# BIBLIOMETRIC ANALYSIS OF RESEARCH ON PHYSICAL ACTIVITY AND MOTOR SKILLS FROM 1990-2020

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## Abstract

This bibliometric analysis examines research on physical activity and motor skills from 1990 to 2020 using the Web of Science Core Collection citation index databases. The study reveals a steady increase in publications over time, with a significant rise in 2019 and 2020. Collaboration among authors is evident, with an average of 3.8 authors per document and 4.28 co-authors per document. The analysis of keywords highlights the diverse range of topics within the field. The annual growth rate of 12.25% indicates a positive and consistent expansion of research output. Notably, articles published in 2008 and 2009 received the

highest mean total citation, demonstrating lasting impact. Recommendations include promoting interdisciplinary collaboration, supporting longitudinal studies, emphasizing the dissemination of recent research, fostering international collaborations, and encouraging replication studies and meta-analyses. By implementing these recommendations, the field of Physical Activity and Motor Skills research can continue to grow and contribute to improving human health and performance.

**Keywords:** Bibliometric Analysis, Physical Activity, Motor Skills.

## Introduction

Over the past two decades, there has been a significant decline in the level of physical activity among children and young people, which is a cause for concern (Bos, 2003; Bonvin, et al., 2013). Engaging in physical activity is crucial for enhancing various aspects of children's development, including their physical health, social skills, cognitive abilities, and psychological well-being (Janssen & LeBlanc, 2010; Cohen, et al., 2014). Previous efforts to promote physical activity among children have primarily focused on four key areas: active transportation, recess, physical education (PE), and sports (Johnstone, et al., 2018).

Motor skills are the result of combining various movement patterns that involve the entire body or specific body segments. Each sport possesses distinct motor skills that give it a unique identity and differentiate it from other physical activities (Jonsson, et al., 2006; Castaner, et al., 2009). The competence of motor skills refers to the ability to consistently and proficiently perform a range of fundamental movement skills (Rudd, et al., 2015; Chen, et al., 2017). In the preschool years (3-5 years old), often referred to as the "golden age" of motor skill competence, children develop many fundamental motor skills such as running, jumping, throwing, and catching (Shenouda, et al., 2017).

Engaging in increased physical activity has been shown to create more opportunities for neuromotor growth, leading to the strengthening of motor skills (Fisher, et al., 2005; Wrotniak, et al., 2006). Conversely, children who have well-developed motor skills are more inclined to participate in physical activity (Piek, et al., 2008; Bonvin, et al., 2013).

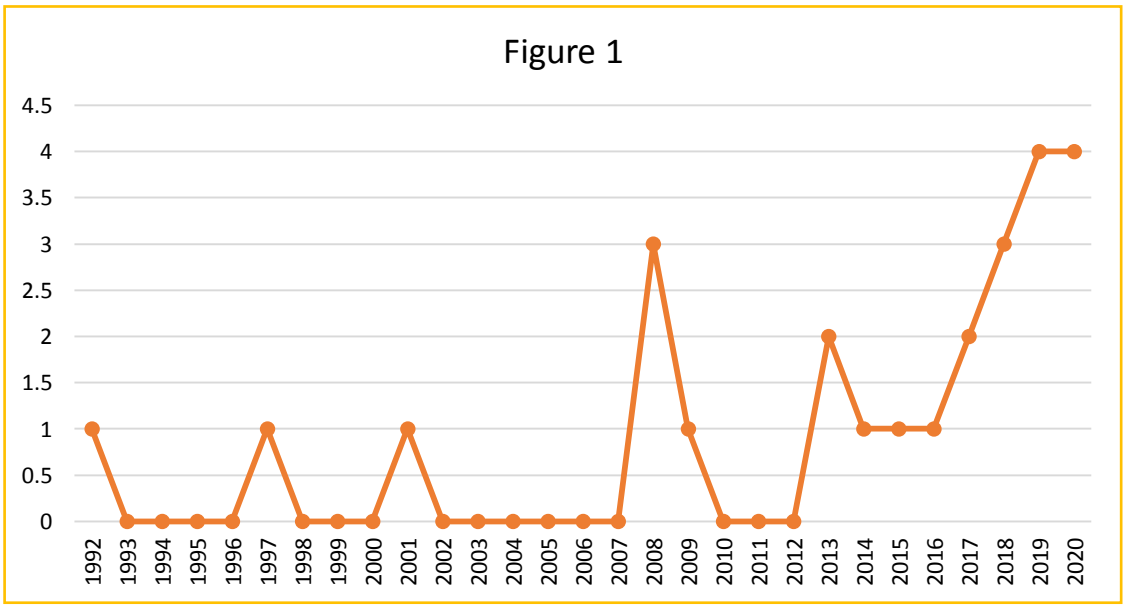
Objectives of this bibliometric analysis is

1. Determine the trend in the number of publications over time in the field of Physical Activity and Motor Skills.
2. Identify periods of low publication activity and investigate potential reasons for these gaps.

3. Calculate the annual growth rate of research output in Physical Activity and Motor Skills.
4. Assess the impact and recognition of publications by analyzing citation data.

**Methods**

For this bibliometric analysis, using the Web of Science Core Collection citation index databases. The search was performed by combining different search terms using Boolean operators, such as "Physical Activity and Motor Skills," "PA and Motor skills," and "Exercise and Motor Skills." The search was conducted by searching titles in published articles to retrieve relevant publications. The data collection covered the period from 1992 to 2020. A total of 56 results were obtained from various sources, including books, journals, and others. The different document types within the results included 25 articles, 1 editorial material, 28 meeting abstracts, and 2 reviews. For the inclusion criteria, only articles were selected, while the exclusion criteria comprised editorial material, meeting abstracts, and reviews. Additionally, only publications written in English were included in the analysis, excluding articles in other languages. After applying these refinement steps, a final selection of 25 publications was included in the current research. The data from these articles were downloaded in Plain Text format and analyzed using R-Studio.




**Results**

Figure 1 — Publication output for Physical activity and motor skills between 1992 and 2020.

The number of publications in the field of Physical Activity and Motor Skills has shown a steady increase over time, with a significant rise in publications in 2019 and 2020 (each n = 4). This indicates a growing interest and research activity in this area. There were certain periods, such as between 1992 and 1997, and from 2001 to 2007, where no articles were published in WoS on Physical Activity and Motor Skills. This suggests a potential lack of research focus or limited interest during those periods.

A total of 95 authors contributed to the 25 publications, resulting in an average of 3.8 authors per document. This indicates a collaborative approach to research, with multiple authors working together on each publication. Co-Authorship: On average, each document had 4.28 co-authors, suggesting a significant level of collaboration and multi-disciplinary involvement in the field of Physical Activity and Motor Skills research.

The selected publications featured a total of 112 keywords, with 87 of them being author keywords. This indicates a wide range of topics and interests within the field, as authors used various keywords to describe their research.

The calculated annual growth rate of 12.25% indicates a positive and consistent increase in research output in Physical Activity and Motor Skills over the years. This growth rate suggests a growing interest in the field and an expanding body of knowledge.

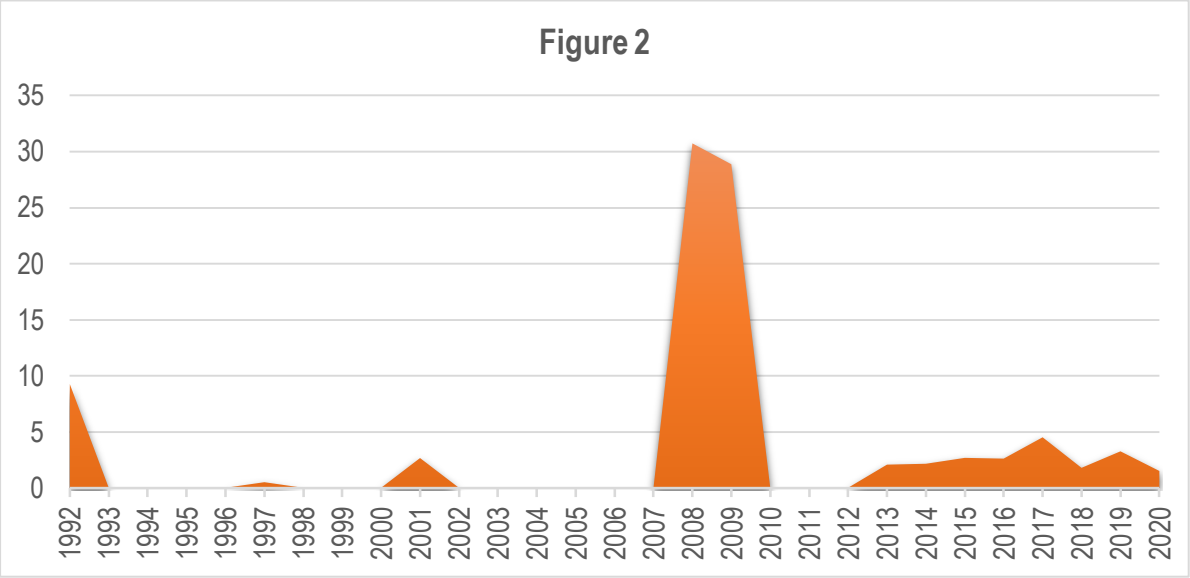



Figure 2 — Mean total citation of year wise.

From the Figure 2: Among the selected 25 published articles, the year 2008 had the highest mean total citation of 30.69. This indicates that, on average, each article published in 2008

received a significant number of citations (399 mean total citations per article). Similarly, in 2009, the mean total citation was 28.83 (346 mean total citations per article). These years demonstrate a high level of impact and recognition within the field, with the research being cited frequently by other scholars.

Early Publications: In the year 1992, the mean total citation was 9.24 (268 mean total citations per article), suggesting a moderate level of recognition for articles published during that time. This indicates that even though the number of citations was lower compared to 2008 and 2009, the research from 1992 still had a significant impact over a longer period, with 29 citable years.

The latest year, 2020, had the lowest mean total citation of 1.5 (1.5 mean total citations per article). This indicates that the articles published in 2020 had a relatively lower level of immediate impact and recognition within the field. However, it's important to note that this value is based on only one citable year, so it may not provide a comprehensive representation of the long-term impact of the research.

**Discussion**

The findings of the bibliometric study suggest a growing interest in the field of Physical Activity and Motor Skills research, as evidenced by the surge in publications in recent years. This indicates that researchers are increasingly focusing on understanding and exploring this area of study. The collaborative nature of the research, with multiple authors and co-authors involved in each publication, highlights the interdisciplinary approach and the exchange of knowledge within the scientific community. The diverse range of keywords used in the selected publications further demonstrates the multifaceted nature of Physical Activity and Motor Skills research. Researchers are exploring various aspects and subtopics within the field, contributing to its dynamic and evolving nature.

Regarding citation data, the articles published in 2008 and 2009 had the highest impact and received a significant number of citations. This suggests that the research conducted during these years had a lasting influence on the field. The earlier publications from 1992 also received a moderate level of recognition, indicating their continued relevance over a longer period of time. On the other hand, the most recent publications in 2020 had a lower immediate impact, but it's important to consider the limited number of citable years for those articles.

It is noteworthy that the publications included in the analysis were conducted by researchers from various countries, such as the USA, England, China, Netherlands, Iran, Canada, and Switzerland. This international collaboration reflects the global interest and efforts in advancing the knowledge and understanding of Physical Activity and Motor Skills.

Overall, this bibliometric study provides valuable insights into the current state of Physical Activity and Motor Skills research, highlighting its growth, collaboration, and impact. It contributes to the existing body of literature and can inform researchers and practitioners about the key publications and trends in the field.

**Conclusion**

In conclusion, the findings of the bibliometric study indicate a growing interest in the field of Physical Activity and Motor Skills research. The surge in publications in recent years suggests that researchers are increasingly focusing on understanding and exploring this area of study. The collaborative nature of the research, as evidenced by multiple authors and co-authors involved in each publication, highlights the interdisciplinary approach and the exchange of knowledge within the scientific community. The diverse range of keywords used in the selected publications further demonstrates the multifaceted nature of Physical Activity and Motor Skills research, with researchers exploring various aspects and subtopics within the field.

The citation data reveals that articles published in 2008 and 2009 had the highest impact and received a significant number of citations, indicating their lasting influence on the field. Publications from 1992 also received a moderate level of recognition, highlighting their continued relevance over a longer period of time. Although the most recent publications in 2020 had a lower immediate impact, it is important to consider the limited number of citable years for those articles.

The international collaboration among researchers from various countries, including the USA, England, China, Netherlands, Iran, Canada, and Switzerland, reflects the global interest and collective efforts in advancing the knowledge and understanding of Physical Activity and Motor Skills.

Based on the findings of the bibliometric study, the following recommendations can be made such as, Encourage further interdisciplinary collaboration: Given the collaborative nature of Physical Activity and Motor Skills research, it is recommended to promote interdisciplinary collaboration among researchers from different fields, such as sports

science, psychology, physiology, and education. This can foster the exchange of ideas and expertise, leading to a more comprehensive understanding of the subject matter. Support longitudinal studies: Longitudinal studies can provide valuable insights into the long-term effects of physical activity and motor skill development. Researchers should be encouraged to conduct longitudinal research to better understand the impact of physical activity on various aspects of human health and performance over time. Emphasize the dissemination of recent research: While earlier publications continue to have relevance, it is important to disseminate and promote the findings of recent research. This can be achieved through conferences, seminars, and open-access publications, ensuring that the latest advancements in the field reach a wider audience and contribute to ongoing discussions. Foster international collaborations: International collaborations facilitate the exchange of knowledge and perspectives from different cultural and geographical contexts. Efforts should be made to encourage and support collaborations between researchers from various countries, enabling a global approach to Physical Activity and Motor Skills research. Encourage replication studies and meta-analyses: Replication studies and meta-analyses can validate and consolidate existing findings, enhancing the robustness and reliability of research in the field. Researchers should be encouraged to conduct replication studies and meta-analyses to strengthen the evidence base and provide more comprehensive insights into Physical Activity and Motor Skills. By implementing these recommendations, the field of Physical Activity and Motor Skills research can continue to grow, evolve, and contribute to improving human health and performance.

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