that involves visualizing successful performance and strategies for coping, may be an effective intervention for pre-competition anxiety and self-confidence.

Using a quasi-experimental pre-test post-test design, the study had included 10 participants (5 Wushu athletes and 5 Wrestling athletes) drawn from district-level training academies in Thrissur, Kerala. The participants were exposed to intervention involving structured mental imagery sessions before their competitions. The Competitive State Anxiety Inventory-2 (CSAI-2) was administered to measure cognitive anxiety, somatic anxiety, and self-confidence levels before and after the intervention.

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Results showed a significant reduction in cognitive and somatic anxiety scores, while self- confidence increased remarkably after the mental imagery intervention. Thus, mental imagery is an effective, inexpensive, and non-invasive psychological tool that can facilitate mental preparation and performance for an athlete. In conclusion, this study has highlighted the urgent need for integrating psychological training techniques, particularly mental imagery, into the day-to-day coaching routines, especially in such high-pressure situations like combat sports settings.

Key words: Competitive anxiety, Cognitive anxiety, Somatic anxiety, Self-Confidence, Mental Imagery, Wushu, Wrestling

Introduction

The scientific field of psychology investigates the complex mechanisms of the human mind, observing at the sensitive states, behavioral patterns, and cognitive operations that effect human proficiency and interaction. As a specialized field, sports psychology examines the psychological aspects of training, competition, and strong performance. This field studies cognitive processes, psychological interventions, and mental approaches that correct athletes' performance, mental toughness, and easy psychological strength (Carr, 2006). Sports psychology examines how mental processes such as motivation, confidence, emotional regulation, and stress influence athletes' performance. In competitive environments, athletes frequently encounter psychological challenges that may either enhance or impair their performance. Among these, competitive anxiety is one of the most widely studied constructs due to its significant impact on athletic outcomes (Martens et al., 1990).

Competitive Anxiety

Competitive anxiety refers to a situation-specific form of anxiety that arises in response to perceived performance demands in sports settings. Competitive anxiety is generally conceptualized as comprising two primary components: cognitive anxiety and somatic anxiety. Cognitive anxiety involves negative expectations, worry, and self-doubt, whereas somatic anxiety refers to physiological responses such as increased heart rate, sweating, and muscular tension (Weinberg & Gould, 2019). While a moderate level of anxiety may facilitate performance by increasing alertness, excessive anxiety can impair concentration, disrupt coordination, and reduce overall effectiveness. Prolonged exposure to competitive anxiety may also contribute to burnout, decreased motivation, and withdrawal from sports

participation (Hanton et al., 2005). Athletes participating in high-stakes competitions often experience heightened levels of anxiety due to the perceived importance of the event and its potential consequences (Hanton et al., 2005). Cognitive anxiety has been shown to disrupt attentional processes, leading to negative thought patterns and reduced concentration, while somatic anxiety affects physiological functioning, impairing motor coordination and execution (Weinberg & Gould, 2019). These two dimensions interact dynamically, influencing overall performance and psychological well-being.

Mental Imagery

Given the detrimental effects of excessive anxiety, sports psychologists have increasingly focused on developing interventions to regulate athletes' psychological states. One such intervention is mental imagery, also known as visualization or mental rehearsal. Mental imagery is defined as the cognitive process of creating or recreating experiences in the mind using multiple sensory modalities, including visual, auditory, and kinesthetic components (Morris et al., 2005). This technique allows athletes to mentally rehearse skills, anticipate competitive situations, and regulate emotional responses. Mental imagery is widely recognized as a cost-effective and non-invasive method for enhancing performance, increasing confidence, and reducing anxiety (Cumming & Williams, 2013). Research has demonstrated that mental imagery enhances motor skills, reaction time, decision-making abilities, and emotional regulation. By mentally rehearsing performance scenarios, athletes can prepare for competition more effectively, thereby reducing uncertainty and anxiety (Cumming & Williams, 2013).

Mental imagery can be categorized into motivational, cognitive, and somatic types, each serving distinct functions. Motivational imagery involves visualizing successful outcomes and goal attainment, thereby enhancing confidence and motivation (Hall et al., 1998). Cognitive imagery focuses on rehearsing specific skills and strategies, contributing to improved technical performance and motor learning (Frank et al., 2019). Somatic imagery, on the other hand, involves the visualization of physiological control, such as relaxation and breathing regulation, which helps reduce the physical symptoms of anxiety (Blumenstein & Orbach, 2012). These different forms of imagery collectively contribute to both performance enhancement and anxiety reduction.

Empirical studies have consistently supported the effectiveness of mental imagery in reducing competitive anxiety. Imagery interventions help athletes develop a sense of control and familiarity with competitive situations, thereby

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minimizing stress and enhancing confidence (Morris et al., 2005). Additionally, combining imagery with techniques such as self-talk, relaxation, and mindfulness has been found to further enhance its effectiveness (Hasanah & Refanthira, 2020). These interventions help break the cycle of anxiety and poor performance by improving psychological readiness.

Combat sports- Wushu and wrestling

Combat sports such as Wushu and wrestling present unique psychological and physical challenges, making them particularly relevant for studying competitive anxiety. These sports require rapid decision-making, technical precision, and emotional regulation under intense pressure (Kuan & Roy, 2007). The one-on-one nature of combat sports increases psychological stress, as athletes compete individually without team support. Wrestling involves high levels of physical exertion and strategic thinking, often leading to both cognitive and somatic anxiety. Wushu, on the other hand, requires precision, coordination, and adaptability, along with the ability to perform under evaluative conditions. Despite these challenges, there is limited research examining the role of mental imagery in these disciplines, particularly within the Indian context.

Need and significance of the study

The need for the present study arises from the lack of research focusing on Indian athletes in combat sports. Cultural, environmental, and training-related factors may influence the effectiveness of psychological interventions such as mental imagery. Most existing studies have focused on Western populations, thereby limiting the generalizability of findings to Indian athletes. This study is significant as it aims to address this gap by examining the effectiveness of mental imagery in reducing competitive anxiety among Wushu and wrestling athletes. The findings are expected to contribute to the development of evidence-based psychological interventions and support coaches and practitioners in enhancing athletes' performance and well-being.

Method

The present study adopted a quasi-experimental one-group pre-test–post-test design to examine the effect of mental imagery on competitive anxiety among athletes. This design allows for the assessment of changes within the same group of participants over time without the use of a control group. A quantitative research approach was employed to objectively measure and compare anxiety levels before and after the intervention. Such designs are commonly used in sports psychology

research where random assignment and strict experimental control may not be feasible (Creswell & Creswell, 2018).

The sample consisted of ten junior-level athletes, including five Wushu athletes and five wrestling athletes. All participants were below the age of eighteen and included both male and female athletes. They were actively engaged in competitive training and had a minimum of one year of experience in their respective sports. The participants were recruited from district-level training academies in Thrissur, Kerala. The selection of participants was based on convenience sampling, considering their availability and willingness to participate in the study.

Measures

The Competitive State Anxiety Inventory-2 (CSAI-2), developed by Martens et al. (1990), was used to assess the levels of competitive anxiety. This instrument is widely used in sports psychology to measure cognitive anxiety, somatic anxiety, and self-confidence. It consists of twenty-seven items, with nine items for each subscale, rated on a four-point Likert scale ranging from "not at all" to "very much so." The CSAI-2 has demonstrated high reliability and validity across various populations, making it a suitable tool for assessing anxiety in adolescent athletes (Craft et al., 2003; Cerin, 2003).

Procedure

The procedure of the study was carried out in three phases. In the first phase, the pre-test was administered one day prior to the participants' competition to assess baseline levels of anxiety. The assessment was conducted in a quiet and controlled environment to minimize external distractions. In the second phase, the participants underwent a structured mental imagery intervention for a duration of one month. The intervention consisted of three sessions per week, with each session lasting approximately fifteen to twenty minutes. The sessions included guided visualization of sport-specific skills, rehearsal of successful performances, relaxation techniques, and positive self-talk. Participants were also encouraged to practice imagery individually using audio-guided recordings. In the third phase, the post-test was administered one day prior to the participants' subsequent competition under similar conditions as the pre-test, allowing for direct comparison of results.

Data analysis was conducted using Jamovi software. Descriptive statistics, including mean and standard deviation, were calculated for each variable at both pre-test and post-test stages. Paired sample t-tests were used to determine whether the differences in scores were statistically significant. Ethical considerations were

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strictly followed throughout the study. Approval was obtained from the institutional ethics committee, and informed consent was obtained from the parents or guardians of the participants. Assent was also obtained from the participants themselves. Confidentiality and anonymity were maintained, and participants were informed of their right to withdraw from the study at any time without any consequences.

Results and discussion

Table 1

Sample descriptives using t-test for equality of means

Variable	Pre-test M (SD)	Post-test M (SD)	*t*(df=9)	*p*
Cognitive Anxiety	29.50 (1.51)	24.00 (2.08)	4.92	.001
Somatic Anxiety	26.60 (1.65)	20.90 (2.07)	6.86	< .001
Self Confidence	19.00 (1.63)	27.60 (2.94)	−6.94	< .001

The descriptive statistics and paired t- test results provide a clear preliminary understanding of how the intervention (mental imagery) influenced cognitive anxiety, somatic anxiety, and self-confidence among the participants.

For cognitive anxiety, the mean score decreased from 29.50 in the pre-test to 24 in the post-test. This reduction suggests that participants experienced lower levels of worry, negative thoughts, and performance-related concerns after the intervention. The slight increase in standard deviation (from 1.51 to 2.08) indicates a small rise in variability, meaning that although most participants showed improvement, the extent of reduction differed somewhat across individuals. The median values also decreased from 29.50 to 24, reinforcing the consistency of this decline. However, the maximum score in the post-test (30) shows that a few participants still retained relatively higher cognitive anxiety.

In terms of somatic anxiety, a similar pattern is observed. The mean score dropped from 26.60 to 20.90, indicating a notable reduction in physiological symptoms such as tension, sweating, and increased heart rate. The standard deviation increased slightly from 1.65 to 2.07, again suggesting some variability in how participants responded to the intervention. The median values (26.50 to 20.50) closely mirror the mean changes, confirming a general downward trend. Although the minimum and maximum values indicate some spread in scores, the overall shift reflects improved control over bodily symptoms of anxiety.

For self-confidence the results show a marked improvement, with the mean increasing from 19 in the pre-test to 27.60 in the post-test. This substantial rise indicates that participants felt more assured, capable, and mentally prepared following the intervention. The increase in standard deviation from 1.63 to 2.94 suggests greater variability in post-test confidence levels, meaning that while most participants improved, some experienced a more pronounced boost than others. The median also increased from 19 to 27.50, supporting the overall enhancement in confidence. The higher maximum value (34) in the post-test further indicates that certain individuals achieved very high levels of self-confidence.

Overall, the descriptive data suggest that the mental imagery intervention was associated with a reduction in both cognitive and somatic components of competitive anxiety, along with a substantial increase in self-confidence**.** The consistent changes in mean and median values across variables indicate a general positive trend among participants, while the slight increase in variability highlights individual differences in response to the intervention. These findings provide preliminary support for the effectiveness of mental imagery in enhancing psychological readiness and emotional regulation in athletes, which can be further validated through inferential statistical analysis.

Discussion

The current study investigates the efficacy of mental imagery intervention on three dimensions of Psychology: Cognitive Anxiety, Somatic Anxiety, and Self-Confidence as measured by the Competitive State Anxiety Inventory-2 (CSAI-2). This was done among 10 participants, of which five were from Wushu and five from wrestling. The results of the pre-test and post-test indicated significant psychological changes in all three sub-scales after the intervention.

The statistical analysis revealed a decline in the value of cognitive anxiety and also that of somatic anxiety levels, whereas significant increments were discovered on self-confidence scores. Mental Imagery seems as an effective psychological tool for managing the pre-competition nervousness and stimulating the confidence of combat sport participants. Cognitive anxiety encompasses mental processes such as worry, fear of failure, negative expectations, and doubts regarding performance. Pre-treatment, the mean cognitive anxiety score was substantially high, indicating that athletes had a lot going on in their minds about the uncertainty of outcomes and internal pressures. This is consistent with findings on the phenomenon where cognitive anxiety reaches a peak just prior to performance, especially in individual and high-contact sports such as Wushu and wrestling (Martens et al, 1990).

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These findings are consistent with the theoretical framework proposed by Vealey and Greenleaf (2006), who suggested that imagery enhances athletes' ability to mentally rehearse successful performances, thereby reducing uncertainty and performance-related concerns. Through repeated visualization of successful execution, athletes may develop a greater sense of control and preparedness, reducing the likelihood of cognitive disruptions during competition. This finding conforms with the rest of the literature supporting the assertion that guided mental imagery is meant for rehearsal of the competing scenarios for preparation while reducing the mental clutter associated with competitive stress (Morris et al., 2005). The intervention allowed athletes to visualize optimum performance, which produced feelings of familiarity and cognitive control over upcoming challenges.

The present findings are also in consistent with the study conducted by Mamassis & Doganis (2004), who stated that athletes who participated in imagery training experienced significant reductions in cognitive anxiety and improvements in psychological skills. Similarly, Callow & Hardy (2001) found that imagery interventions helped athletes reduce negative thinking patterns and improve concentration before competition. From a cognitive-behavioral perspective, imagery functions as a rehearsal mechanism that permits athletes to anticipate competitive situations and mentally practice coping strategies. This repeated exposure may replace irrational fears and negative expectations with constructive and performance-enhancing thoughts. The decrease in cognitive anxiety observed in the current study supports the notion that mental imagery contributes to improved psychological resilience and emotional stability among athletes.

Physiological displays of anxiety are part of somatic anxiety, such as accelerated heartbeats, sweating, muscle tension, and heightened arousal. Scores from the pre-test indicate that there were moderate to high somatic arousal manifestations respondents experienced, which could easily be regarded as common phenomena in sports that demand high preparedness and aggression (Craft, 2003). Results after the intervention showed decreased somatic anxiety. This disguised that the mental imagery method actually relaxed the body and minimized physiological stress responses. The finding is in agreement with the previous research finding wherein imagery with relaxation element as well as breath control diminished somatic signs of anxiety (Williams et al., 2010). This results also aligns with the work of Morris, Spittle, and Watt (2005), who emphasized that imagery activates neural pathways similar to those involved in actual performance. Repeated mental rehearsal can therefore foster familiarity with competitive situations, reducing physiological arousal and promoting relaxation.

The findings are further supported by research conducted by Munroe-Chandler and colleagues (2008), who reported that imagery interventions were associated with reduced physiological stress responses and enhanced emotional control among athletes. Likewise, studies by Cumming and Williams (2012) highlighted that imagery can be used as an anxiety-management strategy to regulate bodily responses before competition.

Combat sports such as wrestling and Wushu involve high levels of physical contact, uncertainty, and performance pressure. Consequently, athletes are particularly vulnerable to physiological manifestations of anxiety. By mentally rehearsing competitive scenarios, athletes may become desensitized to stress-inducing situations and develop greater confidence in their ability to cope effectively. The significant reduction in somatic anxiety found in the present study suggests that imagery may be particularly valuable for athletes participating in high-pressure individual sports.

Self-confidence, as indexed by CSAI-2, describes an athlete's belief in his or her ability to succeed under pressure and in overcoming the rigors imposed by competing against others. Low- to moderate-pretest scores for self-confidence levels are quite normal for a setting such as a feared event in a physically demanding sport. The post testing scores were significantly higher from the statistical perspective, clearly indicating that the mental imagery intervention was positively affecting athletes' belief in their own capabilities.

Mental imagery is a well-researched means for assisting self-confidence by giving athletes the opportunity to visualize themselves winning under pressure (Vealey & Greenleaf, 2010). It is believed that this cognitive rehearsal can activate both the neural and emotional systems for the successful execution of the given skill, increasing the athlete's sense of readiness or competence (Munroe-Chandler & Morris, 2011). In the study, participants felt that they had improved levels of concentration, foresaw match scenarios well, and had a greater sense of emotional control because of the structured mental imagery sessions. This finding supports the proposition of the multidimensional anxiety theory proposed by Martens and colleagues (1990), which identifies self-confidence as a critical factor influencing athletic performance. According to this theory, increased self-confidence can buffer the negative effects of anxiety and contribute to enhanced performance outcomes.

The present findings are consistent with previous researches demonstrating the positive effects of imagery on confidence enhancement. Feltz and Landers (1983) reported that mental practice and imagery significantly improved athletes' confidence and performance expectations. Similarly, Callow and Hardy (2001)

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reported that motivational imagery increased athletes' confidence, motivation, and perceived competence. The increase in self-confidence should be celebrated, as self-confidence is negatively correlated with competitive anxiety, especially in situations where quick decision-making and composure are critical (Woodman & Hardy, 2003). Mental imagery permits athletes to repeatedly visualize successful performances, creating a sense of accomplishment even before actual participation. This mental rehearsal strengthens efficacy beliefs and increases confidence in one's abilities. The substantial improvement in self-confidence observed in the current study provides strong evidence that imagery can facilitate the development of positive self-perceptions among athletes. The enhanced confidence may also serve as a buffer against the potentially deleterious effects of cognitive and somatic anxiety.

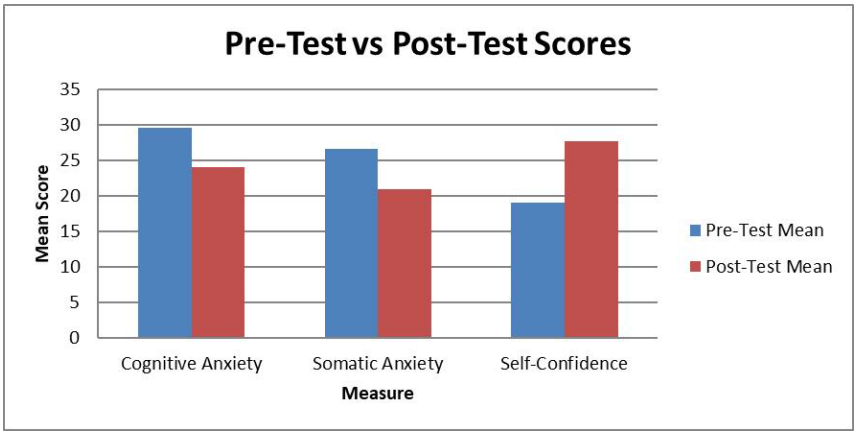

Figure 1 Mean score of pre and post intervention

Note. The above figure presents a statistical analysis of data collected from 10 participants using the Competitive State Anxiety Inventory-2 (CSAI-2). The tool evaluates three psychological states: Cognitive Anxiety, Somatic Anxiety, and Self-Confidence before and after a given intervention.

Practical Application

The findings of this study have meaningful practical implications for athletes, coaches, sport psychologists, and trainers. For athletes, mental imagery can be integrated into daily training as a low-cost and effective psychological technique to enhance performance readiness and regulate emotions. Sport psychologists can use mental imagery as part of individualized intervention programs to address specific psychological concerns such as low self-confidence or high anticipatory anxiety. Furthermore, combining imagery with relaxation techniques, positive self-talk, kin-

esthetic cues, and scenario-based rehearsal helps athletes prepare for both expected and unexpected situations. This integrated approach not only reduces anxiety but also develops adaptive mental responses during high-pressure performance.

Limitations of the Study

Despite the promising findings, several limitations must be acknowledged. The small sample size (N =10) restricts the generalizability of the results, and although noticeable changes were observed, studies with larger samples are needed to confirm the reliability of these effects. The absence of a control group makes it difficult to attribute the observed changes solely to the mental imagery intervention, as other factors such as motivation or environmental influences may have contributed. Participant variability, including prior experience with imagery techniques and individual differences in anxiety levels, was not controlled, which may have influenced the outcomes. Nevertheless, the study provides a useful foundation and highlights the importance of integrating mental training into regular sports practice.

Conclusion

The study shows the significance of mental imagery interventions being introduced early in the training of athletes, especially in the junior and adolescent categories. Early psychological support nurtures future self-regulatory habits, sharpening focus and composure that are needed by an athlete in sustained training and mental health. Coaches, trainers, and sports psychologists are encouraged to make imagery training a part of their routine practice sessions, considering the very little resources needed and that it can be designed according to the needs of athletes. Indeed, this research reveals that mental strength is as important as physical strength as well as that mental imagery serves as a powerful technique that can help in closing the gap between training and performance, fear and confidence, and potential and achievement.

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