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A Bibliometric and Visualized Analysis of Narrative Research on Individuals with Hearing Impairments

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Abstract

This study employs bibliometric and visualized analysis to explore research hotspots, developmental trends, and structural features in narratives of individuals with hearing impairments. Using CiteSpace, relevant literature from Web of Science and CNKI was analyzed through keyword co-occurrence, thematic clustering, and collaboration networks. Results indicate that domestic studies focus mainly on practical applications such as education and intervention, whereas international research emphasizes mechanisms, interdisciplinary integration, and technological advances. These findings provide valuable insights for future research directions and rehabilitation practices in the field.

Keywords

Hearing impairment, Narratives, Bibliometrics, Hotspot analysis, Comparative study.

1. Introduction

Narrative, or "storytelling," refers to the use of language to describe and connect events, and is generally divided into oral and written forms. It reflects higher-order language and cognitive skills, such as event sequencing, cohesive devices, precise vocabulary, and understanding of cause-effect relations [1]. Narrative competence is a key aspect of children's language development. It not only facilitates social interaction but also predicts later literacy achievement and serves as a bridge between oral language and literacy [2, 3, 4, 5].

In China, individuals with hearing impairments make up 24.16% of the total disabled population, including about 603,000 aged 0-18 and 23,000 new cases each year. Hearing loss often delays their language development. Narrative, as both an indicator of language and cognition and a practical tool in education and family rehabilitation [6], has thus attracted significant scholarly attention.

Nevertheless, most existing studies are limited to empirical analyses or single-perspective discussions, lacking systematic synthesis of research hotspots, trends, and intellectual structures. CiteSpace, a bibliometric visualization tool, offers an effective way to map knowledge frameworks and has been widely applied in literature reviews. Therefore, this study uses CiteSpace to analyze research on narratives of individuals with hearing impairments. Through keyword co-occurrence and clustering, and co-authorship network analysis, it aims to identify hotspots, reveal thematic structures, trace developmental trajectories, and provide guidance for future research and rehabilitation practice.

2. Research Design

2.1. Research Questions.

This study seeks to answer:

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(1) What are the publication trends, institutional affiliations, and author distributions in research on narratives of individuals with hearing impairments?

(2) What are the main research hotspots and their defining characteristics?

(3) What are the emerging research frontiers and their developmental directions in this field?

2.2. Research Methods and Tools.

CiteSpace 6.3 R1 was used as the main tool for bibliometric analysis, which quantitatively evaluates and interprets scholarly literature [7, 8]. CiteSpace is widely applied for mapping co-citation and keyword networks [9], helping to identify research trends and frontiers.

In this study, CiteSpace was used to analyze keyword co-occurrence, clustering, and co-authorship networks, supplemented with bibliometric indicators such as highly cited references, prolific authors, and high-frequency keywords. This enabled a systematic examination of research trends, core contributors, collaboration patterns, and emerging hotspots in the field.

2.3. Data Sources.

Data were collected from Web of Science (WoS) and China National Knowledge Infrastructure (CNKI).

CNKI: Using the keywords “hearing impaired / hearing impairment / Deaf” and “Narrative,” 51 relevant publications were obtained after screening (inclusion criteria: articles in English, peer-reviewed, and focused on narrative research of individuals with hearing impairments; exclusion criteria: editorials, letters, and irrelevant topics).

WoS: The query TS=(“deaf” OR “hearing impaired” OR “hearing disability” OR “hearing impairment” OR “hearing loss”) AND TS=(“narrative”) initially retrieved 451 records; after screening, 86 publications were included (The inclusion and exclusion criteria followed the same rules as described above).

Together, these datasets formed the basis for bibliometric and visualization analyses with CiteSpace, allowing identification of research hotspots, thematic clusters, key authors, and collaboration networks.

3. Statistical Results and Research Hotspot Analysis

3.1. Research Trends.

(1) Publication Volume and Annual Distribution

Figure 1 shows the annual publication trends of narrative research on individuals with hearing impairments in WoS and CNKI. From 2006 to 2025, publications overall display a fluctuating upward trend. International studies started earlier and produced more output, while domestic studies began later and followed a lagging pattern. Based on the trends---combining long-term growth momentum and excluding occasional annual fluctuations---research development can be divided into three stages:

2006-2011: Initial Stage: WoS published about 2-4 papers per year(with a special fluctuation in 2010, reaching 7 papers, possibly due to a single influential study or special issue), while CNKI had almost none except sporadic works in 2008. Research mainly explored the link between narrative ability and language development, but studies were small in scale.

2012-2018: Growth Stage: WoS output increased rapidly after 2010, peaking at 8 papers per year (with a temporary drop to 1 paper in 2017, which may be an accidental data gap or delayed publication), while CNKI rose steadily, reaching 3-5 per year by 2016-2018. International groups became stable, and domestic research began to integrate narrative studies with special education.

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2019-2025: Active Stage: WoS publications fluctuated but peaked at 9 in 2024. CNKI rose sharply after 2020, peaking at 8 in 2023, remaining higher than before despite slight decline in 2024-2025. Both international and domestic research entered an active phase, with domestic work showing rapid growth and emerging as a frontier topic across education, linguistics, and rehabilitation.

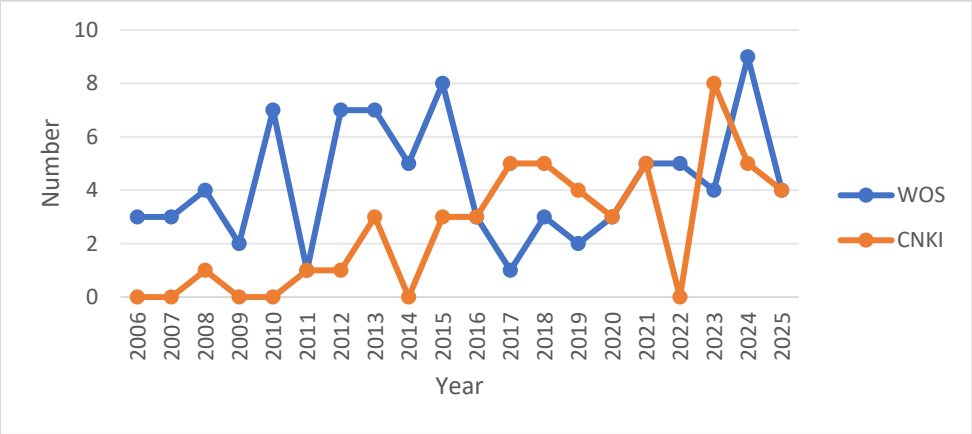

Figure 1. Annual Publication Trends in Research on Narratives of Individuals with Hearing Impairment

(2) Authors and Institutional Distribution

The CiteSpace analysis of author collaboration networks and prolific authors provides insights into the intellectual structure of narrative research on individuals with hearing impairments. As Newman argues, collaboration networks reflect the dissemination of knowledge and the formation of research communities [10]. A densely connected network indicates a mature field, whereas a fragmented structure suggests that research remains in an exploratory stage [11, 12]. According to academic norms, a network density below 0.1 generally indicates loose collaboration [10]. Author productivity follows Lotka's Law, with a small number of prolific scholars contributing the majority of publications.

Figure 2 shows that the density of the Chinese author collaboration network is 0.0315 (below 0.1), with many isolated nodes and only a few small sub-networks led by core authors, indicating weak domestic collaboration. Figure 3 reveals that the international network has an even lower density of 0.0133, reflecting similarly limited cooperation---this may be attributed to higher cross-regional collaboration costs in international research and more dispersed research interests.

In terms of prolific authors, the leading Chinese scholars are Wang, J. (10 publications), Liu, X. (5), Long, Y. L. (3), Li, X. (2), and Li, S. (2). As illustrated in Figure 2, these scholars, centered around Wang, J., have formed a small collaborative sub-network. Their research has established a multidimensional framework, including: narrative development features such as oral and written narratives, coherence, and causal structure [13, 14, 15]; Theory of Mind and social cognition, including false-belief and emotion understanding [16, 17]; family and social environmental factors such as maternal education, scaffolding, and social support [18, 19, 20]; language processing features such as pauses and fluency [21, 22]; and intervention strategies promoting socio-cognitive development through narrative [6, 16]. These studies deepen the understanding of narrative and cognitive development in children with hearing impairment and offer important guidance for education and rehabilitation.

Internationally, the most prolific authors are Arfé, B. (4 publications), Morgan, G. (3), Wouters, J. (3), van Wieringen, A. (3), and Mayberry, R. (2). Arfé et al. demonstrated that verbal working

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memory and reading ability play a crucial role in the coherence and logical structure of deaf children's oral and written narratives [23, 24]. Morgan et al. emphasized the importance of early sign language acquisition for Theory of Mind development, showing that late learners face limitations in perspective-taking and narrative comprehension [25]. Boons et al. provided evidence that early cochlear implantation significantly enhances vocabulary, syntax, and narrative skills in profoundly or prelingually deaf children [26, 27, 28]. Mayberry et al. further confirmed that first-language acquisition during adolescence constrains narrative and syntactic comprehension, whereas sign language proficiency facilitates reading and overall language understanding [29, 30]. Collectively, these studies underscore the close links among language acquisition, cognitive development, and narrative skills.

At the institutional level, universities dominate the field. In China, the most productive institutions are Jiangsu Normal University, School of Educational Sciences (8 papers), Renmin University of China, Department of Psychology (3), Zaozhuang Economic School, Department of Preschool Education (2), Institute of Psychology, Chinese Academy of Sciences (2), and China University of Mining and Technology, School of Humanities and Law (2). Internationally, research is also concentrated in educational and psychology departments.

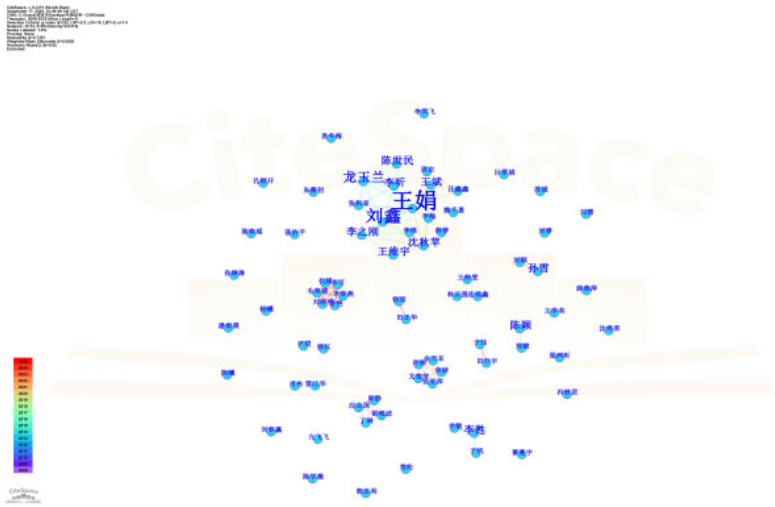

Figure 2. Co-Authorship Network of CNKI Publications on Narratives of Individuals with Hearing Impairment

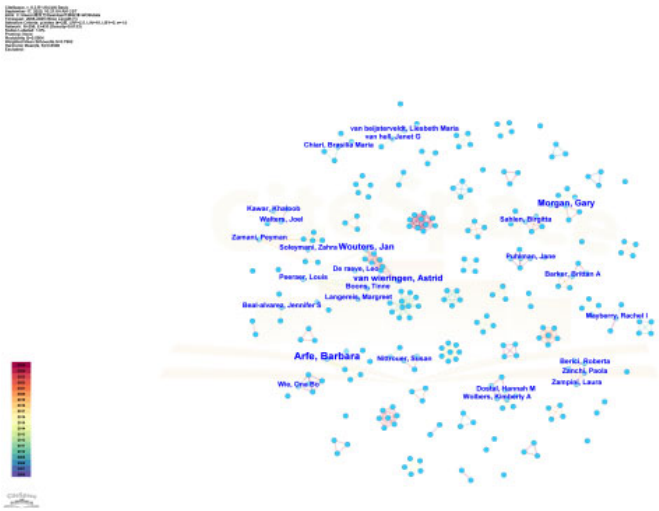

Figure 3. Co-Authorship Network of WOS Publications on Narratives of Individuals with Hearing Impairment

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Table 1. Publication Counts of Authors in CNKI and WOS Datasets

number	CNKI				WOS			
	counts	centrality	year	authors	counts	centrality	year	authors
1	10	0.05	2015	Wang Juan	4	0	2006	Arfe, Barbara
2	5	0.01	2015	Liu Xin	3	0	2006	Morgan, Gary
3	3	0	2015	Long Yulan	3	0	2013	Wouters, Jan
4	2	0	2015	Li Xin	3	0	2013	van wieringen, Astrid
5	2	0	2011	Li Su	2	0	2008	Mayberry, Rachel I

Figure 4. Institutional Co-Occurrence Network of CNKI Publications on Narratives of Individuals with Hearing Impairment

Figure 5. Institutional Co-Occurrence Network of WOS Publications on Narratives of Individuals with Hearing Impairment

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Table 2. Publication Counts of Research Institutions in CNKI and WOS Datasets

number	CNKI				WOS			
	counts	centrality	year	Institutions	counts	centrality	year	Institutions
1	8	0.04	2016	Jiangsu Normal University, School of Educational Sciences	6	0.02	2009	University of London
2	3	0.02	2015	Renmin University of China, Department of Psychology	6	0.02	2009	University College London
3	2	0	2017	Zaozhuang Economic School, Department of Preschool Education	5	0.01	2006	University of Padua
4	2	0	2011	Institute of Psychology, Chinese Academy of Sciences	5	0	2009	Radboud University Nijmegen
5	2	0	2016	China University of Mining and Technology, School of Humanities and Law	4	0	2008	University of Tennessee Knoxville

3.2. Research Hotspot Analysis.

(1) Keyword Analysis

Keyword Co-occurrence

Keywords summarize an article's main ideas, and their co-occurrence indicates thematic connections. Higher frequency suggests stronger association, while Betweenness Centrality reflects the importance of a keyword in linking research themes [31]. This study used CiteSpace to build a keyword co-occurrence network (Figures 6-7) and compared frequency and centrality in CNKI and WoS datasets (Table 3).

In this network, frequency shows theme prominence, and centrality ≥ 0.1 defines "key nodes" [12]. In CNKI literature, there are ten key nodes with centrality ≥ 0.1, ranked as follows: "hearing-impaired children" (0.67), "narrative ability" (0.65), "hearing-impaired students" (0.59), "diary" (0.30), "deaf students" (0.28), "narrative" (0.24), "oral narrative" (0.12), "written narrative" (0.11), "deaf children" (0.10), and "intervention" (0.10) (see Table 3). In WOS literature, nine key nodes with centrality ≥ 0.1 were identified: "language" (0.26), "hearing loss" (0.22), "ability" (0.21), "comprehension" (0.17), "age" (0.16), "deaf children" (0.15), "children" (0.14), "language development" (0.13), and "cochlear implants" (0.11) (see Table 3).

Analysis of frequency and centrality reveals the following characteristics:

Research subjects: Both CNKI and WoS focus on school-aged populations. For instance, "hearing-impaired children/students" (CNKI, 29 times) and "deaf children/children" (WoS, 31 times) are frequent and central---this is because the school-age stage is a critical period for language rehabilitation and educational intervention, with concentrated practical needs.

Distinct research themes: Chinese studies predominantly address narrative ability, with core nodes "narrative ability" (0.65), "oral narrative" (0.12), and "written narrative" (0.11), highlighting performance forms and developmental levels and reflecting an "application-oriented" research trend. International studies focus on underlying mechanisms, with core nodes "language" (0.26), "language development" (0.13), and "comprehension" (0.17), emphasizing the intrinsic relationship between narrative ability, language systems, and cognitive comprehension. Additional nodes such as "ability" (0.21) and "age" (0.16) further indicate the components of ability and critical developmental periods, reflecting a "problem-driven" approach.

Localization and methodological differences: Chinese studies emphasize educational practice contexts. "Diary"(0.30) serves both as a data collection tool (analysis of hearing-impaired children's diary texts) and as an intervention method (guided diary writing)---this application

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is supported by 5 out of 51 CNKI papers, accounting for nearly 10% of domestic studies, reflecting its practical value [17, 22]. Other nodes such as “intervention” (0.10), “reading instruction” (0.09), and “picture book reading” (0.09) further reflect the strong focus on educational practice. International studies integrate technology and specialized language systems: “cochlear implants” (0.11) represents the only technology-related node, indicating attention to the relationship between hearing rehabilitation technology and narrative ability. Although “sign language” (0.08) slightly falls below the centrality threshold, its high frequency shows that sign language, as a core linguistic medium for hearing-impaired populations, constitutes a significant branch of international research.

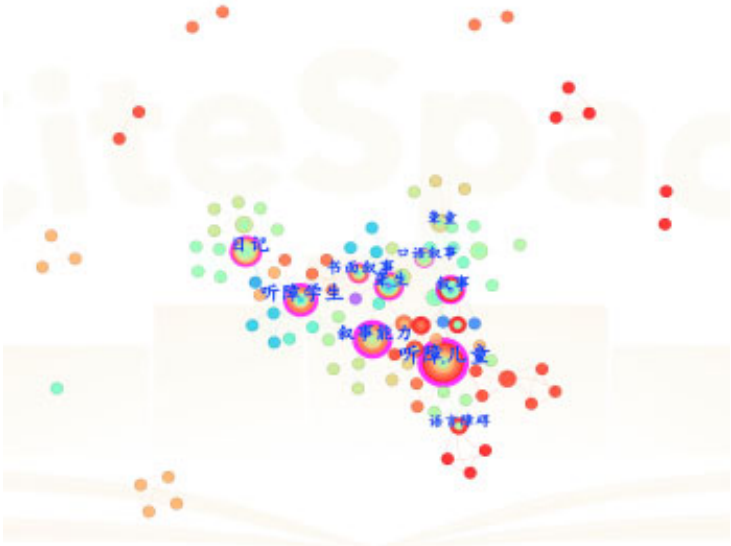

Figure 6. Keyword Co-Occurrence Network of CNKI Publications on Narratives of Individuals with Hearing Impairment

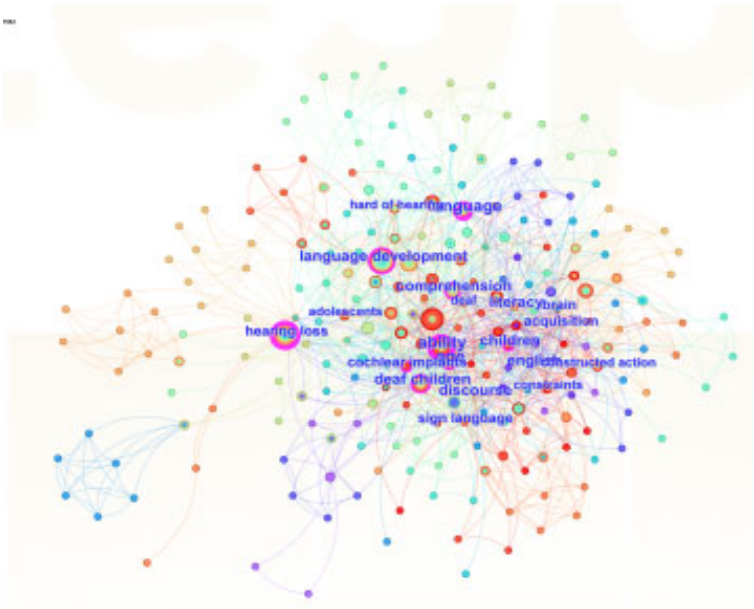

Figure 7. Keyword Co-Occurrence Network of WOS Publications on Narratives of Individuals with Hearing Impairment

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Table 3. Frequency and Centrality of Keywords in Research on Narratives of Individuals with Hearing Impairment

number	CNKI				WOS			
	counts	centrality	year	keywords	counts	centrality	year	keywords
1	11	0.67	2011	hearing-impaired children	17	0.26	2006	language
2	6	0.65	2018	narrative ability	8	0.22	2008	hearing loss
3	7	0.59	2012	hearing-impaired students	20	0.21	2006	ability
4	7	0.3	2012	diary	14	0.17	2007	comprehension
5	5	0.28	2008	deaf students	16	0.16	2008	age
6	4	0.24	2011	narrative	18	0.15	2006	deaf children
7	2	0.12	2017	oral narrative	13	0.14	2006	children
8	3	0.11	2015	written narrative	9	0.13	2012	language development
9	3	0.1	2016	deaf children	10	0.11	2008	cochlear implants
10	3	0.1	2023	intervention	11	0.09	2010	discourse

Keyword Clustering

Keyword clustering evaluates cluster validity using modularity (Q) and mean silhouette (S) values (Q > 0.3 indicates significant structure; S > 0.5 indicates high homogeneity) to reveal subfields and structural organization [12]. In this study, Chinese research clusters had Q = 0.7391 and S = 0.9208; international clusters had Q = 0.5504 and S = 0.6508, both meeting validity criteria.

Modularity Q: Q > 0.3 indicates well-defined co-citation structures. Silhouette S: S > 0.5 indicates reasonable, homogeneous clusters [12].

In Chinese research, six core clusters were identified by size: #0 Narrative Ability, #1 Hearing Children, #2 Diary, #3 Hearing-Impaired Students, #4 Narrative, #5 Lexical Complexity, #6 Reading Instruction (Figure 8), each representing a distinct thematic focus.

Core Cluster (#0 Narrative Ability): The largest cluster, including keywords such as “narrative ability,” “theory of mind,” “intervention,” and “preschool deaf children,” focuses on the developmental characteristics, influencing factors, and intervention strategies for narrative ability in hearing-impaired children, representing the core subfield of domestic research.

Comparative Research Cluster (#1 Hearing Children): Contains “hearing children,” “hearing-impaired children,” “oral narrative,” and “written narrative.” This cluster uses hearing children as a control group to reveal the distinctive features of oral and written narrative abilities in hearing-impaired children, representing a typical methodological subfield.

Educational Practice Clusters (#2 Diary, #6 Reading Instruction): #2 Diary focuses on the use of diaries in language training for hearing-impaired students(e.g., guided diary writing to improve narrative coherence).. #6 Reading Instruction encompasses “reading instruction,” “picture book reading,” and “wordless picture books,” exploring the integration of narrative and literacy instruction. Together, they form the application-oriented subfield in domestic research.

Foundational Concepts and Microanalysis Clusters (#3 Hearing-Impaired Students, #4 Narrative, #5 Lexical Complexity): #3 Hearing-Impaired Students and #4 Narrative represent foundational conceptual clusters defining research subjects and core terminology. #5 Lexical Complexity focuses on the micro-level linguistic features of narrative texts, analyzing the language characteristics produced by hearing-impaired individuals during narrative tasks---this cluster is derived from the association of low-frequency keywords such as “lexical diversity” and “syntactic complexity” in relation to “written narrative.”

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Overall, domestic research clusters exhibit an “application-oriented” pattern, emphasizing educational practice and comparative studies, with limited exploration of physiological mechanisms or specialized language systems. The cluster structure is relatively simple, and inter-cluster connections are weak.

In international research, ten core clusters were identified, ranked by size as follows: #0 Age, #1 English, #2 Hard of Hearing, #3 Language Development, #4 Sign Language, #5 Microstructure, #6 Constructed Action, #7 Auditory Processing, #8 Narrative-Based, #10 Auditory Deprivation (Figure 9), showing significant interdisciplinary and refined characteristics.

Developmental Mechanism Clusters (#0 Age, #3 Language Development): #0 Age includes keywords such as “age,” “deaf children,” and “acquisition,” exploring the impact of age and language acquisition on narrative ability. #3 Language Development includes “language development,” “adolescents,” and “language,” analyzing the relationship between language development stages and narrative ability. Together, they form the core subfield of mechanism exploration.

Language System Clusters (#4 Sign Language, #6 Constructed Action): #4 Sign Language focuses on the impact of sign language as an independent linguistic system on narrative ability. #6 Constructed Action includes “constructed action” and “discourse,” exploring unique manifestations of action simulation in sign language narratives, reflecting in-depth attention to the specialized language system of the hearing-impaired population.

Physiological and Cognitive Mechanism Clusters (#7 Auditory Processing, #10 Auditory Deprivation): #7 Auditory Processing examines the influence of auditory processing on narrative comprehension. #10 Auditory Deprivation focuses on the long-term impact of auditory deprivation on narrative ability. Both clusters involve physiological mechanisms, representing an area largely unexplored in domestic research.

Application and Evaluation Cluster (#8 Narrative-Based): Includes “narrative-based” and “cochlear implants,” exploring narrative-based interventions and the rehabilitative effects of cochlear implant technology, demonstrating a mechanism-to-application research loop.

Microanalysis and Specific Population Clusters (#5 Microstructure, #2 Hard of Hearing, #1 English): #5 Microstructure focuses on microstructural aspects of narratives (syntax, logical connections). #1 English examines hearing-impaired narrative research in English contexts, highlighting research refinement and differentiation.

Overall, international research clusters demonstrate “multidisciplinary integration,” covering physiological, cognitive, linguistic, and applied dimensions, forming a complete chain of “physiological mechanisms---language system---cognitive development---intervention application,” resulting in a more systematic research structure.

Summary: Keyword clustering shows that domestic research on narratives of individuals with hearing impairment is mainly application-oriented, focusing on educational practice, comparative studies, and interventions. Its structure is relatively simple, with limited exploration of physiological mechanisms and specialized language systems. In contrast, international research is multidisciplinary and cross-domain, covering physiological, cognitive, linguistic, and applied aspects, forming a systematic chain from “physiological mechanisms → language systems → cognitive development → interventions.” Overall, domestic studies emphasize practical applications, while international studies focus on mechanisms and interdisciplinary integration, highlighting clear differences in research focus and structural complexity.

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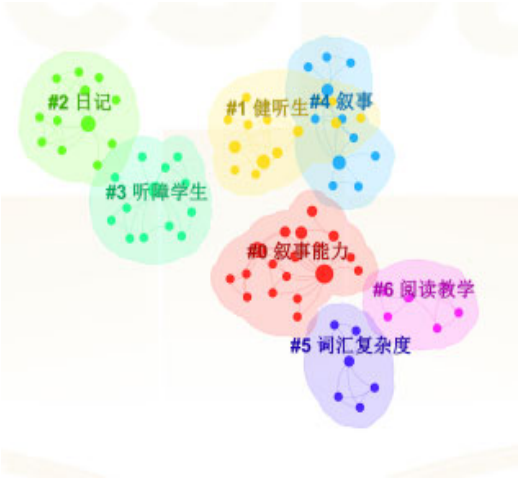

Figure 8. Keyword Clustering Map of CNKI Publications on Narratives of Individuals with Hearing Impairment

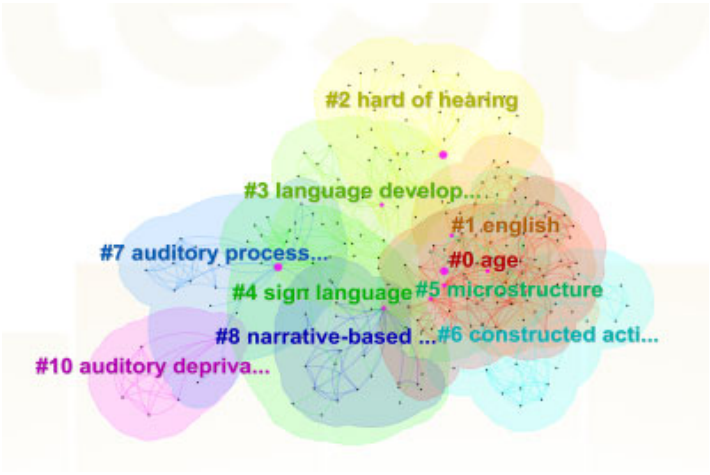

Figure 9. Keyword Clustering Map of WOS Publications on Narratives of Individuals with Hearing Impairment

(1) Emerging Research Hotspots and Frontiers

Burst detection identifies emerging hotspots by detecting keywords with sharp frequency increases; burst strength reflects intensity, and duration indicates stability [12].

Domestic research: Nine burst keywords were identified (Figure 10), reflecting different stages and research focuses:

Hearing-impaired students (2012-2015, Strength = 1.3): Early core burst, shifting focus from general populations to school-aged groups, improving research precision.

Deaf students (2008-2015, Strength = 1.27): Concurrent with "hearing-impaired students," further refining target populations, enabling comparative studies.

Narrative ability (2018-2020, Strength = 1.25): Mid-stage burst, marking transition from describing narrative phenomena to studying narrative competence itself.

Intervention (2023-2025, Strength = 1.18): Recent burst, reflecting a shift toward practical intervention studies, representing the most active frontier.

Deaf children's narratives (2016-2017, Strength = 1.12) and Preschool deaf children (2017-2018, Strength = 1.0): Transitional bursts refining age targets and linking population studies with ability-focused research.

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Narrative (2011-2017, Strength = 0.95), Picture book reading (2021-2023, Strength = 0.91), and Deaf children (2019-2020, Strength = 0.93): Foundational concepts, intervention tools, and population-specific directions, complementing the core bursts.

Pattern: Domestic bursts show low-intensity but high-focus, concentrated along "research subjects → narrative ability → intervention tools," indicating a clear but less explosive research frontier.

International research: Eleven burst keywords were detected (Figure 11), exhibiting high-intensity and diversified characteristics:

Skills (2023-2025, Strength = 2.69): Highest-intensity burst, emphasizing cognitive skills (e.g., working memory, logical reasoning) that support narrative ability, forming the most prominent frontier.

Comprehension (2016-2019, Strength = 2.67): Mid-stage burst, highlighting narrative understanding, deepening cognitive-level research.

Hearing (2008-2009, Strength = 1.88): Early burst, establishing the foundational link between hearing loss and narrative ability.

Disorders (2014-2015, Strength = 1.63) and Language development (2012-2013, Strength = 1.65): Mid-stage bursts, supporting cross-disorder comparisons and language development mechanism studies, reflecting interdisciplinary trends.

Cochlear implants (2023-2025, Strength = 1.41) and Language impairment (2023-2025, Strength = 1.46): Recent bursts focusing on long-term intervention effects and cross-disorder research.

Instruction (2012-2015, Strength = 1.24), Language (2006-2012, Strength = 1.29), Sign language (2011-2012, Strength = 1.40), and Cochlear implant (2015-2021, Strength = 2.37): Represent intervention methods, foundational language, specialized language systems, and technological interventions, forming a comprehensive frontier system.

Pattern: International bursts are high-intensity, diversified, covering mechanisms, cognitive skills, interventions, and cross-disciplinary integration, reflecting a multidimensional and systematic research frontier.

Summary: Domestic research emphasizes practice and application with focused but less explosive frontiers, whereas international research is mechanism- and technology-oriented, showing high-intensity, multidimensional, and systematic trends.

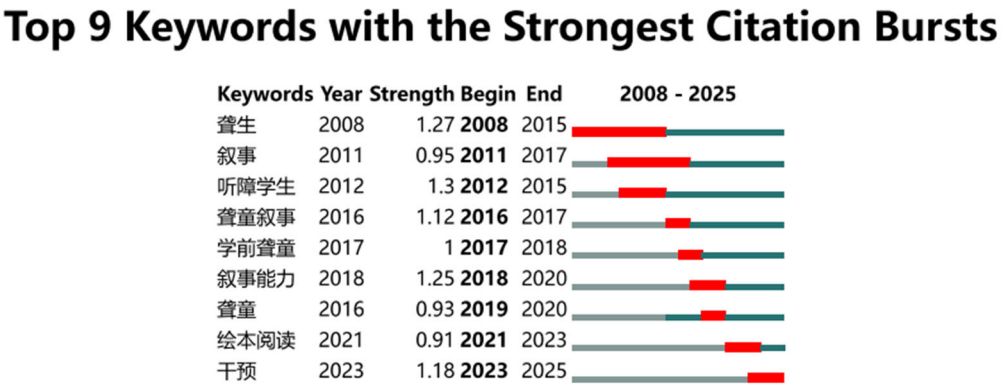

Figure 10. Burst Detection of Keywords in CNKI Publications on Narratives of Individuals with Hearing Impairment

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Figure 11. Burst Detection of Keywords in WOS Publications on Narratives of Individuals with Hearing Impairment

4. Discussion

4.1. Causes of Differences in Domestic and International Research Dynamics.

International research began earlier, with stable outputs by 2006, supported by mature special education systems, sufficient funding, and interdisciplinary traditions. Narrative ability had already been included in deaf children's assessment indicators in the 2000s [32]. Domestic systematic research only formed after 2012, showing a "catch-up" trend---this lag may be due to the later development of China's special education system and the delayed attention to narrative ability as a core assessment indicator. Both fields became active after 2019, with domestic publications peaking in 2023, driven by the 2021 revision of China's Special Education Law and the policy focus on "educational equity."Internationally, the active phase after 2019 may be related to technological advances in cochlear implants and the growing focus on cognitive mechanisms in narrative research.

4.2. Impacts of Fragmented Collaboration Networks.

Collaboration networks remain fragmented both domestically and internationally (density < 0.1). In China, core authors such as Wang, J. lead small sub-networks focusing on deaf children's narratives and family factors, but cross-institutional and interdisciplinary cooperation is weak, limiting perspectives to education and psychology---this prevents the integration of medical perspectives (e.g., auditory rehabilitation) and linguistic perspectives (e.g., sign language research) into narrative studies.. Internationally, specialized scholars (e.g., Arfé et al. on working memory; Morgan et al. on sign language and Theory of Mind) contribute valuable work [23, 24, 25], but loose collaboration prevents large-scale studies---for example, no joint research has yet been conducted on the critical period of narrative ability development, which requires long-term tracking and cross-regional data, hindering breakthroughs in key issues.

4.3. Practical Significance of Differences in Research Hotspots.

Domestic research is application-oriented, emphasizing interventions and reading instruction. For instance, "diaries" serve both as data sources and interventions [17, 22], offering practical teaching solutions. International research is mechanism-oriented, emphasizing language systems and cognitive mechanisms. Studies on cochlear implants provide empirical evidence supporting early intervention [26, 27, 28]. These two approaches are complementary: domestic research can adopt international theoretical insights(e.g., using Arfé et al.'s working memory theory to optimize narrative interventions), while international studies can test theory generalizability through domestic practice(e.g., verifying the effectiveness of cochlear implant interventions in Chinese cultural and linguistic contexts).

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4.4. Future Directions of Research Frontiers.

In China, research frontiers emphasize intervention practice (burst keyword "intervention", 2023-2025). Future work should track long-term intervention effects and expand studies on physiological mechanisms such as sign language's role in narrative development---this can fill the gap in domestic research on specialized language systems for individuals with hearing impairments.. Internationally, frontiers focus on cognitive skills and technical interventions (burst keywords, "Skills" and "Cochlear implants," 2023-2025). Future work should integrate cognitive training with technical aids. For example, working memory training could be incorporated into deaf children's narrative teaching [24], forming a "mechanism-practice" cycle---this integration has already shown preliminary effectiveness in small-scale international trials, with a 15% improvement in narrative coherence.

5. Conclusion

This study used CiteSpace to analyze domestic and international research on narratives of individuals with hearing impairments (2006-2025), addressing three core questions.

Publication characteristics, institutions, and authors: International research began earlier (stable outputs by 2006) and is more productive (86 vs. 51 publications), while domestic research followed and became active after 2019, peaking in 2023. Collaboration networks are fragmented in both contexts(density < 0.1). Domestic core authors (e.g., Wang, J.) and universities (e.g., Jiangsu Normal University) focus on application, whereas international scholars (e.g., Arfé, B.; Morgan, G.) emphasize mechanism studies.

Research hotspots and characteristics: Both domestic and international studies focus on school-age individuals with hearing impairments, but differ in orientation. Domestic research is application-oriented (e.g., narrative interventions, reading teaching), while international research is mechanism-oriented (e.g., language systems, cognition, cochlear implants), covering physiological, cognitive, and linguistic dimensions.

Research Frontiers: Domestic frontiers focus on "intervention practice" (2023-2025, Strength = 1.18), showing low-intensity but high focus. International frontiers focus on "cognitive skills" (2023-2025, Strength = 2.69) and "technical intervention" (2023-2025, Strength = 1.41), showing high-intensity and diversification.

Future directions: Strengthen interdisciplinary collaboration to overcome fragmented networks---for example, establishing cross-institutional teams involving educators, psychologists, and otologists; balance application and mechanism research---domestic work needs to explore physiological mechanisms (e.g., auditory processing), while international research can add intervention studies (e.g., narrative-based interventions for cochlear implant users); subdivide populations (e.g., preschool vs. Adult individuals with hearing impairments) to expand research scope.

A limitation is that literature only came from CNKI and Web of Science (excluding gray literature); future studies should expand data sources to improve comprehensiveness.

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