








A five-decade bibliometric review of interventions for performance anxiety in sports

Key themes and future directions

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Abstract: *Introduction:* Performance anxiety is a significant psychological factor influencing athletes' performance across various sports. *Methods:* This bibliometric analysis provides a comprehensive review of research on performance anxiety in sports, spanning from 1974 to 2024. Utilizing data from the Scopus database, the study examines 794 journal articles to identify core research themes, influential contributors, global collaboration networks, and emerging trends. *Results:* The analysis reveals an annual growth rate of 8.07% and highlights the dominance of countries like the United States and the United Kingdom in driving research and fostering international collaborations. Key themes include stress, self-confidence, mental health, and performance enhancement, with recent trends focusing on digital interventions, motivational climate, and esports. Highly cited papers and prominent journals underscore the interdisciplinary integration of psychology, physiology, and sports science. The study also maps the thematic evolution of the field, showcasing a shift from foundational constructs to applied interventions and contemporary topics. *Discussion:* Findings emphasize the need for greater collaboration with underrepresented regions and exploration of emerging areas such as digital sports and personalized psychological interventions. This review offers valuable insights for researchers, practitioners, and policymakers to advance understanding and application in performance anxiety and sports.

Keywords: performance anxiety, sports psychology, mental health, bibliometric analysis

Introduction

Performance anxiety is a pervasive psychological phenomenon that affects athletes across various levels of competition, influencing their ability to perform optimally under pressure. Defined as an excessive fear or apprehension about one's performance in a competitive setting [1], performance anxiety has been a central focus of sports psychology research for decades. Early studies primarily explored the physiological and psychological mechanisms underlying anxiety, such as arousal, stress, and cognitive interference, establishing foundational theories that shaped the field [2]. However, as competitive sports have evolved, so too has the understanding of performance anxiety, transitioning from a unidimensional focus to a multidimensional construct encompassing emotional regulation, self-confidence, and coping strategies [3, 4]. The increasing

integration of psychology and sports science highlights the importance of addressing performance anxiety, not just as a barrier to success but also as an opportunity for growth and resilience development in athletes.

The growth of research in performance anxiety has been marked by significant advancements in both theoretical and practical approaches. From the foundational theories of competitive trait anxiety to contemporary studies on self-regulation and motivational climate, the field has expanded to include diverse populations, settings, and methodologies. Thematic evolution in the literature reveals an increasing emphasis on applied research, particularly interventions aimed at mitigating anxiety and enhancing performance. These interventions range from psychological techniques, such as mindfulness and cognitive-behavioural strategies [5, 6], to physiological approaches, including biofeedback and physical conditioning [7]. Moreover, the

emergence of new trends, such as esports and virtual training environments, has further broadened the scope of performance anxiety research, presenting novel challenges and opportunities. This bibliometric analysis aims to map the development of the field over the past five decades, shedding light on its core themes, influential contributors, and emerging trends.

Global collaboration networks and interdisciplinary integration have played a pivotal role in advancing research on performance anxiety. Countries like the United States and the United Kingdom have established themselves as leaders, contributing significantly to the literature and fostering international partnerships. Highly cited papers and influential journals reflect the multidisciplinary nature of the field, integrating insights from psychology, physiology, and sports science. However, despite these advancements, there remain gaps in understanding how cultural, gender, and contextual factors influence performance anxiety in diverse populations. Addressing these gaps requires leveraging emerging research methods, such as machine learning and big data analytics, to uncover nuanced patterns and relationships. Furthermore, fostering greater collaboration among underrepresented regions and expanding research into underexplored domains, such as mental health in esports and the impact of digital interventions, will be critical for the continued evolution of the field.

This study seeks to answer a central research question: How has the scholarly landscape of performance anxiety in sports evolved over the past five decades in terms of research themes, influential contributors, global collaboration patterns, and emerging trends? By addressing this question, the study aims to systematically uncover the development and transformation of the field from its early theoretical foundations to its current applied and interdisciplinary focus. The analysis investigates not only the volume and growth of publications but also the thematic shifts, dominant research areas, and the role of international collaboration in shaping the knowledge base. In doing so, the study provides valuable insights into where the field has been, where it currently stands, and where it may be headed, offering guidance for future research, policy development, and applied practice in sports psychology and mental health.

Methodology

This bibliometric analysis aims to provide a comprehensive overview of research on performance anxiety in sports, tracing its thematic evolution, identifying influential contributors, and highlighting emerging trends. The analysis was conducted using data extracted from the Scopus data-

base, which is widely recognized for its extensive coverage of peer-reviewed literature. The search query was formulated using key terms related to interventions, treatments, and psychological aspects of performance anxiety in sports. The final query included: *TITLE-ABS-KEY (intervention OR treatment OR medication OR psychological) AND TITLE-ABS-KEY (performance AND anxiety AND sports)**, restricted to publications in English, published between 1974 and 2024, and categorized as journal articles.

The initial search yielded 856 documents from the Scopus database. These records were then screened to eliminate duplicates, non-journal articles (e.g., conference papers, editorials, book chapters), and publications that did not align with the thematic scope of performance anxiety in sports. Titles and abstracts were reviewed to confirm relevance, particularly ensuring that the studies addressed psychological, physiological, or intervention-related aspects of performance anxiety within a sporting context. After the data screening and cleaning process, a total of 794 journal articles were retained for bibliometric analysis. For the data extraction, the retrieved dataset included bibliographic information such as authors, affiliations, journal titles, keywords, publication years, citations, and collaboration networks. Those documents spanned over 50 years, with an annual growth rate of 8.07%. The data were processed using bibliometric software which is Biblioshiny [8]. Descriptive statistics were used to summarize key metrics, including total publications, annual growth rates, average citations, H-index, and G-index, for journals, authors, and countries. Thematic mapping and co-occurrence analyses of keywords were performed to identify core research themes and their evolution over time.

To analyse global collaboration, co-authorship networks were constructed at the institutional and national levels. The degree of collaboration was assessed by examining single-country publications (SCP) versus multiple-country publications (MCP), while collaboration networks were visualized to identify central hubs and emerging regions. Additionally, the thematic evolution of the field was analysed using a Sankey diagram, linking major research themes across three periods: 1974–2010, 2011–2019, and 2020–2024. These three time periods signify different phase or period of research development; 1974 – 2010 was the foundational period with relatively slower growth in publications, 2010 – 2019 was the acceleration phase in terms of research activity, and subsequently 2020 – 2024 reflecting post-COVID19 pandemic period which captures the shift of trend that includes more digital and virtual involvements. Highly cited papers were identified based on total citations, citations per year, and normalized citation metrics to evaluate their influence and significance in shaping the field.

Results and Discussion

Bibliometric overview of performance anxiety and sports research (1974–2024)

This bibliometric analysis spans from 1974 to 2024, comprising 794 documents sourced from 339 outlets, including journals and books. The field demonstrates an annual growth rate of 8.07%, indicating increasing research interest, with an average document age of 10.6 years and 25.36 citations per document, reflecting substantial impact. The dataset includes 3,320 Keywords Plus and 1,727 Author's Keywords, highlighting the diversity of topics explored. Contributions come from 2,980 authors, with only 57 single-authored works and 58 single-authored documents, showing a strong preference for collaboration, as evidenced by 4.33 co-authors per document and 23.3% of publications featuring international co-authorships. All 794 documents are journal articles, demonstrating a focus on peer-reviewed dissemination (see Table 1).

The annual scientific production on interventions for performance anxiety in sports has shown a significant upward trend over the past five decades, beginning with sporadic publications in the 1970s and 1980s, where article counts remained below 10 per year. The growth became more consistent in the 1990s, with annual outputs gradually increasing, reaching double digits by 1997. A substantial surge in productivity occurred after 2007, culminating in an exponential rise from 2017 onwards. The most prolific years were 2021, 2022, 2023, and 2024, with article counts reaching 65, 69, 74, and 97, respectively. This growth highlights the increasing attention and research focus on performance anxiety interventions in sports, particularly in recent years (see Figure E1 in the electronic supplementary material ESM1).

The average citations per year for articles on interventions for performance anxiety in sports show fluctuations over time, reflecting varying levels of influence and relevance of published research. Early years, such as 1977, saw a notable peak with an average of 7.10 citations per year, driven by a small number of foundational studies that garnered significant attention. The average citations per year generally increased during the 1990s and early 2000s, with peaks like 4.71 in 2000, reflecting the enduring impact of publications during this period. However, from 2010 onwards, while the volume of publications rose sharply, the average citations per year began to stabilize or decline, as observed in recent years with 1.53 in both 2022 and 2023 and 0.49 in 2024. This suggests that while more articles are being published, individual papers are drawing fewer annual citations on average, potentially due to the increased breadth of research dispersing scholarly attention (see Figure E2 in ESM1).

Table 1. Descriptive statistics of bibliometric data on interventions for performance anxiety in sports (1974–2024)

Description	Results
Main information about data	
Timespan	1974:2024
Sources (journals, books, etc)	339
Documents	794
Annual growth rate %	8.07
Document average age	10.6
Average citations per doc	25.36
Document contents	
Keywords plus (ID / Identifiers)	3320
Author's keywords (DE / Descriptors)	1727
Authors	
Authors	2980
Authors of single-authored docs	57
Authors collaboration	
Single-authored docs	58
Co-Authors per Doc	4.33
International co-authorships %	23.3
Document type	
Article	794

The three-field plot in Figure 1 illustrates the collaborative relationships among institutions (AU_UN), countries (AU_CO), and author keywords (DE) related to interventions for performance anxiety in sports. Leading institutions such as the University of Melbourne, Victoria University, and the University of Calgary are shown to contribute significantly to this research field. Countries like the United States, the United Kingdom, Australia, and Canada dominate the research landscape, reflecting strong international collaborations. The author keywords highlight key research themes, with frequent focus on terms such as “anxiety,” “depression,” “sport psychology,” “stress,” and “performance,” showcasing the central topics explored by researchers. The size of the thickness of the connecting lines refer to more connections, and therefore higher frequency. This visualization underscores the global and interdisciplinary nature of the field, with institutions and countries playing pivotal roles in advancing knowledge through diverse thematic contributions.

Influential journals and their impact

Perceptual and Motor Skills leads with 42 articles, followed by Frontiers in Psychology with 38, and the International Journal of Environmental Research and Public Health with 26. Other prominent sources include the Journal of Sports Sciences (23 articles) and the Journal of Physical Education and Sport (20 articles). Several journals, such as PLOS ONE and Psychology of Sport and Exercise, contribute 16 articles

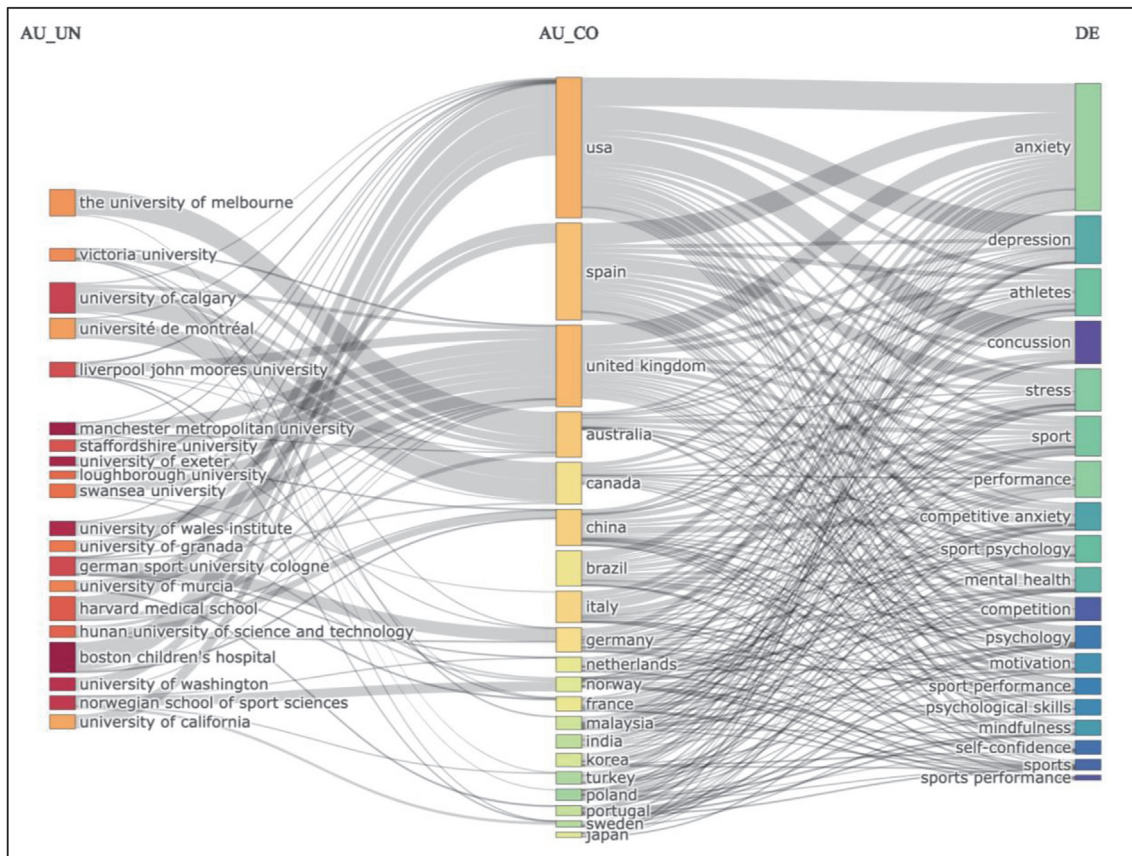


Figure 1. Collaborations among institutions, countries, and author keywords in research on performance anxiety in sports. *AU_UN: Authors universities/affiliations; AU_CO: Authors countries; DE: Descriptors or keywords.

each, showcasing their role in disseminating research on this topic. The diversity of journals reflects the interdisciplinary nature of this research area, integrating perspectives from psychology, public health, and sports science (see Figure E3 in ESM1).

Looking at the key metrics for influential journals publishing research on performance anxiety in sports, the Perceptual and Motor Skills, with an H-index of 17, leads in total citations (932) and the number of publications (42) since its inception in 1985 (refer Table E1 in ESM1). The Journal of Sports Sciences has a high total citation count (1,544) and an H-index of 16, indicating its strong influence since 1989. Journals such as the Journal of Sport and Exercise Psychology (H-index 15, citations 1,382) and Frontiers in Psychology (H-index 13, citations 548, with the highest M-index of 1.3) demonstrate significant impact despite a relatively recent start in 2016. The International Journal of Environmental Research and Public Health, although newer (2018), also exhibits a strong M-index (1.25) with 26 publications and 340 citations. Other journals like the British Journal of Sports Medicine (H-index 10) and Psychology of Sport and Exercise (H-index 10) contribute steadily to the field. These metrics underscore the

diversity and influence of journals across different time-frames and levels of focus on performance anxiety in sports research.

Prominent authors and their impact

Hanton S leads with 13 articles and a fractionalized count of 4.42, indicating substantial involvement in collaborative works. Wilson MR and Hardy L follow with 9 and 8 articles, and fractionalized counts of 3.03 and 4.17, respectively, showcasing their significant individual contributions. Authors like Turner MJ, Smith RE, and Robazza C also demonstrate notable contributions, with their fractionalized counts reflecting varying levels of collaboration. Meehan WP, while contributing six articles, has the lowest fractionalized count (0.83), suggesting high collaboration in their works. This analysis underscores both the productivity and collaborative dynamics of key authors in the field (see Figure E4 in ESM1).

In terms of the number of articles (N. Articles) and total citations per year (TC per Year), authors such as Hanton S, Wilson MR, and Hardy L show consistent contributions spanning multiple years, with larger markers indicating

Table 2. Key metrics of prominent authors in performance anxiety and sports research

Author	H index	G index	M index	Total citations	Number of publications	Publication year (Start)
Hanton S	13	13	0.5	565	13	2000
Wilson MR	9	9	0.529	613	9	2009
Hardy L	8	8	0.216	351	8	1989
Smith RE	7	7	0.226	873	7	1995
Glass CR	6	6	0.353	406	6	2009
Mellalieu SD	6	6	0.25	196	6	2002
Robazza C	6	6	0.188	145	6	1994
Smoll FL	6	6	0.194	852	6	1995
Turner MJ	6	8	0.5	155	8	2014
Vine SJ	6	6	0.353	376	6	2009

higher productivity or impact in specific periods (refer to Figure E5 in ESM1). Hanton S stands out with sustained activity over time and notable influence, as reflected by the size of the markers. Authors like Robazza C and Mellalieu SD demonstrate more recent but impactful contributions, while others, such as Glass CR and Liu Y, have intermittent production with notable citation impact in specific years. The chart underscores varying trajectories of productivity and influence, revealing both long-term contributors and recent impactful authors in the field.

The distribution of author productivity follows Lotka's Law, which illustrates that most authors contribute a single publication, while a smaller proportion of authors account for multiple publications. In this dataset, 2,694 authors (90.4%) have written only one document, highlighting the dominance of single contributions in the field. The proportion of authors contributing multiple documents decreases sharply, with 196 authors (6.6%) writing two documents, 54 authors (1.8%) writing three, and only a few contributing more than four. For example, just one author has written as many as 13 documents. This pattern reflects a highly skewed distribution of productivity, where a small group of prolific authors significantly shapes the field, while the majority are occasional contributors (see Figure E6 in ESM1).

Table 2 highlights the contributions and impact of prominent authors in performance anxiety and sports research, focusing on productivity and citation metrics. Hanton S leads in productivity with 13 publications, an H-index and G-index of 13, and a total of 565 citations since starting in 2000, reflecting significant influence. Wilson MR shows a strong citation impact with 613 citations across 9 publications and a higher M-index (0.529), indicating consistent productivity since 2009. Smith RE has the highest total citations (873) across 7 publications, demonstrating substantial influence. Hardy L, a senior contributor starting in 1989, has accumulated 351 citations with 8 publications. Turner MJ, despite starting more recently in 2014, has matched Hanton's M-index (0.5), showing high productivity in a short

period. Glass CR, Mellalieu SD, and Robazza C have similar contributions in terms of H-index and G-index (6 each), with varying citation counts, reflecting moderate influence. Smoll FL and Vine SJ, with H and G indices of 6, also exhibit strong citation impacts, particularly Smoll with 852 citations. This analysis underscores the varying levels of impact and influence among authors based on productivity and citation metrics.

Institutional and regional contributions

Meanwhile, from the institutional perspective, Boston Children's Hospital leads with 14 articles, showcasing its significant role in the field. Several institutions, including Manchester Metropolitan University, the University of Exeter, the University of Wales Institute, and the University of Washington, each contribute 13 articles, reflecting their prominent involvement. The Norwegian School of Sport Sciences and the University of Calgary follow closely with 12 articles each. German Sport University Cologne, Liverpool John Moores University, and Staffordshire University contribute 11 articles each, emphasizing their active engagement in advancing research in this domain. This distribution underscores a global and institutional collaboration in addressing performance anxiety and sports-related topics (see Figure E7 in ESM1).

In terms of single-country publications (SCP) and multiple-country publications (MCP), the United States leads with the highest number of articles, predominantly in single-country collaborations, followed by the United Kingdom and Spain, which also show significant contributions (see Figure E8 in ESM1). Countries such as Australia, Germany, and Canada exhibit a higher proportion of multiple-country collaborations (MCP), indicating strong international research networks. While countries like China, Brazil, and Italy contribute a notable number of articles, their output is largely driven by single-country collaborations. Smaller contributors, including Turkey, Greece, and Poland, show minimal MCP activity, suggesting limited

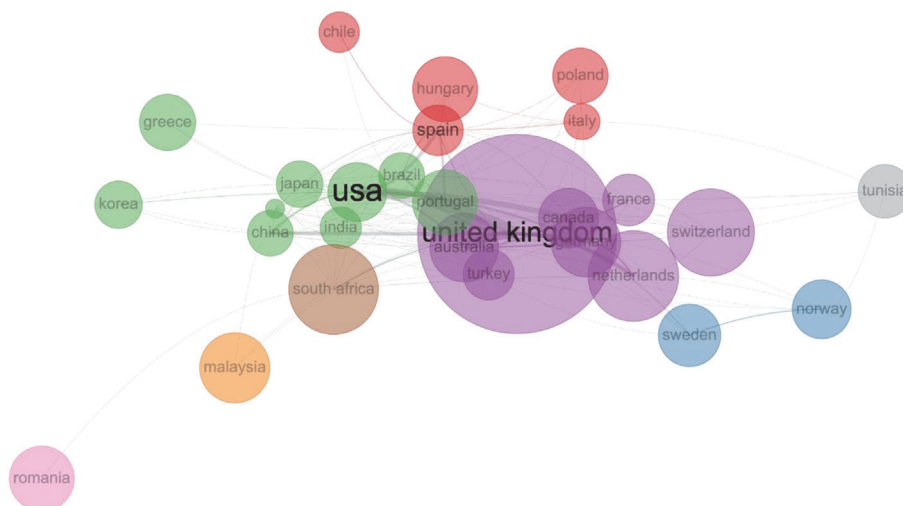


Figure 2. Global collaboration network in performance anxiety and sports research.

international collaboration. This distribution emphasizes the dominance of the United States and the United Kingdom in the field and highlights the growing role of international partnerships in advancing research.

Similarly, the United States leads in the cumulative research production with a steep and consistent increase in output, particularly accelerating after 2010, reflecting its dominant role in the field. The United Kingdom follows with substantial contributions, showing steady growth throughout the years. Spain and Australia demonstrate notable increases in production, especially in the last decade, reflecting their growing presence in this area. China, while starting later, exhibits a sharp rise in publications after 2015, signaling its emerging influence. This trend highlights the increasing global participation and leadership of these countries in advancing research on performance anxiety and sports (see Figure E9 in ESM1).

On the other hand, the most-cited country in performance anxiety and sports research is the United Kingdom leads with 3,432 total citations and an impressive average of 44 citations per article, showcasing its substantial influence in the field (refer to Figure E10 in ESM1). The United States follows with 2,712 citations and an average of 26.6, reflecting a strong but slightly less impactful citation rate. Canada, despite a smaller total citation count (769), has the highest average article citations (48.1), indicating the high impact of its research. Australia (1,274 citations, 36.4 average) and Germany (916 citations, 35.2 average) also demonstrate strong influence. Spain, while contributing significantly with 787 citations, has a lower average of 16.1. Other notable contributors include the Netherlands (32.3 average), Portugal (31.5 average), Sweden (29.1 average), and Italy (12.8 average).

Global collaboration networks

The network visualization in Figure 2 illustrates global collaboration in performance anxiety and sports research, highlighting the interconnectedness of countries based on co-authorships. The United Kingdom and the United States dominate the network with the largest nodes, reflecting their central roles in fostering international collaborations. Other significant contributors include China, Spain, and Australia, which form strong links with both major and smaller research nations. European countries such as Sweden, Belgium, and Norway also show active collaboration within regional clusters. Emerging contributors like Malaysia, Indonesia, and Tunisia are linked to larger networks, indicating growing involvement in international research. Smaller clusters, including Ukraine, Kazakhstan, and Hong Kong, exhibit more isolated collaborations, suggesting limited but focused contributions. Generally, countries within the same colour cluster indicate the tendency of collaborating more frequently with each other, or in another way, it represents closely connected research networks. This network underscores the importance of international partnerships in advancing research on performance anxiety and sports, with prominent hubs facilitating knowledge exchange globally.

Highly cited papers and their influence

Table 3 highlights highly cited papers in performance anxiety and sports research, showcasing their total citations, annual citation rates (TC per Year), and normalized citation metrics. Reilly T's 2000 paper in the *Journal of Sports Sciences* leads with 713 total citations, averaging 27.42 citations per year and a high normalized TC of 5.82, reflecting

Table 3. Highly cited papers in performance anxiety and sports research and their impact metrics

Paper	DOI	Total citations	TC per year	Normalized TC
REILLY T, 2000, J SPORTS SCI	10.1080/02640410050120078	713	27.42	5.82
JONES G, 1995, BR J PSYCHOL	10.1111/j.2044-8295.1995.tb02565.x	349	11.26	4.34
MAHONEY MJ, 1977, COGN THER RES	10.1007/BF01173634	348	7.10	1.00
SMITH RE, 2007, J SPORT EXERC PSYCHOL	10.1123/jsep.29.1.39	291	15.32	4.89
WALSH NP, 2021, BR J SPORTS MED	10.1136/bjsports-2020-102025	285	57.00	13.61
KIRKCALDY BD, 2002, SOC PSYCHIATRY PSYCHIATR EPIDEMIOL	10.1007/s00127-002-0554-7	285	11.88	5.00
SMITH RE, 2006, J SPORT EXERC PSYCHOL	10.1123/jsep.28.4.479	277	13.85	6.35
ROSENBERG D, 2010, AM J GERIATR PSYCHIATRY	10.1097/JGP.0b013e3181c534b5	272	17.00	3.56
JONES G, 1992, PERCEPT MOT SKILLS	10.2466/pms.1992.74.2.467	249	7.32	5.41
VICKERS JN, 2007, J MOT BEHAV	10.3200/JMBR.39.5.381-394	229	12.05	3.84

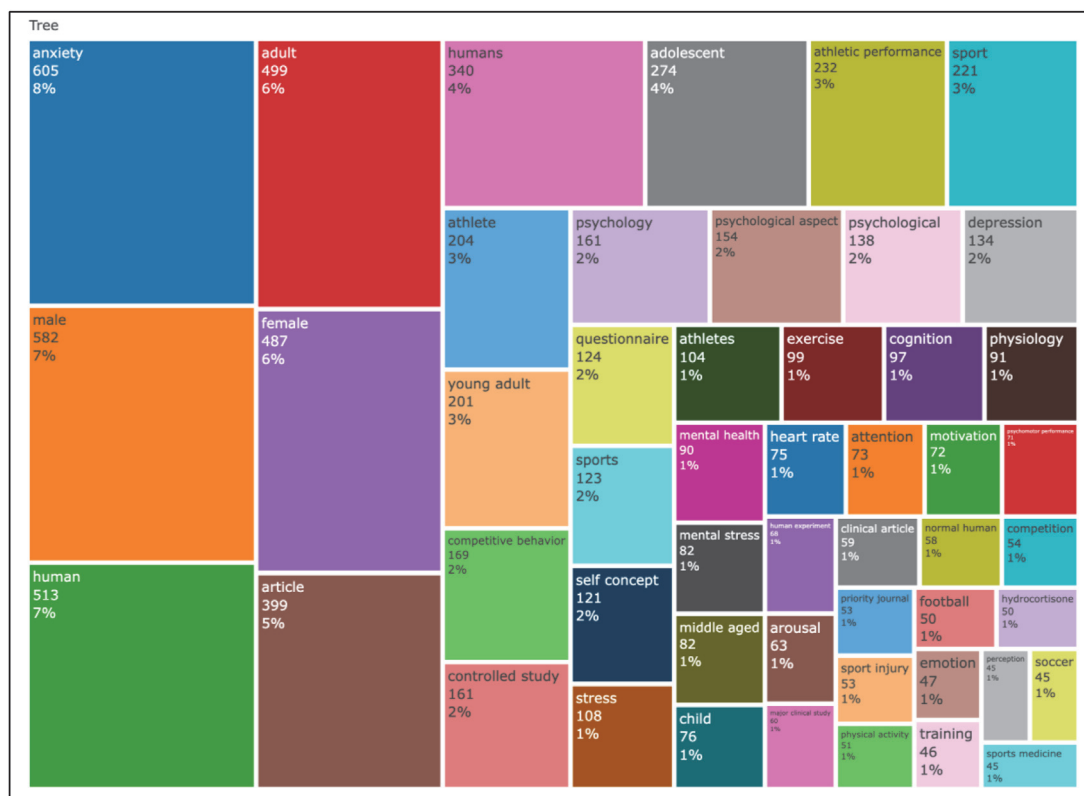


Figure 3. Core research themes in performance anxiety and sports research based on term frequency.

its substantial influence. Walsh NP’s 2021 article in the British Journal of Sports Medicine stands out with the highest TC per Year (57.00) and a normalized TC of 13.61, indicating a strong and immediate impact. Smith RE has two notable contributions in the Journal of Sport and Exercise Psychology (2006 and 2007), with high annual citation rates (13.85 and 15.32, respectively) and normalized TCs of 6.35 and 4.89. Jones G’s works (1995 and 1992) exhibit strong cumulative impact, with normalized TCs of 4.34 and 5.41. Mahoney MJ’s 1977 paper demonstrates enduring relevance with a normalized TC of 1.00 over a longer

timeframe. This analysis highlights foundational and recent influential studies shaping research in the field.

Core research themes and emerging trends

The treemap visualization in Figure 3 highlights the most frequently occurring terms in performance anxiety and sports research, revealing core research themes and areas of focus. “Anxiety” is the most prominent term, with a

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frequency of 605, emphasizing its centrality to this research field. Gender-related terms like “male” (582) and “female” (487) appear frequently, reflecting studies that explore gender-specific aspects. Terms like “human” (513) and “adult” (499) indicate a focus on human subjects, while “adolescent” (274) and “young adult” (201) suggest interest in younger populations. Performance-related terms, including “athletic performance” (232), “athlete” (204), and “sports” (123), highlight the emphasis on physical activities. Psychological terms, such as “psychology” (161), “psychological aspect” (154), “stress” (108), and “mental health” (90), underscore the psychological dimensions of the research. Additional themes, such as “cognition” (97), “motivation” (72), and “self-concept” (121), point to cognitive and motivational studies. Emerging topics, including “sport injury” (53), “training” (46), and “sports medicine” (45), indicate an applied focus on practical and clinical aspects. This analysis reflects a diverse and interdisciplinary approach within the field.

As demonstrated in Figure E11 in ESM1, early topic like “competitive trait anxiety” emerged in the 1980s, reflecting initial interest in psychological factor. By the early 2010s, terms such as “motivational climate,” “self-confidence,” “anxiety,” and “competition” gained traction, emphasizing the growing focus on psychological and performance-related aspects. Recent years (2015–2023) show a sharp increase in research on terms like “stress,” “performance,” “mental training,” and “mental health,” indicating their rising importance. Emerging topics, such as “motivational climate,” “quiet eye,” and “performance enhancement,” signal current and future areas of interest. The progressive diversification and growth of term frequencies underscore the expanding scope of research, integrating psychological, physiological, and performance-related dimensions in the field.

Thematic landscape and evolution

Central themes like “anxiety,” “human,” “male,” and “adult” dominate the network, emphasizing their foundational role in the field (see Figure E12 in ESM1). Surrounding these central nodes are clusters of related terms, such as “psychological aspect,” “stress,” “mental stress,” and “physiology,” reflecting the integration of psychological and physiological dimensions. Topics like “competitive behavior,” “sports self-concept,” and “motivation” cluster together, showcasing a focus on psychological performance enhancement. Another significant cluster includes clinical and methodological terms like “controlled study,” “clinical article,” and “exercise,” highlighting the applied and experimental nature of the research. Emerging areas such as “depression,” “quality of life,” and “sport injury” reflect the evolving focus on mental health and well-being in sports.

As seen in figure E12 in ESM1, the three clusters with different colours (blue, red, and green) represent a group of keywords that tend to appear together more frequently than with keywords in the other clusters. Typically, the larger the nodes, the more frequently the keyword appears; and the thicker the line in between the nodes, the more frequent those keywords were paired. The dense interconnections between terms underscore the multidisciplinary and integrative nature of the research, blending psychological, physiological, and performance-related aspects.

Examining the thematic evolution across the three periods, early research (1974–2010) focused on foundational themes like “stress,” “emotion,” “sport performance,” and “competitive trait anxiety,” laying the groundwork for understanding psychological aspects of performance (refer to Figure E13 in ESM1). As seen in the Sankey diagram, during 2011–2019, the focus broadened to include applied topics such as “sport psychology,” “applied sport psychology,” “disability,” “cognition,” and “psychological state,” reflecting an expansion into practical and interdisciplinary areas. In the most recent period (2020–2024), emerging themes like “motivation,” “basic psychological needs,” “coping strategies,” “self-confidence,” and “esports” signal a growing emphasis on individualized approaches, well-being, and contemporary trends in sports psychology. This progression showcases the dynamic and evolving nature of the field.

On a deeper level, the increasing prominence of themes such as “self-confidence,” “coping strategies,” “digital interventions,” and “esports” also reflects broader shifts in both sports culture and clinical practice. Greater emphasis on “self-confidence” and “coping strategies” indicates a growing recognition of the psychological determinants of performance, leading to the integration of cognitive-behavioural techniques and resilience-building approaches into holistic athlete care [9,10]. Similarly, the rise of “digital interventions” aligns with the expanding use of online-based self-help platforms, mobile health applications, and virtual reality technologies, which offer scalable and accessible solutions for athletes facing stigma or logistical barriers to traditional therapy. Furthermore, the emergence of “esports” highlights an evolving understanding that performance anxiety is not limited to traditional athletic settings but also extends to competitive digital environments. Collectively, these trends suggest a paradigm shift toward more personalized, technology-assisted, and context-specific clinical approaches in managing performance anxiety.

Limitations

Relying exclusively on Scopus as the data source for this bibliometric analysis may introduce potential biases. Scopus tends to have broader coverage of English-language and

Western journals, which may result in the underrepresentation of research published in non-English languages or regional journals not indexed in the database [11]. This could skew the analysis toward countries and institutions with greater access to high-impact journals, overlooking valuable contributions from underrepresented regions. Additionally, variations in indexing practices and journal inclusion criteria may affect the comprehensiveness and diversity of the retrieved literature.

Conclusion and further directions

The findings of this bibliometric analysis highlight the dynamic and evolving nature of performance anxiety and sports research. Over the decades, the field has transitioned from foundational studies on stress and competitive trait anxiety to more applied and contemporary topics, such as motivation, coping strategies, and esports. The United States and the United Kingdom have emerged as dominant contributors, fostering extensive global collaborations, while emerging countries like Malaysia and Tunisia signal the growing internationalization of the field.

Further research should focus on strengthening collaborations among underrepresented regions, addressing emerging challenges like digital sports and mental health, and leveraging advanced methodologies to explore the nuanced relationships between psychological and physical performance. This approach will ensure the continued growth and relevance of the field in addressing both theoretical and practical dimensions of performance anxiety in sports.

Electronic supplementary materials

The following electronic supplementary material is available with this article at <https://doi.org/10.1024/2674-0052/a000120>.

ESM1. Table E1 and Figures E1–E13.

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