

A Comparative Analysis of Hotspots in Semiotics Theory Research in China and Abroad: A Knowledge Mapping Analysis Based on CiteSpace

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Abstract: Based on literature data with "semiotics theory" as the research topic from the CNKI and WOS databases, this study employs CiteSpace software to conduct a comparative analysis of the relevant research on semiotics theory in China and abroad from 2000 to 2022. The results show that: Domestic and international research on semiotics theory exhibit a multi-centered development trend, gradually forming distinctive and complementary schools of semiotics theory. China's and abroad research focuses differently, with foreign research focusing more on applying semiotics theory in social sciences, educational research, language fields, and biological sciences. In contrast, domestic research tends to focus on introducing and studying foreign semiotics theories, with linguistics being an important research area. Both domestic and international research on semiotics theory have expanded the scope of theoretical research, forming widely applicable categories of semiotics. Hotspots in foreign research include "student"; "model"; "future"; "evolution"; "information"; "framework"; "discourse"; and "construction", while hotspots in domestic research include "semiotics", "Peirce", "pragmatism", "Lotman", and "symbols". The development process of domestic and international research on semiotics theory has some differences, with each stage exhibiting different research characteristics. However, both have developed from theoretical to applied research, phenomenon to essence law research, and single-mode to multi-mode research. Domestic researchers should strengthen communication and cooperation with international counterparts, build a research community for semiotics theory, deepen research connotations, and provide more case studies as paradigms; timely summarize the current status and development patterns of domestic research on semiotics theory, and gradually form a Chinese school of semiotics with international influence.

Keywords: semiotics theory, research hotspots, CiteSpace, literature visualization, semiotics schools.

1. Introduction

"The 21st century is the century of semiotics. Contemporary culture has rapidly entered a 'highly semiotic era,' where semiotics consumption has far surpassed material consumption." [1] Increasingly, more countries and organizations have recognized the importance of semiotic research, especially in the current era of "unprecedented great changes in the world" (Jinping Xi, 2018), where various social strata are in constant conflict. There are frequent cultural conflicts among different ethnic groups at the international level. The competition for "semiotics power" has surpassed other forms of power. (Yiheng Zhao, 2016) However, our exploration of symbols should be balanced to maximize semiotic power. It should be oriented towards the pursuit of truth, which is the ultimate interpretation after infinite semiotic activities, the ultimate explanatory term, namely truth. [2] "The ultimate concern of semiotics is human beings, whether it is the study of semiotic systems or the interpretation of various meanings, it is all in service of this purpose." [3]

Since the early 20th century, the development of semiotics has gone through three stages and four modes: the linguistic model of Saussure, the logical-rhetorical model of Peirce, the Cassirerian model, and the Bakhtin-Lotman model. [4] From the 1970s to the present, the third stage of theoretical development in semiotics has shown a trend of multi-theoretical centers. This indicates that semiotics has gained increasing attention from researchers in different countries and regions worldwide and has been widely applied in fields such as biology, neuroscience, media studies,

sociology, and cultural studies, with prominent interdisciplinary and cross-regional characteristics. Nowadays, in Europe and America, various influential new schools have emerged, such as the new Tartu, Copenhagen, and Bloomington schools that have shifted towards the "holistic semiotics" model, the cognitive school in Northern Europe and North America, the media semiotics school, the Birmingham school of cultural semiotics in the UK, the "Paris school" in France, and the Turin school in Italy, as well as the social semiotics school that integrates sociology, Marxism, and sociolinguistic theories. [5]33 In recent years, semiotic research in China has also gradually become an essential branch of the global semiotics movement, with the potential to become the "fourth semiotic kingdom" after the United States, France, and Russia.[5]1

Scholars have conducted comprehensive literature reviews on semiotic theory. However, there is still room for further supplementation in these studies. Regarding the research scope, existing reviews have mainly focused on the development of semiotics in China from a practical perspective, summarizing the achievements of different stages. However, since the beginning of the new century, semiotic research has undergone significant domestic and international changes, and there still needs to be a more systematic presentation of the dynamic research process and developmental trends of semiotic theory in the literature. Regarding research content, domestic studies have primarily focused on applied research in semiotics or specialized studies on theorists such as Peirce and Lotman, as well as research on disseminating Western semiotic theories in China. However, there are few studies that compare the research hotspots of semiotic theories both domestically and internationally. In terms of research methods, existing comprehensive studies have mainly covered the concepts, schools, dissemination, and reception of semiotics, but there has been no research that uses bibliometric analysis to comprehensively analyze the current status, characteristics, hotspots, and dynamic evolutionary trends of semiotic theory research both domestically and internationally. Given this, this paper primarily adopts the method of bibliometric analysis to visually and comparatively analyze the relevant literature on semiotic theory in the China National Knowledge Infrastructure (CNKI) and Web of Science databases from the past 22 years (2000-2022), aiming to systematically explore the current status, hotspots, and trends of semiotic theory research both domestically and internationally, with the hope of providing basis and inspiration for future research and practical exploration.

2. Research Methods

2.1 2.1 Research Tools

This study used CiteSpace (version 5.8.R3), an information visualization software developed by Chaomei Chen, to analyze the distribution, research hotspots, and trends of semiotics theory research. In the network map, N represents the total number of nodes, and E represents the total number of links in the network, which reflects the collaboration status. Network density describes the degree of closeness of author or institution collaborations.

2.2 2.2 Data Collection

For domestic research, the CNKI database was used to analyze the publication volume. The search criteria were set as "subject word = 'semiotics theory'" with a publication date limited to 2000-2022. The sources of literature were selected as "Peking University Core" and "CSSCI". The search was conducted on August 30, 2022, 272 Chinese literature were finally selected.

For foreign research, the Web of Science database was used to analyze the publication volume. The search criteria were set as "document type = 'article,' time = '2000-2022', subject words = 'semiotics theory*' or 'semiotic theory*' or 'the theory of semiology*' or 'symbol theory*' or 'semiotic theories*'", with document types selected as "articles" and "review articles", the language selected as "English", and additional recommendations from the database were added. The search was conducted on August 30, 2022. A total of 312 English literature were selected.

3. Data Analysis and Graphical Interpretation

3.1 3.1 Disciplinary Distribution Analysis

An analysis was conducted on the disciplinary distribution of the 272 Chinese and 312 English literature searches. Both showed significant interdisciplinary characteristics. In China, semiotics theory research in Chinese language and script accounted for 33%, while in foreign countries, semiotics theory research is more prevalent in arts and humanities, interdisciplinary, social sciences, and education research nodes. It also shows a development trend in computer science, linguistics, communication, and other disciplines.

3.2 3.2 Visualization Analysis based on CiteSpace

The purpose of this study is to use the visualization function of CiteSpace to conduct a statistical and comparative analysis of the 272 Chinese and 312 English literature related to semiotics theory research, in order to explore the collaboration among authors and institutions in this research field both domestically and internationally, as well as the hotspots, frontiers, and development trends.

3.2.1 Comparative Analysis of Academic Influence of Core Authors in China and Abroad

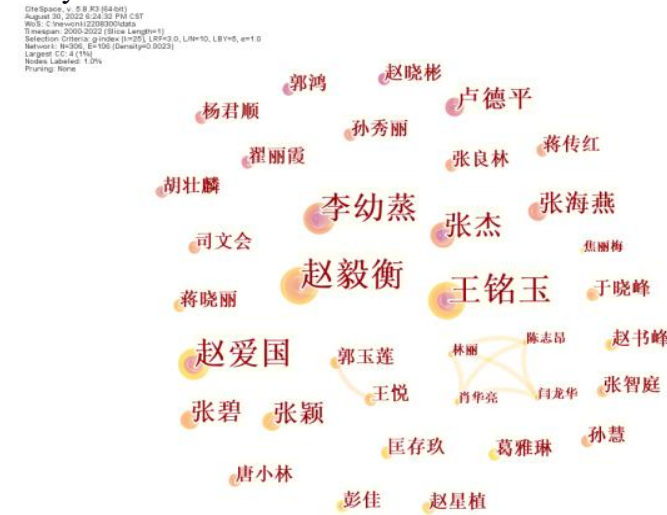


Fig.1 Collaboration Map of Authors in Domestic Semiotics Theory Research



Fig.2 Collaboration Map of Authors in International Semiotics Theory Research

As shown in Figure 1, 306 authors appeared with 106 connections, and the network density is 0.0023. Five larger nodes are visible, namely Mingyu Wang , Yiheng Zhao, Youzheng Li , Aiguo

Zhao , and Jie Zhang . Based on the definition of core authors according to Price's law, authors who have published three or more papers in this field are considered prolific authors. Analysis shows that there are nine prolific authors. Longhua Yan formed a group with Hualiang Xiao , Li Lin , and Zhiang Chen. Zhuanglin Hu , Youzheng Li , Lixia Zhai, Jie Zhang , and Deping Lu conducted early research on semiotics theory. Bi Zhang , Ying Zhang , Yalin Ge , Xingzhi Zhao , Yue Wang , Hui Sun , Shufeng Zhao , Cunjiu Kuang are emerging forces, and the team is growing. An overview of the entire graph reveals many isolated points, with no network connections between various groups, indicating that academic collaboration needs to be improved. The research on semiotics theory in China is relatively scattered.

Among the three largest nodes, Mingyu Wang is mainly engaged in the research of linguistic semiotics. Yiheng Zhao summarizes the characteristics, patterns, research status, and future trends of different stages of semiotics from a more macro perspective. Youzheng Li, an independent scholar who studied in the United States and served as a messenger for communication between domestic and foreign semiotics research, conducts comparative studies of the development status and theoretical interactions of Chinese and Western semiotics and is committed to the study of historical semiotics.

As shown in Figure 2, 361 authors appeared with 196 connections, resulting in a network density of 0.003. Three larger nodes are visible, namely Kalevi Kull, Hongbing Yu, and Cs De Souza, who are considered prolific authors.

Christopher Ball is part of two author groups, one consisting of Agustin Fuentes and Ann Marie Thornburg, forming a three-person author group, and the other consisting of Carl Os Fausto, Chloe Nahum Clauda, Gregory Schrempp, and Igor Pasternak, forming a five-person author group. The core author Kalevi Kull and Anti Randviir form an author group, and there are also several smaller collaborative teams with only one connection between nodes, indicating a weak collaboration. CsDe Souza has also conducted early research on semiotic theory, Christopher Ball, Robert Wallden, Anti Randviir, Cary Campbell, Alin Olteanu, Jamin Pelkey, Dave Wood, Paolo Bertetti, Mattia Thibault, and Melchor Cagara Paete are emerging forces. It is worth noting that Chinese scholars are also playing an essential role in the field of semiotics on the international stage, such as Hongbing Yu and Hongwei Jia.

The largest node, Kalevi Kull, primarily focuses on biosemiotics, which is a crucial shift in the field of semiotics in the United States toward biology and ecology. The founding figure of this movement is the American semiotician Thomas A. Sebeok, and Kalevi Kull has further developed biosemiotics, defining it simply as "the science of sign activity in living systems".[5]37 Hongbing Yu is mainly engaged in interdisciplinary and intercultural research in semiotics, linguistics, and communication. Cs De Souza, applies semiotic methods to human-computer interaction design, calling it semiotic engineering.

Based on the comparative analysis above, it can be observed that there are more high-productivity authors in the field of semiotics in China compared to foreign countries, indicating that semiotics theory has received more attention from researchers in China than in foreign countries since the beginning of the new century. In contrast to China, foreign semiotics research has formed larger author groups with more frequent collaborations between pairs of authors, indicating that academic cooperation among authors in this field is more closely knit in foreign countries compared to China. However, due to the interdisciplinary nature of semiotics research, there is still significant room for improvement in communication and collaboration. Both China and foreign countries have a strong presence of emerging scholars in this field, indicating that semiotics research is flourishing.

3.2.2 Analysis of Academic Influence of Domestic and International Publishing Institutions

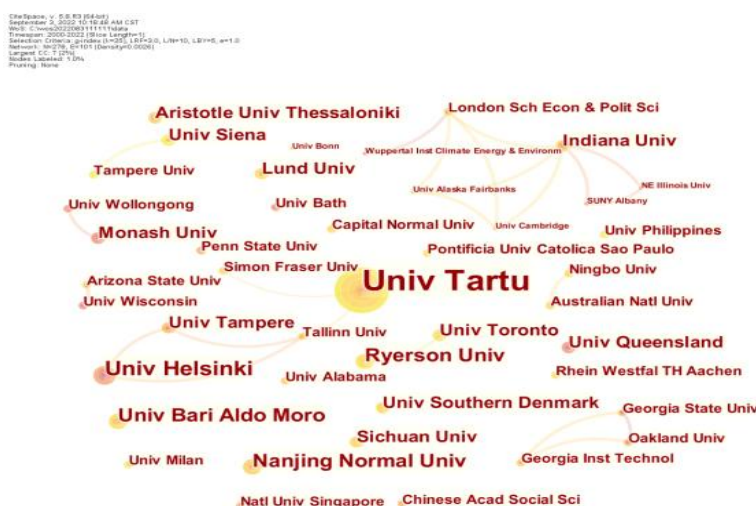
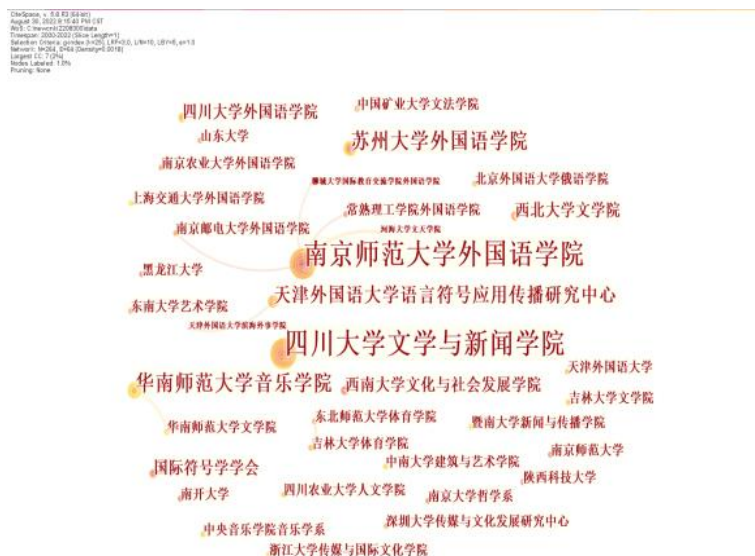


Figure 3 shows that there are a total of 264 nodes and 64 links, with a density of 0.0018. The visualization results obtained from the analysis of 272 literature show the prominent institutions researching semiotics theory. Representative publishing institutions in the field of semiotics theory in China are centered around Nanjing Normal University School of Foreign Studies, Sichuan University School of Literature and Journalism, South China Normal University School of Music, Suzhou University School of Foreign Languages, and Tianjin Foreign Studies University Language Symbol Application and Communication Research Center. “Currently, there are six semiotics research centers in China, including Sichuan University Institute of Semiotics and Media Studies, Nanjing Normal University International Institute of Semiotics, Tianjin Foreign Studies University Language Symbol Application and Communication Research Center, Suzhou University Semiotics Research Center, Shanghai University - University of Turin Interdisciplinary Research Center for Cultural Semiotics, and Tongji University Institute of Linguistics and Multimodal Semiotics.”[5] Nanjing Normal University School of Foreign Studies and Sichuan University School of Literature and Journalism are tied for first place with 10 publications each, with the former focusing on the research of Bakhtin and Lotman's semiotics theory and the latter focusing on

communication and semiotics research. The publications from these two institutions account for 41.6% of the top ten, indicating the highest influence. Through the above analysis, universities are the prominent research institutions in semiotics theory, showing obvious "localized" characteristics. At the same time, the collaborative networks among these institutions are relatively scattered, with only Nanjing Normal University School of Foreign Studies forming a relatively robust network of collaboration. This indicates that the research in the field of semiotics theory in China has not yet formed clustering phenomena, and the leading institutions are primarily concentrated in a few universities.

Figure 4 shows 278 nodes and 101 edges, with a density of 0.0028. The visual results analyzed from 325 literature articles reveal the prominent institutions researching semiotic theory. Representative publishing institutions in semiotic theory outside China are centered around University Tartu, University Helsinki, Ryerson University, University Bari Aldo Moro, Nanjing Normal University, and others. University Tartu ranks first in terms of publications with 12 articles, mainly focusing on biosemiotics research led by Kalevi Kull, as well as research on political semiotics, social semiotics, cognitive semiotics, and others. University Helsinki follows with 5 articles, focusing on Peircean semiotics, Foucauldian theory, and semiotics in hegemony, ethics, and other areas. University Tartu is significantly higher than other institutions and has the highest impact. Universities are still the backbone of semiotic theory research abroad.

Collaborations among foreign institutions are more closely connected. University Helsinki, University Tampere, and Tallinn University have formed collaborative relationships, and Tallinn University has also established a collaboration with University Tartu. Indiana University has formed a relatively concentrated collaborative network with six other universities. However, the most influential University Tartu still has significant room for collaborative exchanges with other institutions. In addition, two Chinese institutions, Nanjing Normal University and Sichuan University, have yet to establish collaborative relationships with foreign institutions. This indicates that research in semiotic theory in foreign institutions has yet to form clustering phenomena.

3.2.3 Research Hotspot Analysis

As shown in the knowledge map of keywords, After excluding "semiotics" and "symbol", which are the subject word, the top ten keywords were selected based on keyword frequency and centrality. The high-frequency keywords are "Lotman", "Peirce", "Bakhtin", "Saussure", and "culture". However, not all high-frequency keywords have high centrality, and relying solely on high-frequency keywords cannot accurately determine research hotspots. In CiteSpace software, keywords with high centrality (Centrality ≥ 0.1) are easily seen as inflection points in the knowledge map of keyword frequency, which to some extent, represent the research hotspots in the field. Regarding centrality, "semiotics" has a centrality of 0.43, making it a pivotal point in the network. The centrality of "Peirce" is 0.22, and "Lotman" is also 0.17. The keyword "pragmatism" with a frequency of 2, and a centrality of 0.18. Therefore, "Peirce", "pragmatism", and "Lotman" are the main research hotspots, followed by "culture" (centrality 0.08), "Saussure" (centrality 0.04), and "Bakhtin" (centrality 0.04).

As shown in the keyword knowledge map of foreign countries, "Language" has the highest frequency and the most significant node. The high-frequency keywords are "language", "evolution", "perspective", "perception", "framework", Etc. The centrality of "student" is 0.29, "model" is 0.27, "future" is 0.24, "evolution" is 0.20, and "framework" is 0.19. Combining high frequency and centrality, "evolution" and "framework" are the main research hotspots, followed by "student", "model", "future", "language".

3.2.4 Keyword Cluster Analysis

LLR (Log-Likelihood Rate) algorithm was used for cluster analysis to categorize and organize keywords to understand the categories of semiotics theory research topics. A total of 13 cluster results were obtained, where Modularity=0.8818 > 0.3, indicating significant clustering, and Mean Silhouette=0.9788 > 0.7, indicating high clustering reliability. The 13 results are #0 semiotics, #1 Peirce, #2 symbol, #3 Lotman, #4 cultural symbol system, #5 cultural semiotics, #6 meaning

generation, #7 methods, #8 method models, #9 linguistics, #10 social semiotics, #11 spatiotemporal body, #12 traditional sports.

The research above on semiotics theory was further summarized into three main areas: theoretical research involves the semiotics theories of Peirce, Lotman, Barthes, Bakhtin, Morris, Eco, Etc.; applied semiotics research includes the application of semiotics theory in translation, teaching, film and animation, design, and sports; method research includes the study of methods and method models in semiotics.

After analysis on keywords in semiotics research abroad, a total of 11 clustering results were obtained, with Modularity=0.8358 and MeanSilhouette=0.9598. The 11 results are #0 student, #1 semiotics, #2 animation, #3 social capital, #4 Peirce, #5 identity, #6 gestures, #7 emotion, #8 biosemiotics, #9 dog cognition, #10 semiotic archaeology. The research content of semiotics focus on five areas, namely biology, education and teaching, anthropology, sociology, and artificial intelligence.

As shown in the scientific knowledge map (timeline view) of keyword clustering, since 2000, semiotics has been a research hotspot accompanied by the studies of Lotman, Bakhtin, Peirce, Saussure, and other semiotic theories, and has continued to the present. Subsequently, in 2006, semiotics was applied as a translation theory to cross-lingual translation and communication, and in 2007, it was applied to comparative research. In 2011, the semiotic theories of Barthes and Morris received attention, and the research hotspots continued to expand. After 2013, semiotics research began to shift from foreign to domestic applications in fields such as cultural communication, design, film and television media, and socio-economics, with in-depth research and broader topics. Since 2016, the number of nodes has been small, and the number of publications has declined, indicating that research in this stage is relatively scattered and diversified, consistent with the sound and deepening research stage and the analysis of publication volume. During this period, the focus was mainly on in-depth research of many new research topics that emerged earlier. At the same time, some new hot keywords in this stage include design symbols, design rhetoric, visual symbols, design rhetoric, tourism products, design time, and new trademarks.

Foreign semiotics research had fewer hotspots during the first decade of the new century. The main hotspots were student, language, and information, indicating that research mainly focused on teaching, linguistics, and other fields and covered the entire period. From 2010 to 2017, the number of high-frequency keyword nodes increased continuously, and the connections were dense, such as perception, perspective, identity (2010), technology (2011), discourse, model, framework, representation (2012), evolution (2013), knowledge (2014), anxiety, future (2017). Since 2018, the number of nodes has been small, and the number of publications has declined. During this period, some new hot keywords include animal, mind, experience, adolescent, image, hippocampus, Etc.

4. Summary and Outlook

Through comparative analysis above, the following findings are observed: Firstly, domestically and internationally, semiotics research shows a trend of multi-theoretical centers with distinctive and complementary semiotic schools gradually forming. Secondly, researchers from different regions show varying degrees of attention to semiotic theories. Foreign research tends to focus on applying semiotics in social sciences, educational research, linguistics, and biological sciences. In contrast, domestic research mainly focuses on introducing and studying foreign semiotic theories. In recent years, semiotics application research in China has expanded its scope. Thirdly, semiotics research has been broadened both, integrating semiotic theories with various fields and forming widely applicable interdisciplinary semiotics. The development process of semiotics research shows differences between domestic and foreign studies, with different research characteristics at different stages. However, all have experienced the development process from theoretical research to applied research, from phenomenon-oriented research to research on essence and regularity, and from single mode to multiple modes. Researchers from both China and abroad should strengthen dialogue and

collaboration between Eastern and Western semiotic theories. For domestic researchers, the six semiotics research institutes and centers in China should regularly conduct exchanges, forming a community of semiotics research in China. While introducing foreign theories, the current status and development trends of domestic semiotics research should be summarized promptly, gradually forming an internationally influential Chinese semiotics school and contributing new strengths to the development of humanities and social sciences in China.

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