

Visual Analysis of Research on Chinese Psychological Skills Training Based on CiteSpace V

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Abstract: In order to explore the progress, evolution trend and frontier hotspots of the research on psychological skills training in China, 320 scientific research documents on psychological skills training included in the China National Knowledge Infrastructure (CNKI) database from 1990 to 2020 were taken as the research objects, and the literature method was used to , visual analysis, bibliometrics and other research methods, using CiteSpace V software and Excel software to draw knowledge maps and statistical charts for visual analysis and bibliometrics analysis. The results show that the research on psychological skills training in China in the past 30 years can be divided into four stages: initial development (1990-2000), rapid development (2001-2008), steady development (2009-2015), and developmental decline (2016-2020). In this stage of development, the number of published papers shows an inverted U-shaped curve overall; Zhang Zhongqiu, Liu Shuhui, Zhang Liwei, Si Gangyan, etc. are the main representatives of the research; "Modern Sports Psychology Research Review" is the most frequently cited Literature; "Psychological skills training", "Psychological training", "Psychological skills", "Representational training" and "Psychological quality" are research hotspots. Suggestion: Strengthen exchanges and cooperation between research scholars and research institutions, broaden research ideas, enrich research objects, innovate research methods, and make theoretical results better serve research practice.

Keywords: psychological skills training; progress dynamics; cutting-edge hotspots; knowledge map; visual analysis

1. Introduction

Psychological Skill Training (PST for short) refers to the use of certain methods and means to exert influence on people's psychology and conduct specialized training on the brain, in order to achieve the purpose of strengthening psychological skills and cultivating special psychological abilities. In short, psychological skills training is the practice of systematic and continuous mental or psychological skills [1] . Since 1990, two scholars, Li Jingcheng and Zhang Liwei, published the translation of the keynote report "New Achievements and Development Trends of World Sports Psychology Research" made by Robert N. Singer, then chairman of the International Sports Psychology Society, at the Beijing Asian Games Science Conference. Beginning in "Physical Education" (now "Journal of Capital Institute of Physical Education") [2] , research on psychological skills training has been developed in China for nearly 30 years. Especially since the beginning of the new century, with the success of the Olympic bid in 2001 and the successful hosting of the 2008 Beijing Olympic Games, the Chinese sports theory circle has produced a large number of high-level achievements in the study of psychological skill training. However, through combing, it is found that most of the research on psychological

skills training in China focuses on a qualitative perspective. It only conducts research on a certain topic in the field of psychological skills training, and lacks an overall grasp of the research progress of psychological skills training and the ability to reveal the laws of psychological skills training research. Analysis of literature results. In view of this situation, CiteSpace V software is used to conduct a visual analysis of the research progress in the field of psychological skills training in order to gain a comprehensive insight into the pattern and research trends of Chinese psychological skills training research. Hotspots, summarize the theoretical results of psychological skills training research, and provide theoretical reference and rationalization suggestions for future related research.

1. Data sources and research methods

1.1. Data source

This study uses the China National Knowledge Infrastructure (CNKI) database as the data source, the source type of the literature is "academic journals", the retrieval method of "advanced search" is adopted, and the retrieval condition is "subject = psychological skill training or keyword = psychological skill training", the time span is "1990-2020", the retrieval date is "May 10, 2021", and a total of 479 relevant research documents were retrieved (see Table 1). In order to ensure the reliability and representativeness of the literature analysis results of "psychological skills training", the literature data were pre-processed, and the literature with poor relevance to the topic and foreign language literature, conferences, notices, newspapers and other literature were eliminated, and 320 papers were selected. The literature is the literature sample used in this study, which is exported in the "Refworks" format for subsequent visual analysis.

Table 1. List of data sources for this study

Retrieve	Content
Data Sources	China National Knowledge Infrastructure (CNKI) database
Document source type	academic journals
language type	Chinese
search method	Advanced Search
Search condition	Theme = Mental Skills Training or Keyword = Mental Skills Training
time span	1990 ~ 2020
retrieval time	May 10, 2021
Total number of documents	479
Featured Documents	320

1.2. Research Methods

1.2.1. Documentation method

In the China National Knowledge Infrastructure (CNKI) database, "psychological skills training" was used as the subject or key words to conduct advanced searches, the time span was from 1990 to 2020, and 320 journal papers selected from the search results were used as literature materials for this study, document collation, research analysis and induction and summary work.

1.2.2. Visual analysis method

the research field of psychological skills training in China, CiteSpace V (5.6.R4 (64-bit)) software to draw scientific knowledge maps for visualization tools [3]. Enter the data of 320 documents in the "Refworks" format into CiteSpace V (5.6.R4 (64-bit)) software, set the time span (Time Slicing) to 1990-2020, and time slice (Years Per Slice) to 1. In the first stage of the year, choose Author (author), Institution (organization), Keyword (keyword) as the node type, and the threshold value is the default value of the system. Clustering of related nodes and time zone co-occurrence analysis are carried out, and co-occurrence network, time zone evolution, etc. are drawn. The knowledge map visually shows the progress, research hotspots and evolution trends in the field of psychological skills training research in China in the past 30 years.

1.2.3. Bibliometric method

Bibliometrics is a quantitative analysis method that uses various external characteristics of scientific and technological literature as the research object, and uses mathematical and statistical methods to describe, evaluate and predict the current situation and development trend of science and technology [4]. This research takes 320 journal papers selected from the China National Knowledge Infrastructure (CNKI) database as the research object or the key word "psychological skills training". Statistics based on metrology features to maximize the information contained in the knowledge graph representing relevant documents.

2. Research results and analysis

2.1. Year analysis of research on psychological skills training in China

Analyzing the relationship between the number of academic papers published in a certain research field and the time changes can show the historical trajectory, development speed and current stage of the field, and can effectively predict its development trend and research dynamics [5]. In the China National Knowledge Infrastructure (CNKI) database, an advanced search was carried out with the theme or keywords of "psychological skills training", and the time span was "1990-2020". A total of 479 related documents were retrieved and 320 journal papers were selected. Statistical analysis of the data was carried out using the bibliometric method, and the results shown in Figure 1 were obtained.

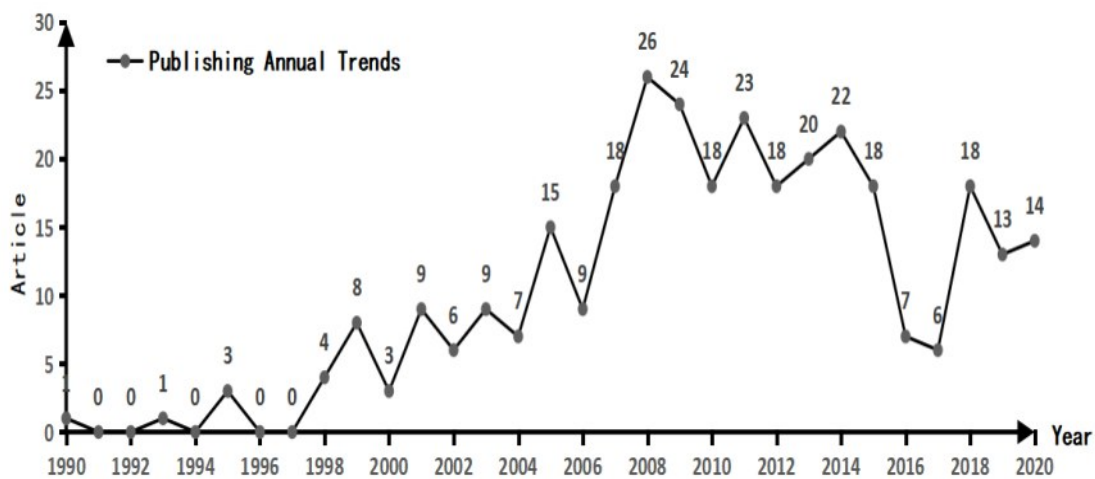


Figure 1. Trend chart of the number of papers published on psychological skills training research papers in China from 1990 to 2020

It can be seen from Figure 1 that the development of research on psychological skills training in China in the past 30 years can be roughly divided into four stages: the first stage (1990-2000) was the initial stage of development, and a total of 20 papers were published in 11 years, accounting for (6.25% of 320 papers), at this stage, the development of psychological skills training research was slow, with few research results and a low level of development; the second stage (2001-2008) was a stage of rapid development, with a total of 99 papers published in 8 years, about It is 5 times the number of papers published in the first stage, accounting for 30.94% of the total number of papers. In particular, 26 papers were published in 2008, reaching the highest peak of the number of papers published in China's psychological skills training research since the new century. The emergence of this peak coincides with China's success in hosting the 2008 Beijing Olympic Games is closely related. At this stage, the annual volume of psychological skills training has made a huge breakthrough and improvement, showing a strong momentum of development; the third stage (2009-2015) is a stage of steady development. A total of 143 papers have been published in the past 7 years, accounting for 44.69% of the total number of papers, with an average annual publication volume of 20 papers. At this stage, more scholars have joined the research field of psychological skills training, and stable research has emerged Scholars and research teams, at the same time, the research field of psychological skills training in China has diversified research

basically in the state of independent research . The lack of academic exchanges and cooperation among researchers is not conducive to academic contention and resource sharing, and it is not conducive to the formation of a stable and lasting research team in the field of psychological skills training in China .

2.3. Institutional Analysis of Research on Psychological Skills Training in China

Research institutions have an important role and extraordinary significance for a research field. Through the visual analysis of research institutions in the field of psychological skills training in China, it can intuitively show the scientific research status and influence of different institutions in the field of psychological skills training research in China , thus Identifying the core institutions of research on psychological skills training in China will also help to discover the shortcomings and existing problems of research at the institutional level . Using CiteSpace V software, run it to get the co-occurrence map of Chinese psychological skills training research institutions (see Figure 3) .

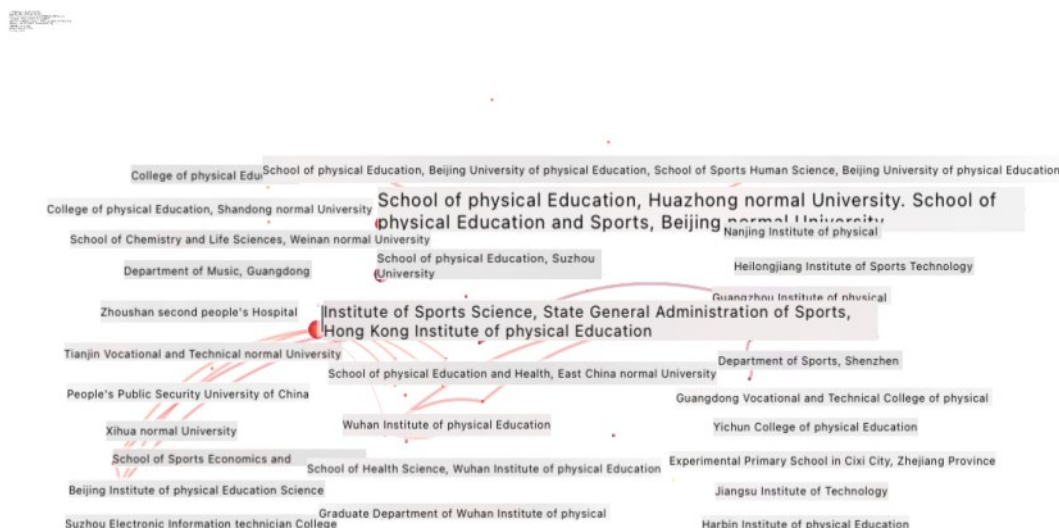


Figure 3. The institutional co-occurrence map of research on psychological skills training in China (N≥2)

It can be seen in Figure 3 that Nodes (node) = 244 , Links (connection) = 61 , Density (density) = 0.00 21 , where each node represents a mechanism, and the size of the node shape is proportional to the frequency of the mechanism , and the node The thickness of the lines between them indicates the cooperation between institutions , and the thicker the lines, the closer the cooperation . Usually, the frequency of an institution's appearance is positively correlated with the amount of papers published. The larger the node, the more frequently it appears, which means the more papers the institution publishes. Figure 3 forms a sports science research institute centered on the State Sports General Administration It can be seen that it is the core research institution in the field of psychological skills training in China. From the perspective of the number of nodes, there are currently 244 relevant institutions that have conducted research on psychological skills training, mainly the Institute of Sports Science of the General Administration of Sport of China, various sports colleges, and sports colleges (sports departments) of normal or comprehensive colleges and universities. A total of 61 cooperations have been carried out between them, forming two cooperation networks centered on the Institute of Sports Science of the General Administration of Sports of China and Wuhan Institute of Physical Education. , reflecting that the distribution of psychological skills training research institutions in China is relatively wide. Although there are many institutions involved in the research of psychological skills training, there are few cooperation and exchanges between institutions, and there are not many cooperation networks formed, and good cooperation has not yet been established. relation. In this case, the national sports department, provincial sports institutes, local sports bureaus, colleges and universities and other levels should establish a linkage mechanism,

complement each other's advantages, and cross-cooperate, so as to form a research chain of Chinese psychological skills training and promote research in the field of psychological skills training. All-round, high-quality and sustainable development provides impetus.

2.4. Analysis of highly cited literature on research on psychological skills training in China

Through the China National Knowledge Infrastructure (CNKI), under the search conditions of this study, select the "cited" sorting to get a list of the top 10 highly cited literature in the field of psychological skills training in China (see Table 2, the deadline for data statistics is May 2021 10).

Table 2. List of the top 10 highly cited literature in the field of psychological skills training in China

Serial Number	Essay Topic	Author	Journal Title	Cited Frequency	Download	Time
1	A Summary of Modern Sports Psychology Research	Tension is, Ren is not much	Acta Psychologica	105	3498	1995-10-30
2	Research status and future trend of modern sports psychological skills training	Qiu Fen, Yao Jiaxin	Journal of Wuhan Institute of Physical Education	95	2307	2007-02-15
3	On the domestic research status of imagery training	Wang Min	Journal of Shenyang Institute of Physical Education	73	825	2003-09-10
4	A review of the application of mindfulness training in the field of sports competition	Zhong Boguang, Si Gangyan, Zhang Chunqing	Chinese Journal of Sports Medicine	52	1362	2013-01-25
5	Athletes' self-control: Important theories and research progress	Tension is	psychological science	51	1948	2013-05-20
6	A Psychological Study on the Game Performance of Advanced Shooters	Liu Shuhui, Zhao Guorui, Wang Hui-min and others	Physical Education Teaching (now Journal of Capital Institute of Physical Education)	48	291	1993-04-02
7	Research on Improving the Psychological Regulation Ability of Shooting Players	Li Jingcheng, Liu Shuhui, Li Sihua, etc.	Journal of Capital Institute of Physical Education	47	1132	2009-05-15
8	Research development and application of sports psychology in the field of competitive sports	Zhang Zhongqiu	Journal of Tianjin Institute of Physical Education	46	3053	2012-05-25
9	Mental Training and Monitoring of Chinese Diving Team in Preparation for Beijing Olympic Games	Zhang Zhongqiu, Zhao Guoming, Liu Yunzhou and others	Sports Science	46	1061	2009-11-15
10	Analysis on the Current Situation and Development Trend of Sports Psychological Training	Xu Wanbin	Sports and Science	46	1537	2003-07-25

The number of citations of a document is a key evaluation index for the academic quality and academic influence of a document. In general, the citation frequency of a document is highly positively correlated with the quality of the document. Therefore, citation analysis is feasible as a scientific evaluation method for documents. [8]. It can be seen from Table 2 that the most frequently cited literature on the study of psychological skills training in China is the "Review of Modern Sports Psychology Research" published by Zhang Wei and Ren Weiduo on October 30, 1995 in the "Acta Psychologica", was cited 105 times and downloaded 3498 times [9]. The top 10 highly cited papers in the field of psychological skills training in China are all from core journals and CSSCI source journals, mainly sports journals and journals of sports colleges, and the authors of highly cited papers highly overlap with the core authors in this field, such as Zhang Zhongqiu, Liu Shuhui, Zhang Liwei, etc. It shows that the authors of the highly cited papers have grasped the key issues in the development of Chinese psychological skills training, the research is in-depth, and has strong guiding significance for the practice of Chinese psychological skills training.

2.5. Analysis of hot spots in research on psychological skills training in China

A research hotspot is a topic studied by a group of papers that appear in a large number and have internal connections within a period of time [10]. Keywords are the core of a topic and the main perspective of research, and can accurately reflect the current research hotspots and development trends of a topic. Therefore, the research hotspots and directions of topic literature can be analyzed through keyword co-occurrence characterization. After running the CiteSpace V software, the keyword co-occurrence map of China's psychological skills training research is obtained (see Figure 4).

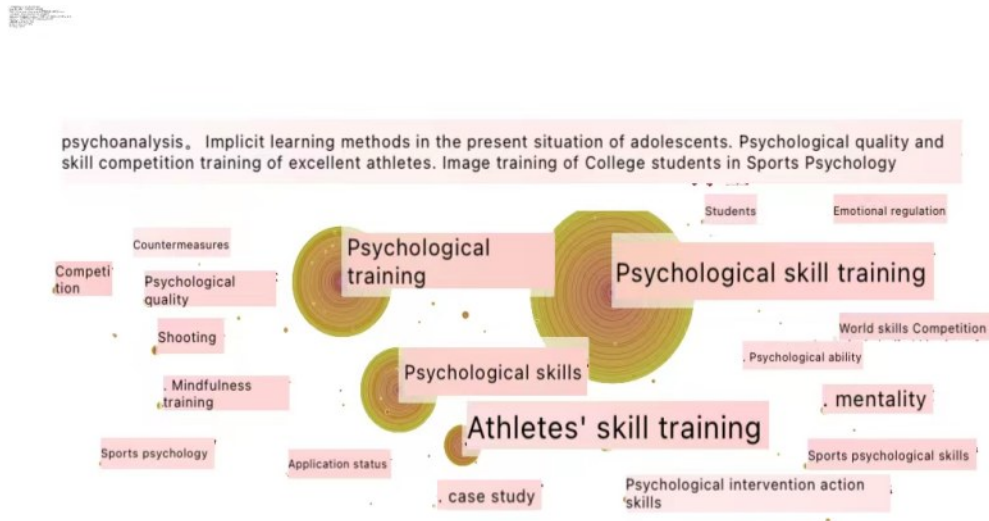


Figure 4. Keyword co-occurrence map of Chinese psychological skills training research (N≥5)

Nodes are an important way to display information in the knowledge graph. Figure 4 shows the keyword nodes that appear more than 5 times in journal papers in the field of Chinese psychological skills training research. Each concentric circle on the picture represents a node, each node represents a keyword, the size of the node is proportional to the frequency of keyword occurrence, the larger the node, the higher the frequency. Different nodes appearing in the same document are connected by line segments. The thickness of the connection line is related to the connection density of the nodes. The thicker the connection line, the closer the connection between the nodes. It can be seen from Figure 4 that "psychological skills training", "psychological training", "psychological skills", "skills training", "representation training" and "psychological quality" are the main prominent nodes. The high-frequency keywords contained in Figure 4 are exported, and after statistics, a list of keyword frequencies in the research field of psychological skills training in China is obtained (see Table 3).

According to the concept of keyword centrality, we can analyze the frontiers of the current Chinese psychological skills training research field from high-frequency keywords, and can also provide a research hotspot basis for follow-up research [11]. It can be seen from Table 3 that the most frequently occurring keyword in the research field of psychological skills training in China is "psychological skills training" with a frequency of 110 times. According to Figure 4 and Table 3, it can be seen that keywords such as "psychological skills training", "mental training", "psychological skills", "athletes", "skills training", "sports psychology", "imagery training", and "psychological quality" are Chinese psychological skills. Research hotspots in the field of training.

3. Conclusions and suggestions

3.1. Conclusion

- (1) This study uses 320 documents included in the China National Knowledge Infrastructure (CNKI)

database from 2000 to 2020 as the data source for statistical analysis. It is found that the research on psychological skills training in China in the past 30 years can be divided into the beginning of development (1990-2000), rapid development (2001-2008), stable development (2009-2015), and developmental decline (2016-2020). Overall, the number of publications on Chinese psychological skills training research presents an inverted U-curve trend.

Table 3. A list of the top 20 keywords in the research field of psychological skills training in China

serial number	Key words	frequency	year	serial number	Key words	frequency	year
1	mental skills training	110	1990	11	skill competition	7	2012
2	mental training	71	1995	12	mindfulness training	6	2013
3	mental skills	54	1998	13	middle distance running	6	2001
4	athlete	27	2001	14	sports	6	2006
5	skill training	18	1999	15	method	6	2004
6	sports psychology	11	1990	16	train	6	2004
7	Representational training	9	2001	17	excellent athlete	6	1999
8	psychological quality	9	2002	18	psychological intervention	5	2009
9	shooting	8	1998	19	sports mental skills	5	2001
10	mental state	7	2005	20	psychological counseling	5	2009

The serial number is the keyword frequency ranking, and the year is the time when the keyword first appeared.

(2) Zhang Zhongqiu is the scholar with the largest number of publications in the field of psychological skills training in China. The core authors of the research on psychological skills training in China are strong, and most of them are professors. Zhang Zhongqiu, Si Gangyan, Liu Shuhui, Zhang Liwei, Ren Jie, Zhao Daliang, Zhao Guoming, Wang Huimin, etc. are the main representatives, and they are the core force to promote the research on psychological skills training in China. The core institutions of China's psychological skills training research are mainly the Sports Science Research Institute of the State Sports General Administration, the sports colleges (sports departments) of various sports universities, normal or comprehensive universities, among which the Sports Science Research Institute of the State Sports General Administration has the strongest scientific research strength, yielding the most results.

(3) The literature with the highest citation frequency in the research field of psychological skills training in China is the "Review of Modern Sports Psychology Research" published by Zhang Wei and Ren Weiduo in the "Acta Psychologica" on October 30, 1995, with 105 citations times, the number of downloads is 3498 times. Highly cited papers have grasped the key issues in the development of Chinese psychological skills training, have certain theoretical innovation and research depth, and have strong guiding significance for the practice of Chinese psychological skills training. The journals with highly cited articles are mainly concentrated in sports journals and journals sponsored by sports universities, and most of them are high-level journals such as core journals and CSSCI source journals.

(4) The research hotspots in the research field of psychological skills training in China mainly focus on "psychological skills training", "psychological training", "psychological skills", "imagery training", "psychological quality" and so on. In the past 30 years, the research on psychological skills training in China has developed in the direction of diversification of research objects and research methods.

3.2. Recommendations

(1) In recent years, the popularity of research on psychological skills training in China has declined, and the trend of decline has been obvious. The number of published papers has shown a decreasing trend year by year, which deserves the attention of research institutions and academic organizations on psychological skills training in China. It is recommended to fully explore the essence and connotation of psychological skills training, and take method innovation as a breakthrough to conduct systematic, in-depth and comprehensive research on psychological skills training in the new era.

(2) The common problems of the authors and institutions of psychological skills training research are low contact density, little communication and cooperation, and failure to establish a good cooperative network and cooperative relationship. It is recommended that researchers share more resources and academic contention among researchers in order to form a stable and lasting research team in the field of psychological skills training in China . Establish a linkage mechanism, realize complementary advantages and cross-cooperation, form a research chain of Chinese psychological skills training, and provide impetus for the development of psychological skills training research.

(3) Appeal to experts and scholars in psychology, pedagogy, physical education and other disciplines to pay attention to the research on psychological skills training and participate in the research. Only in this way can more high-level, high-quality, and highly cited research results be produced , forming a new development pattern of "a hundred flowers blooming and a hundred schools of thought contending" in the study of psychological skills training in China.

(4) It is recommended that future researchers, on the basis of fully grasping the trends, frontiers and hot spots of Chinese psychological skills training research, pay attention to the latest developments in foreign psychological skills training research, and deeply analyze the classic literature and research hotspots of foreign psychological skills training research , through the comparative analysis of research results at home and abroad, broaden research ideas, enrich research objects, innovate research methods, pay attention to linking theory with practice, so that theoretical results can better guide the research practice of psychological skills training, and realize the comprehensive research on psychological skills training in China orientation, high quality and sustainable development.

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Conflicts of Interest

The authors declare no conflict of interest.

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