

Research Approaches in Sport Psychology and Exercise Psychology

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Abstract: Sport psychology and exercise psychology represent two major branches of sport psychology, focusing respectively on the optimization of athletic performance and the promotion of physical activity among the general population. With the advancement of research methodologies and increasing interdisciplinary integration, the two fields have demonstrated growing convergence in theoretical foundations, research methods, and practical applications. Through a comprehensive literature review, this paper systematically examines recent developments in sport psychology and exercise psychology. Particular attention is given to advances in cognitive neuroscience, psychological intervention techniques, and emerging competitive domains within sport psychology, as well as research on the mechanisms underlying exercise-related mental health benefits, psychological determinants of exercise behavior, and personalized intervention strategies within exercise psychology. Furthermore, the similarities and differences between the two fields are analyzed in terms of theoretical foundations, research populations, research objectives, and intervention orientations. The review suggests that although sport psychology and exercise psychology differ in their primary research concerns and application contexts, both seek to explain and promote the psychological processes underlying human movement behavior. Moreover, increasing integration is evident in the application of neuroscience technologies, artificial intelligence, and behavioral intervention approaches. Looking ahead, AI-driven research, neuroscience investigations in real-world settings, and the development of culturally grounded theories are expected to become key directions for future advancement in sport psychology. The findings contribute to a more comprehensive understanding of the disciplinary framework of sport psychology and provide implications

for future research and practice.

Keywords: Sport Psychology; Exercise Psychology; Sport Psychology Discipline; Research Progress; Psychological Intervention

1. Introduction

As an interdisciplinary field formed through the integration of psychology and sport science, sport psychology has undergone more than half a century of development and has gradually evolved into multiple relatively independent yet interconnected research branches. Among them, sport psychology and exercise psychology constitute the two major pillars of the discipline. The former focuses on competitive sport settings and examines athletes' psychological states and behavioral performance in highly stressful and competitive environments, whereas the latter centers on participation in physical activity among the general population and explores the psychological determinants of exercise behavior and its effects on mental health.

The differentiation between sport psychology and exercise psychology is a natural consequence of the divergence in research paradigms and application contexts. In the current disciplinary landscape, however, the two fields increasingly exhibit trends of methodological integration and mutual borrowing of theoretical frameworks. The introduction of cognitive neuroscience techniques has brought the two domains closer at the methodological level, while the rise of artificial intelligence and big-data analytics has provided them with shared analytical tools and research methods.

2. Advances in Sport Psychology Research

Recent advances in sport psychology are primarily characterized by three notable trends: the deep integration of cognitive neuroscience paradigms, the technological advancement of psychological intervention strategies, and the

substantive expansion of research boundaries into emerging competitive domains.

At the level of cognitive neural mechanisms, researchers have systematically investigated the superior action-processing capabilities of elite athletes. Zhou Chenglin and colleagues have argued that the introduction of cognitive neuroscience techniques has significantly advanced the field of sport psychology, leading to important discoveries regarding the neural mechanisms underlying athletes' action-processing advantages. Through the application of real-time neurophysiological monitoring technologies, such as electroencephalography (EEG), magnetic resonance imaging (MRI), and transcranial magnetic stimulation (TMS), researchers have been able to uncover the neural processes involved in action perception and execution, thereby substantially enriching current understanding of sport-related cognitive functioning. Drawing on feedforward model theory and mentalizing systems, Zhou and colleagues conducted a series of studies in open-skill sports such as table tennis and found that elite athletes demonstrate significant cognitive advantages in action anticipation and decision-making processes. These advantages appear to be rooted in neuroplastic adaptations resulting from long-term sport-specific training, highlighting the critical role of experience-dependent brain reorganization in the development of athletic expertise [1].

Research on stress coping and emotional regulation has likewise progressed from behavioral observations to investigations of underlying neurophysiological mechanisms. Recent studies involving table tennis athletes have examined the neurodynamic processes associated with proactive control under pressure. Findings indicate that social rewards and monetary rewards enhance athletes' ability to cope with stressful situations through distinct neurocognitive pathways. Specifically, monetary rewards primarily facilitate the allocation of early attentional resources, whereas social rewards improve the sustained deployment of cognitive resources by strengthening intrinsic motivation. These findings deepen current understanding of the interaction between reward systems and stress regulation while providing new theoretical foundations for psychological interventions in competitive sport settings [2].

Advances in psychological intervention techniques have also attracted considerable

scholarly attention. Attention Bias Modification Training (ABMT) has demonstrated promising effects in reducing pre-competition anxiety among athletes. Empirical evidence indicates that after four weeks of attention bias modification training, elite athletes exhibited significantly lower levels of competitive anxiety and a marked reduction in attentional bias toward negative information, with relatively large effect sizes reported [3]. In addition, mindfulness-based interventions have gained increasing prominence within competitive sport contexts. Researchers have found that brief mindfulness training can effectively mitigate the detrimental effects of mental fatigue on tactical performance in basketball. Beyond these approaches, integrated intervention models that combine principles of positive psychology, cognitive-behavioral strategies, and psychophysiological technologies are being increasingly adopted in sport psychology practice.

The expansion of research boundaries constitutes another important dimension of contemporary sport psychology. In particular, the psychology of esports has emerged as a rapidly developing area of inquiry. As a novel form of competition, esports introduces unique psychological characteristics that challenge and extend traditional sport psychology frameworks. Research conducted by Matthew G. Young and colleagues found that psychological toughness and resilience were not significantly associated with competitive achievement among elite esports players. These findings suggest that conventional psychological assessment tools developed for traditional sports may be insufficient for capturing the psychological attributes most relevant to digital competitive environments. Consequently, researchers have emphasized the need to develop specialized instruments capable of assessing the distinctive cognitive, social, and tactical demands of esports participation [4]. Young and colleagues' work highlights the paradigm challenges faced by sport psychology in response to emerging forms of competition while simultaneously creating opportunities for the continued expansion and refinement of the discipline's theoretical and methodological boundaries.

3. Advances in Exercise Psychology Research

In recent years, the development of exercise psychology has followed a trajectory that is both

relatively independent from and deeply interconnected with sport psychology. Major advances in the field can be observed in three areas: the neurobiological mechanisms underlying the psychological effects of exercise, the psychological determinants of exercise behavior, and the exploration of personalized intervention approaches.

Understanding the mechanisms through which exercise influences mental health has long been a central concern of exercise psychology. Significant progress has been made in uncovering the neurobiological foundations of these effects. A study conducted by the Institute of Psychology, Chinese Academy of Sciences, provided the first direct neurobiological evidence that acute aerobic exercise improves emotional well-being through the functional specialization of amygdala subregions. The findings revealed that the medial and lateral subdivisions of the right amygdala play complementary roles in automatic emotion regulation. Specifically, the medial subregion primarily regulates the intensity of emotional experiences and self-evaluation, whereas the lateral subregion contributes more broadly to emotional regulation and the enhancement of positive affective arousal [5]. High-intensity interval training (HIIT) has also been shown to alleviate deficits in emotional processing among individuals with high trait anxiety by increasing motor cortex excitability in response to negative emotional stimuli, with effects exceeding those of moderate-intensity continuous training. In addition, systematic reviews integrating neurobiological, psychological, and social perspectives have examined the comprehensive mental health benefits associated with long-term exercise interventions.

Research on the psychological mechanisms underlying exercise behavior has expanded from single-factor explanations to multidimensional frameworks that emphasize dynamic interactions among psychological variables and behavioral outcomes. Self-efficacy has consistently been identified as a key determinant of exercise adherence, exerting its influence through pathways such as goal setting, self-regulation, and coping with barriers. Autonomous motivation has also been shown to be a strong predictor of sustained exercise participation, with previous exercise behavior further strengthening its predictive power. Moreover, exercise commitment is positively associated

with exercise adherence, with health beliefs and exercise behavior serving as sequential mediators. Empirical evidence indicates that the independent mediating effect of health beliefs accounts for 69.7% of the total effect. Regarding affective experiences, researchers have explored the applicability of the Peak–End Rule within exercise contexts and found that both peak emotional experiences during exercise and emotional states at the conclusion of an exercise session significantly influence individuals' affective evaluations and subsequent exercise frequency [6]. Personality traits have likewise been identified as important predictors of preferences for exercise intensity and the extent of stress reduction achieved through training. Notably, individuals with higher levels of neuroticism appear to derive the greatest stress-relief benefits from aerobic exercise interventions [7].

The exploration of personalized intervention strategies represents a major practical shift within contemporary exercise psychology. In a social environment increasingly characterized by instant gratification and digitalization, maintaining long-term exercise adherence has become particularly challenging among university students. The application of machine learning techniques, such as random forest algorithms, has provided novel analytical tools for identifying key predictors of exercise behavior. The psychological effects of exercise among children and adolescents have also been subjected to comprehensive evaluation [8]. A network meta-analysis found that psycho-motor training programs integrating physical activity with cognitive training were the most effective interventions for reducing symptoms of anxiety and depression among children and adolescents. However, the effectiveness of different exercise modalities varied across developmental stages. Furthermore, the influence of mobile information technologies on the mental health benefits of exercise has emerged as a rapidly growing area of research. Collectively, these findings suggest that exercise psychology is undergoing a paradigm shift from universal intervention approaches toward more individualized and precision-based intervention strategies [9].

4. Connections and Distinctions Between Sport Psychology and Exercise Psychology
Sport psychology and exercise psychology can

be situated within the unified disciplinary framework of sport psychology because they share a common disciplinary foundation. However, this underlying unity does not preclude substantial differences in their research orientations and theoretical emphases. Examining both the connections and distinctions between these two fields contributes to a more comprehensive understanding of the structure and developmental logic of sport psychology as a discipline.

4.1 Connections Between Sport Psychology and Exercise Psychology

First, the Two Fields Share Common Theoretical Foundations

Whether addressing psychological regulation in competitive sport settings or the maintenance of exercise behavior in everyday contexts, both fields rely on a thorough understanding of fundamental psychological processes, including motivation, emotion, and cognition. For example, Self-Determination Theory has been widely applied to explain athletes' training engagement and burnout while also serving as a prominent framework for predicting the initiation and maintenance of exercise behavior among the general population. Similarly, Achievement Goal Theory demonstrates comparable explanatory power in understanding both competitive performance anxiety and exercise-related goal orientations. In a critical review, Furley and colleagues highlighted executive function as a major topic within sport and exercise science, noting that researchers continue to investigate two closely related questions: whether participation in physical activity enhances executive function and how executive function contributes to superior athletic performance [10].

Second, There Is Increasing Methodological Integration and Complementarity

A wide range of methodological approaches—including neuroscience techniques, psychophysiological measurements, longitudinal research designs, and meta-analytic methods—are extensively employed in both fields. No research method is exclusive to either domain. Recent developments suggest that psychophysiological assessment techniques are increasingly facilitating a bidirectional research paradigm linking mind and body, thereby creating opportunities for greater methodological integration and knowledge exchange between

sport psychology and exercise psychology.

Third, Intervention Approaches Are Becoming Increasingly Interconnected

Intervention strategies developed within one field are frequently adopted and adapted by the other. For instance, mindfulness training, originally popularized within competitive sport settings, has been incorporated into exercise psychology interventions to enhance bodily awareness and intrinsic motivation during physical activity. Conversely, findings from exercise psychology regarding exercise enjoyment and affective experiences have been applied to sport psychology to address mental fatigue resulting from prolonged high-intensity training. Mindfulness-based interventions provide a representative example of this reciprocal exchange. Such interventions have been used in competitive sport to mitigate the detrimental effects of mental fatigue on tactical performance while also being implemented in exercise settings to promote greater awareness and acceptance of exercise experiences.

4.2 Distinctions Between Sport Psychology and Exercise Psychology

First, the Two Fields Differ in Their Primary Objectives

The production of knowledge in sport psychology is fundamentally oriented toward optimizing athletic performance. Its central concern is understanding how athletes can achieve peak performance under conditions of competitive pressure. In contrast, exercise psychology places health promotion and psychological well-being at the core of its research agenda. Its primary focus is understanding how individuals can establish and maintain positive physical activity habits in daily life. In this sense, sport psychology is primarily outcome-oriented, whereas exercise psychology is predominantly process-oriented.

Second, the Two Fields Target Different Populations

Sport psychology primarily investigates competitive athletes who have undergone systematic training and whose psychological characteristics are highly specialized. Exercise psychology, by contrast, focuses on a much broader population, including children, adolescents, adults, older adults, and various special populations. These differences in target populations inevitably lead to systematic variations in research design, measurement

instruments, and intervention strategies.

Third, the Two Fields Emphasize Different Theoretical Frameworks

In response to the immediate and performance-oriented nature of competitive sport, sport psychology has developed a theoretical framework centered on stress management, attentional control, and psychological skills training. Exercise psychology, on the other hand, addresses the gradual and health-oriented nature of behavioral change and has therefore established theoretical models focused on behavioral adoption, maintenance, and relapse prevention. Emerging frameworks, such as dual-process models of physical activity adoption and maintenance, seek to integrate both reflective and automatic processes within a unified explanatory system. These models complement, while differing from, the more immediate self-regulatory perspectives commonly emphasized in sport psychology.

Despite these distinctions, the boundaries between sport psychology and exercise psychology have never been rigid or impermeable. Real-world phenomena, such as the psychological adaptation of retired athletes transitioning from competitive training to recreational exercise and the increasing prevalence of competitive elements within public fitness activities, require theoretical and methodological integration across the two fields. Consequently, both their similarities and differences continue to drive the dynamic development of sport psychology as a whole.

5. Future Directions

Based on a systematic review of recent developments in sport psychology and exercise psychology, as well as a critical examination of the relationship between the two fields, several future directions can be identified.

First, artificial intelligence (AI) is expected to become a key driving force promoting deeper integration between sport psychology and exercise psychology. At present, AI technologies have already been applied to the identification of athletes' psychological states and the prediction of sport performance, including talent identification, performance forecasting, and intelligent monitoring of mental health status. Zhou Chenglin and colleagues have suggested that advances in AI algorithms may provide more direct and precise insights into the mechanisms underlying exercise-induced

neuroplasticity in the human brain. Beyond competitive sport, AI also demonstrates considerable potential in predicting exercise behavior, developing personalized exercise prescriptions, and delivering mobile health interventions [1]. More importantly, the universal analytical methods and technological platforms provided by AI are gradually eliminating the technical barriers that have traditionally separated sport psychology and exercise psychology in terms of data processing. Through unified algorithmic frameworks, behavioral, physiological, and psychological data generated in both fields can be integrated and analyzed collectively, thereby facilitating the development of more generalizable theoretical explanations of the psychological mechanisms underlying human movement behavior. In this sense, artificial intelligence should be viewed not merely as a technological tool but also as a potential epistemological force capable of transforming the paradigms of sport and exercise psychology.

Second, neuroscience technologies are expected to move beyond laboratory settings and into real-world environments, thereby narrowing the methodological gap between competitive sport and exercise contexts. Emerging techniques such as non-invasive deep brain stimulation and neurofeedback have shown promise as effective methods for enhancing athletic performance. At the same time, these technologies are increasingly being explored as intervention tools within exercise psychology. For example, findings from competitive sport settings regarding the influence of reward systems on proactive control provide important theoretical insights into the neural foundations of exercise motivation. Conversely, evidence from exercise psychology demonstrating the role of amygdala subregions in emotion regulation offers a neurobiological framework for understanding pre-competition emotional regulation among athletes. As neuroscience methodologies become more portable and ecologically valid, they are likely to foster greater integration between the two fields by enabling the investigation of psychological processes within authentic movement environments.

Third, growing cultural confidence will continue to provide momentum for the localization and contextualization of sport psychology. For many years, both sport psychology and exercise psychology have largely relied on theoretical

frameworks developed within Western cultural contexts [11]. However, deep-seated cultural differences exert significant influences on the psychological mechanisms underlying sport and exercise behavior. Scholars have argued that sport psychology remains heavily rooted in Western-centered paradigms and that there is a pressing need to develop culturally sensitive and culturally competent theoretical frameworks [12]. Traditional Chinese culture offers distinctive intellectual resources for this endeavor, including holistic conceptions of mind–body unity, process-oriented philosophies of self-cultivation, and integrated perspectives on health and well-being. These cultural traditions provide valuable foundations for constructing indigenous theories of sport and exercise psychology. Professor Ji Liu, in overseeing the development of sport psychology textbooks in China, has similarly emphasized the importance of grounding theoretical development in local sport practices and disciplinary strengths while establishing a content system that is both scientifically rigorous and intellectually meaningful. Recent discussions on disciplinary development have further proposed integrating research on psychological enhancement of athletic performance with exercise-based psychological interventions for special populations, thereby promoting closer connections between scientific research and practical application. Future research should continue to advance this agenda and strive to develop culturally informed theoretical frameworks capable of explaining both peak performance in competitive sport and health-promoting exercise behavior in everyday life.

6. Conclusion

Sport psychology and exercise psychology are not two isolated territories within the disciplinary landscape; rather, they are distinct branches that have emerged from the common intellectual roots of sport psychology. Both fields share a fundamental concern with understanding the psychological mechanisms underlying human movement behavior. While each generates knowledge within its own contextual domain, both contribute in complementary ways to the expansion and enrichment of the broader theoretical framework of sport psychology.

With the advancement of research methodologies and the deepening of scholarly

inquiry, sport psychology and exercise psychology are undergoing a paradigm shift from coexistence and competition toward increasing integration and convergence. Three major trends are shaping this transformation: the growing application of artificial intelligence in research, the extension of neuroscience technologies into real-world settings, and the emergence of culturally grounded theoretical development driven by increasing cultural confidence. Together, these trends are promoting a more integrated, interdisciplinary, and open future for the field of sport psychology.

If sport psychology is to develop a new disciplinary identity in the future, this identity will no longer be founded upon the traditional dichotomy between competitive sport and exercise participation. Instead, it will take the holistic experience of human physical activity as its theoretical point of departure. Such a perspective has the potential to transcend existing disciplinary boundaries, foster deeper integration between sport psychology and exercise psychology, and advance a more comprehensive understanding of the psychological foundations of human movement and well-being.

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