

REVIEW ARTICLE

Visualizing the knowledge domain of multimodal discourse analysis (2009-2019): A bibliometric review

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Abstract: Different from traditional discourse analysis, multimodal discourse analysis (MDA), a systematic analysis of different semiotic modes, utilizing language, images, sounds in a discourse, emphasizes the coordination of both dynamic and static semiotic resources. This study presents the status quo and development trend of the research field through an objective, systematic, and comprehensive review of relevant publications available from the Web of Science Core Collection. Analysis techniques including a descriptive statistical method and a bibliometric method are used. The study quantitatively analyzes the publications in terms of general characteristics, geographical distribution, high-cited representatives, and topic discovery and distribution to illustrate the development and trend of MDA. The research findings are as follows: (1) In the past 10 years or so, international MDA research has presented a significant growth trend, with flourishing research output, interest and diversification of presented subjects; (2) New topics are constantly emerging, with research topics mainly focusing on the development of visual grammar, gesture, digital technologies, conference presentations, metonymy and metaphor, etc.; (3) Research focuses mainly on multimodality, semiotics, conversation analysis, critical discourse analysis etc.; (4) The article also listed a series of important and highly influential literature, countries, journals and authors on MDA during different periods. It is hoped that this paper can provide a reference for the further study of MDA.

Keywords: multimodal discourse analysis; bibliometric; Citespace; review

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1. Introduction

In the current age of multimedia, the function and mode for communication have changed dramatically, therefore it is acknowledged that meaning is rarely made via language alone. Instead, communication is conducted simultaneously through many kinds of modes, such as oral or written language, gestures, facial expressions, body language, tables, pictures, videos and so on

(Jewitt, 2016). This phenomenon is generally called ‘multimodality’, which is now linguistically investigated in the domain of multimodal discourse analysis (MDA).

The focus of linguistic research on discourse analysis has led to specialized research on discourse in various industries and fields, such as military discourse, classroom discourse, and consulting discourse. With rapid development of modern science and technology, multimodality has become a new trend attracting attention of discourse researchers. How to combine discourse with this new tide is an important issue for modern linguistic. It is necessary to investigate how multimodal discourse analysis plays a unique role in linguistic and what is the new interaction between the two.

Based on the search result from Web of Science Core Collection, this paper demonstrates the status quo of multi modal discourse analysis during the past 10 years (2009-2019) by conducting a visualization analysis. This systematic analysis illustrates the publication evolution over time and identifies current research interests and potential directions for future research, which can potentially assist researchers in keeping abreast of the research status and can also help monitoring new scientific and technological development in the research field to provide reference for the following research.

2. Definitions of key terms

2.1. Multimodal discourse analysis

Halliday views language as a social phenomenon to “fully understand the relationship between observed instances of language behavior and the underlying system of language” (Halliday, 1978: 8). As Halliday explains, “if you don’t know the system, then you cannot understand the text” (Halliday, 1978: 10). Halliday’s view of language was applied to fields that include discourse analysis, education, language development, second language development, computational linguistics, clinical linguistics, translation, language typology and the study of language in various domains, such as science, medicine, literature and the law. Multimodal discourse analysis is a branch derived from Halliday’s theory and has received much attention since its birth.

Multimodal discourse analysis is an approach to the discourse which focuses on how meaning is made through the use of multiple modes of communication as opposed to just language (Jones, 2012). Multimodal Discourse Analysis “holds that meanings are created in texts and interactions in a complex interplay of semiosis across multiple modes which include but are not limited to written and spoken language” (Cameron & Panović, 2014).

Jewitt (2016: 11) discusses three approaches to doing multimodality grounded in a distinct discipline, with a distinct theoretical and methodological outlook. They are conversation analysis, systemic functional linguistics and social semiotics. By comparing the differences between these three approaches (**Table 1**), it shows not all scholars working in these originating disciplines are interested in multimodality. For instance, many conversation analysts or systemic functional linguists focus on the study of ‘talk’ or ‘speech’. Yet within each of the three disciplines, scholars identify a substantial and growing body of literature and a community of scholars engaging with multimodal research. These bodies of work contribute to the thriving of multimodality and MDA.

Table 1. Mapping three approaches to multimodality: SFL, social semiotics and conversation analysis (Jewitt, 2016)

	Systemic Functional Linguistics (SFL)	Social semiotics	Conversational Analysis (CA)
Aims	Recognition of social functions of forms	Recognition of power and agency	Recognition of social order in interaction
Theory of meaning	Meaning as choice	Motivated sign	Sequentiality
History	European functionalism	SFL, critical linguistics, semiotics	American interactionism, ethnomethodology
Conceptualization of ‘means for making meaning’	Semiotic resource, mode	Mode, semiotic resource	(Semiotic) resource
Example representatives	O’Toole, Martin, Unsworth, O’Halloran	Kress, van Leeuwen	Goodwin, Heath, Mondada
Empirical focus	Artefacts, including texts and objects	Artefacts, mostly texts	Researcher generated video recordings of interaction
Method of analysis	Micro analysis of selected short fragments, corpus analysis, multimodal analytics	Micro analysis of selected short fragments, historical analysis	Micro analysis of (collections of) selected short fragments

Practical research has been the main direction in the field of multimodal discourse analysis in recent years, which makes MDA research develop in a mixed way of qualitative and quantitative research. At present, computer-assisted experiments are the main means of practical research with the supplement of a corpus-based approach. But most of them are short-term synchronic research, which cannot accurately reflect the historical development of multimodal discourse.

By adopting visualization analysis, this research aimed to track and find out the diachronic changing rules of multimodal discourse analysis. During this process, the theory, model or method of multimodal discourse analysis will be validated, adjusted, modified and improved dynamically at multiple levels. Its fundamental purpose is to better understand the application and development of multimodal discourse analysis in various fields.

2.2. Visualization analysis

In the era of Big Data, data visualization tools and technologies are essential to analyze massive amounts of information and help researchers better understand the current status of the field. Data visualization is a graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns of specific fields. This study attempted to realize the visualization of the collected data by using bibliometric methods.

Bibliometrics analyzes the impact of research outputs using quantitative measures. Bibliometrics complements qualitative indicators of research impact such as peer review, funding received, and the number of patents and awards granted. Together they assess the quality and impact of research. Researchers can not only use bibliometrics to provide evidence of the impact of the research outputs when applying for jobs, promotion or research funding but also find new and emerging areas of research. Besides, this method can also identify potential research collaborators and journals in which to publish.

This study intends to answer the following questions: (1) What is the general situation of

multimodal discourse analysis research since 2009? (2) What are the research hotspots of multimodal discourse analysis? (3) What is the trend of multimodal discourse analysis research?

3. Methods

3.1. Data collection

The Web of Science Core Collection, an abstract and citation database as well as an online scientific citation indexing service managed by Clarivate Analytics, which contains publications from the sciences, social sciences, arts and humanities, dating back to 1900. It was chosen as the database for collecting journal articles and reviews related to multimodal discourse analysis. Three rationales are listed to justify the choice. First, the Web of Science Core Collection, which contains Science Citation Index, Social Sciences Citation Index, Art and Humanities Citation Index, and an Emerging Sources Citation Index, is recognized as one of the world's leading multidisciplinary bibliographic databases, covering over 21,100 peer-reviewed, high-quality international scholarly journals (Web of Science Group, 2019). Researchers may search these indices selectively and set a custom time span, which is below the search boxes, to search. Second, it includes a relatively large set of journals specializing in discourse analysis as well as journals specializing in other disciplines that occasionally publish articles related to multimodal discourse analysis, such as *Discourse & Communication*, *Discourse & Society*, *Visual Communication*. Third, metrics covered include total publications, average citation per item, total citation count, etc., which allows researchers to extract bibliographic information, productive authors and prolific journals from their respective results as well as create citation reports for each of them. All these metrics support the researcher with an ideal data source to conduct this visualization analysis. The data was collected on the Web of Science Core Collection and the last visit was on July 1st, 2020. To collect the largest number and highest quality of relevant articles related to multimodal discourse analysis in the database, this study set the search configuration (Topic = multimodal discourse analysis, Document types = Article OR Review, Language = English and the Time span = 2009 to 2019). The search tool filtered the data automatically, with 590 articles and 5 reviews, collected as the input data. After the second filtration conducted by CiteSpace, the number of valid data was 578.

3.2. Analytical tool: CiteSpace

This study employed Citespace 5.5.R2, a freely available Java application for visualizing and analyzing trends and patterns in scientific literature which was jointly developed by Dr. Chaomei Chen of the School of Information Science and Technology at Drexel University, Philadelphia, PA, USA and WISE Laboratory at Dalian University of Technology. CiteSpace provides various functions to facilitate the understanding and interpretation of network patterns and historical patterns, including identifying the fast-growth topical areas, finding citation hotspots in the land of publications, decomposing a network into clusters, automatic labeling clusters with terms from citing articles, geospatial patterns of collaboration, and unique areas of international collaboration. It focuses on finding critical points in the development of a field or a domain, especially intellectual turning points and pivotal points (Chen, 2010).

In recent years, using the method of literature metrology research has gradually become the humanities and social science academic research of many scholars in important ways. In the study

of Wang and Yan (2019), 2,180 papers related to embodied cognition in the framework of linguistics were reviewed by using Citespace. Document co-citation analysis, citation burst detection, and betweenness centrality measurement were conducted to explore and determine the thematic patterns, emerging trends, and critical articles of the knowledge domain. Li and Jiang (2020) set out to conduct a dynamic visual knowledge mapping analysis of literature on Ecolinguistics with the help of bibliometric analysis software, Citespace and VOS Viewer. The article presented a whole skeleton of international literature on Ecolinguistics in six dimensions which have shed light on future research on Ecolinguistics. These previous research indicated the fastest accesses provided by Citespace are: (1) classic literature in the field and authoritative publications and experts in the field; (2) the hot spots and latest progress of this field; (3) the development process and change of the author's research ideas; (4) hot research units, hot institution and hot countries in this field; (5) understanding of the evolution process of frontier problems in this discipline or knowledge field. All of these showed the necessity and superiority of using this tool.

In this study, Citespace was used to find out the critical path and knowledge turning point of the evolution of the MDA discipline domain and to conduct a visualization analysis of the valid records collected from the previous procedure. The study quantitatively analyzed the publications in terms of general characteristics, geographical distribution, high-cited representatives, and topic discovery and distribution to grasp the foci and trend of MDA.

4. Results

4.1. General characteristics

According to the statistical distribution of the published papers (**Figure 1**), we can divide the past ten years research into four phases: (1) Phase 1: A period of slow growth (from 2009 to 2015). In this stage, the study on multimodal discourse analysis (MDA) was at an initial level, where the analytical techniques and tools were not yet mature, so the developmental process in this field was relatively slower than the later stage. (2) Phase 2: A period of rapid growth (from 2015 to 2016). The MDA welcomed its spring, with prolific researchers in different disciplines and abundant scientific research achievements. (3) Phase 3: A period of reason (from 2016 to 2017). The research in this field has emerged a transient saturation. After experiencing rapid development, academia had higher requirements on MDA research perspective, research content and research methods. (4) Phase 4: A period of outburst (from 2017 to 2019). MDA experienced another breakthrough after two years of brew of international and interdisciplinary cooperation.

What stands out in **Figure 2** is the continual growth of citation (**Figure 2**), with the production of multimodal discourse analysis (2009-2019) started at a low point of 5 in 2009 and peaked of 876 in 2019. It is the development of technology and the process of globalization that solves a major problem: the complexity and time-consuming nature of MDA analysis, particularly for dynamic texts such as videos and websites, which prompted this continuous heat and attention of this field. As people, processes, data and things become increasingly interconnected in the present world, the application of MDA theory to solve real problems in the world is becoming an exciting reality.

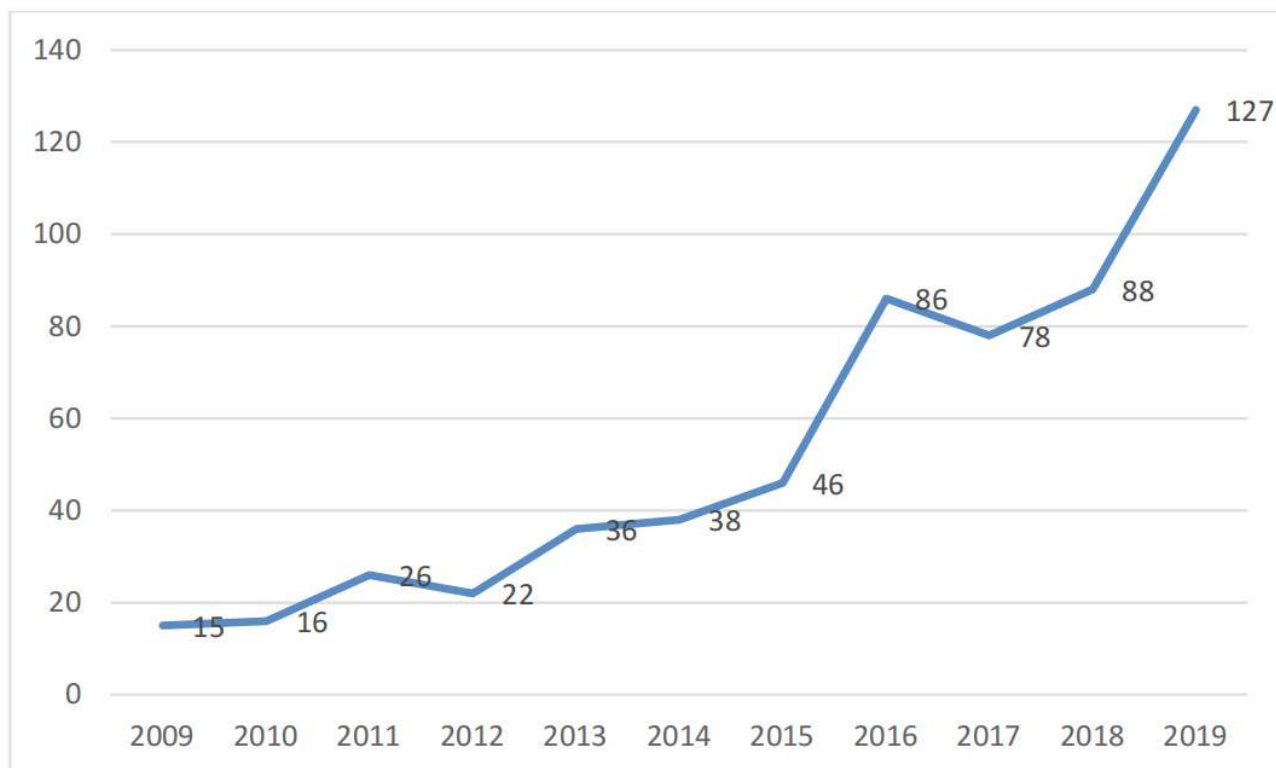


Figure 1. Sum of times published per year.

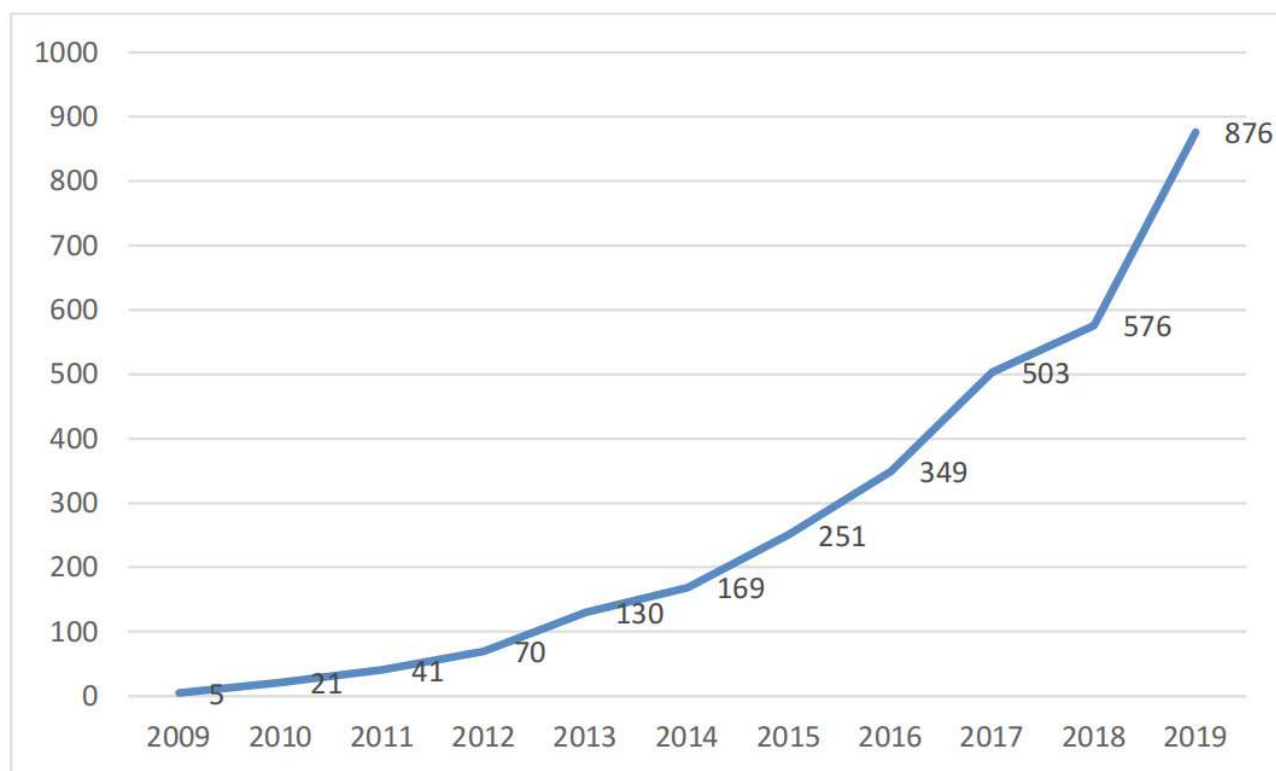


Figure 2. Sum of times cited per year.

4.2. Geographical distribution

The cooperation network represents the delicacy degree of a certain research field, and the more frequent the cooperation, the deeper the discipline development. The size of the nodes in the collaboration map indicates the number of papers published by authors, institutions or countries, and the links between them reflect the strength of their partnership (Li & Chen, 2016).

By using the cluster analysis method in CiteSpace, the status of international multimodal discourse analysis is carried out by a scientific cooperation network analysis. Figure 3 is the macro co-country network. In the past ten years, while Spain and China were getting fast growth in the study of MDA, the top-four countries that dedicated their efforts in this field were the USA, UK, Australia and Sweden. Germany, Singapore, South Africa and Canada are also in the top 10 list. The largest volume of articles was published in the United States (119 articles), followed by the United Kingdom (69 articles), Australia (61 articles), Sweden (38 articles), Spain (36 articles), China (35 articles), Germany (25 articles), Singapore (21 articles), South Africa (16 articles) and Canada (13 articles).

Besides, it is well known that multimodal discourse analysis is an interdisciplinary field as well as an international communicative platform which prompt collaboration and cooperation among countries. For example, American scholars shared their research achievements with Chinese, Japanese, Canadian while Australian with scholars from Denmark, Singapore, UK. In contrast with the developed countries, it is found that developing countries are much less willing to establish a cooperative relationship with other countries, with lesser lines and smaller size in published articles and reviews. Through mapping the cooperation network among author and country, it concluded that most of the researchers are from the United States, the United Kingdom and Australia; among the five clusters in the country cooperation network, the largest cluster was multilateral, members include Australia, Spain, Denmark, Germany, South Africa and so on. The second cluster was centered on the United States, including Poland, Singapore, Brazil and Finland. The third was centered on China, and the main members are Sweden, New Zealand and Pakistan and Slovenia.

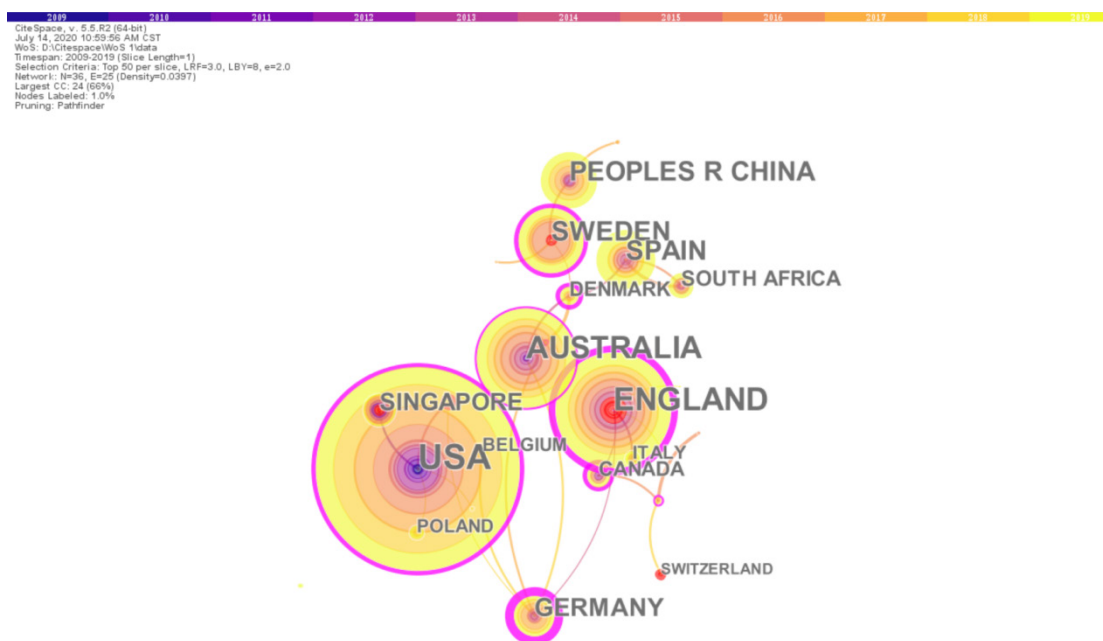


Figure 3. Geographical distribution.

4.3. High-cited representatives

Sorted by the total citation count, the top ten periodicals are *Critical Discourse Studies*, *Social Semiotics*, *Discourse & Communication*, *Discourse & Society*, *Visual Communication*, *Journal of Pragmatics*, *English for Specific Purposes*, *Text & Talk*, *Argumentation*, *Discourse Context & Media*. The total publications and average citation per item are also listed (**Figure 4**). With the highest 63 total citation count achieved by *Critical Discourse Studies*, 19 realized by both *Social Semiotics* and *Discourse & Communication*, these figures can help us find out the leading periodicals in multimodal discourse analysis easily and provide researchers with clearer perspectives when they are prepared to submit their writings for publication.

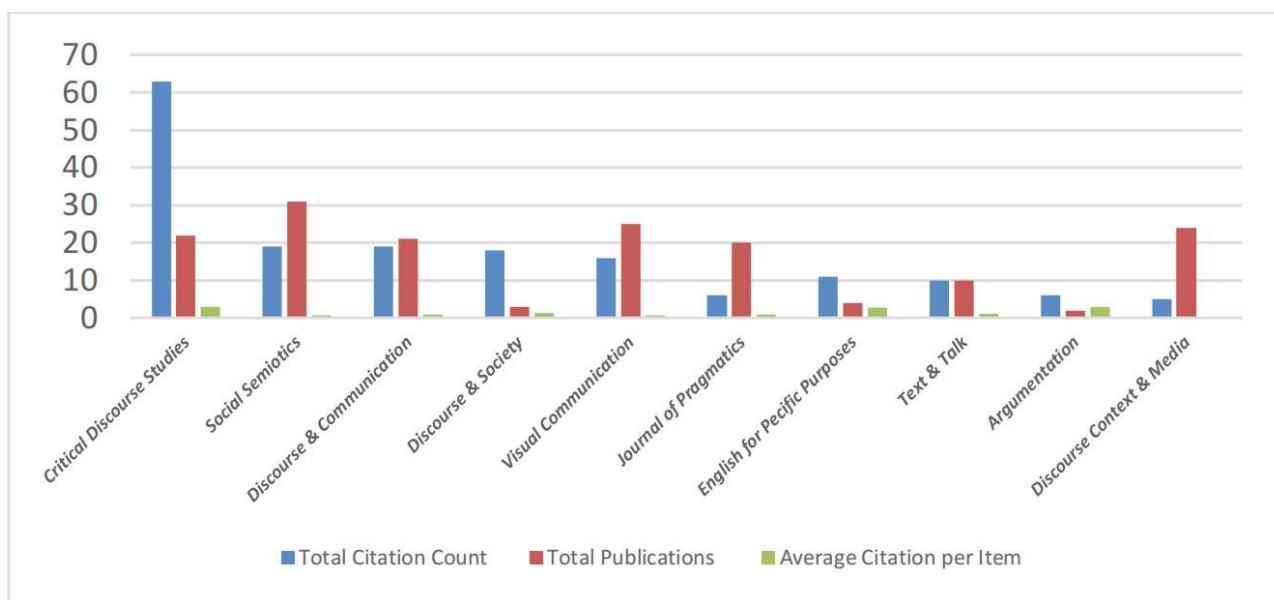


Figure 4. High-cited journals.

The citation bursts are nodes that direct those papers whose citation frequency has suddenly increased in the time dimension. The citation nodes that appear suddenly are indicated in red. The node with high emergence means that these authors or literature will receive extra attention in the corresponding time interval, to a certain extent, it represents the research frontier and hot issues of the subject in the corresponding time interval (Chen, 2010). Through the investigation of the cited literature, it is possible to track the hotspots of a certain discipline and research field and their diachronic evolution. **Figure 5** and **6** shows the Top 10 cited authors with the strongest citation bursts and Top 5 references with the strongest citation bursts, which may provide the novice with references. However, to understand the hotspots of the research more intuitively, it also needs to be presented through keyword knowledge graphs.

The knowledgebase is a collection of scientific literature repeatedly cited by scientists in a certain field during the research process, which is classic scientific literature in a certain research field. Any discipline needs to acquire, understand, and absorb the knowledge base before it can carry out in-depth research on related topics. Regarding the co-cited map of the international MDA research literature, see **Figure 7** and **8**.

Top 10 Cited Authors with the Strongest Citation Bursts

Cited Authors	Year	Strength	Begin	End	2009 - 2019
BALDRY A	2009	3.0329	2009	2014	
GOODWIN CHARLES	2009	2.5821	2009	2011	
LEVINSON S C	2009	3.0813	2009	2010	
VANLEEUVEN T	2009	6.2954	2009	2014	
HALL S	2009	3.8825	2009	2014	
HALLIDAY MAK	2009	4.2928	2010	2015	
LEMKE JL	2009	4.4728	2010	2016	
IEDEMA R	2009	3.8096	2010	2013	
HEATH C	2009	3.4226	2011	2014	
ROTH WM	2009	2.9327	2011	2014	

Figure 5. Top 10 cited authors with the strongest citation bursts.

Top 5 References with the Strongest Citation Bursts

References	Year	Strength	Begin	End	2009 - 2019
VAN LEEUVEN T, 2005, INTRO SOCIAL SEMIOTI, V0, P0	2005	8.3897	2009	2013	
KRESS G, 2006, READING IMAGES GRAMM, V0, P0	2006	16.7268	2009	2014	
HALLIDAY MAK, 2004, INTRO FUNCTIONAL GRA, V0, P0	2004	6.1676	2009	2012	
KENDON A, 2004, GESTURE VISIBLE ACTI, V0, P0	2004	4.4715	2009	2012	
BALDRY A, 2006, MULTIMODAL TRANSCRIP, V0, P0	2006	7.5256	2009	2014	

Figure 6. Top 5 references with the strongest citation bursts.

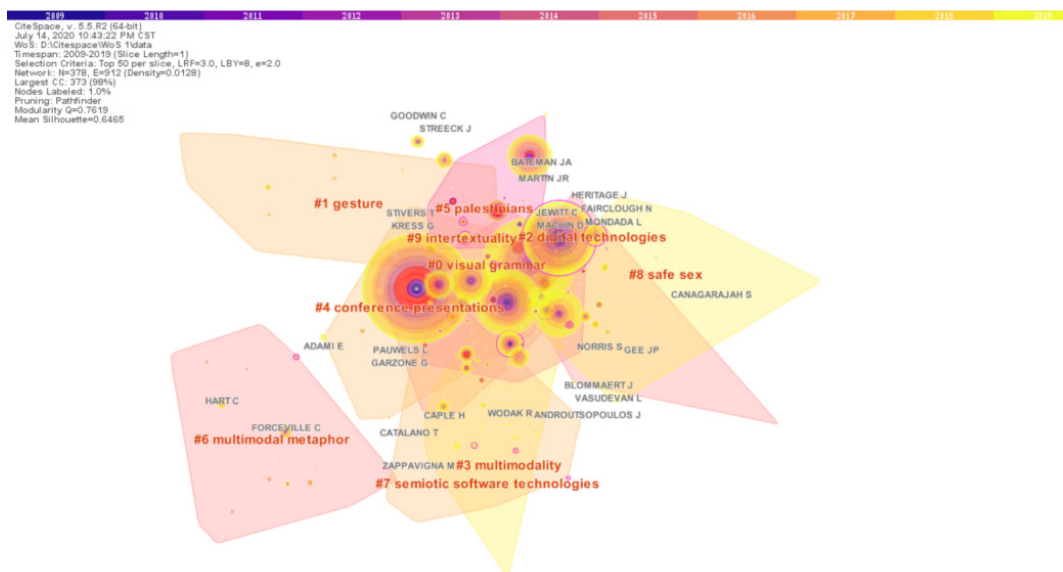


Figure 7. Co-citation network associated with cited author.

Figure 7 visually presents the visualization results of highly cited author in international MDA research. The annual rings in Figure 7 represent cited authors, and the size of the annual rings corresponds to the number of citations. The color of the year ring represents the cited history of the cited authors. The thickness of the annual ring is proportional to the number of citations in the corresponding time zone. The connection between the annual rings reflects the co-citation strength. The color of the line represents the year in which the co-occurrence relationship first occurred. The node label font size reflects the intermediary centrality of the node literature (Chen, 2010). Through the measurement of the modularity (Q value = 0.7619) and the mean silhouette (S value = 0.6465), 10 clusters were extracted, according to the cluster size: visual grammar, gesture, digital technologies, multimodality, conference presentations, Palestinians, multimodal metaphor, semiotic software technologies, safe sex, and intertextuality.

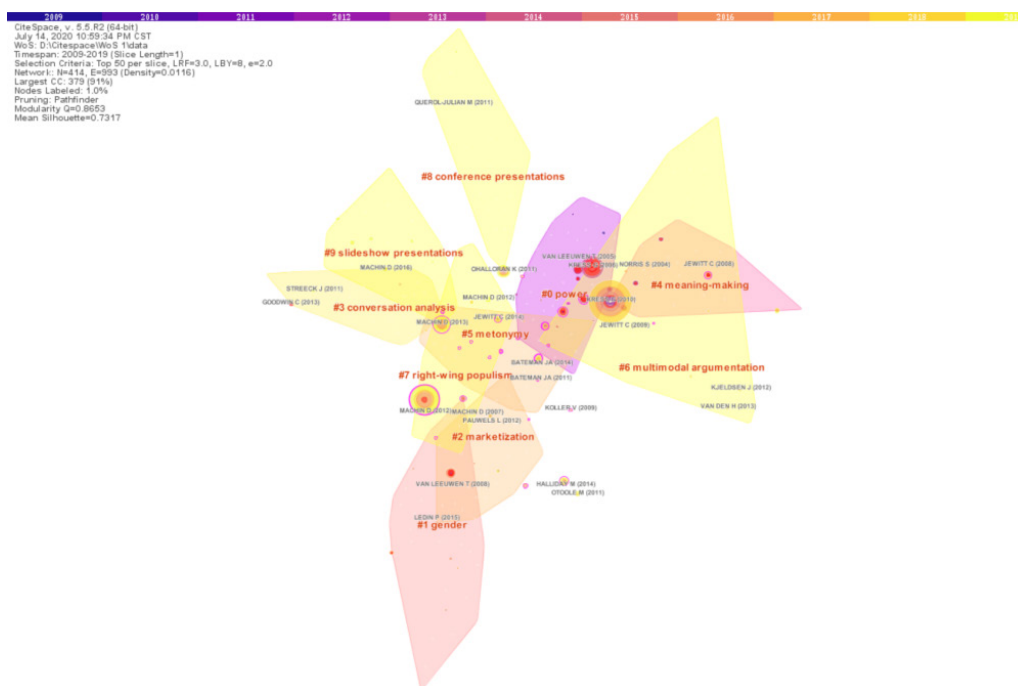


Figure 8. Co-citation network associated with reference.

Figure 8 visually presents the visualization results of highly cited literature, turning point literature and surge literature in international MDA research. Through the measurement of the modularity (Q value = 0.8653) and the mean silhouette (S value = 0.7317), 10 clusters were extracted, according to the cluster size: power, gender, marketization, conversation analysis, meaning-making, metonymy, multimodal argumentation, right-wing populism, conference presentation and slideshow presentations.

4.4. Topic discovery and distribution

Being the basis of multimodal discourse analysis, the heated discussion about multimodality, multimodal discourse analysis and discourse analysis is never faded. Figure 9 present the keyword co-occurrence charts, from which we can summarize that “multimodal discourse analysis” (with a frequency of 29), together with its highly related terms including “multimodality” (168), “discourse” (117), “language” (53), “discourse analysis” (43), “critical discourse analysis” (29), “multimodal analysis” (21), and “discourse analysis” (40), is the main topic of global research

related to multimodal discourse analysis. In Mondada's (2009) article, for example, it dealt with the multimodal and spatial arrangements of the participants within pre-beginning and opening sequences, i.e. sequences taking place before the actual opening of social interaction and achieving the conditions for an imminent opening. The research stays at a face-to-face level and gestures and space were highlighted. Bateman and Wildfeuer (2014) articulated a model of discourse pragmatics that is sufficiently general to apply to the specifics of visually communicated information and show this at work concerning several central aspects of visual narrative. Other high-frequency keywords including "systemic functional linguistics" (11), "conversational analysis" (26), "semiotics" (15), and "social semiotics" (28) reflect the theoretical levels that were mainly discussed. Bednarek and Caple (2014) introduced a new framework for the analysis of news discourse to scholars in Critical Discourse Analysis (CDA) and beyond which emphasizes the importance of news values for linguistic analysis and encourages a constructivist approach to their analysis. The emerging studies on "multimodal critical discourse analysis" (23) reflect a recent trend in discourse studies which is the integration of critical discourse analysis and multimodal discourse analysis. Extended keywords such as "language" (51), "gesture" (25), "identity" (22), "gender" (22), "communication" (21), "organization" (20), "literacy" (19), "social media" (18), "English" (16), "talk" (15), "representation" (15), "politics" (15), "image" (13), and "students" (11) reflect the research content of these articles. Blom and Hansen (2014) mapped the use of forward-referring headlines in online news journalism by analyzing of 100,000 headlines from 10 different Danish news websites. With the development of social media, scholars started to pay a contribution from off-line communication to on-line communication. Zappavigna (2016) investigated the visual choices that are made in the images chosen to construe relationships between the represented participants, the photographer, and the ambient social media viewer.

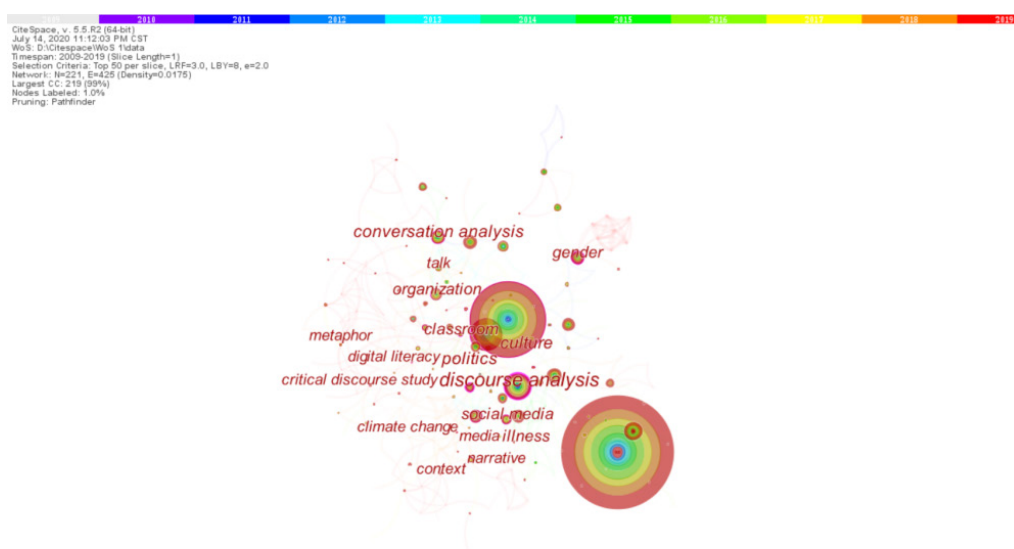


Figure 9. Keywords distribution.

5. Conclusion

Scollon and Levine (2004: 4–5) has concluded that, in terms of multimodal discourse analysis, the future including multimodal discourse analysis will focus on the role of the Internet in discourse

analysis, social activities, or multimodal discourse analysis in the study of social interaction, education activities under the contextual multimodal discourse analysis, institutional discourse (workplace) of multimodal discourse analysis. Van Leeuwen (2011: 679) believed that multimodal discourse analysis is an emerging field with broad development space, so it is impossible to get a list for the future development of multimodal discourse analysis. However, he stressed that the future development of multimodal discourse requires three elements: self-reflexivity, cultural diversity and engaging with technology. The statistical and descriptive results of this study on the hot spots and future development trends of multimodal discourse in the past 10 years also partially confirm the predictions of these scholars.

To better understand the dramatic increase in global research related to multimodal discourse analysis, a visualization review of 578 relevant journal articles published between 2009 and 2019 was conducted, indexed in the Web of Science Core Collection. The study can draw a number of conclusions from the results and implications for future research. (1) With 578 papers were published, 60 papers per year on average to explore the issues and challenges they face, the number of the yearly article volume, showed that the research on MDA has been on the increase overall in the past 10 years or so, indicating that this field has gained great attention internationally. The discipline distribution and journal co-citation displayed a diversified feature, showing that emerging topics related to MDA continue to emerge and the discipline field has been expanded. It can be seen that the study of multimodal discourse analysis has gradually become a research hotspot and focus in the academic circle at this stage. (2) Through visualizing the network of keywords co-occurrence, reference co-citation and author co-citation, and calculating the related values of different clusters, the new research themes could be summarized, including the development of visual grammar, gesture, digital technologies, conference presentations, metonymy and metaphor, etc. (3) The research front hotspots mainly focused on multimodality, semiotics, conversation analysis, critical discourse analysis, etc. (4) The article also listed a series of important and highly influential literature, countries, journals and authors on MDA during different periods. It was found that global research related to multimodal discourse analysis has been generated primarily from the USA, the U.K. and Australia, all of which are top developed countries with greater history and experience in MDA research. These facts also prove that the three countries have not only produced most high-yielding research institutions and fruitful authors, but also published most productive journals. In contrast, efforts made by developing countries, except for China, are largely invisible, as shown by the analysis of leading countries. Therefore, researchers from developing countries, especially Asian countries such as India and Saudi Arabia, which hold a large population and take an active role in the background of international cooperation and collaboration, should make greater effort to explore the possibility of researching multimodal discourse analysis in their countries. This will both deepen the understanding of exotic multimodal discourse analysis and complement the existing literature from the perspective of sending countries.

As an approach to the discourse which focuses on how meaning is made through the use of multiple modes of communication as opposed to just language, MDA is getting more important because we get much more time being stuck in-home, receiving explosive information in different modes under the impact caused by COVID-19. So, additional work is needed to trace the change of multimodal discourse and create a possible innovation in this discipline.

Based on this conclusion, the latter scholars should improve the popularity of the research by

linking the research projects with hot topics. At the same time, future research should also pay attention to the emerging trends which are still in the initial stage, and further expand the scope of research in this field.

Conflict of interest

No conflict of interest was reported by the author.

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