REVIEW ARTICLE

Mental training for college athletes: A comparative analysis of Chinese and Western approaches and innovations

Tang Yangyang. *Lincoln University College. Kuala Lumpur, Malaysia.*
Guangxi University of Finance and Economics. Nan Ning, China.
Lim Seong Pek . *Lincoln University College. Kuala Lumpur, Malaysia.*

ABSTRACT

This paper examines the development of mental training in sports, emphasizing the differences between China and other countries in terms of training methods and research approaches. The study employs a literature review method to analyse existing domestic research and draw conclusions. Numerous studies have shown that mental training is crucial for enhancing athletes' performance. By investigating the definitions of mental training in various regions and assessing the current state of mental training in Chinese universities, this study highlights these differences. The findings reveal several gaps between China and other countries in this field: 1) China's research on mental training started relatively late, with limitations in both content and depth; 2) deficiencies in research design, including limited scope in subject and sample selection, unclear operational definitions of variables, and insufficient control of extraneous variables; and 3) a lack of empirical research and methodological innovation in mental training. These findings suggest that China needs to expand and enhance research in mental training, with a particular focus on empirical studies and methodological innovation, to bridge the gap with other countries.

Keywords: Mental training, Sports performance, College athletes, Chinese, Western.

Cite this article as:
Yangyang, T., & Seong Pek, L. (2025). Mental training for college athletes: A comparative analysis of Chinese and Western approaches and innovations. *Journal of Human Sport and Exercise, 20*(1), 266-279. https://doi.org/10.55860/5rvacy38

Corresponding author. *Faculty of Social Science, Arts & Humanities of Lincoln University College. Kuala Lumpur, Malaysia.*
E-mail: limsp@lincoln.edu.my
Submitted for publication August 25, 2024.
Accepted for publication October 23, 2024.
Published December 08, 2024.
Journal of Human Sport and Exercise. ISSN 1988-5202.

doi: https://doi.org/10.55860/5rvacy38

INTRODUCTION

Success in competitive sports depends heavily on two factors: skill (including strength and endurance) and motivation (e.g., mental attitude, confidence)(Locke & Latham, 1985). Mental training, as an integral part of athletic training methods, has received much attention for its effectiveness in improving mental and physical aspects of athletic performance. This mode of training has evolved over the last century, with innovations in methodology accelerating markedly in the mid-20th century. For example, Vealey (2007) noted that the application of mental training has expanded from elite competitive sport to the field of physical education, particularly amongst young people involved in sport. Mariani et al. (2019) further emphasize the importance of mental training for the dual development of physical and mental health in young athletes and professionals. The diversity of mental training techniques - from mental imagery to positive thinking training - suggests a tailored approach to teaching and learning that aligns with the nuanced motor skills required in a variety of sports (Lindsay et al., 2023).

The first explorations of mental training began in the early 20th century and have evolved over the past century. Subsequently, the systematic development of mental training occurred in the mid-20th century (Lochbaum et al., 2022). This adaptive approach has been shaped by historical contexts, socio-cultural factors, and the diverse needs of sports disciplines in different countries and eras (Adeyeye et al., 2013; Jain et al., 2015; Subathra et al., 2021; Zhang et al., 2021). Currently, research on psychological training is more focused on the perspective of elite athletes (Si et al., 2011; Si et al., 2021; Галинська & Бінсюй, 2022). Research on the psychological condition of college athletes is weak, and this is an area that few Chinese scholars have explored (Fang et al., 2023). This study adopts an inductive literature review method to critically review a variety of psychological training methods and distil the effects of various psychological training methods on athletic performance, aiming to assess the applicability and effectiveness of these psychological training strategies, analyse the current status of domestic scholars' research in the field of psychological training, and put forward the research strengths and shortcomings of Chinese and Western scholars in a bid to provide other scholars with research on the psychological training of university student-athletes to provide valuable references for other scholars' research on the psychological training of college athletes.

METHODOLOGY

In the research methodology section, the researcher used an inductive literature review method to construct the design of this study. The purpose of the study was to analyse the effectiveness of mental training methods in improving the athletic performance of Chinese college athletes through a literature review and to identify research gaps compared to international studies. This section describes the research design in detail.

Data collection

Source Academic databases (CNKI, Web of Science, Google Scholar).
Types: empirical studies, theoretical papers, review articles, master's theses, doctoral dissertations.
Keywords: mental training, mental skills training, athletic performance, college athletes, China.

Through data collection, the author retrieved 300 pieces of related literature, including 200 pieces of Chinese literature and 100 pieces of Western literature. By analysing and comparing, the author sorted out the differences between Chinese and Western research fields, research contents, research objects, and research methods in the field of mental training.

Table 1. Literature quantity summary table form.

Literature geography	A study of college athletes	A study of elite athletes
China	175	25
International	12	88

Note. Unit: Articles.

Data analysis

Literature classification: Literature was categorized according to mental training techniques, research focus, sample size, and research methods.
Techniques: Goal setting, visualization, positive thinking, meditation, self-talk, relaxation
Research focus: college athletes.
Sample size: Large versus small scale studies.
Research methods: empirical research, experimental design, qualitative analysis.

Evaluation criteria

Relevance: To determine the relevance of each study to the research objectives.
Quality: To assess the methodological rigor and validity of each study.
Findings: Extract the main conclusions related to the effectiveness of mental training methods and their impact on athletic performance.
Gaps: Identify gaps in research focus, sample diversity and methodological innovation.

Comparative framework

International and Chinese studies: Comparison of the development, application and effectiveness of mental training methods.
Development: Historical evolution and current trends.
Application: specific techniques used and their implementation in training.
Effectiveness: Measurement of results and performance improvement.

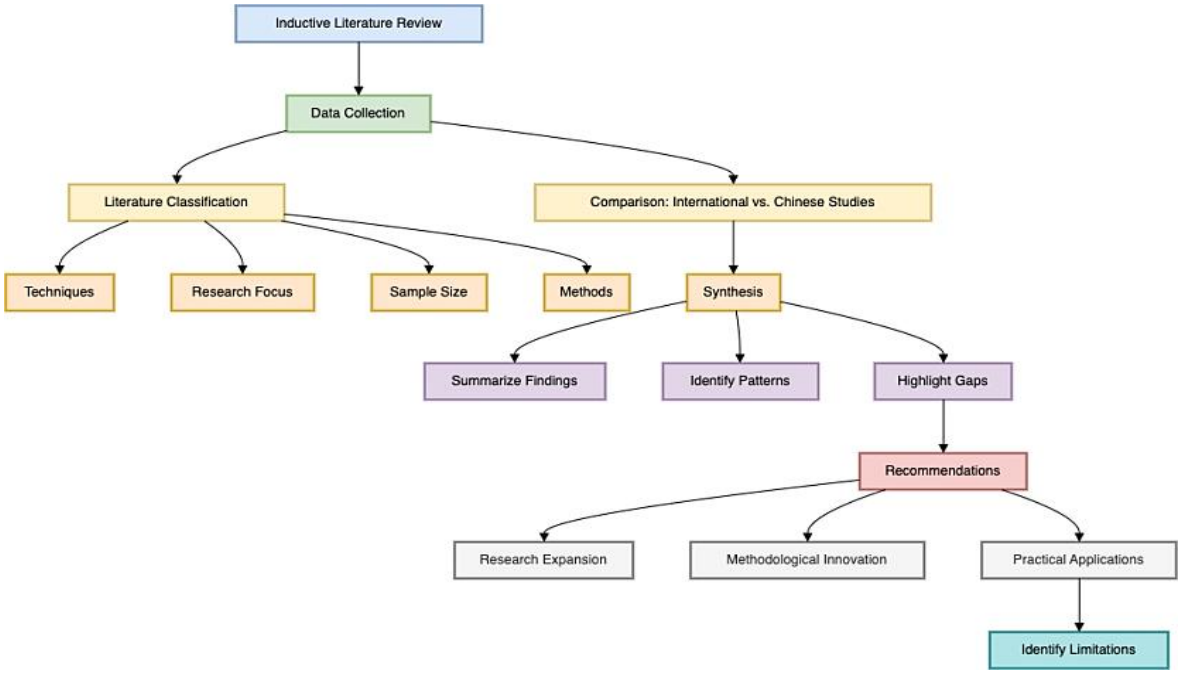

Figure 1. Conceptual framework for analysing national and international research on mental training.

Synthesis

Summarize findings: Compile the main findings of the literature review.
Identify Patterns: Identify common themes and differences between Chinese and foreign studies.
Highlighting Gaps: Highlighting areas where Chinese research is lagging behind or where there are significant gaps.

This conceptual framework (Figure 1) was adopted in this paper to comprehensively analyse the effectiveness of mental training in improving athletic performance, with a particular focus on Chinese college athletes, as well as to provide valuable insights for future research and practical applications.

DEFINITION OF MENTAL TRAINING

In sports, when it comes to training, we can quickly associate it with physical training, strength training, endurance training, speed training, etc. However, few people can think of the fact that athletes' performance and athletic performance also have a very important relationship with the athletes' psychological state, and a more stable and positive psychological state can bring a positive impact on athletes' performance, and mental training is becoming an important training component used in sports training (Glass et al., 2019). In recent years, sport psychology has received more and more attention from scholars, and mental training and mental skills training have become popular contents of research in many fields of psychology and sports science. Psychological skills training (PST) refers to the learning and practice of a mental skill, which is a strategy of mental state regulation that can help athletes regulate their mental state and emotional state so that they can better perform their sport in competition and improve their sports performance at the same time (Kumari & Kumar, 2016). Western scholars (Sponholz, 2012) and Eastern scholars (Jingjing, 2023) have reached a consensus that PST has at least two goals: the first is to help athletes perform at a more desirable level of athletic performance and improve athletic performance through mental training. The second is to help athletes achieve better self-development and life development through long-term mental training. Chinese scholar Jian (2023) believes that mental training is an important way to exercise and improve the mental ability of high-level athletes, and that positive and effective mental training can not only improve athletes' athletic ability and performance, but also exercise their psychological tolerance, so that athletes can always remain calm, complete the game and achieve good athletic performance. Slagter et al. (2007), who defined mental training as the practice of attentional skills, believed that mental training can have an impact on the brain and cognitive functions and stimulate the brain to process or perceive accordingly. Turgut and Yasar (2020), who believed that mental training refers to the practice of skills that can change the mental state in a certain way, which can help athletes to better regulate and control their own athletic performance, said that mental training can improve athletic performance and improve the mental ability of athletes. However, the pattern of mental training has not been specifically delineated in previous studies, and future research should enhance the understanding of how each mental training category applies specifically to each sport.

WESTERN SCHOLARS' RESEARCH ON MENTAL TRAINING TECHNIQUES: STRENGTHS AND LIMITATIONS

Western scholars' research on mental training started earlier, and scholars have developed a series of mental training techniques such as meditation, imagery, goal setting, visualization, self-talk, positive thinking and so on through testing. Through experiments and measurements, these techniques have been proved to have obvious functions of improving sports performance (Glass et al., 2019; Lin et al., 2021; Ungerleider, 2005). Through scholars' research on mental training, we provide an overview of commonly used mental training

techniques, which are goal setting, visualization techniques, positive thinking meditation, self-talk, and relaxation techniques.

Goal setting is the same as the SMART method of goal setting, i.e., setting achievable, measurable, time-bound, and specific goals to give athletes clarity and focus. Locke and Latham (1985) explored in their article a study of NCAA football coaches comparing coaches with a better win-loss record to coaches with a poorer win-loss record over a period of 5 years, using goal setting techniques were more likely to help players win games. In subsequent research (Weinberg & Gould, 2023), goal setting was found to have a positive impact on athletic performance, primarily in the form of improved free throw shooting after goal setting practice. Weinberg and Gould research provided a detail data for the goal setting, that this goal setting may give athletes psychological cues to reach greater performance.

Imagery training is also often referred to as visualization and mental rehearsal (Gould et al., 2014). In sports training, imagery is understood as imagining the physical sensations and visual images of movement without movement (Simonsmeier & Buecker, 2017). Many scholars have conducted practical studies on imagery training, and these studies have confirmed that imagery training can effectively help athletes improve their sports performance (Ladda et al., 2021). Based on current studies, the reason for the incomplete application of imagery method in physical training may be that different sports are not suitable for imagery-based training. In addition, researchers need to expand the detailed data of the experiment in different sports events.

Positive thinking and meditation, a common approach to mental training, are often used in combination in sport. Their positive effects on athletic performance have been confirmed by several studies. Hut et al. (2023) concluded from a controlled trial that college athletes' sport anxiety and enjoyment of sport improved after mental skills training (PST) and a positive thinking intervention (MSPE). Baltzell and Akhtar (2014) concluded from an experiment with female athletes that positive thinking meditation training can help athletes stabilize their emotions and focus more on the present moment, which can have a positive impact on improving athletes' game status and sport performance. In these studies, there is still a need to refine the research across sports and expand the selection of sample sizes in the studies to ensure that Positive Mindfulness Meditation is a mental training technique that can be generalized to all sports and sports groups.

Self-talk, often referred to as self-talk, is an area of research that has historically attracted the attention of psychologists and philosophers (Fritsch et al., 2024; Hardy et al., 2004; Hatzigeorgiadis et al., 2011; Tod et al., 2011). In the field of athletic training, self-talk has been shown to have a positive impact on athletic performance, especially in sports where motor technique dominates (Hatzigeorgiadis et al., 2011). Clearly, there is a reciprocal relationship between sports performance and self-talk. However, in the studies of Western scholars, there are more positive studies on self-talk and fewer reverse studies, e.g., whether athletes' negative psychological performance in competition or training is influenced by negative self-talk, which suggests that the diversity of studies and the exploration of research perspectives should be broadened in this area of research.

Deep breathing, also known as diaphragmatic breathing, is a technique used to relax the mind and body by inhaling deeply and exhaling slowly (Toussaint et al., 2021). Incorporating relaxation techniques such as deep breathing into a daily sports training program can help athletes reduce anxiety and improve performance (Parnabas et al., 2014). In addition, Ismail et al. (2022) showed that deep breathing techniques not only help athletes improve mental toughness, but also regulate pre-competition stress. While most researchers have explored the direct relationship between deep breathing and relaxation and anxiety relief, fewer have

examined the relationship between deep breathing and athletic performance, and the findings lack support from multiple data sources.

Based on current research, it is evident that Western scholars have certain advantages and limitations in the field of mental training research. The advantages include:

Early initiation and mature theoretical framework
Western countries began research on mental training early, leading to the development of a well-established theoretical framework. This system encompasses various psychological intervention techniques, including cognitive behavioural therapy, positive thinking training, and visualization. These methods are not only applied in clinical psychology but are also extensively used in sports, education, and other fields.

Extensive empirical research
Western research in mental training is characterized by a substantial number of empirical studies, particularly randomized controlled trials (RCTs), which provide robust evidence supporting the effectiveness of these interventions. This rigorous research design enhances the scientific credibility of the findings.

Interdisciplinary collaboration
Research in this area often involves cross-disciplinary collaboration among fields such as psychology, neuroscience, and physiology. This interdisciplinary approach offers a more comprehensive understanding of the mechanisms underlying mental training, contributing to insights into its multifaceted impact on athletic performance and mental health.

However, there are also certain limitations in these studies:

Long-Term and continuity issues
Much of the existing research on mental training focuses on short-term experimental studies. Consequently, conclusions are often drawn from short-term data, with a lack of long-term tracking and exploration of the enduring effects and practical applications of mental training.

Research subjects and sample size
Many studies have dealt mainly with elite and professional athletes, with fewer studies on adolescents, college athletes and amateur athletes. This limits the generalizability of the findings to a wider population. In addition, the relatively small sample sizes of some studies may lead to variability in the findings and reduce the overall robustness of the data.

Research design and methodology
Most research relies on observational methods and tends to use a single research methodology, such as questionnaires and self-reports, which can introduce subjective bias. In sport, research has tended to focus on psychological training only, neglecting the integration with physiological training, which hinders a comprehensive understanding of the overall improvement of athletic performance.

REVIEW OF CURRENT RESEARCH ON MENTAL TRAINING FOR COLLEGE ATHLETES IN CHINA

China's research on sport psychology started late, and there is no unified theory and complete training system for mental training, and the application of mental training among college athletes has not yet been popularized (Kunfeng & Yonghai, 2022). According to the current study, Chinese scholars' research on mental training

mainly focuses on the following aspects, i.e., representation training, positive thinking meditation, self-talk and relaxation training. (Kunfeng & Yonghai, 2022; Lee, 2021)

Imagery training is a relatively well researched mental training method in China in recent years, but it is still at a relatively superficial stage (Jiahui, 2021). Changzhu and Pei (2001) studied the concept, theory and main research areas of imagery training, and he believed that imagery refer to all psychological phenomena that are characterized by images on the surface. imagery training can not only help athletes better acquire and consolidate sports skills, but also effectively deal with athletes' anxiety, regulate the activation level, and promote the rehabilitation of sports injuries. In addition, research on imagery training has also been carried out in various sports. For example, the application of imagery training in college dance teaching (ye, 2006), the application of badminton training in universities Yi (2008), the application of swimming teaching in universities (Hui, 2014), the application of volleyball training in universities (Haijing, 2007), the application of golf teaching (Wenlong et al., 2019) and so on. Although the research on imagery training in China is still in a relatively shallow stage, and the conclusions drawn from the research are not so convincing (Zhihui, 2018), it is undeniable that imagery training can help the learning of motor skills, and it is a very effective mental training method (Peiquan et al., 2023). However, it is worth noting that imagery training can also be subdivided into several contents, and the adaptability of these subdivided imagery training contents to the training contents of sports is easily overlooked by researchers (Maolin et al., 2020), which will be an obstacle to the development of more targeted and effective training methods.

Positive thinking meditation training is an effective mental training method to help athletes relieve mental fatigue, which can positively regulate the human brain and nervous system (Yexuan, 2024). However, judging from the current research situation in China, the research on integrating positive thinking meditation into the daily training of college athletes is still very scarce, and has only gradually increased in the past two years. In her master's thesis, Huaru (2023) Mental fatigue in college athletes was studied in a master's thesis, and it was observed that mental fatigue in athletes could be effectively alleviated after a positive thinking intervention. Fengbao et al. (2024) conducted a psychological intervention study on 300 college athletes from a sports university in their research and found that athletes with high levels of positive thinking were more able to enjoy and focus on the game and produce a higher level of fluency experience during the game. From the current study, the potential application of mindfulness training across all sports and its implementation as a supplement to physical training in daily routines requires further investigation. It is crucial to expand the scope of research to determine whether mindfulness training can not only alleviate mental fatigue but also enhance athletic performance. Additionally, research should explore the feasibility and effectiveness of incorporating mindfulness training into the daily training regimen across various sports disciplines.

Self-talk is a common mental training method used by many Chinese coaches in their daily training, who often ask athletes to tell themselves "*I can do it*", "*I can do it*" and other self-affirming words to stabilize the athletes' psychological state and improve athletes' confidence and performance (Liu et al., 2023). However, a search of the CNKI website revealed that there are only 79 studies on self-talk in the field of sport, which has only gradually increased in the last decade, and there is no localized research in the field of self-talk, and there is a lack of localized and innovative design of research methodology and measurement tools (Jingchao, 2021). However, it is undeniable that in recent studies, self-talk has answered yes to whether it can improve athletes' sports performance. Xiaoting and Hongwei (2016) conducted an experimental control analysis on national tennis youth athletes and college tennis players respectively, and the results of the study showed that self-talk had a stronger effect on improving first serve accuracy for college athletes, and that self-talk was able to effectively improve the athletic performance of college tennis players. However, improving athletes' ability to self-talk during daily training requires more attention from academics and coaches. Current

research in China has mainly emphasized experimental evaluations between coaches and athletes, but there is a need to explore external factors as well. For example, the popularity of the Internet and the impact of educational measures on athletes may be critical to the development of effective self-talk strategies. Further research in these areas may provide a more comprehensive understanding of how to optimize athletes' self-talk training.

Relaxation training, also known as ideological relaxation, refers to training in accordance with certain procedures to regulate one's physiological and psychological activities, so that both physiology and psychology tend to be in a relaxed state (Mengyao, 2019). According to the classification of forms, it is divided into apparent relaxation, imaginative relaxation, biological relaxation, progressive relaxation and so on, and according to the classification of methods, it is a total of respiratory regulation, music regulation, psychological suggestion regulation and other methods (Qingjiang, 2014). In the field of mental training, relaxation training has been researched by Chinese scholars as a point of mental training, but the number of studies is also very scarce, with studies focusing on swimmers, sparring athletes, basketball players, and fencers (Qing, 2022). For example, Dianshuai and Zhenguo (2023) conducted an intervention study on the fatigue phenomenon of college student sparring athletes, and pointed out that music conditioning has a very good effect on muscle relaxation, which not only improves the athletes' psychological state, but also effectively relieves muscle fatigue, cardiorespiratory skill fatigue, and nerve fatigue. Chinese scholars' research on relaxation training mainly concerns its effects on relieving muscle and nerve fatigue. However, studies on the specific forms and methods of relaxation training are scarce. In addition, comprehensive studies on the broader effects of relaxation training on sports performance are lacking. To better understand the potential benefits and applications of relaxation training in sport, further exploration is needed in these areas.

Current research on mental training in China is still in its early stages. The scope of research is not yet comprehensive, and the depth of investigation is relatively limited. This presents a significant opportunity and motivation for Chinese scholars to further explore and develop the field of mental training.

THE GAP BETWEEN CHINA AND WESTERN COUNTRIES IN MENTAL TRAINING RESEARCH

An analysis of existing literature reveals several gaps between Chinese and international research on mental training, particularly in areas such as research content and quantity, research design, and innovation and practical application.

Research content and quantity

Chinese research on sport psychology commenced later compared to other countries, resulting in a relatively limited body of work. For example, a search in CNKI (China National Knowledge Infrastructure) yielded only 3,386 articles related to mental training, with even fewer empirical studies on college athletes (Fang et al., 2023; Ziyan & Hang, 2023). This paucity of research is notable, especially as China's socio-economic development progresses and the Chinese government sets more refined goals for sports development, such as those outlined in the "*14th Five-Year Plan for Sports Development (2021)*". This plan aims to establish world-class sports centres that integrate training, science, technology, medical care, and services, and to promote the application of mental training (Ziyan & Hang, 2023). Therefore, "*mental training*" has been attracting more and more attention from Chinese scholars in recent years. A search of CNKI (China Knowledge Network) for 200 articles related to mental training and college athletes revealed that research related to mental training of college athletes peaked in 2022 and 2023. As shown in Figure 2.

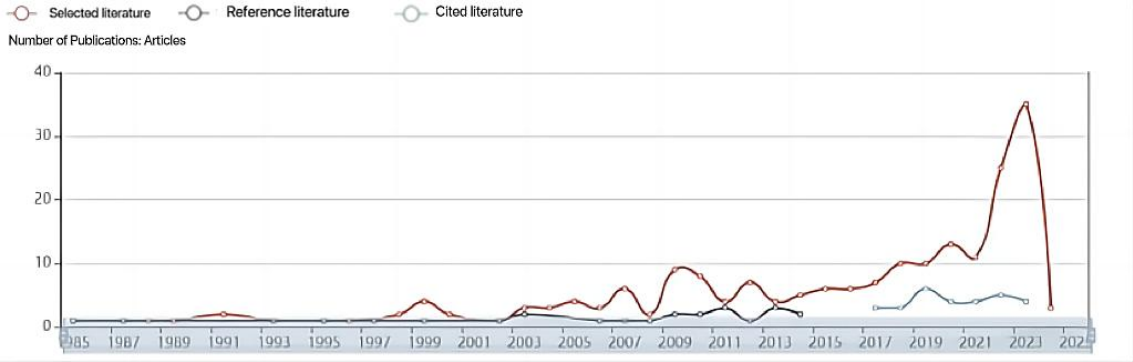

Figure 2. Analysis of overall trends in research associated with mental training in college athletes.

Current research in China focuses on broader concepts, with less research on more detailed elements of mental training, such as representational training, including visual representation, auditory representation, kinaesthetic representation, and environmental representation. Chinese scholars have insufficiently explored these more specific areas, and this is a research gap that needs to be filled by Chinese scholars. In addition, it is worth noting that there is an obvious lack of research on the influence of negative factors by Chinese scholars, such as the influence of coaches' negative emotions, negative words, and emotional states on athletes' psychological state and athletic performance, as well as the generative mechanisms behind these negative influences, which are also of great significance in mental training research (Jian & Hongmin, 2020; Jingchao, 2021).

Research design

Chinese studies often face limitations in terms of sample size and scope of selection, which may affect the reliability and generalizability of the findings. For example, Yashi (2019), Leipo (2013), Junbin and Wensheng (2005), Yi (2008), Qian (2018) selected small sample sizes in their experimental studies. Inconsistent results or non-significant differences in some mental training studies occur from time to time, and this phenomenon is likely to be due to the small sample size, so that no significant differences can be detected (Ye, 2023). In terms of the experimental process, many current studies lack clear operational definitions of dependent, independent and intermediate variables, which undermines the reliability and validity of the experiments. There are also deficiencies in the quantitative control of exogenous variables, which should be minimized, which is crucial for accurately assessing the effects of mental training (peng, 2009).

Innovation and practical application

There is limited theoretical and methodological innovation in mental training research in China. In particular, there is a lack of autonomy in experimental research, mental training research has not yet formed a research system based on localization, and in the use of measurement tools and questionnaires, most of them are directly applied to scales that have been developed abroad (Jingchao, 2021), and there is a lack of innovative research on the scales in line with the characteristics of Chinese athletes. In terms of practice, there is a lack of integration of research and practice, and training in colleges and universities still lacks a comprehensive training model that includes mental training. Secondly, psychological assessment is often overlooked in the assessment of college athletes (Kunfeng & Yonghai, 2022). This has led to an underestimation of the role of mental training in the overall development of athletes (Jingjing, 2014). This, coupled with the relative lack of research on mental training by Chinese scholars and coaches' lack of knowledge of sport psychology, has led to a lack of systematic mental training programs and a well-developed mental training system in China for both professional and college athletes (Pei, 2020).

In summary, although China has made some progress in mental training research in recent years, it is still in the primary stage, and many mental training techniques lack detailed and specific research and application. Chinese scholars still have many limitations in this research field, such as limited innovation in research methods, insufficiently comprehensive methods, insufficient depth of exploration, and insufficient practical application. Addressing these limitations is crucial to promoting the development of this field and developing more effective and evidence-based mental training methods for Chinese athletes.

CONCLUSION

This study explores the important role of mental training in improving athletic performance through an inductive literature review, summarizes the current status of research on mental training of Chinese college athletes, and compares and analyses the strengths and weaknesses of Chinese and Western research in the field of mental training. The findings indicate that mental training methods such as goal setting, imagery, mindfulness meditation, self-talk, and relaxation significantly improve athletes' psychological states, alleviate anxiety, and enhance athletic performance. These methods even have positive effects on athletes' future development and mental health. However, the study reveals that while mental training is widely recognized and implemented in the international sports community, its application among university athletes in China is still limited. Furthermore, China's empirical research, methodological innovation, and systematic application of mental training lag behind international standards. Specifically:

- China's research on mental training began relatively late, with limited content and insufficient depth.
- Deficiencies in research design, including a limited scope in selecting research subjects and sample sizes, and a lack of rigor in controlling variables during experiments.
- A lack of empirical research and methodological innovation, with most studies focusing on theoretical discussions rather than practical applications, and insufficient research based on localized contexts.

Future research should place greater emphasis on the empirical nature of the study, the broad application of research and practice, the specificity of mental training in different sports, and the rigor of the research design. Meanwhile, research should focus on interdisciplinary cooperation, integrating insights from psychology, neuroscience, sports science, and education to reveal the intrinsic mechanisms of mental training and its applications in various fields. In addition, the use of the Internet, virtual reality (VR) and augmented reality (AR) technologies can facilitate the development of personalized mental training programs. Examining the effects of external factors on athletes' psychological changes and performance will deepen our understanding and improve the effectiveness of mental training interventions. With the increasing emphasis on athletic performance in Chinese colleges and universities and the breakthroughs made by scholars around the world in sport psychology research, the role of psychological training in athletic training will become more prominent. Therefore, systematic and sustained research is an important means to improve the effectiveness and application of psychological training. Research and application in this field need more professionals' long-term attention and efforts.

AUTHOR CONTRIBUTIONS

Tang Yangyang contributed significantly to the conception and design of the study, conducted the literature review and data analysis, and prepared the manuscript draft. She also integrated feedback from co-authors to revise the manuscript for intellectual content and ensured the accuracy and integrity of all aspects of the research. Lim Seong Pek supervised the overall research process, providing guidance on the study's design and methodology. He contributed to refining the comparative framework and offered critical revisions to

enhance the manuscript's quality. Additionally, he oversaw the submission process and correspondence with the journal.

SUPPORTING AGENCIES

No funding agencies were reported by the authors.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

REFERENCES

Adeyeye, M., Edward, H., Kehinde, A., & Afolabi, F. (2013). Effects of mental-skills training on the performance of table tennis players of national institute for sport, Lagos. IOSR Journal of Research & Method in Education, 2(3), 22-27. https://doi.org/10.9790/7388-0322227

Baltzell, A., & Akhtar, V. L. (2014). Mindfulness meditation training for sport (MMTS) intervention: Impact of MMTS with division I female athletes. The Journal of Happiness & Well-Being, 2(2), 160-173.

Changzhu, Q., & Pei, X. (2001). Concepts, Theories, and Major Research Areas in Representational Training: Current Status and Analysis. Sports Sciences(03), 76-80.

Dianshuai, N., & Zhenguo, Y. (2023). A study on the effect of music conditioning method in fatigue recovery of sparring athletes. The 13th National Convention on Sport Science of China, Tianjin, China.

Fang, L., Zhang, Y., & Jia, L. (2023). Exploring the mental training and psychological service system of high-level sports teams. Laboratory Research and Discovery, 42(11), 220-223.

Fengbao, L., Zhongqiu, Z., & Shuqiang, L. (2024). The effect of positive thinking on athletes' mental flow: a mediating role for psychological resilience. Journal of Chengdu Institute of Physical Education, 50(02), 143-150.

Fritsch, J., Feil, K., Jekauc, D., Latinjak, A. T., & Hatzigeorgiadis, A. (2024). The relationship between self-talk and affective processes in sports: A scoping review. International review of sport and exercise psychology, 17(1), 482-515. https://doi.org/10.1080/1750984X.2021.2021543

Glass, C. R., Spears, C. A., Perskaudas, R., & Kaufman, K. A. (2019). Mindful sport performance enhancement: Randomized controlled trial of a mental training program with collegiate athletes. Journal of Clinical Sport Psychology, 13(4), 609-628. https://doi.org/10.1123/jcsp.2017-0044

Gould, D., Voelker, D. K., Damarjian, N., & Greenleaf, C. (2014). Imagery training for peak performance. In J. L. Van Raalte & B. W. Brewer (Eds.), Exploring sport and exercise psychology (3rd ed., pp. 55–82). American Psychological Association. https://doi.org/10.1037/14251-004

Haijing, W. (2007). A study on the application of representational training in volleyball training and competition [Master's degree].

Halynska, A., & Bingxu, Z. (2022). the Characteristics of Chinese Sports Psychology of Management and Its Application in Training and Competition. Collection of Scientific Research Papers State University of Infrastructure and Technologies Section “Economics and Management,” 51, 14–19. https://doi.org/10.32703/2664-2964-2022-51-14-19

Hardy, J., Hall, C. R., & Hardy, L. (2004). A note on athletes' use of self-talk. Journal of Applied Sport Psychology, 16(3), 251-257. https://doi.org/10.1080/10413200490498357

Hatzigeorgiadis, A., Zourbanos, N., Galanis, E., & Theodorakis, Y. (2011). Self-talk and sports performance: A meta-analysis. Perspectives on Psychological Science, 6(4), 348-356. https://doi.org/10.1177/1745691611413136

Huaru, L. (2023). Meta-analysis and experimental study of sport-related psychological fatigue in college athletes [Master's degree].

Hui, H. (2014). A Study on the Application of Representational Training Theory in Teaching Swimming Technique in Colleges and Universities. Journal of Guangzhou Sports Institute, 34(05), 117-119. https://doi.org/10.13830/j.cnki.cn44-1129/g8.2014.05.032

Hut, M., Minkler, T. O., Glass, C. R., Weppner, C. H., Thomas, H. M., & Flannery, C. B. (2023). A randomized controlled study of mindful sport performance enhancement and psychological skills training with collegiate track and field athletes. Journal of Applied Sport Psychology, 35(2), 284-306. https://doi.org/10.1080/10413200.2021.1989521

Ismail, F. H., Abd Karim, Z., Rozali, N. A., & Ramalu, R. R. (2022). The effects of deep breathing on the mental toughness of athletes in Puchong Fuerza football club. Pedagogy of Physical Culture and Sports, 26(4), 265-269. https://doi.org/10.15561/26649837.2022.0406

Jain, S., Phogat, W. S., & Kumar, P. (2015). Interactive effect of mental skills training and anxiety on Indian athlete's performance. Interactive effect of mental skills training and anxiety on Indian athlete's performance. International Journal of Physical Education, Sport and Health, 1(4), 60-63.

Jiahui, Z. (2021). A study of the effect of representational training on the accuracy of forehand and backhand strokes of college students specializing in tennis [Master's degree].

Jian, L., & Hongmin, X. (2020). An Analysis of the Application of Mental training for Wushu Athletes in Colleges and Universities. Wushu Studies, 5(05), 52-54. https://doi.org/10.13293/j.cnki.wskx.008360

Jian, S. (2023). Exploring the necessity of students' mental training and training methods in college soccer teaching. Sports World(02), 145-147.

Jingchao, H. (2021). A review study of self-talk in the field of sport psychology. youth sports(04), 45-47+41.

Jingjing, F. (2023). A study of the effects of positive-acceptance-awareness-commitment training on shooting percentage and attention of 15-17-year-old female basketball players [Master's degree].

Jingjing, S. (2014). Research on the status quo and countermeasures of pre-competition mental training of discus athletes in Changchun colleges and universities [Master's degree].

Junbin, L., & Wensheng, C. (2005). An analysis of the effect of mental training on the performance of middle-distance runners. sports science and technology(04), 56-59. https://doi.org/10.14038/j.cnki.tykj.2005.04.018

Kumari, S., & Kumar, J. (2016). Mind training techniques and sports psychology: An integrated approach to mental skills for achieving optimum performance. International Journal of Advanced Research, 4(3), 523-535.

Kunfeng, W., & Yonghai, W. (2022). A Study of the Function and Value of Mental Training in Collegiate Athletic Training. youth sports(03), 74-75+66.

Ladda, A. M., Lebon, F., & Lotze, M. (2021). Using motor imagery practice for improving motor performance-a review. Brain and cognition, 150, 105705. https://doi.org/10.1016/j.bandc.2021.105705

Lee, B. (2021). The effect of mental skills training on athletic performance. Contemporary Sports Technology, 11(11), 37-40. https://doi.org/10.16655/j.cnki.2095-2813.2007-1579-4852

Leipo, C. (2013). A study of the effect of mental training on the performance of collegiate middle-distance runners. Scientific and technological information(06), 336.

Lin, H.-H., Lin, T.-Y., Ling, Y., & Lo, C.-C. (2021). Influence of imagery training on adjusting the pressure of fin swimmers, improving sports performance and stabilizing psychological quality. International journal of environmental research and public health, 18(22), 11767. https://doi.org/10.3390/ijerph182211767

Lindsay, R. S., Larkin, P., Kittel, A., & Spittle, M. (2023). Mental imagery training programs for developing sport-specific motor skills: a systematic review and meta-analysis. Physical Education and Sport Pedagogy, 28(4), 444-465. https://doi.org/10.1080/17408989.2021.1991297

Liu, Y., Yu, T., Jianye, S., & Yingchun, W. (2023). Effects of noise interference on attentional control and motor performance: the moderating role of self-talk. The 13th National Convention on Sport Science of China, Tianjin, China.

Lochbaum, M., Stoner, E., Hefner, T., Cooper, S., Lane, A. M., & Terry, P. C. (2022). Sport psychology and performance meta-analyses: A systematic review of the literature. PloS one, 17(2), e0263408. https://doi.org/10.1371/journal.pone.0263408

Locke, E. A., & Latham, G. P. (1985). The application of goal setting to sports. Journal of Sport and Exercise Psychology, 7(3), 205-222. https://doi.org/10.1123/jsp.7.3.205

Maolin, Y., Lianghui, L., Rong, F., & Jingran, T. (2020). Design and Effectiveness Measurement of Specialized Representational Training Programs--An Example of Basketball Free Throw Training. Journal of Shanghai Institute of Physical Education, 44(11), 28-37. https://doi.org/10.16099/j.sus.2020.11.004

Mariani, A. M., Marcolongo, F., Melchiori, F. M., & Cassese, F. P. (2019). Mental skill training to enhance sport motivation in adolescents. Journal of Physical Education and Sport, 19, 1908-1913.

Mengyao, S. (2019). A Brief Analysis of the Application of Ideological Relaxation in Sports Training. Contemporary Sports Technology, 9(15), 29-30. https://doi.org/10.16655/j.cnki.2095-2813.2019.15.029

Parnabas, V. A., Mahamood, Y., Parnabas, J., & Abdullah, N. M. (2014). The relationship between relaxation techniques and sport performance. https://doi.org/10.13189/ujp.2014.020302

Pei, Y. (2020). Mental training Strategies for Basketball Players in General Colleges and Universities. Journal of Qiqihar University (Philosophy and Social Science Edition)(08), 153-155. https://doi.org/10.13971/j.cnki.cn23-1435/c.2020.08.040

Peiquan, L., Yan, W., & Min, L. (2023). The effect of increased attention on motor skill acquisition - using positive thinking meditation as a medium. The Fourth Academic Exchange Conference on "National Fitness and Scientific Exercise" and the International Academic Forum on Exercise and Health, Nanchang, Jiangxi, China.

Peng, Q. (2009). An experimental study of representational training on serve success in college tennis teaching [Master's degree].

Qian, Z. (2018). A study on the relationship between core self-evaluation, emotion regulation self-efficacy and psychological tolerance of armed police officers and group mental training [Master's degree].

Qing, G. (2022). The Effectiveness of Relaxation Training with Imagination Training in the Mental training of College Basketball Players. Journal of Hubei Second Normal College, 39(05), 69-73.

Qingjiang, W. (2014). A Brief Analysis of the Application of Ideological Relaxation in Sports Training. The New West (Theoretical Edition)(06), 167+169.

Si, G., Duan, Y., Li, H. Y., & Jiang, X. (2011). An exploration into socio-cultural meridians of Chinese athletes' mental training. Journal of Clinical Sport Psychology, 5(4), 325-338. https://doi.org/10.1123/jcsp.5.4.325

Si, G., Li, X., Huang, Z., Wang, D., Wang, Y., Liu, J.-D., Liu, H., Zhao, D., Bu, D., & Zhang, C.-Q. (2021). The mental health of Chinese elite athletes: Revisiting the assessment methods and introducing a management framework. International Journal of Sport and Exercise Psychology, 1-15. https://doi.org/10.1080/1612197X.2021.1907769

Simonsmeier, B. A., & Buecker, S. (2017). Interrelations of imagery use, imagery ability, and performance in young athletes. Journal of Applied Sport Psychology, 29(1), 32-43. https://doi.org/10.1080/10413200.2016.1187686

Slagter, H. A., Lutz, A., Greischar, L. L., Francis, A. D., Nieuwenhuis, S., Davis, J. M., & Davidson, R. J. (2007). Mental training affects distribution of limited brain resources. PLoS biology, 5(6), e138. https://doi.org/10.1371/journal.pbio.0050138

Sponholz, K. (n.d.). Effects of mental-skills training on collegiate divers' performance and perception of success. Retrieved from [Accesed 2024, 25 november]: http://hdl.handle.net/20.500.12648/361

Subathra, P., Elango, M., & Subramani, A. (2021). Influence of mental training on aggression and sports competition anxiety among volleyball players. Gorteria, 34(1), 377-382.

Tod, D., Hardy, J., & Oliver, E. (2011). Effects of self-talk: A systematic review. Journal of Sport and Exercise Psychology, 33(5), 666-687. https://doi.org/10.1123/jsep.33.5.666

Toussaint, L., Nguyen, Q. A., Roettger, C., Dixon, K., Offenbächer, M., Kohls, N., Hirsch, J., & Sirois, F. (2021). Effectiveness of progressive muscle relaxation, deep breathing, and guided imagery in promoting psychological and physiological states of relaxation. Evidence-Based Complementary and Alternative Medicine, 2021. https://doi.org/10.1155/2021/5924040

Turgut, M., & Yasar, O. M. (2020). Mental Training of College Student Elite Athletes. Journal of Education and Learning, 9(1), 51-59. https://doi.org/10.5539/jel.v9n1p51

Ungerleider, S. (2005). Mental training for peak performance: Top athletes reveal the mind exercises they use to excel. Rodale.

Vealey, R. S. (2007). Mental skills training in sport. https://doi.org/10.1002/9781118270011.ch13

Weinberg, R. S., & Gould, D. (2023). Foundations of sport and exercise psychology. Human kinetics.

Wenlong, Z., Baichao, X., & Shuai, Z. (2019). Application of the Representational Training Method to Golf Instruction. Chinese Journal of Education(S1), 212-214.

Xiaoting, B., & Hongwei, J. (2016). Intervention-Level Matching Effects of Cognitively Assisted Training of the Tennis Serve. Journal of Chengdu Institute of Physical Education, 42(06), 95-98+109. https://doi.org/10.15942/j.jcsu.2016.06.15

Yashi, Z. (2019). An Exploratory Study on the Mental training of High-level Tennis Players in Beijing Colleges and Universities. Sporting Trend(06), 269.

Ye, S. (2006). An experimental study on the use of music-representation teaching method in sports dance teaching in colleges and universities [Master's degree].

Ye, X. (2023). A study of the effects of growth mindset, sport self-efficacy on self-limitations and mental training in athletes [Master's degree].

Yexuan, Z. (2024). Feasibility study of positive thinking meditation training on the recovery of sports mental fatigue in sports dancers. Research on Ice and Snow Sports Innovation, 5(02), 179-181. https://doi.org/10.20155/j.cnki.issn2096-8485.2024.02.060

Yi, Z. (2008). An experimental study of the teaching of representational training in a general badminton course [Master's degree].

Zhang, L., Ge, Y., & Li, D. (2021). The features and mission of sport psychology in China. Asian Journal of Sport and Exercise Psychology, 1(1), 45-53. https://doi.org/10.1016/j.ajsep.2021.03.008

Zhihui, C. (2018). An investigation of the effect of the use of representational training in school soccer teaching and training. Contemporary Sports Technology, 8(25), 61-62. https://doi.org/10.16655/j.cnki.2095-2813.2018.25.061

Ziyan, W., & Hang, Z. (2023). Challenges, Paths and Trends of Mental training for High-level Athletes. Bulletin of Scientific and Technical Literature on Sports, 31(12), 253-256. https://doi.org/10.19379/j.cnki.issn.1005-0256.2023.12.063