

Visual Analysis of Research Hotspots and Frontiers on Left-Behind Children in China Using CiteSpace (2010-2022)

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Abstract

Left-behind children (LBC) have become a pressing social issue in China, as these children face unique psychological and developmental challenges due to parental absence. Given the rise in attention to LBC over the past decade, it is essential to evaluate trends and emerging themes in this research domain. This study retrieves 634 papers on left-behind children (LBC) from the Chinese Social Sciences Citation Index (CSSCI) between January 1, 2010, and December 30, 2022. Utilizing CiteSpace 6.1.R6 software, it visualizes and analyzes authors, institutions, and keywords. Findings reveal a significant increase in LBC research in China over the past decade, followed by a recent decline in the last two years. Leading contributors include Zhao Jingxin, Liu Xia, Fang Xiaoyi, and Ye Jingzhong, affiliated with prominent Chinese universities. Key research areas encompass rural LBC, mental health, loneliness, psychological resilience, education, and parent-child relationships, transitioning from problem identification to problem-solving. Previous research focused on rural and migrant LBC, emphasizing mental health, education, loneliness, and academic performance. Proposed countermeasures encompass family support, psychological resilience, and parent-child attachment. Future research frontiers involve peer attachment, teacher support, and psychological capital for LBC in China.

Keywords: Left-Behind Children, Citespace, Research Frontiers, Research Hotspots, China

Introduction

The 1980s saw China's economic reform and the gradual birth of its migrant community. Migrant workers go to the cities to work, a phenomenon caused by the large-scale transfer of China's surplus rural labor to the cities. They are the backbone of China's economic and social development and have significantly contributed to its cities' prosperity and rapid growth. China has a unique dualistic social structure between its rural and urban regions, and its home registration system is entwined with it. As such, living standards such as housing, education, employment, and medical care have become a challenge for migrants, having to leave their children in their rural homes. They become away from their children over long periods; their

children are eventually identified as left-behind children (LBC) - a social term that reflects their low socioeconomic situation (Ye et al., 2006). LBC are under 18 and have at least one (1) parent working away from home; they are never usually with their parents for more than six months (Zhao & Shen, 2011). China's sixth (6th) census revealed 61.025 million LBC by 2010, which accounts for 21.9% of the children in the country (She & Luo, 2009). Scholars point out that in provinces and cities where labor export is highly concentrated, the amount of LBC to the overall local children reaches about 20%.

In contrast, the number of LBC in six (6) provinces exceeds more than half of the LBC nationwide (Duan & Zhou, 2005). Therefore, studying this phenomenon that emerged just as China went into economic reform is significant. What has been the research on LBC? What are the research hotspots? What do their trends show? Which institutions and scholars made far-reaching contributions to the subject? What have been the collaborative relationships among these scholars? What are the research frontiers? What are the gaps and shortcomings? This study provides the answers.

This study employs CiteSpace, an advanced global information visualization software, to conduct quantitative visual analysis and information mining on literature related to LBC and evaluate the subject's development, trajectory, and characteristics. This study assists scholars of various disciplines in comprehending this subject's fundamentals, structure, dynamics, and trend development for subsequent research. It clarifies the relevant factors affecting LBC's psychological and behavioral development. It guides intervention measures to develop LBC with healthy personalities and positive qualities (Zhou & Qi, 2006).

China has an abundance of abandoned children. Owing to the limitations of their upbringing, they exhibit distinct unfavourable traits in their physical and mental development, which contribute to their troublesome behaviour. Studies have shown, for instance, that absentee parents considerably raise the depressive symptoms of their children left behind (Liang et al., 2017). They have considerably higher rates of smoking, alcohol misuse, and truancy than rural children whose parents do not work away from home (Yu et al., 2023; Zhang et al., 2022). The increase in problematic behaviour leads to an increase in the dropout rate of these youngsters; the disruption in their school education and the difficult social milieu in which they live leads to an increase in criminal behaviour among them (Wu et al., 2019). It is vital to conduct a thorough and comprehensive examination of these abandoned youngsters.

Previous research on children left behind has been extensive. First, research on their circumstances has included comparisons between those left behind and others. Children who are left behind are more prone to experience psychological and acculturation issues. They have also been investigated from the standpoint of mental health, including the behavioural, affective, personality, interpersonal, and learning dimensions. Several studies have demonstrated that the mental health of rural children left behind is often substandard (Wu et al., 2019). In addition, rural left-behind students are more likely to experience school alienation, leading to negative emotions such as helplessness and loneliness and triggering linked mental health issues (Sun et al., 2015). Second, these problems' root causes have been investigated. The level of mental health of rural LBC varies greatly by age, gender, type of housing, family economic circumstances, parents' educational background, and length of time away from home (Zhang et al., 2021). Social environment and support, family status, and

individual qualities can also have an impact on a person's growth. Among the topics examined are the feelings of isolation felt by youngsters left behind (Ding et al., 2019) and their difficulties with social adaption (Zhang et al., 2018).

Nevertheless, much research on LBC is still needed. There have been articles on trends and hotspots development of LBC (Wang et al., 2016), but they stopped in 2016. Therefore, this study provides an integrative review through knowledge mapping analysis to sketch a holistic and systematic picture of the subject. This study adopts a quantitative approach to illustrate the research landscape of China's LBC comprehensively.

Materials and Methods

Research Tools

CiteSpace is an application that visualizes and analyzes recent changes in academic literature, freely available at <https://citespace.podia.com/>. It was developed in 2004 by Chaomei Chen, a well-known Chinese American expert in information visualization and a tenured professor at Drexel University, Philadelphia, USA. It has since been improved and innovated in theory and visualization properties and is now quite mature and stable (Chen, 2006). Institutional and author collaboration, keyword co-occurrence, literature and journal co-citation, and author co-citation relationships can be presented in intuitive images of the knowledge graph. This software uses a time segmentation strategy to divide the entire time interval into uniform time slices, forms a co-occurrence network within each time slice according to the co-occurrence relationship, and then merges these small networks in chronological order to create an extensive progressive visual network (Chen, 2004). It subsequently shows the knowledge map and the entire picture of the subject's development; users can zoom in locally and explore the network in depth.

Data Source

This study uses "LBC", "left-behind students", and "left-behind adolescents" as search terms in the Chinese Social Sciences Citation Index (or CSSCI). It then analyzes the keyword categories of issuing institutions, author clustering, time series graphs, and emergence.

Research Framework

This study uses the CSSCI for study selection and bibliometric software, CiteSpace 6.1.R6, for scientific knowledge mapping and analysis of the 634 CSSCI-selected publications. CiteSpace analyzes the sample publications, authors, institutions, and keywords to illustrate the visualization mapping. It then summarizes and outlines the subject's current research status and hotspots and analyzes its research frontiers and trends (see Figure 1).

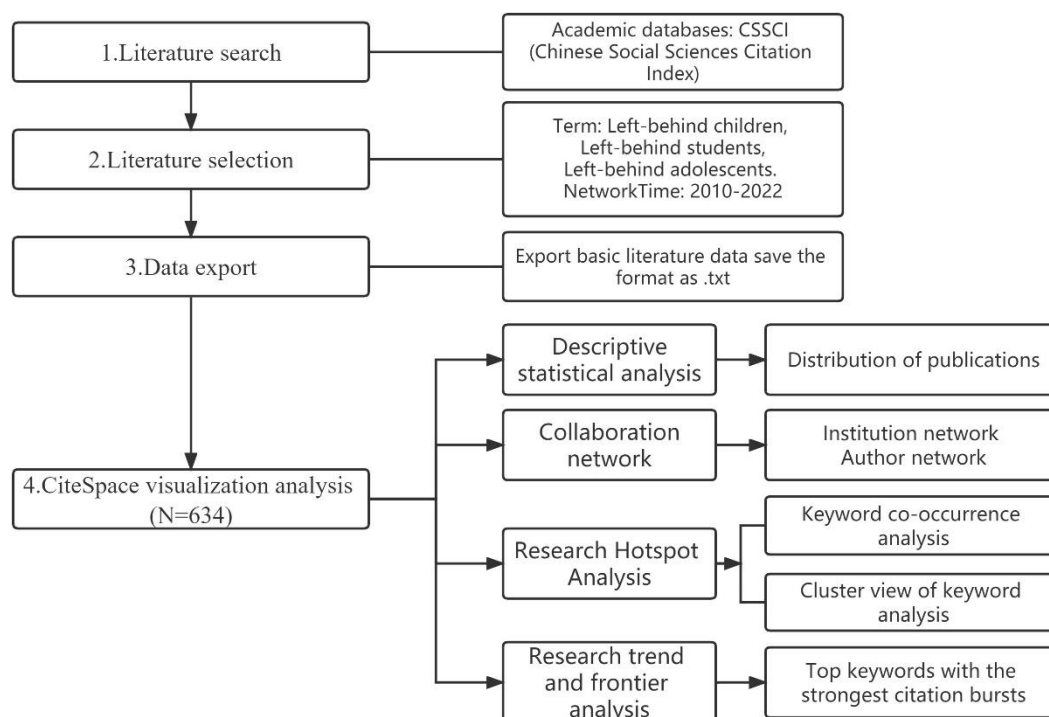


Figure 1. The research framework

Results

This section summarizes and synthesizes the studies on China's LBC by conducting a profile and citation analysis of the gathered literature and a occurrence analysis of all the keywords. A publication profile, including frequency statistics on the number of publications, key journals, principal researchers, and critical institutions, helps to assess the subject's current research. A co-citation analysis of the authors, sources, and studies frequently cited in the sample publications helps to uncover the subject's knowledge base. A co-citation and cluster analysis of the keywords constitute its research hotspots. Last, an extracted keyword mutation analysis of the sample publications summarizes the scientific research trends on LBC in China.

Research Publications

This study accounts for the 634 papers retrieved from the CSSCI between 2010 and 2022. The number of research publications on LBC in China shows an increase for the first ten (10) years and a subsequent decrease in the following years. Figure 2 indicates that the number of research publications fluctuated between 2010 and 2018, peaking in 2018, decreasing between 2019 and 2022, and abating in 2022. The point of time and scale coincides with the children's circumstances. Based on the growth curve, two (2) stages can be identified:

- (1) The booming phase (2010-2018). Figure 2 illustrates the doubling of numbers from 34 publications in 2010 to a peak of 66 in 2018. A rapid rise is observed between 2015 and 2018. The average number of papers published per year is 48, with an annual growth rate of 8.64%.
- (2) The declining and stabilizing phase (2019-2022). In this phase, the number of studies published showed a gradual decrease from 47 to 29, with an annual growth rate of -14.87% before abating in the final two (2) years.

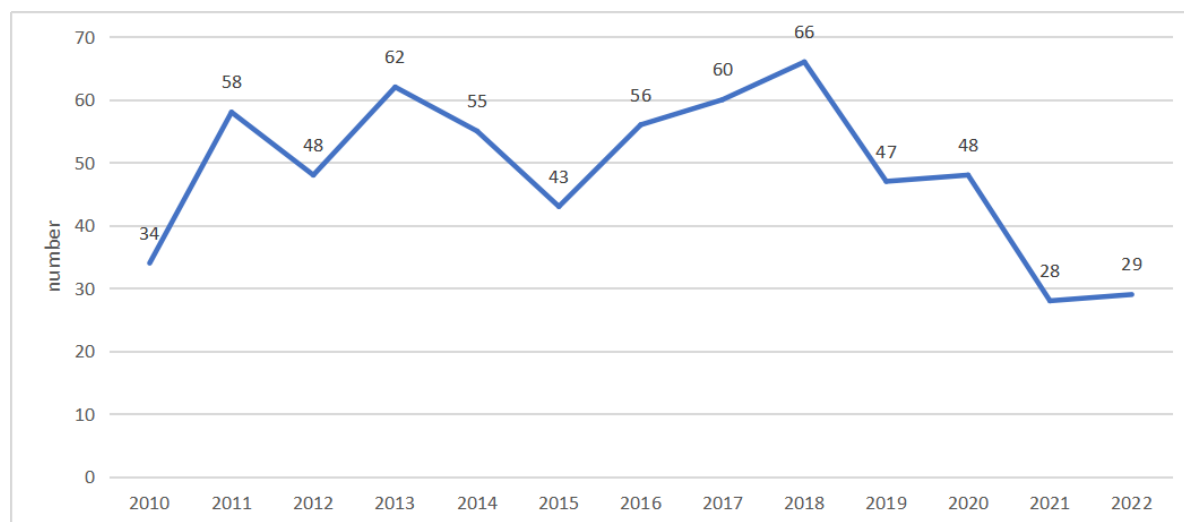


Figure 2. Publications on China's LBC (2010-2022)

Collaboration Network

The prominent issue of China's LBC is garnering diverse consideration from academics and institutions. An investigation becomes necessary when knowledge affiliation has been developed on the subject. This study employs CiteSpace to perform a authorship analysis and create an author collaboration graph and an institutional collaboration network graph. It is to study the collaborative relations of authors and to determine the subject's primary researchers.

Researchers

This study utilizes CiteSpace to analyze the scholar research relationships, obtaining a co-linear knowledge map of scholars (see Figure 3). An author collaboration graph investigates the collaborations among authors and identifies the principal authors. This study also applies CiteSpace for co-authorship analysis; the nodes in the graph indicate the authors, and the node size shows the number of authors' publications, with larger nodes indicating more publications. The lines connecting the nodes indicate collaboration among authors (Chen, 2014). The results are shown in Figure 3, consisting of 349 authors and 173 collaborative relations. The network density of the graph is 0.0028; the more connected nodes in a network, the higher the network density. In network science, the mutual rows of connections, the frequency of connections between nodes, and the relative frequency of connections between circle members relative to non-members are all relevant to the measurement of network density. The network density of 0.0028 indicates that only 0.28% of the potential relationships in the network of studies on LBC have been realized. It also reveals that solid collaborations among authors on this subject have yet to be formed; instead, they seem more fragmented. However, Figure 3 indicates that it is possible to identify the actual collaborations; four (4) groups are among them.

The first group includes Fan Xinghua, Chen Fengju, and Fang Xiaoyi as the primary authors (with more than four publications), with Yu Si, Yu Mengjiao, He Miao, Lu Xuan, Zhou Yan, and Liu Shuangjin as secondary members. Their research interests include studying adjustment problems of LBC, such as problematic behaviors, emotional issues, and other concerns brought about by their disadvantageous circumstances (Fan & Fang, 2010; Fan et al., 2018). The second group comprises Zhao Xue-Mei, Zhao Ke-Yun, Huang Xue-Jiao, and Yang Xin,

Table 1
Core Researchers of Left-Behind Children in China

Frequency	Year	Name	Centrality Strength	Begin year to end the year
11	2011	Fan Xinghua		
9	2010	Zhao Jingxin		
7	2012	Zhang Xuelang	2.03	2012-2016
6	2010	Liu Xia		
6	2011	Lulia Lu		
6	2013	Deng Qian	2.74	2013-2015
5	2011	Yang Jing	2.62	2011-2012
5	2011	Wu Ni		
5	2016	Fengju Chen	2.16	2016-2018
5	2018	Zhao Keyun		
4	2010	Fang Xiaoyi		
4	2010	Ye Jingzhong		
4	2013	Deng Chunkao		
4	2013	Lv Lidan	2.14	2013-2014
4	2014	Zhang Jinfu	2.19	2014-2015
4	2014	Zhu Cuiying	2.19	2014-2015
4	2018	Jiang Yingjie		
4	2018	Zhao Xuemei		

Institutions

This study used CiteSpace to construct a network graph of institutions in order to investigate collaborative linkages and identify prominent institutions. The parameters are identical to those for researchers, with the exception of the node type, which is changed from "author" to "institution." Figure 2 depicts the resulting network of 315 institutions (nodes) and 137 partnerships (line connections). The nodes in Figure 4 represent institutions, whereas the lines linking the nodes depict the approved links between the institutions. Nodes with a high

frequency (number of publications) are selected as significant nodes that have a considerable impact on the development of scientific research on the subject. A thicker line between the nodes implies a closer connection. The network graph has a density of 0.0028, indicating that just 0.2% of the potential linkages in the network of studies on LBC are actualized. It also demonstrates a lack of collaboration between organisations. However, Figure 3 illustrates an essential collaborative interaction. Connecting Shandong Normal University's Faculty of Psychology, China Agricultural University's College of Humanities and Development Studies, Hunan First Normal University's School of Educational Sciences, and Southwestern University's Department of Psychology is the Institute of Developmental Psychology at Beijing Normal University.



Figure 4. Institutions with a high frequency of co-citation

Table 2 shows that the top eight (8) institutions in the literature output are all higher education institutions. Beijing Normal University has actively contributed to studies on LBC (see Table 2). It is also interesting that reputable Chinese universities have become China's main force of research on LBC, for example, Beijing Normal University and Southwest University.

Table 2
China's Contributors to Studies on Left-Behind Children

Frequency	Year	Institution
21	2010	Institute of Developmental Psychology at Beijing Normal University
11	2010	Faculty of Psychology at Shandong Normal University
10	2010	Department of Education at Beijing Normal University
9	2010	College of Humanities and Development Studies at China Agricultural University
8	2014	Department of Psychology at Southwestern University

8	2012	School of Sociology and Population Studies at Renmin University of China
6	2016	School of Educational Sciences at Hunan First Normal University
6	2018	School of Psychology at Northeast Normal University

Research Hotspot Analysis

Since keywords have a centralized overview of research content, this study determines keyword analysis to seek frequency and keyword co-occurrence and cluster to understand the research hotspots on LBC.

Keyword Co-Occurrence Analysis

This study utilizes keyword analysis with the CiteSpace input parameters remaining the same, with the exception that the type of node was modified from "organization" to "keyword". Table 3 shows that the frequency of the top ten (10) keywords is 520 times, accounting for 44% of the total frequency of keywords (1183). The top ten (10) keywords in the research literature of LBC are, in order: "left-behind children" (389), "mental health" (28), "loneliness" (21), "rural" (17), "migrant children" (12), "depression" (11), "education" (11), "self-esteem" (11), "family education" (10), and "resilience" (10). It indicates that Chinese research focuses on the psychology of LBC; these are the subject's research hotspots. Centrality refers to the number of times a node acts as a "mediator" and ranges from 0 to 1 (Chen, 2006). "Mental health", "rural area", "depression", "education", and "self-esteem" appear higher than 0.1, indicating that these five (5) keywords occupy critical positions in the network and are associated with other keywords.

Table 3

Top 10 keywords in Studies on China's Left-Behind Children

Rank	Frequency	Centrality	Year	Keywords
1	389	1.28	2010	Left-behind children
2	28	0.06	2010	Mental health
3	21	0.01	2010	Loneliness
4	17	0.03	2011	Rural
5	12	0.01	2010	Migrant children
6	11	0.02	2010	Depression
7	11	0.02	2011	Education
8	11	0.02	2014	Self-esteem
9	10	0.01	2011	Family education
10	10	0.01	2013	Resilience

The term co-occurrence map for this study is depicted in Figure 5; "mental health" appears most frequently with the largest circle, followed by "loneliness", "rural," and "depression."

The connections between the circle's numerous nodes suggest the following. First, the "mental health" of LBC appears to be the most prevalent research topic, with despair and loneliness as the dominating difficulties. Second, in addition to "left-behind children," "migrant children" also appear as research objects; several comparisons have been made between the mental health conditions of migrant and LBC in the past. Finally, the majority of research is conducted in rural and ethnic regions. The final mitigating elements are parental education, psychological resilience, and children's self-esteem.



Figure 5. Keyword co-occurrence map of literature on China's left-behind children

Keyword Cluster Analysis

Current research hotspots on LBC cluster around seven (7) categories, as revealed by a keyword cluster analysis. The template value (modularity, Q value) is 0.5539, and the average profile value (silhouette, S value) is 0.950, according to the cluster analysis function of CiteSpace. According to Chen(2006), $Q > 0.3$ signifies a clearly defined connection. Figure 6 depicts the term cluster analysis performed for this investigation. Figure 5 displays the keyword clusters for the first seven categories: #0 rural children left behind, #1 rural, #2 loneliness, #3 mental health, #4 psychological resilience, #5 parent-child bonding, and #6 migrant children.

The aforementioned keywords are grouped and structured for examination, and the results are presented in seven (7) sections (see Table 4). Category #0 contains 111 publications with keywords such as "left-behind children," "social adaptation," "rural rejuvenation," "social assistance," "empathic companionship," "non-left-behind children," "customary domain," "personal domain," and "moral domain" In the context of rural rejuvenation in China, the publications examine the social support and compassion of rural left-behind children versus non-leaving-behind children. Category #1 consists of 49 publications with keywords such as "left-behind children," "reading status," "questionnaire survey," "ethnic areas," "self-harming behaviour," "rural left-behind children," "ethnic areas," "left-behind teenagers," and

"compulsory education." The papers provide research on the behavioural issues of rural children left behind in ethnic areas. The second main category consists of 39 publications with keywords such as "left-behind children," "parent-child bonding," "tracking study," "missing anxiety," "moral justifications," "rural left-behind children," "parent-child relationship," "life events," "academic achievement," and "peer groups." The articles address the emotional difficulties, academic performance, and social support of children left behind. Category 3 is the fourth major category, containing 26 publications with keywords including "left-behind children," "physical and mental health," "sports participation," "farmhouse bookstore," "parental absence," "mental health," "assimilation effect," "class structure," "contrast effect," and "negative emotions." The publications address the emotional difficulties and mental health of abandoned children. Category #4 is the fifth category and consists of 21 publications with keywords including "left-behind children," "social support," "western rural areas," "objective support," "support utilisation," "psychological resilience," "left-behind adolescents," "mediating role," "father's presence," and "emotional regulation." Included in these publications are studies on the psychological resilience and emotional control of children left behind.

Researchers have made considerable strides in their study of abandoned infants, concentrating not only on their demographics but also on mitigating factors, as evidenced by the cluster analysis. The researchers describe many scientific study techniques, such as questionnaire analysis and qualitative interviews. The economic progress of contemporary society has resulted in the birth of LBC, leading to an increase in research on their psychological resilience and self-esteem. The above study demonstrates that scholars are actively investigating this topic.

Table 4

Keyword Cluster Analysis of Literature on China's left-behind children

Type	Number of Literature	Clustered Keywords	Content included
0	111	Rural left-behind children	left-behind children, social adaptation, rural revitalization, social support, empathic companionship, non-left-behind children, customary domain, personal domain, moral domain. and cognitive empathy
1	49	Rural	left-behind children, reading status, questionnaire survey, ethnic areas, self-harming behavior, rural LBC, ethnic areas, left-behind adolescents, and compulsory education
2	39	Loneliness	LBC, parent-child bonding, tracking research, missed anxiety, moral excuses, rural LBC, parent-child relationship; life events, academic performance, peer groups

3	26	Mental health	LBC, physical and mental health, sports participation, farmhouse bookstore, parental absence, mental health, assimilation effect, class structure, contrast effect, negative emotions
4	21	Resilience	LBC, social support, western rural areas, objective support, support utilization, psychological resilience, left-behind adolescents, mediating role, father's presence, and emotional regulation
5	16	Parent-Child Attachment	LBC; peer attachment; teacher-student relationship; internalizing problems; categorization management; parent-child attachment; resilience; LBC in junior high school; lack of fathering; subjective well-being
6	13	Migrant children	LBC; Migrant children; Migrant children; Uncertainty; LBC; Educational equity; Policy options; Social governance
7	10	Family Support	Rural LBC; Category characteristics; Gender effect; Age effect; Emotional intelligence; Occurrence mechanism; School bullying; Family support; Teacher support



Figure 6. Keyword cluster analysis map of literature on China's left-behind children

Research Trend and Frontier Analysis

This study analyzes the subject's research trends and frontiers by examining the sudden change in keywords with CiteSpace's burst detection. The keywords appear suddenly and increase in frequency within a certain period. As seen in Figure 7, three (3) characteristics can be summarized. First, the keywords with the highest centrality of 2.6 or more are "education", "ethnic areas", "social support", and "countermeasures". Second, the research hotspots, varying over the past decade, can be classified into three different stages. The early stage (2010-2014) comprises comparative studies between left-behind and normal children in rural and ethnic areas, focusing on education, exposure to mass media, reading, and other socialization. Research from the middle stage (2015-2017) shifts to the behavioral issues of LBC, focusing on countermeasures, such as social support and family functioning. The near-term phase (2018-2022) highlights the psychological aspects behind the children's behaviors, such as depression. In social support, there is a shift from the initial focus on the reception aspect of support to other areas of social support, such as peer and teacher support. The solution strategy becomes more active and concentrates on tapping the psychological aspect of LBC. Third, all keywords appear to have a comparatively brief lifespan, indicating that most are quickly displaced by new words over time, except for "depression," which has a four (4)-year lifespan. Last, recent and ongoing research on LBC depicts a shift from the negative to the positive aspects, as keywords like peer attachment, teacher support, and psychological capital show relevance for the subsequent two years.

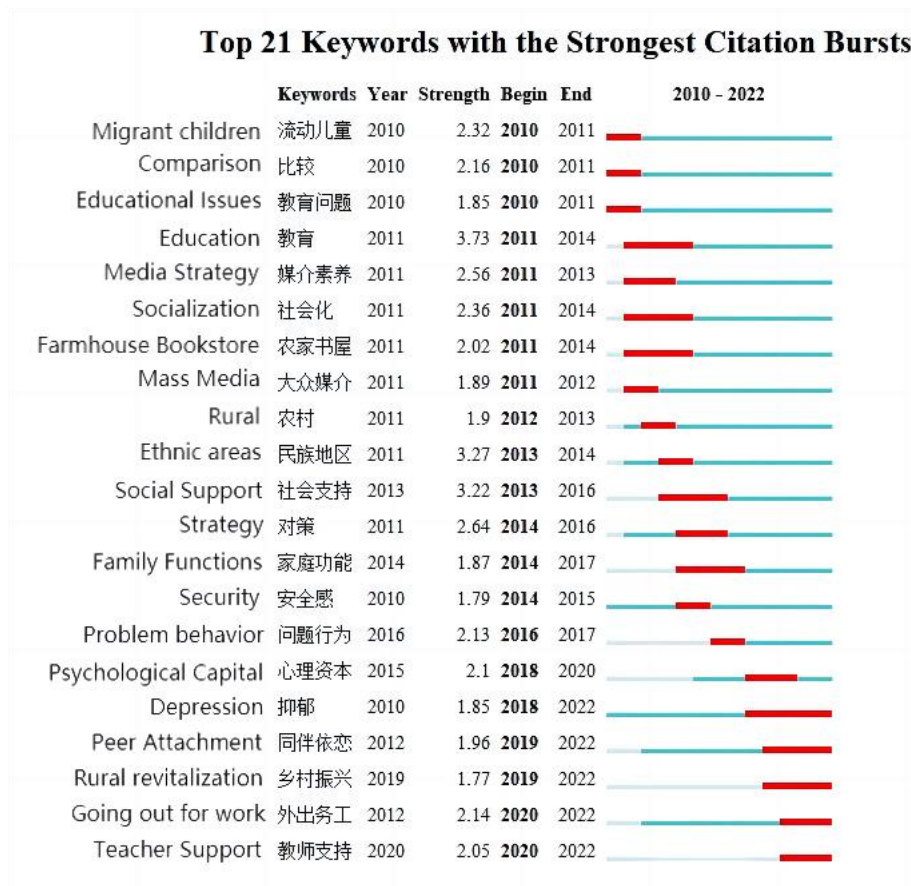


Figure 7. Top 21 keywords with the strongest citation bursts

Discussion

Several research questions direct this study. This study assists scholars of various disciplines in comprehending the subject of country's LBC and its fundamentals, structure, dynamics, and scientific developments for subsequent research.

The temporal distribution indicates that the number of research publications fluctuated between 2010 and 2018 (an unusually rapid uprise between 2015 and 2018), peaking in 2018, decreasing between 2019 and 2022, and abating in 2022. Between 2010 and 2018, the number of research articles on LBC showed an upward trend, with a rapid upward period occurring from 2015 to 2018. In May 2007, the Chinese Women's Federation and thirteen (13) other ministries and commissions issued a "Notice on Caring for LBC in the country by Sharing the Blue Sky". The promulgation of a series of laws and regulations instigated researchers to study LBC, increasing the number of research literature, as seen between 2010 and 2014, and culminating in the introduction of the Opinions of the State Council on Further Improving Services for Migrant Workers in September 2014 and the Opinions in February 2016. During this time, while the state vigorously promoted the relevant policies, the media focused massive attention on the children, sparking widespread social concern. It is evident from the rapid increase of related publications between 2015 and 2018, peaking in 2018. By 2020, China gained significant ground against poverty, improving much of the children's circumstances. The number of research publications decreased.

Scientific collaboration is the practise of two or more authors sharing their resources and skills to co-create research (Kumar, 2015). Strong collaborative ties between academics can facilitate the sharing of novel ideas, thoughts, and theories, the generation of new information, and, ultimately, the reduction of educational resource waste and the enhancement of research output (Khalagi et al., 2021). There is a tiny amount of collaboration among highly productive scholars on the topic of children left behind. These academics have a wide range of study interests, such as mental health, educational challenges, family support, academic achievement, morality, emotions, and the behaviour of children left behind (Fan & Wu, 2020; Liao et al., 2015; Yi, et al., 2012; Yao et al., 2016). Yet, scholarly collaboration does exist to a limited extent.

It may be necessary to strengthen research collaborations on LBC, but this may be due to the fact that universities are the dominating power in human capital research in China and are likely to prescribe the study direction of essential topics to be investigated. China is home to the top three universities investigating this topic, all of which are well-known institutions. When colleges receive government funding support for research initiatives, there is a considerable possibility that they will commit more resources to further research on abandoned children in China.

The LBC research hotspots are expressed in three ways. First, the most major research issue is "mental health," which focuses mostly on depression and loneliness. Second, the research subject consists of "left-behind children" and "migrant children"; previous studies have compared the mental health of migrant children and LBC more frequently. Finally, in terms of region, the emphasis is on rural and ethnic regions. Regarding mitigating factors, the focus is on family education, psychological resilience, and self-esteem of children left behind. In terms of study topics and methodology, the research on LBC has been enhanced during the previous decade. To expand on prior studies, additional study is required.

The research trends of LBC indicate that, from 2010 to 2014, scholars conducted comparative studies between left-behind and normal children in rural and ethnic areas, and content studies on education, mass media exposure, reading, and other socialization elements. In the subsequent period (2015-2017), scholars focused their research on the behavioral issues of LBC brought about by their circumstances and the attention of the media and government. In the later period (2018-2022), the focus on behavioral issues expanded to the emotional being of the LBC. The research emphasized identifying positive strategies and drawing on their psychological capital. China has achieved much in the field of positive psychology that scholars have applied it to resolve the conditions of disadvantaged individuals by drawing on their unique resources to counteract the negative influences in their lives. Recent times indicate that a future trend will be an emphasis shift from the negative to the positive, where LBC can benefit from peer attachment, teacher support, and psychological capital.

Overall, the visual knowledge map produced by CiteSpace provides an insight into the literature on LBC, identifying key authors. Its analysis to review the existing literature is a helpful addition. The above results provide valuable information for future researchers.

Conclusions and Future Research

This study aims to (1) investigate the essential characteristics, current status, and development of research on LBC in China; (2) determine the contributions of key authors by

analyzing the co-authorship collaboration graph; and (3) investigate the research hotspots and development trends on LBC by keyword mapping. The main research findings are as follows.

First, the number of research publications fluctuated between 2010 and 2018, peaking in 2018, decreasing between 2019 and 2022, and abating in 2022. Two (2) developmental phases are identified: (1) the booming phase (2010-2018) and (2) the declining and stabilizing phase (2019-2022).

Second, high-producing authors in this subject include Fan Xinghua, Zhao Jingxin, and Zhang Xuelang. Strong collaborative relationships have yet to flourish among them. Highly productive research institutions include Beijing Normal University's Institute of Developmental Psychology, Shandong Normal University's Faculty of Psychology, Beijing Normal University's Department of Education, China Agricultural University's College of Humanities and Development Studies, and Southwestern University's Department of Psychology. Collaboration among these institutions could be more robust.

Finally, seven study foci are identified: "children left behind in rural areas," "rural places," "loneliness," "mental health," "psychological resilience," "parent-child bonding," and "migrant children." The most important research topic is "mental health," which focuses mostly on depression and loneliness. The research object consists of "left-behind children" and "migrant children"; previous studies have compared the mental health of migrant children and LBC more frequently. Considering region, particular emphasis is placed on rural and ethnic regions. Concerning mitigating factors, the focus is on family education, psychological resilience, and the self-esteem of children left behind.

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This study has limitations. First, it offers the China context, including data collection from Chinese scientific databases. It does not provide the reader with global data. This study encourages data collection from multiple databases to obtain more comprehensive data. Additionally, a separate and in-depth study on the specific aspects of LBC is still wanted. There is always the belief that adding keywords other than those identified in this study can help to expand the answers to the research questions substantially.

This study significantly advances theoretical understanding and contextual insights within the field of left-behind children (LBC) studies in China. Theoretically, this study contributes by mapping the trajectory of LBC research, uncovering phases of development and highlighting research themes that have transitioned from problem-centric (e.g., mental health issues like

depression and loneliness) to resilience-focused themes. This shift illuminates a broader trend towards understanding LBC beyond their challenges, addressing how factors like peer attachment, teacher support, and psychological capital can mitigate adverse effects and foster resilience. The study's use of keyword mapping and co-authorship analysis contributes methodologically to future LBC research, encouraging interdisciplinary collaboration for more robust findings.

Contextually, this study provides a nuanced examination of LBC issues in the Chinese setting, where LBC is influenced by factors unique to rural and ethnic areas. By focusing on institutions, authors, and specific research themes, it sheds light on the structural academic landscape, which plays a crucial role in addressing LBC challenges through educational, psychological, and social lenses. This detailed exploration of influential authors and institutions further encourages collaboration, ensuring that ongoing efforts are supported by strong institutional networks for addressing LBC's unique needs.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data Availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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