



Bibliometric Computation Mapping Publication Analysis in Sports Psychology using VOSviewer

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Abstract

In the field of sports coaching, research urgently needed that is closely related to achievement. Specifically, in the field of sports psychology, there is still a great need for research that specifically examines ideas that can be used as input for those who need them. The purpose of this study is to examine developments regarding sports psychology research, especially aspects of psychology that are currently developing rapidly through a bibliometric approach using a computerized mapping analysis application using VOSviewer. Apart from that, this research hopes to identify existing research trends in the field of sports psychology. Various article data obtained were sourced from Google Scholar using the Publish or Perish Reference Manager application. The keywords used to guide the search process in this research are "Psychological Aspects on Athletes". During the search, the author found 988 articles relevant to the keyword. The articles obtained came from a span of 10 years, namely 2012-2022, and came from various journals and publishers. If explained one by one the published articles related to the psychological aspects of athletes from year to year will be obtained as follows: 55 articles in 2012, 62 articles in 2013, 69 articles in 2014, 73 articles in 2015, 73 articles in 2016, 74 articles in 2017, 89 articles in 2018, 119 articles in 2019, 140 articles in 2020, 132 articles in 2021 and 102 articles in 2022. Judging from the data, it can be seen that there has been an increase and decrease from year to year and we checked all of this using VOSviewer. The results of this study will help future researchers regarding sports psychology, especially aspects of psychology in sports, in finding sources, studies, and theories that are relevant to their research. However, this research still has limitations in using the application, so it is recommended to use other applications that make it possible to obtain further results.

How to Cite

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INTRODUCTION

In the field of sports coaching, research urgently needed that is closely related to achievement. Sports science is expected to produce results in the form of the highest achievements. Sports science is important things that coaches and other parties must know in order to achieve athletes peak performance (Rohendi & Rustiawan, 2020). In addition to sports science in sports training, we need to look at several things, namely physical, technical, tactical, and mental. In the course of physical sports training, techniques and tactics are always programmed in a structured way, while concerning psychology or mentality so far most trainers have not included them in a specific training program, this is what the author regrets. As academics, it's a good idea for us to see how psychology influences overall performance, we don't need to be directly involved in training, but studying through relevant research to improve an athlete's performance.

Sport psychology is a subdiscipline of psychology applied to a competitive sport as a specific context of organized physical (motor) activity (Hanin & Stambulova, 2004). Psychological science is needed to help improve the expected performance. The culture and sports coaching system must empower science and technology and integrate the sports sub-disciplines (Hoedaya, n.d.). The application of psychology in sports is intended to help someone's sports talent develop properly without any obstacles and factors related to personality. Talking about psychology in sports, there are two objects in this psychology, namely sports performance and psychosocial aspects which will often affect athletes. Therefore psychology also examines the psychological aspects of athletes (Rohmansyah, 2017). However, in the field of research, it is not yet clear whether sports psychology, especially the psychological aspects of athletes, is of great interest to academics and researchers or not.

There are analytical techniques that can be used to determine the development of research interest in the field of sports psychology with the topic of psychological aspects of athletes. The analysis in question is bibliometric. Bibliometrics is defined as measuring or analyzing books/literature using a mathematical and statistical approach (Royani & Idhani, 2018). In the course of making this research, the authors found several articles on bibliometrics, including an analysis of research developments in the field of instrumentation (Tupan, Rochani Nani Rahayu, Rulina Rachmawati, 2018), A bibliometrics

review of the first thirty years of the Journal of Environment Psychology (Milfont & Page, 2013), bibliometric analysis of the trend of Covid-19 research in Indonesia in the fields of business and management (Nurfauzan & Faizatunnisa, 2021), Bibliometric analysis of trends in the use of ICT in mathematics learning (Supinah & Soebagyo, 2022), Trends and patterns of 2013 curriculum research in physical education: Bibliometric analysis from 2013-2020 (Gazali et al., 2021) and Analysis of the Development of Literature Self-Regulated Learning from 2017-2021 using Bibliometric Analysis (Saepulmilah & Azhari, 2022). Bibliometric analysis is a method that has been proven to be able to provide a comprehensive picture of the topic to be studied. Therefore, the author feels it is necessary to carry out an analysis because it provides good benefits in the realm of sports psychology. The results of this analysis using bibliometrics will later map existing research in sports psychology, as well as illustrate existing research trends. So that in the future there can be positive developments in the practice of sports psychology research which is an important basis or reference for academics and sports psychology practitioners in carrying out practice in the field.

We see that the discussion of the psychological aspects of athletes has not yet been studied thoroughly, so there is a need for studies based on relevant literature to be able to discuss this matter. Apart from that, there is a gap where research in the field of sports psychology is still dominated by trials of certain psychological methods and descriptive analysis of various phenomena, there is no research that is able to map out definite trends in research publications from time to time. From the several examples of research articles that the authors include, researchers have not found a detailed bibliometric analysis in the field of sports psychology with the topic of psychological aspects of athletes. Especially in the last ten years, from 2012 to 2022 using the VOSviewer application. Therefore, with this research, the author intends to conduct computational research using VOSviewer through Google Scholar and with the help of the Publish or Perish application with the aim that in the future academics and researchers can determine what themes and topics are being discussed a lot or even what themes and topics are lacking. interest so that other writers can take the right topic to be used as research.

Sports psychology has now become an inseparable part of sports performance. However, in reality, coaches have not implemented sports

psychology in a comprehensive and integrated manner in a training program. This is very unfortunate considering that there has been a lot of research on athlete psychology to improve athlete performance. Until now, many academics have researched various kinds of psychological studies, especially on athletes. Many of these multiple types of research are also outlined in all bibliometric analyses whose aim is to help identify the main topics of authors, the sources used by them, and the articles, countries, journals, and institutions most frequently cited in a particular field. In connection with sporting achievements in Indonesia and the still dearth of coaches in the application of psychology, the author compiled this bibliometric to fill the existing void, especially in the psychological aspects of athletes. So that coaches or academics can see clearly how far research on psychological aspects has developed and can help improve athlete performance.

The importance of this research is so that coaches and academics know that various studies on sports psychology have been carried out. So that it can increase the confidence of trainers that sports psychology in training is needed and academics can find out about big topics that have been widely developed regarding the psychological aspects of athletes, thereby inspiring academics to continue to develop research, especially in the area of psychological aspects that can work together with coaches to improve athlete performance.

METHOD

In this study, all the articles obtained were publications that had been published online and can be found using Google Scholar. The thing that the author considers using Google Scholar is because this database can be accessed by anyone without having to pay, of course this will make it easier to search for various articles. The author uses Google Scholar because Google Scholar is a journal search engine that is popular among researchers and academics, especially in Indonesia, Google Scholar is used very often. The advantage of Google Scholar is that it is easy to access sources of scientific information, researchers or academics can easily find the latest scientific articles, relevant research results, and other reference materials. Google Scholar also makes it easier for researchers and academics to find related articles, thereby saving the time and effort needed to search for relevant sources of information. Apart from that, Google Scholar also has a wider database and of course, at no cost to other sources, several research results must be accessed for

a fee. Google Scholar also provides information about citations or citations of scientific articles, this will help the quality of their research and publications. This is the basis for the author to use Google Scholar as the main search engine in this research.

Furthermore, Publish or Perish is an application that is used to get all article data, without taking a long time and relevant articles will be detected by the application. Publish or Persih is designed for researchers to find and analyze the sources of information needed. This app is designed to help academics (individuals) to present the impact of research even if it has few citations (Dwi Ridho Aulianto et al., 2019). In addition, this application can also help select various articles in an online database according to the quality of the articles, for example, it can analyze the number of citations, author, article title, year of publication, and publisher to DOI owned by these articles. So it will be very detailed and can be easily analyzed. This research certainly went through several stages, namely:

- a. Publication data collection is done using the publishing or perish application. Researchers who don't have this application can first download it on their laptop/pc and then install it. Once installed, then we can use the application. Regarding the use of publish or perish applications, this can be seen in several studies, one of which is research conducted by Dwi Fitria Al Husaeni (Al Husaeni & Nandiyanto, 2021). In this application, the researcher searches for articles using several keywords, namely "sports psychology", "exercise psychology", "athlete psychology" with journal articles published from 2012 to 2022.
- b. After data collection, data processing is carried out using a simple application, namely Microsoft Excel. The data that has been searched using publish or perish is saved in Microsoft Excel. In Microsoft Excel, it is then tidied up again so that the publications of the last 10 years can be seen, such as what the researchers are looking for in publishing or perish.
- c. Next is the use of the VOSviewer application, which is intended for processing bibliometric data from previously obtained articles. With VOSviewer we can build and visualize the relationship between one article and another and can represent specific information on bibliometric graphical maps (Tupan, 2016). Some of the steps carried out in the VOSviewer application can be seen in the research (Herawati et al., 2022).

The last is to discuss the results of the ana-

lysis that has been obtained from the VOSviewer application. This discussion and analysis has been stated in the menu contained in the application and the analysis display also consists of three types, namely network visualization but there is also overlay visualization and density visualization, the use of which depends on the needs of each individual author. In addition to displaying the analysis results, VOSviewer can also display clusters that have been divided and state which keywords belong to which cluster. This will make it easier for the author to explain the results of the analysis that has been carried out by VOSviewer.

RESULTS AND DISCUSSION

Publication Data Search Results

Based on searching data using the Publish or Persih application from Google Scholar, various research titles were obtained that were related

to the keywords that the author specified. There were 988 articles obtained in the form of meta-data which were then explained in detail in the Microsoft excel program with the composition of cites, authors, title, year, source, publisher, article URL, cites URL, GSRank, QueryDate, Type, DOI, ISSN, CitationURL, volume, issue, Start-Page, EndPage, ECC, CitePerYear, CitesPerAuthor, AuthorCount, Age, Abstract, FullTestURL, and RelatedURL. The author presents a table detailing the articles that have been obtained previously using the applications described previously. Table 1 is some examples of articles that will be analyzed using the VOSviewer application, the authors take the 20 best articles with the highest number of citations in the 2012-2022 timeframe that are truly related to the author's keywords. Psychological aspect publication data on athletes can be seen in **Table 1**.

Table 1. Psychological Aspect Publication Data on Athletes

Authors	Title	Year	Citation	Reference
RM Eime, JA Young, JT Harvey	A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual	2013	2398	(Eime et al., 2013)
K Henriksen, R Schinke, K Moesch	Consensus statement on improving the mental health of high performance athletes	2020	228	(Henriksen et al., 2020)
D Fletcher, M Sarkar	Mental fortitude training: An evidence-based approach to developing psychological resilience for sustained success	2016	221	(Fletcher & Sarkar, 2016)
AM Lane, CJ Beedie, MV Jones, M Uphill	The BASES expert statement on emotion regulation in sport	2012	196	(Lane et al., 2012)
JJ Moreland, KA Coxe, J Yang	Collegiate athletes' mental health services utilization: A systematic review of conceptualizations, operationalizations, facilitators, and barriers	2018	193	(Moreland et al., 2018)
K Hodge, EA Hargreaves	Psychological mechanisms underlying doping attitudes in sport: Motivation and moral disengagement	2013	189	(Hodge et al., 2013)
E Pluhar, C McCracken, KL Griffith	Team sport athletes may be less likely to suffer anxiety or depression than individual sport athletes	2019	183	(Pluhar et al., 2019)
LJ Ferguson, KC Kowalski, DE Mack	Self-compassion and eudaimonic well-being during emotionally difficult times in sport	2015	178	(Ferguson et al., 2015)
JL Ford, K Ildefonso, ML Jones	Sport-related anxiety: current insights	2017	176	(Ford et al., 2017)
K Hodge, DF Gucciardi	Antisocial and prosocial behavior in sport: The role of motivational climate, basic psychological needs, and moral disengagement	2015	171	(Hodge & Gucciardi, 2015)
T Curran, AP Hill, HK Hall	Relationships between the coach-created motivational climate and athlete engagement in youth sport	2015	158	(Curran et al., 2015)
C Chang, M Putukian, G Aerni, A Diamond	Mental health issues and psychological factors in athletes: detection, management, effect on performance and prevention	2020	141	(Chang et al., 2020)

DF Gucciardi, S Hanton, S Fleming	Are mental toughness and mental health contradictory concepts in elite sport? A narrative review of theory and evidence	2017	140	(Gucciardi et al., 2017)
SP Bird	Sleep, recovery, and athletic performance: a brief review and recommendations	2013	128	(Bird, 2013)
PR Appleton, AP Hill	Perfectionism and athlete burnout in junior elite athletes: The mediating role of motivation regulations	2012	126	(Appleton & Hill, 2012)
DJA Rhind, S Jowett, SX Yang	A comparison of athletes' perceptions of the coach-athlete relationship in team and individual sports	2012	124	(Rhind et al., 2012)
Y Lee, J Koo	Athlete endorsement, attitudes, and purchase intention: The interaction effect between athlete endorser-product congruence and endorser credibility	2015	122	(Lee & Koo, 2015)
A Bali	Psychological factors affecting sports performance	2015	120	(Bali, 2015)
J Bucci, GA Bloom, TM Lough-head	Ice hockey coaches' perceptions of athlete leadership	2012	117	(Bucci et al., 2012)
M Cocks, CA Moulton, S Luu, T Cil	What surgeons can learn from athletes: mental practice in sports and surgery	2014	112	(Cocks et al., 2014)

Development of Research in the Field of Sports Psychology (Psychological Aspects of Athletes)

Figure 1 is displayed which aims to provide information regarding research developments in the field of sports psychology, especially in terms of the psychological aspects of athletes which were published between 2012-2022 and came from Google Scholar.

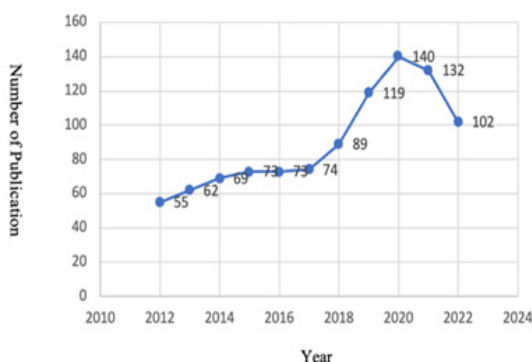


Figure 1. Developmental Level of Sports Psychology Research (Psychological Aspects of Athletes)

Figure 1 shows that research developments in the field of sports psychology, especially concerning the psychological aspects of athletes, are very diverse. Over the past 10 years, a total of 988 journal articles have been produced with various publishing journals and of course also from various publishers, with an average of 89.82 articles published each year. Examples of publisher journals are the Journal of Sport Psychology, Journal of Sport Psychology in Action, Journal

of Clinical Sport Psychology, Journal of Sport Science, International Journal of Sport Science, etc. While some examples of the publishers in question are Taylor & Francis, Journals.human-kinetics.com, Cambridge.org, Springer, ncbi.nlm.nih.gov, researchgate.net, etc.

Based on Figure 1 we can see that in 2012 there were 55 articles published, in 2013 there were 62 articles, then in 2014 the increase was not too significant from the previous year, namely 69 articles, in 2015 there were 73 articles while in 2016 there was no increase compared to 2015 both produced 73 articles, the following year 2017 the increase also did not look much, only issuing 74 articles, 2018 totaling 89 published articles, 2019 as many as 119 articles, in 2020 there was a significant increase from the previous year to 140 articles, it's just that it's very unfortunate in 2020 there was a decrease in the number of published articles, namely 132 articles and it is even more unfortunate that in 2022 there were 102 published articles, but because 2022 has not ended yet, it is possible that the number of published articles will continue to increase and it is hoped that the number will be even greater than the previous year.

Visualization of Sports Psychology Articles (Psychological Aspects of Athletes) Using VOSviewer

After the author saves data from Publish or Perish the researcher enters the data into the VOSviewer application for computational mapping. From the initial results of the computational mapping of words, there were 323 keywords and the authors chose 113 keywords related to

the author's data. The selection of keywords is adjusted to the relevance of the data found to the desired target in the research. This figure comes out after going through a computational process using an application based on the nine clusters explained in the section below. From the computational results, it is said that several clusters are separated and distinguished by various colors. Some of these clusters are divided as follows:

- (i) Cluster 1 is marked in red with 26 keywords, namely anxiety, aspect, athlete mental health, athlete performance, comparison, depression, difference, elite athlete, high-performance athlete, individual athlete, intervention, mental health, mindfulness, psychological consequence, psychological demand, psychological distress, psychological functioning, psychological intervention, psychological intervention, psychological safety, psychological skills training, psychological well, resilience, self-efficacy, sports performance, sports, and symptoms.
- (ii) Cluster 2 is marked with a green color totaling 18 keywords, namely athlete, athlete burnout, behavior, coaches perception, competitive anxiety, emotion, perfectionism, pressure, psychological factor, psychological hardness, psychological perspective, psychological pressure, psychological profile, psychological quality, psychological state, psychological stress, psychological variables, sports performance
- (iii) Cluster 3 is marked in blue with a total of 18 keywords, namely ability, achievement, athlete performance, attention, effort, individual, mental skill, motor skill, performance, psychological aspect, psychological attribute, psychological issue, psychological problem, psychological skill, psychological skills, skills, sports psychologist and sports psychology.
- (iv) Cluster 4 is marked with a light green color with 16 keywords, namely adolescent athlete, analysis, burnout, lack, outcome, patient, perspective, psychological, psychological benefit, psychological change, psychological character, psychological health, psychological level, psychological process, psychological readiness, and readiness.
- (v) Cluster 5 is marked in purple with 13 keywords, namely athlete engagement, athlete satisfaction, attitude, basic psychological need, competence, control, imagery, mood state, motivational climate, psychological need, psychological preparation, psychological training, and sports activity.
- (vi) Cluster 6 is marked in light blue with 9 keywords, namely confidence, elite sport,

focus, motivation, personality, psychological resilience, self-confidence, stressor, and team sport.

- (vii) Cluster 7 is marked in orange with 8 keywords, namely important aspect, perception, psychological impact, the psychological response, psychological strategy, psychological support, psychology, and strength.
- (viii) Cluster 8 is marked in brown with 4 keywords, namely emotional intelligence, mental toughness, psychological well-being and stress.
- (ix) Cluster 9 is marked in pink with 1 keyword, namely psychological condition.

The nine clusters are detailed and you can see the image map in **Figure 2**.



Figure 2. Network Visualization Keywords Aspects of Athlete Psychology

Figure 2 shows the relationship between one keyword and another keyword. The size of the circle indicates that the frequency of occurrence of the keyword is more than the other keywords. The more these keywords appear, the bigger the circle will be. Using the VOSviewer application produces several types of display options, not only network visualization but also overlay visualization and density visualization (Hartati et al., 2020), its use depends on the needs of each author.



Figure 3. Overlay Visualization of Keywords Aspects of Athlete Psychology

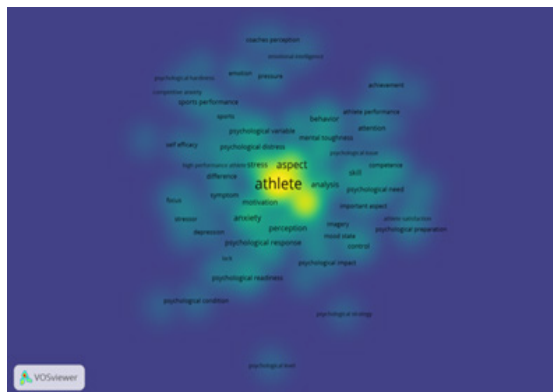


Figure 4. Density Visualization Keywords Aspects of Athlete Psychology

The color in the Density Visualization indicates the number of items around the point. The greater the number of items around the dot and the higher the weight of the surrounding items, the closer to the color of the yellow dot. Conversely, the smaller the number of items around the dot and the lower the weight of the surrounding items, the closer the color of the dot is to blue (Kahfi et al., 2022). Figure 4 shows that the keywords athlete, analysis, aspect have a greater correlation strength value compared to other keywords.

CONCLUSION

This study aims to perform a computational mapping analysis using VOSviewer on research articles taken from Google Scholar through Publish or Perish. The topic that the author raises is Sports Psychology with the keyword "Psychological Aspects of Athletes". From the search results, it was found that there was an increase from 2012 to 2020 and a significant decrease from 2020 to 2022. So that there are opportunities in 2022 and later to research or related to the psychological aspects of athletes or with other terms included in the theme of sports psychology research. This research can be a reference for future researchers so they can find out what the real picture of existing research in the field of sports psychology is. Apart from that, practically this research can be useful for sports practitioners in analyzing aspects of sports psychology in athletes.

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