

A Bibliometric Analysis of Emotions in Second Language Learning from 2004 to 2023

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Abstract:

In recent years, emotions in the realm of second language learning has increasingly gathered the attention of the academic community. Understanding learners' emotions holds great significance in comprehending the process of acquiring a second language language. The purpose of this paper is to provide a comprehensive overview of the current status and emerging trends in the field of emotions in second language learning from 2004 to 2023, serving as a valuable reference for future research on the topic. A meticulous search was conducted on the Web of Science core database to identify relevant literature on emotions in second language learning published during the specified period. The collected data were subjected to analysis and visualization using the tools and software, including MS Excel and Biblioshiny. The overall number of publications exhibited a positive upward trend each year. Core highly cited source journals in this domain included System, Frontiers in Psychology and Modern Language Journal boasting a significant number of articles, citations and influence factors. Jean-Marc Dewaele emerged as the most influential author in the field. Among the most cited documents, a substantial portion of the research focused on foreign language enjoyment and anxiety. The countries at the forefront of international cooperation were China, the United Kingdom and the USA. China and the United Kingdom exhibit the most frequent cooperation. The hotspots in emotional studies of second language learners in these 20 years encompassed keywords like anxiety, motivation, positive psychology including enjoyment, willingness and more. Additionally, burnout, anxiety, motivation and positive psychology define the evolving research trends in this domain. There exists a potential avenue for future research to explore multidimensional emotional themes. This exploration could offer educators, researchers, and learners a more holistic understanding of the emotional dimensions of second language learning. Furthermore, author collaborations in the field are mainly centered in Asia, Europe and North America, with less involvement from South American and African countries. Collaborative efforts often manifest in small and intermittent groups, without the establishment of extensive international research institutions. In the future, opportunities arise for enhancing national collaborations between governments and institutions to strengthen research initiatives.

Keywords: bibliometric analysis, emotions, second language learning, literature vizualization, knowledge gragh, biblioshiny

INTRODUCTION

Learners' emotions have long been regarded as a source of energy for learning [1]. For many years, psychologists have been examining emotions. Additionally, emotions have been referred to as "affect" by certain language acquisition scholars [2] and they were regarded as an irrational aspect of language learning throughout the Second Language Acquisition (SLA) period, which generally spanned from the early 1960s to the mid-1980s [1]. From the middle of the 1980s to the beginning of the 2010s, emotion and cognition were widely considered interconnected and emotions crucial for language learning, with fear receiving the most attention [3]. The establishment and growth of 'positive psychology' have sparked renewed interest in exploring both positive and negative emotions in language learning and teaching [4]. Researchers are coming to realize that the difference in language learning among second/foreign language learners cannot be solely attributed to a single emotion.

Over time, there has been an exponential increase in the volume of studies conducted on second learners. Correspondingly, scholars have studied emotions in second language acquisition from various perspectives. These include a focus on the theories of emotions in second language learning [5], studying the role of negative and positive emotions in second language learning, such as foreign language classroom anxiety (FLCA) [6], boredom [7], foreign language enjoyment (FLE) [8], grit [9], wellbeing [10], resilience [11], engagement [12]. They also aim at investigating emotion scales, such as Foreign Language Enjoyment Scale [13], Foreign Language Classroom Anxiety Scale [6]. They explored the effects of learner-internal variables and teacher-centered

variables [14], of classroom environments [15] in emotions of second language learners, as well as exploring the relationships between emotions and second language learning [16].

Several review articles are available on emotions in second language acquisition and related literature, authored by Dewaele, J. M. (2020) [1], Wang, Y., et al. (2021) [17], and Yu, Q. (2022) [18]. However, none of these reviews employs bibliometric analysis, which can provide valuable insights into publication trends, influential outlets, and prolific contributors in the field of emotions in second language learning literature. Considering this gap, we conduct a comprehensive bibliometric analysis of emotions in second language acquisition literature. Our study aims to offer a broad overview of the existing literature. Indeed, a large body of literature is available for careful analysis allowing us to uncover the literature's intellectual structure and emergent themes present in the field [19]. At a broad level, we offer an overview of the cumulative scientific development of emotions in second language learning. More specifically, we aim to address the following research questions:

RQ1: What is the trend of scientific publications in emotion in second language acquisition research?

RQ2: What are the most cited sources, the impact authors, high productivity affiliations?

RQ3: What are the influential articles?

RQ4: What does the international cooperation of countries entail?

RQ5: What topics have received the most attention in the SLA emotions literature and what are the top current research trends?

‘Bibliometric research’ is a quantitative research technique that offers an overview of a particular research field [20]. It involves cluster analysis, encompassing citation analysis, co-citation analysis, bibliographic coupling, co-author analysis, and co-word analysis. Based on bibliometric techniques, identifying current research areas and potential future research directions provides a roadmap for further research [21]. Bibliometric research has gained prominence throughout numerous scientific disciplines, including technology [22], economics [23], psychology [24] and medicine [25]. Performing a bibliometric analysis on the topic of emotions in second language acquisition allows us to establish a strong basis for making valuable contributions to the field. Bibliometric research allows scholars to obtain a more comprehensive understanding of the field, identify areas that warrant further investigation, and generate innovative concepts within the domain of second language emotion research.

The purpose of this article is to use bibliometric techniques to analyze scientific articles on emotions in second language acquisition that were indexed in the Web of Science core database between 2004 and 2023. It also includes three main detailed objectives: (1) To summarize the general characteristics and trends of scientific publications, the most important source journals, the most influential authors, and the most cited articles. (2) To analyze international cooperation between countries in this field. (3) To explore the most popular research topics and trends based on keyword analysis.

DATA AND METHODS

Data Sources

Figure 1 shows our search and selection strategy, which involved a four-stage process: (1) database search, (2) document filtration, (3) language filtration, and (4) subject filtration [26].

Step 1: Database Search. The core collection of Web of Science, including SCI-Extended, SSCI, ESCI, and A&HCI journal papers, was searched using the topic words "second language learning" AND "emotion" and a total of 750 valid articles were obtained.

Step 2: Time Filtration. The search period spanned from January 1, 2004, to December 31, 2023, leading to 638 initial results.

Step 3: Document Filtration. “Articles” were chosen as the document type and other data such as those of “commentaries, books, chapters, conference papers, and editorials” were excluded. After document filtration, it led to 595 results.

Step 4: Language Filtration. The search was further refined by selecting articles published in the English language, leaving 580 results.

Step 5: Subject Filtration. The data were meticulously filtered by reviewing titles, abstracts, and keywords to eliminate documents not directly related to the research topic. After removing irrelevant articles, a total of 548 valid articles were obtained.

Methods

The bibliometric methodology was employed to analyze the literature inclusion. The analysis utilized Biblioshiny, a visual analysis tool built by Rstudio (4.2.3) and Microsoft Excel 2013. BiblioShiny is based on the R language Bibliometrix package, enabling comprehensive scientific mapping analysis, word cloud generation, development run charts, and other visualizations based on literature information [27]. Microsoft Excel 2013 was used to examine the changes and trends in the number of documents. Biblioshiny was used to analyze the features of emotions in second language studies, including product outcomes, journals, authors, articles, countries and institutions and keywords.

RESULTS AND DISCUSSION

In this section, we present and analyze the findings in relation to the research questions, more specifically, the research status in the field, which encompasses publication outcomes, The most cited sources, the impact authors, high productivity affiliations, collaborations between countries and the evolution of frequently explored keywords and topics over time.

Production Outcomes

The production and annual distribution of articles serve as visual indicators reflecting the level of research and development in a specific field. The total number of research submissions on emotions in second language learners between 2004 and 2023 amounted to 548. For the analysis of production outcomes, the path of Descriptive Analysis-Plot-Annual Scientific Production was followed. Figure 1 shows a continuous dynamic increase in the number of emotional research submissions for second language learners from 2004 to 2023, with an annual production growth rate of 28.25%. Based on the annual distribution chart, the recent 20 years of emotional studies in second language learners can be divided into three phases: the first phase (2004-2010) represents the study's initial period, the second phase (2011-2017) characterizes a period of stable development, and the third phase (2018-2023) reflects a period of rapid development. The rise in publishing is mainly attributed to the incorporation of positive psychology in the field of second language learning[5], infusing the field with fresh research perspectives, theoretical resources, research topics, and methodologies. As a result, the number of publications is expected to continue its growth.

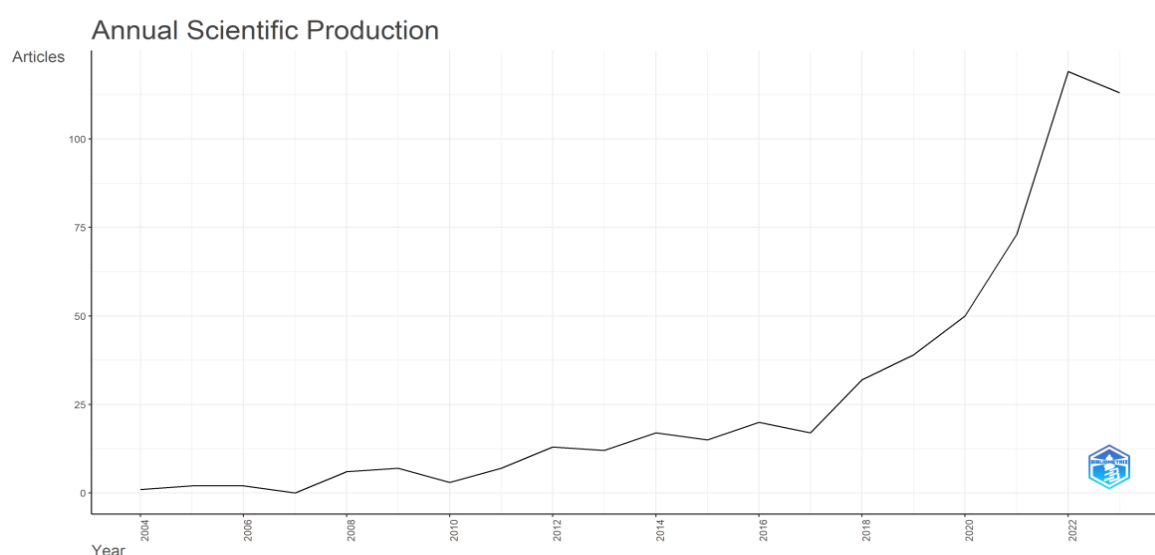


Figure 1. Map of Annual Scientific Production

The Most Cited Sources, The impact Authors, High Productivity Affiliations

The most cited sources

The ten most important sources that publish articles on emotion research in second language acquisition are shown in Figure 2. The path that was used for high cited sources analysis (No.=10), is 'Descriptive Analysis-Sources-Most Local Cited Sources'. The top three quoted journal is Modern Language Journal, which was cited by 832 articles on emotion research in second language acquisition, followed by System (cited by 687 articles) and Studies in Second Language Language learning and Teaching (cited by 613 articles).

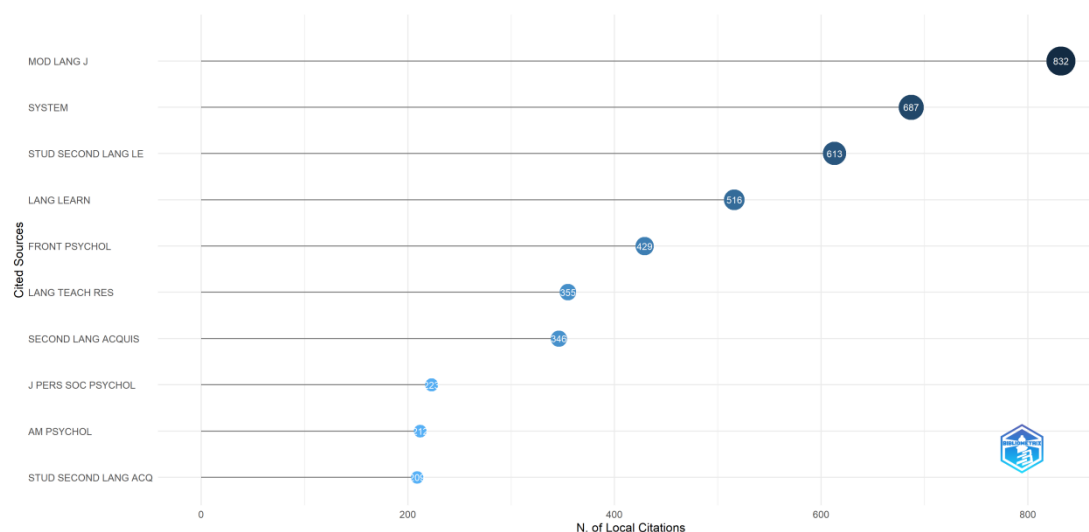


Figure 2. Map of The Most Cited Sources

The impact authors

Traditional literature measurement analysis uses the document analysis method and quotation analysis method to evaluate the academic influence of scholars. 'Biblioshiny' evaluates the academic influence of authors by H index, G index, TC (Total Cited Frequency) and Quantity Indicators, and creates a comprehensive reflection of the authors' academic output and academic contribution through an objective analysis of the number of submissions and quotations. The analysis and mapping of highly influential academic authors are used as follows: Descriptive Analysis-Table-Authors' Local Impact (No.= 10). As shown in Table 1, the most influential academic author of H index in this field from 20004 to 2023 was Jean-Marc Dewaele (H-index:14), followed by Chengchen Li (H-index:10). The top five highly influential academic authors of G index are Jean-Marc Dewaele (G-index:16), Yongliang Wang (G-index:13), Pawlak M. (G-index:12), Mariusz Kruk (G index:12),Chengchen Li (G index:11). Furthermore, the top three authors of total cited frequency were Jean-Marc Dewaele (TC:1936), MacIntyre, P.D. (TC:1012)and Chengchen Li (TC:957). Based on these observations, it is evident that Jean-Marc Dewaele was the most influential author in terms of academic impact, productivity, and citation frequency.

Table 1. Top 10 Impact Authors

Element	h_index	g_index	m_index	TC	NP	PY_start
DEWAELE JM	14	16	0.7	1936	16	2005
LI C	10	11	1.429	957	11	2018
PAWLAK M	9	12	1.8	383	12	2020
KRUK M	8	12	1.6	377	12	2020
WANG Y	7	13	1.75	629	13	2021
DERAKHSHAN A	6	6	1.5	671	6	2021
MACINTYRE PD	6	7	0.545	1012	7	2014
ZHAO X	6	7	1.5	64	7	2021
ZAWODNIAK J	5	6	1	205	6	2020
ZHANG Y	5	7	0.714	94	7	2018

High productivity affiliations

Figure 3 shows the top 10 high-production affiliations in the field of emotional study of second language learners, analyzed and mapped using the path “Descriptive Analysis-Plot-Most Relevant Affiliations (No.= 10)”. Figure 3 shows the top four affiliations for the study of second language learners’ emotions mainly in University of Zielona Gora with 24 articles, University of Macau with 20 articles, Cape Breton University and Huazhong University of Science and Technology with 17 articles respectively. The research affiliations focusing on emotions in second language learners are predominantly located in universities in Europe and Asia.

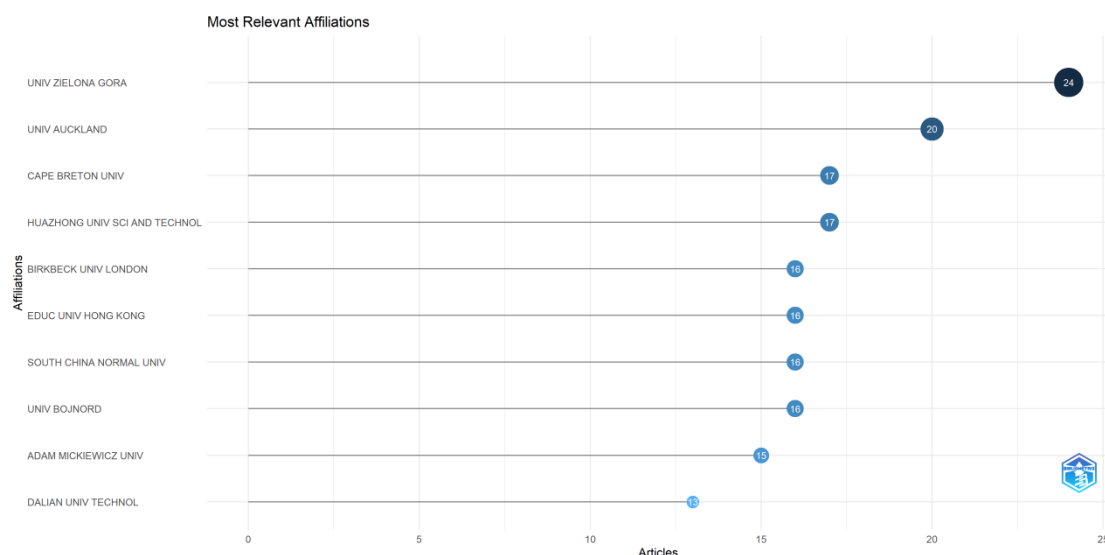


Figure 3. Map of Affiliations in Emotions Research in Second Language Acquisition

The Most Cited Articles

The quotation frequency of a thesis is an important indicator for measuring its academic impact. To analyze and map the most cited articles, the following approach was adopted: Descriptive Analysis-Table-Most Global Cited Papers (No.= 10). Table 2 presents the top 10 most highly cited papers on emotions in second language learning, and a specific analysis is provided below. The most frequently cited paper, with 441 citations, is authored by Wang Y., Derakhshan A. and Zhang L.J., focuses on researching and practicing positive psychology in second language learning and teaching, published in *Frontier in Psychology*[17]. Following closely, with 400 citations, is an article authored by Mao, Q., Dong, M., Huang, Z., & Zhan, Y., exploring learning salient features for speech emotion recognition using convolutional neural networks, published in *IEEE Transactions on Multimedia* (2014) [28]. Ranked third in terms of citations focuses on the effect of foreign language in reducing decision biases, published in *Psychological Science* in 2012. The authors clarified that learning and using foreign languages can provide a more significant mental and emotional detachment compared to speaking one's native language [29].

Additional areas of research that have attracted the attention of scholars include the potential contributions of positive psychology to second language acquisition (SLA), the theory which brings together cognition and emotion, the psychometric properties of Foreign Language Enjoyment Scale, the effects of trait emotional intelligence and sociobiographical variables on communicative anxiety, the relationship between anxiety and L2 achievement, and the effect of emotions to word meanings learning. MacIntyre, P.D., Gregersen, T., & Mercer, S. introduced positive psychology to second language acquisition (SLA) and discovered that the possible benefits of positive psychology are set within the context of previous research, such as the humanistic approach to language education, theories of motivation, the idea of an affective filter, investigations into the characteristics of successful language learners, and notions concerning the self in 2014[30]. They outlined how positive psychology (PP) constitutes a thrilling new dimension to the field of Second Language Acquisition (SLA) literature and how it is shaping educational trends broadly, thereby fostering optimistic anticipations for its potential effects on language instruction and acquisition in 2019[5]. Swain M. (2013) showed a perspective which brings together cognition and emotion is that of Vygotsky's sociocultural theory (SCT) of mind[31]. Li (2018) utilized a combination of

qualitative and quantitative research methods to assess the reliability and validity of the Chinese edition of the Foreign Language Enjoyment Scale, and explored Foreign Language Enjoyment (FLE) within a particular English as a Foreign Language (EFL) setting in China [32]. Dewaele, J., et al. (2008) explored the impact of dispositional emotional intelligence and sociobiographical variables—such as age, gender, educational attainment, number of languages spoken, age when language learning began, acquisition environment, usage frequency, socialization patterns, interaction circle, and perceived language proficiency—on communication apprehension in the native language and foreign language anxiety across second, third, and fourth languages. The investigation spanned across five distinct scenarios: conversing with friends, colleagues, strangers, over the phone, and in public settings[33]. Teimouri, Y., et al. (2019) examined the relationship between anxiety and L2 achievement[34]. Vigliocco, G.et al.(2009) provided a description of semantic representation that emphasizes different categories of data from which we can acquire and uncover word meanings. He identified at least two principal kinds of information for learning word meanings: one stemming from our sensory-motor interactions with the external environment and the other from our internal experiences, especially our emotional states[35].

The top ten cited articles primarily revolve around the following topics: the influence of positive psychology to second language learning, the impact of trait emotional intelligence and sociobiographical variables on language learning, the roles of foreign language enjoyment and anxiety in English as a Foreign Language (EFL) learning and so on. Notably, four publications of the top ten cited articles focused specifically on the effect of positive psychology on second language learning. Additionally, it is noteworthy that among these ten highly cited works, MacIntyre, P.D. appears as the first author in three of them. His significant presence in these publications highlights his prominent role.

Table 2. Top 10 Impact Articles

Paper	Title	Total Citations	TC per Year	Normalized TC
Wang Y, Derakhshan A and Zhang LJ ,2021, FRONT PSYCHOL	Researching and Practicing Positive Psychology in Second/Foreign Language Learning and Teaching: The Past, Current Status and Future Directions DOI:10.3389/fpsyg.2021.731721	441	110.25	16.10
MAO Q, 2014, IEEE TRANS MULTIMEDIA	Learning Salient Features for Speech Emotion Recognition Using Convolutional Neural Networks DOI:10.1109/TMM.2014.2360798	400	36.36	5.46
MACINTYRE PD, 2012, STUD SECOND LANG LEARN TEACH	Emotions that facilitate language learning: The positive-broadening power of the imagination DOI:10.14746/ssllt.2012.2.2.4	395	30.38	7.91
MACINTYRE PD, 2014, STUD SECOND LANG LEARN TEACH	Introducing Positive Psychology to SLA DOI:10.14746/ssllt.2014.4.2.2	287	26.09	3.92
MACINTYRE PD, 2019, MOD LANG J	Setting an Agenda for Positive Psychology in SLA: Theory, Practice, and Research DOI:10.1111/modl.12544	283	47.17	6.45
SWAIN M, 2013, LANG TEACH	The inseparability of cognition and emotion in second language learning DOI:10.1017/S0261444811000486	273	22.75	4.84
LI C, 2018, SYSTEM	Understanding Chinese high school students' Foreign Language Enjoyment: Validation of the Chinese version of the Foreign Language Enjoyment scale DOI:10.1016/j.system.2018.06.004	245	35.00	5.05
DEWAELE JM, 2008, LANG LEARN	Effects of Trait Emotional Intelligence and Sociobiographical Variables on Communicative Anxiety and Foreign Language Anxiety among Adult Multilinguals: A Review and Empirical Investigation DOI:10.1111/j.1467-9922.2008.00482.x	234	13.76	5.14
TEIMOURI Y, 2019, STUD SECOND LANG ACQUIS	SECOND LANGUAGE ANXIETY AND ACHIEVEMENT DOI:10.1017/S0272263118000311	233	38.83	5.31
VIGLIOCCO G, 2009, LANG COGN	Toward a theory of semantic representation DOI:10.1515/LANGCOG.2009.011	222	13.88	2.07

Countries

High productivity countries

Table 3 presents the top 10 high-production countries in the field of emotional study of second/foreign language learners, analyzed and mapped using the path Descriptive Analysis-Table-Most Productive Countries (No.= 10).

Among these countries, China stands as the highest producer, with 443 articles, followed by the United States (No.= 256), the United Kingdom (No. = 142), Iran (No.= 101), and Canada (No.= 86).

Table 3. Top 10 Countries in Scientific Production

Region	Freq
CHINA	443
USA	256
UK	142
IRAN	101
CANADA	86
SPAIN	79
AUSTRALIA	74
POLAND	63
GERMANY	47
SOUTH KOREA	45

Countries of international cooperation

Analysis of Social Structure-Countries Collaboration World Map/Collaboration Network was used as a path for analysis and mapping the levels cooperation of of countries and institutions. Figure 4 and Table 4 show several connections between countries that can be found from cooperation, indicating a higher degree of close transnational cooperation in the field. Among these, China, the United Kingdom, and the USA prominently dominate the network of cooperation, with China holding a significant presence. The thickness of the connections illustrates the level of collaboration between different countries. Notably, China and the United Kingdom exhibit the most frequent cooperation, while China also engages in collaborations with countries such as New Zealand, and Australia.

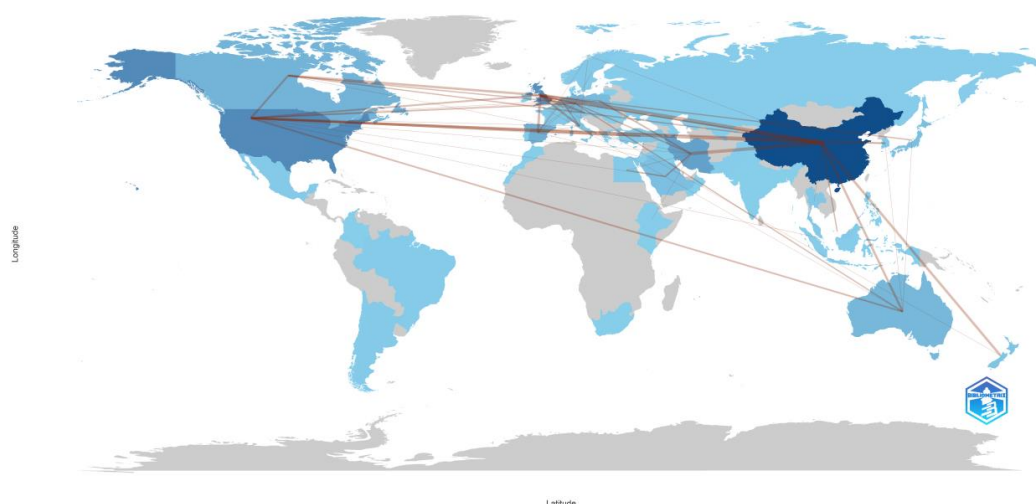


Figure 4. Countries Collaboration World Map

Table 4. World Cooperation Frequency

From	To	Frequency
CHINA	UNITED KINGDOM	14
CHINA	USA	10
UNITED KINGDOM	GERMANY	9
CHINA	NEW ZEALAND	8
USA	UNITED KINGDOM	6
CHINA	AUSTRALIA	5
IRAN	POLAND	5
UNITED KINGDOM	AUSTRIA	5
USA	CANADA	5
USA	SPAIN	5

Analysis of Keywords

Figure 5 illustrates the words with a high frequency in emotional studies of second language acquisition. For the analysis of the key words, the word cloud approach was adopted. The word cloud was generated by using the keywords plus. The function of word cloud is to show the key information and trends in the research field in a graphical way, so as to understand and analyze the research dynamics more intuitively. In the word cloud, the font sizes of the keywords are different according to the frequency of the keywords to highlight those words that appear more frequently in the research. By analyzing the generated word cloud, the hot words and topics in the research field can be identified. And this information is very valuable both for understanding research trends and for guiding future research directions. Figure 5 demonstrates that from 2004 to 2023, the hotspots in emotional studies of second language learners encompassed keywords like anxiety, motivation, positive psychology including enjoyment, willingness and more.

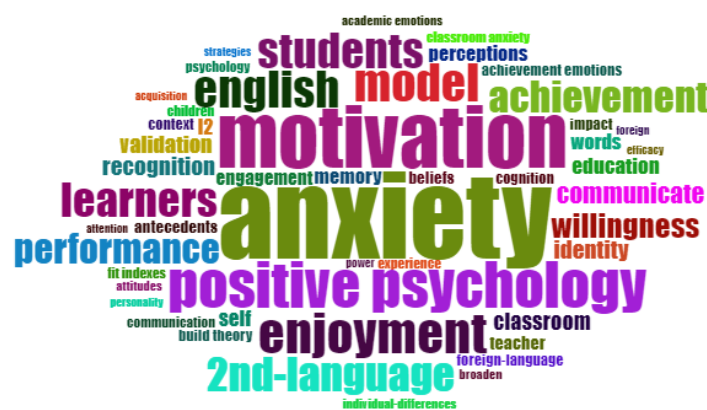


Figure 5. Map of Keywords' Word Cloud

Analysis of Topic Trend

Figure 6 showcases trend topics for emotional study of second language, analyzed through the Documents - Words-Trend Topics. Figure 6 indicate that burnout, anxiety, motivation and positive psychology serve as prominent topic trends in this field of study.

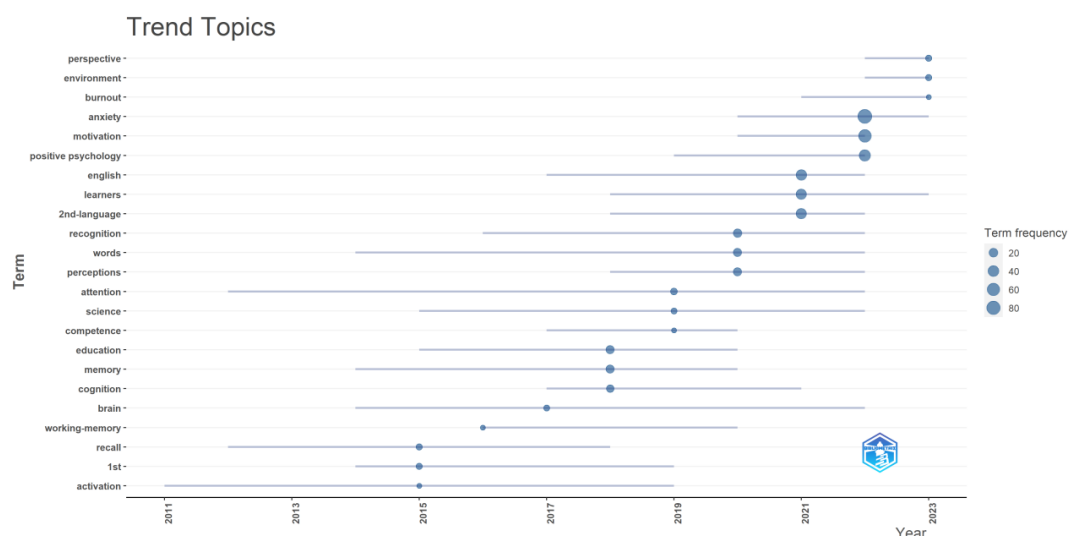


Figure 6. Map of Trend Topics

CONCLUSION AND IMPLICATIONS

This paper utilized ‘Biblioshiny’ software to comprehensively analyze and visualize 548 publications of the core Web of Science database on emotion research in second language learners between 2004-2023. The study aims to gain insights into the overall research landscape in the field, including publication output, high-cited journals, influential authors, highly cited literature, affiliations, countries’ collaborations as well as the hotspots and trends of the research.

The analysis revealed an overall growth in research output during these 20 years. Core high-cited journals, namely *Modern Language Journal* emerged as the major contributors with the highest production, citation rates, and influence factors in the field. Jean-Marc Dewaele emerged as the most influential academic author in the field. The top four affiliations for the study of second language learners’ emotions mainly in University of Zielona Gora, University of Macau, Cape Breton University and Huazhong University of Science and Technology. The top cited articles from 2004 to 2023 shed light on significant aspects of the subject: the influence of positive psychology to second language learning, the impact of trait emotional intelligence and sociobiographical variables on language learning, the roles of foreign language enjoyment and anxiety in English as a Foreign Language (EFL) learning and so on. China stands as the highest producer, followed by the United States and the United Kingdom. Notably, China and the United Kingdom exhibit the most frequent cooperation. The hotspots in emotional studies of second language learners in these 20 years encompassed keywords like anxiety, motivation, positive psychology including enjoyment, willingness and more. Additionally, burnout, anxiety, motivation and positive psychology define the evolving research trends in this domain.

However, as the development of positive psychology in the field of Second language Acquisition (SLA) flourishes, its focus remains primarily on the exploration of enjoyment and anxiety in foreign language contexts. However, there exists a potential avenue for future research to explore multidimensional emotional themes. This exploration could offer educators, researchers, and learners a more holistic understanding of the emotional dimensions of second language learning. Furthermore, author collaborations in the field are mainly centered in Asia, Europe and North America, with less involvement from South American and African countries. Collaborative efforts often manifest in small and intermittent groups, without the establishment of extensive international research institutions. In the future, opportunities arise for enhancing national collaborations between governments and institutions to strengthen research initiatives.

This study undertakes a visualized literature analysis spanning approximately 20 years of research into emotions among second language learners. Within this, variations in quality and volume exist. By employing literature metrics and knowledge graphs, effective literature can be systematically aggregated and filtered, allowing researchers to swiftly grasp current developments and research focal points within the field. It is acknowledged, however, that this article may not encompass all literature sources, analysis methods, and reference content comprehensively. Nevertheless, this objective analysis of existing literature aims to provide valuable reference points for future research endeavors.

ACKNOWLEDGEMENTS

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