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Research on the learning/teaching of L2 listening: A bibliometric review and its implications

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Abstract

This bibliometric study examined the development of research on the learning and teaching of second language (L2) listening from 1948 to 2020 (73 years). Specifically, the study involved: (1) a search and analysis of all the noun phrases to identify important research topics in the abstracts of the published journal articles on L2 listening over the 73 years (divided into three periods) using self-made Python scripts and (2) three co-citation analyses of the references in these articles regarding highly cited authors, publications, and journals, respectively, via the VOSviewer program. The keyword/phrase analysis produced results that helped uncover and delineate the research trends in L2 listening across the three time periods. The co-citation analyses identified the most highly cited authors, publications, and journals as well as the interrelations among the most highly cited items in each of the three categories illustrated with network maps. The results of the analyses and their implications are discussed.

Keywords: bibliometric analysis; co-citation analysis; L2 listening learning; L2 listening teaching; research trends

1. Introduction

In the past few years, bibliometric analysis has rapidly emerged as a popular method for undying diachronic research trends, productivity, and impact in the field of applied linguistics/second language acquisition (SLA) in general (e.g., Amini Farsani et al., 2021; Lei & Liu, 2019; Zhang, 2020) or in a specific area or research strand in this field, such as English for Academic Purposes (EAP), English for Specific Purposes (ESP), and foreign language teaching in pre-school education (e.g., Hyland & Jiang, 2021a, 2021b; Liu & Hu, 2021; Yilmaz et al., 2019). However, so far, there does not appear to have been any bibliometric study on second language (L2) listening, one of the four basic skills in language acquisition and a very important one for overall success in second language acquisition.

Listening is important in language acquisition not only because it is an essential skill but also because it provides language learners with ample input to internalize language rules and develop other language skills, especially for speaking (Feyten, 1991; Mendelsohn, 2001; Rost, 2002; Vandergrift, 2004, 2007). Furthermore, listening is a challenging skill to learn due to the complexity of the process involved in listening (e.g., the involvement of both bottom-up and top-down processing) and the various sub-skills required, such as segmenting and understanding of speech sounds, words, and phrases (Chang & Read, 2006; Chou, 2013; Field, 2004; Graham, 2006; Richards, 2005; Vandergrift, 2007). The importance and the challenging nature of L2 listening is also evidenced by the publication of three review articles on the topic in leading journals in applied linguistics: Rubin's (1994) review in *Modern Language Journal* and Vandergrift's (2004, 2007) reviews in *Annual Review of Applied Linguistics* and *Language Teaching* (two premier journals devoted to systematic reviews), respectively. These reviews highlighted the important role of listening in L2 acquisition, the main research issues and instructional practices involved. They also discussed the likely reasons for the difficulties of L2 listening, such as the "implicit nature [of listening], the ephemeral nature of the acoustic input and the difficulty in accessing the processes" (Vandergrift, 2007, p. 191).

While these reviews provided valuable information on L2 listening and helped promote its research, it has now been about one and a half decades since the last one of these reviews, that is, since Vandergrift (2007). There is little doubt that, since then, new significant developments must have been

made in the research on L2 listening. Hence, given the importance and challenges of L2 listening as well as the fact there has not been any systematic review of research in this area and given the unique power of bibliometric analysis for garnering valuable research information as mentioned above, it is of both interest and importance to conduct a bibliometric analysis of the research on the learning and teaching of L2 listening to help us gain a better and comprehensive understanding of research on L2 listening. Against this backdrop, it is the aim of the present study to present such an analysis.

2. Background and research purposes/questions

2.1. Bibliometric analysis

Coined by Alan Pritchard (1969, p. 348), *bibliometrics* or *bibliometric analysis* refers to "the application of mathematics and statistical methods" to the examination of scientific publications. Quantitative analysis of publication information can be dated to the early 1910s as evidenced by Cole and Eales's (1917) statistical analysis of the publications in comparative anatomy between 1543 and 1860, which evaluated the growth rate of research in this field and the amount of contribution to the field by each European country. However, the practice of bibliometric research as we know today did not really commence until 1963 when Eugene Garfield officially launched his science citation index (SCI), a well-designed citation indexing system first proposed in 1955 (Garfield, 1955).

Unlike previous quantitative analyses of research publications that relied on crude descriptives of publications, keywords, and subject terms for searching and understanding existing research in a given field, the SCI offers systematically compiled comprehensive bibliographic citation information, that is, information about how often and where existing publications have been cited in science journals. In other words, the SCI provides bibliographic citations as a new medium for searching literature. The effectiveness and usefulness of citation-based literature search was later attested to by empirical studies (Salton, 1971; Weinberg, 1974). Furthermore, additional research findings indicated that combining bibliographic citation analysis with the search and examination of keywords and subject terms could significantly increase the efficiency of the retrieval and understanding of research literature (Pao & Worthen, 1989). Because of SCI's success in providing speedy, efficient, and accurate literature searches in science, similar citation systems have been developed in various other fields, such as the social science citation index (SSCI) and the arts and humanities citation index (A&HCI).

More importantly, the value of contemporary bibliometrics in the form of SCI and SSCI lies not only in its efficiency in providing bibliographic and citation

information but has also in its ability to allow researchers to assess, in quantitative terms, important trending research topics, the productivity of researchers and institutions as well as the impact of authors, publications, and journals (De Bellis, 2009; van Raan, 2005). In fact, the latter capability of contemporary bibliometric systems like SCI and SSCI is a key driving factor for their sharply increased use (Garfield, 2007, p. 65). Now bibliometric information from SCI and SSCI is often used to measure and rank the research productivity and impact of not only individual researchers and institutions but also countries (Leydesdorff, 2005; Leydesdorff & Wagner, 2009; Moiwo & Tao, 2013) although there has been caution about such bibliometric analysis-based results being misinterpreted and misused (Ellegaard, 2018; Van Raan, 2005).

2.2. Bibliometric studies in applied linguistics

The past two decades have witnessed a substantial increase of bibliometric studies for various purposes and an expansion of such analyses from natural sciences to various social sciences, such as business management and linguistics (Lei & Liao, 2017; Liu et al., 2015). However, these studies, like most other bibliometric studies, focused mostly on examining and comparing research productivity and impact across individual researchers, institutions, and countries/regions. Lei and Liu's (2019) bibliometric analysis of applied linguistics (first published online in 2018) appears to be the first in the field of linguistics and applied linguistics that did not only study and compare research productivity and impact but also, more importantly, examined, as its focus, the research trends (in terms of key research topics most frequently and extensively discussed and explored) in applied linguistics from 2005 to 2016. Since their study, however, quite a few bibliometric studies with such a scope and focus have quickly appeared (Amini Farsani et al., 2021; Hyland & Jiang, 2021a, 2021b; Liu & Hu, 2021; Yilmaz et al., 2019; Zhang, 2020). With some minor variations in methodology and scope, these studies have all focused on the following aspects of information about the research in their respective chosen target research/teaching area: (i) the most popular research topics over time, (ii) the most highly cited or most influential authors, publications, journals, and sometimes institutions/countries where the authors work, and (iii) the co-citation relations among the most influential authors and publications.

These bibliometric studies in applied linguistics have produced some interesting and important findings about the research developments in the various research areas and issues in applied linguistics being examined. For example, Lei and Liu's (2019) study on the research in the entire field of applied linguistics from 2005 to 2016 showed that important changes occurred during the 12-year period, with the field paying significantly less attention to traditional

linguistic theories and topics, such as generative and structural linguistics and issues like "phonological awareness" and "word order," but significantly more attention to sociocultural and multilingual issues and new technology, including topics of "social class" and "language ideology." Of course, the study also identified some research topics that remained popular during the entire 12-year period, such as "communication competence" and "discourse analysis." Zhang's (2020) bibliometric analysis of the research on SLA in the past two decades (1997-2018) also revealed significant changes in SLA research, particularly with the emergence of some alternative approaches to SLA studies guided by sociocultural and complexity theories (something that was also observed in Lei and Liu, 2019). These emergent approaches contrast sharply with the more established psychologically oriented cognitive approaches to SLA.

Unlike Lei and Liu's (2019) and Zhang's (2020) studies on broader areas of applied linguistics and SLA, Hyland and Jiang's (2021a, 2021b) and Liu and Hu's (2021) bibliometric analysis each focused on the developments of one of two narrower areas that have a relatively short history: EAP and ESP, respectively. Besides identifying the main research topics, these studies delineated how the two relatively new subareas of applied linguistics had rapidly evolved into two vibrant and mature subdisciplines or research strands with a broad scope of academic inquiries of their own. In short, all these results have demonstrated the value of bibliometric analysis.

2.3. Purposes and research questions

The purpose of the present bibliometric study is to uncover the development and scope of the research on L2 listening, one of the four essential language skills in language acquisition. Specifically, focusing on the same aspects of information analyzed in the aforementioned bibliometric studies in applied linguistics, this study aims to answer the following research questions related to research publications on the learning and teaching L2 listening over the past 73 years (1948-2020):

RQ1: What is the distributional pattern of the publications (i.e., the number of publications on L2 listening each year) across the 73 years?
RQ2: What have been the most frequently discussed/explored research topics and have there been any diachronic changes in these topics over time?
RQ3: Who are the most highly cited authors and how are they interrelated in research?
RQ4: Which publications are the most highly cited and how are they interrelated?
RQ5: Which journals are the most highly cited ones and how are they interrelated?

3. Methodology

3.1. Data

The data used for the present study were the set of bibliographic information that we downloaded from Scopus, one of the largest bibliometric databases (Bar-Ilan, 2008). The reason we used the database of Scopus rather than that of Web of Science as our data source was that the Scopus database contained more data, that is, it contained journal articles on L2 listening published in the 1940s and 1950s, which were not included in the database of Web of Science at the portal used in this study. Specifically, the data were searched and downloaded with the query syntax in Scopus as shown in Appendix A. That is, all publications with the key word *listening* in either the title, abstract, or keywords of a search article published in the 42 major journals of applied linguistics (Lei & Liu, 2019) were retrieved and their bibliographic information was downloaded. The query was performed on January 28, 2021 at the portal of one of researchers' university library.

As a result of this step, the bibliographic information of 973 articles was obtained from a total of 30 different applied linguistics/language teaching journal (a list of the journals is provided in Appendix B in a table format). Furthermore, because not all the articles were directly relevant to the learning and teaching of L2 listening, the researchers closely read the title and abstract of the articles and filtered out those publications that did not pertain specifically to L2 listening teaching or learning. In addition, nine articles published in 2021 were excluded. In effect, 380 articles were filtered out and the remaining 593 ones, published in 27 journals between 1948 and 2020, were used for analysis in this study (see Appendix B). Figure 1 illustrates the steps (i.e., the workflow) followed in the process for identifying all the research articles on L2 listening.

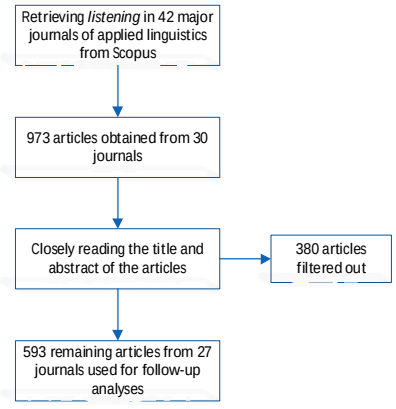

Figure 1 Flowchart for the identification of journal articles on L2 listening

Then, the 593 articles were grouped into three uneven publication periods, as described in Table 1, for the purpose of investigating and comparing research trends in terms of research topics over time. The reason for this uneven division of time periods (43 years in Period 1, 20 years in Period 2, and 10 years in Period 3) was that, as can be seen in Figure 2 and Table 1, the number of publications is highly skewed towards the most recent decades. Our uneven division allowed keeping the number of publications more balanced across the three periods. We will return to this issue in Section 3.1. Another very important point to note is that, compared with the total number of publications in a more generic field, such as applied linguistics and SLA (see Lei & Liu, 2019; Zhang 2020), or in many other more specific research areas (such as EAP and ESP; see Hyland & Jiang, 2021a, 2021b), the total number of publications on the learning and teaching of L2 listening is very small, considering especially the fact that this study covered a much larger span of years (73 years) than those covered in the other studies mentioned above, which ranged from 12 years in Lei and Liu's (2019) study to 30 or 40 years in the studies by Hyland and Jiang (2021a, 2021b), Liu and Hu (2021) and Zhang (2020). In other words, the size of the corpus used in this study is very small, much smaller than those in the existing studies, a fact that would expectedly lead to lower total citation/co-citation numbers.

Table 1 Statistics of the data

Periods	Number of articles	Number of words in the abstracts
Period 1 (1948-1990)	143	14193
Period 2 (1991-2010)	201	30976
Period 3 (2011-2020)	249	46260
Total	593	91429

3.2. Data analysis

We analyzed the data in the following steps to help address the aforementioned research questions. First, based on the bibliographic information such as year of publication, we calculated the annual number of publications with a homemade Python script in order to answer RQ1.

Second, in order to examine the research trends and answer RQ2, we first parsed the abstracts with spaCy (Honnibal & Johnson, 2015), a Python package of natural language processing, and extracted all the noun phrases in the abstracts as potential research topics because research has shown that research topics are all single- or multi-word noun phrases (Lei et al., 2020). This initial extraction generated a total of 2510 items for Period 1, 4833 for Period 2, and

6925 for Period 3. Then, the raw frequency and range (i.e., the number of abstracts in which a noun phrase occurred) of all the noun phrases in each of the three periods were calculated. Range was included as a criterion for research topic selection to help ensure that the selected topics were not the result of only a few authors' highly frequent mention of them. After several rounds of experiments, we decided that a noun phrase with a minimum raw frequency of 5 and a minimum range of 3 was taken as a candidate for important research topics in L2 listening (see Appendix C for selected topics). Both the frequency and range selection requirements were low due to the small total number of abstracts of articles on listening, that is, the small size of the corpus as mentioned previously. It is important to add that we included a stop-word list to filter out some function words, such as pronouns (e.g., *he, they,* and *their*) and conjunctions (e.g., *and, but*, and *since*) because noun phrases as research topics would not include these function words. The application of the frequency and range criteria as well as the exclusion of stop words resulted in a total of 69 research topic candidates for Period 1, 175 for Period 2, and 258 for Period 3.

Next, the three authors individually judged whether each of the items on the resulting lists was indeed an important research topic in the learning and teaching of L2 listening. This selection step, one also taken by Lei and Liu (2019), was necessary because many of these candidate items were generic terms (i.e., concepts, practices, etc.) that were either not L2 listening-specific enough to shed light on our research questions, such as "students," and "teachers," or were L2 listening specific but were not about any specific issue or practice in the learning and teaching of L2 listening, such as "L2 listening." For any disagreements in our individual judgement decisions, we discussed until a full agreement was reached. After this manual selection, a total of 103 research topics were obtained (i.e., 16 for Period 1, 31 for Period 2, and 56 for Period 3). Because some of the research topics from the three periods overlap, the actual total final number of important research topics was 69 (all the 69 topics are provided in Appendix C in a table format). Furthermore, the log-likelihood test was applied to each of the topics in order to examine whether their frequencies experienced any significant up- or downward changes across the three periods. The log-likelihood value of 3.84 was considered as the threshold value for statistical significance (Rayson & Garside, 2000; Wilson, 2013), that is, the value that indicates a significant up- or downward change across the periods. We also used the values of the Bayesian information criterion (BIC) (Wilson, 2013) as effect size measures and followed the common practice of setting a BIC of 2 as the minimum effect size for rejecting the null hypothesis (Huan & Guan, 2020). We computed all the above statistical analyses with homemade Python scripts.

Finally, using VOSviewer v1.6.16 (Van Eck & Waltman, 2010, 2014), we computed the citation/co-citation frequency numbers to identify the most

highly cited authors, the most highly cited publications, and the most highly cited journals as well as the interrelations among the items in each of the three categories in order to answer RQs3-5.

4. Results and discussion

4.1. Number of yearly publications across the 73 years being examined

The annual number of publications pertaining to the learning and teaching of L2 listening is plotted in Figure 2. It is important to first reiterate that the number of publications is highly skewed towards the past decade, especially the past few years. While a substantial increase in the number of publications in the past decade or two has also been observed in all the bibliometric studies of other L2 research areas thanks to the fact that many more journals including new ones are included in the publication data systems such as Scopus, the recent increase in L2 listening was much greater. Furthermore, the total number of publications in this research area is very small compared with those in many other L2 research areas. This very small number of publications on L2 listening indicates that L2 listening has not gained much interest from L2 researchers. Hopefully, the recent sharp increase harbingers an increased interest in L2 listening. One more point worth noting is that there was a noticeable increase of the number of publications on L2 listening in the mid-1980s, but then the number soon decreased and fluctuated until around 2010 when a sharp increase began.

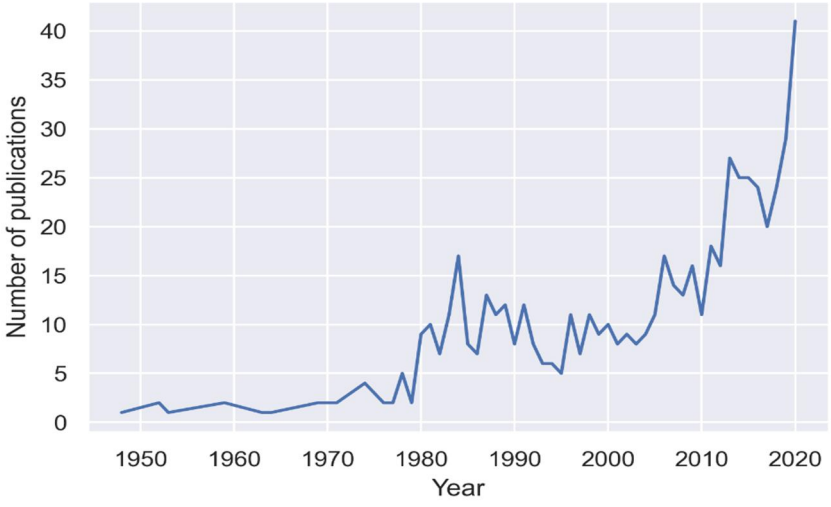

Figure 2 Annual distribution of publications

The temporary increase in the mid-1980s might be attributed to the growing popularity of communicative language teaching (CLT), for, as will be shown below in Sections 3.3. and 3.4, Canale and Swain's (1980) seminal article on CLT approaches was one of the most highly cited items in the publications in L2 listening. The temporary decrease of L2 listening publications that occurred between the early and mid 1990s might be the by-product of a significant increase of interest in L2 writing (as partially evidenced by the launching of *Journal of Second Language Writing* in 1992) as well as the result of a rapid emergence and growth of new research areas in applied linguistics, such as EAP and ESP. This hypothesis may also be supported by the fact that topics of "academic purposes" and "academic listening" increased significantly in Period 2, which began in 1991.

In short, compared with other L2 research areas, listening seems to have remained a relatively "overlooked dimension in language acquisition," a point that Feyten (1991, p. 173) made thirty years ago. This lack of strong interest in L2 listening research might have resulted from the fact that L2 learning/teaching (especially in the context of the target language as a foreign language) historically focused on the development of a mainly reading knowledge in the target language. Also, as Vandergrift (2007) has noted, the implicit nature of listening and the difficulties involved in researching both listening input and listening process might have prevented interested researchers from conducting L2 listening research. Due to these reasons, although more listening research started to appear since the early 1970s, a relative overlook of listening lingered on until about this past decade (as shown by the substantial increase of studies on L2 listening found by our study). However, this overall lack of adequate research on the learning and teaching of L2 listening might be good news for researchers interested in working on this dimension of L2 acquisition because the lack of adequate research into this dimension may mean that research in this area has enormous room for growth.

4.2. Most frequently discussed/explored research topics

The results concerning the most prominent research topics in each of the three periods are reported in Appendix C in a table format. A few important points regarding the computation and reporting of the results need to be made for better understanding. First, because of the two selection criteria for the important research topics (minimally 5 in frequency and 3 in range in each period) and because of the changes of research interests, many of the important topics found in the third period did not make the list of the first period with quite a few not making the list of the second period either. On the other hand, some of the topics found in the first period (e.g., "dictation," "receptive skill," "[audio] tape,"

and "TOEFL") did not make the list of the second and/or the third period because of significantly decreased interest in them. Second, when an item did not make the list of a given period, it means that the item did not have the required minimum raw frequency of 5 or range of 3. For computation and comparison purposes, in such a case, the number of frequency of this item in this period was reported as 0-4. Third, although the reported frequency numbers were raw frequency numbers, our statistical comparison of the frequencies across the three periods took into consideration the corpus size of each period, that is, the differences in corpus size across the three periods were factored into our statistical calculation. In this sense, our comparison of the frequencies across the three period was de facto based on normed frequencies. Finally, in the results in Appendix C, one of the following three signs is provided to show the frequency change of a topic between two neighboring periods from left to right: ~ means "no significant change," > indicates "significant decrease," and < signifies "significant increase."

The results indicate that these most important topics fall roughly into five groups based on their frequency distribution across the three periods. Group 1 is composed of topics whose frequency grew significantly from Period 1 to Period 2 and then stayed popular in Period 3, such as "caption(s)," "contexts," "(English for) academic purposes," "input," and "technology." The reasons for the emergence or increase of the discussion on these topics appear to be twofold. First, starting from the 1990s, researchers and teachers began to pay more attention to topics, such as the role of input and the contexts of listening or the contexts in which students were learning L2 listening. Second, new technologies with increased accessibility appeared, such as captions shown in videos used for listening.

Group 2 consists of topics that emerged or increased significantly in Period 3, including "aural vocabulary knowledge," "individual differences," "integrated tasks," "intelligibility," "metacognitive awareness/instruction," and "working memory." The emergence or increased discussion of these new topics reflected the influence of new theories and perspectives in education and other fields on the learning and teaching of L2 listening, an issue we will return to below. Group 3 is made up of topics whose popularity decreased significantly over time or disappeared entirely, such as "dictation," "receptive skills," "(audio) tape," and the "TOEFL" test. The decease or disappearance of the discussion of these topics reflects the changes of views and teaching practices. For example, dictation, which was used frequently in listening practices in old days, is no longer a main technique for teaching of listening and audio tapes have been essentially replaced by audio/video files. As for the significant decrease of the discussion of "receptive skills," while listening is still a receptive language skill, researchers and teachers today are no longer focusing on the receptive nature of listening as much as they used to; instead, they are concentrating more on

other aspects or issues related to listening, such as individual differences, metacognition, and the use of strategies.

Group 4 includes those topics whose frequency first rose from Period 1 to Period 2 but then deceased in Period 3, such as "academic listening," "listening tests," and "comprehension tests." The decrease of the discussion of such topics in Period 3 might suggest a shift of attention of researchers and teachers from these topics to new topics, such as those listed in Group 2 above. Finally, Group 5 is composed of those topics that have enjoyed essentially the same level of attention, such as "instruction," "listening comprehension," "tests," and "vocabulary." These topics are mostly more generic in nature and are hence perennial in the discussion of L1 listening. It is necessary to note that although "computer assisted language learning" fell into this group, the statistical results showed its increase from the first period was almost significant. More importantly, the topic was entirely absent in Period 1, that is, it did not emerge until Period 2 with a relatively small frequency of 5. In short, a close analysis suggests that "computer assisted language learning" is not really a typical perennial topic that enjoyed popularity even back in the 1950s through 1970s because personal computers were not available then. Instead, it is a topic that really started to gain more and more attention since the early 1990s when PCs began to become widely available.

To sum up, the above results quite accurately reflect the developments of theories and practices in language teaching in general (e.g., individual differences, integrated tasks, and increased use of technology) and in the teaching of listening in particular over the past seven decades, especially the past three decades. As is well known, the rapid advancements in technology have led to an increased and broadened use of technology in education in the past 30 years. Beginning from the 1990s, "computer-assisted language learning/teaching" and other technology-supported teaching practices have entered many language classrooms. Digital audio/video files ready to be played on any electronic devices with functions like "caption" have completely replaced "(audio) tapes" in the teaching of listening. Similarly, new theories and practices, particularly those that are cognitive, sociocultural, and socio-psychological in nature, have also influenced the teaching of L2 listening, especially in the past decade, with researchers and teachers paying significantly more attention to issues, such as "individual differences," "metacognitive awareness/instruction," "motivation," and "working memory" as well as making use of new teaching/research methods and having new foci in teaching, such as "academic listening" and the use of "caption," "integrated tasks," and "semi-structured interviews."

It is important to note the results also seem to suggest that in L2 listening, some aspects of traditional topics, such as grammar and vocabulary have gained more attention recently (i.e., in the past decade) due to new perspectives and

understandings now available on these traditional topics, such as the notion of "aural vocabulary knowledge" and the important role of multiword units and lexicogrammar knowledge (Pan et al., 2018) as well as the notion of "intelligibility" regarding "pronunciation." In other words, researchers and teachers are now focusing on these new aspects or notions of traditional topics. Another interesting point is that "reading" (including "L2 reading" and "reading comprehension") and "writing" have continuously been discussed in research on L2 listening. This fact highlights the close interconnections of these different language skills and the need to integrate them in language learning and teaching, hence the importance of "integrated tasks."

4.3. Co-citation analysis of highly cited authors

The co-citation analysis of the authors in the references was conducted to identify the most highly cited authors and their co-citation relations, that is, how they were interrelated in terms of similarity in their research foci. Following Yilmaz et al. (2019), we set the minimum citation count of an author at 50 because this frequency appeared to be the right one to use to identify authors who made significant contributions in the field, that is, it was not too high to exclude authors with significant contributions but also not too low to include authors whose contributions might not be considered significant enough. The results showed that 46 authors met the criterion. The analysis yielded both the most highly cited authors and the co-citation relations of the 46 authors. The top 20 most highly cited authors, along with their respective numbers of citations received and the statistics of their interrelations, are reported in Table 2 and the results of the interrelations among the most highly cited authors are plotted in a network map in Figure 3.

The results in Table 2 show that L. Vandergrift (375 citations), C. Goh (238 citations), J. Field, I. S. P. Nation, and G. Buck were the top five most highly cited authors in the research on L2 listening. The results are interesting in that, while most of the authors on this list (e.g., Vandergrift, Goh, Field, Buck, & Rost) are renowned experts on L2 listening, some are not actually researchers with a main focus on listening. For example, Nation, Schmitt, Hulstijin, Webb, and Laufer are experts on vocabulary learning, Chamot is well-known for her work on language learning strategies, and Bachman and Alderson were renowned scholars on language testing. The fact that these scholars of diverse interests were among the most highly cited authors in L2 listening reveals the various linguistic and teaching aspects or issues that are of particular importance to the learning and teaching of L2 listening, including learning strategies, testing, and vocabulary.

Table 2 Top 20 most highly cited authors

Author	Weight <Citations>	X	Y	Cluster	Weight <Links>	Weight <Total link strength>
L. Vandergrift	375	-0.2671	0.4908	3	206	12360
C. Goh	238	-0.4025	0.5458	3	205	8030
J. Field	175	-0.2483	0.2835	3	204	5479
I.S.P. Nation	175	1.0389	0.0646	4	191	6959
G. Buck	158	-0.4364	-0.161	1	204	4645
M. Rost	155	-0.2287	0.3291	3	201	4364
S. Graham	151	-0.4802	0.8085	3	192	5448
N. Schmitt	137	0.8828	0.0359	4	192	5674
J. Hulstijn	118	0.3185	-0.1295	4	206	4291
S. Webb	118	1.3785	0.2638	4	149	5087
A.U. Chamot	110	-0.8061	0.6813	3	176	3665
L. F. Bachman	109	-0.7016	-0.6004	1	169	2720
R. Vanderplank	98	-0.0688	0.8676	3	180	3268
M. Swain	93	-0.0154	-0.2511	2	190	1798
J.C. Alderson	92	-0.3993	-0.5135	1	179	2882
P. A. Dunkel	92	-0.547	0.1057	1	179	2247
A. Cutler	82	0.4772	-0.6136	2	155	1768
J. Rubin	81	-0.6053	0.4055	3	186	2259
E. Wagner	78	-0.3376	0.0538	1	151	2006
B. Laufer	76	1.1576	0.0871	4	153	2851

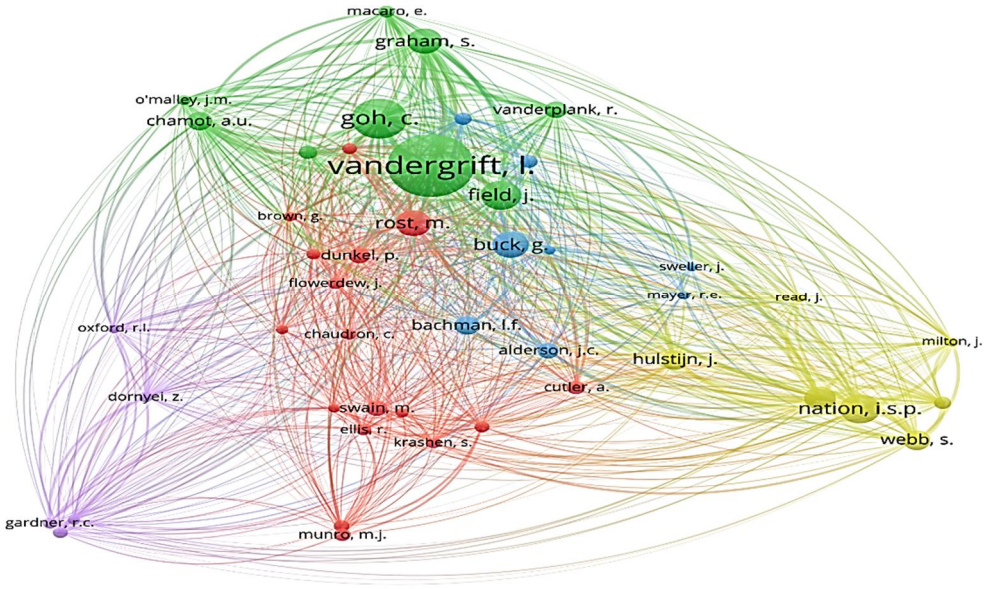

Figure 3 Co-citation analysis of highly cited authors

The results of the network plot (Figure 3) reflecting the interrelations among the top cited authors show that the most highly cited authors were grouped into five clusters (green, blue, orange, purple, and green-yellowish) based on how the topics of their research publications were related to one another. Before

we discuss the network plot in detail, it is important to note that a few authors not in the top 20 list in Table 2 appeared in the plot because, while they were not in the top 20, they were among the highly cited authors in the results and because they were closely linked to some of the top 20 authors by their co-citations. In this network plot, L. Vandergrift, C. Goh, J. Field, M. Rost, and G. Buck form the hub of the entire network because they were not only among the top six most highly cited authors but also because their publications were all specifically about L2 listening. In this sense, they made the greatest all-around contribution to the research on the learning and teaching of L2 listening. In contrast, the remaining most highly cited authors (many of whom were not scholars with a focus on listening) contributed mainly to one specific aspect or issue of L2 listening directly or indirectly. For example, L. Bachman and J. C. Alderson, as just mentioned, were experts on language testing in general and their publications, along with Buck (whose highly cited book *Assessing Listening* was about testing listening specifically) and the others in the blue cluster, had greatly influenced or shaped learning assessment of L2 listening. On the other hand, the highly cited vocabulary specialists, I. S. P. Nation and S. Webb, along with a few other authors in the green-yellowish cluster, demonstrated the importance of vocabulary in L2 listening as well as the need to develop effective ways to increase learners' aural or receptive vocabulary size and enhance their knowledge in such vocabulary.

Furthermore, A. U. Chamot, J. M. O'Malley, and R. L. Oxford (who was located in the purple cluster perhaps because of her work on learning styles and motivations) were renowned scholars on language learning strategies and their publications had an impact on the development and use of listening strategies. This explains why Chamot and O'Malley were in the green cluster with Goh, Vandergrift, Graham and the others who focused specifically on the use of L2 listening strategies, including cognitive and metacognitive ones. In addition, L2 acquisition theorists and teaching methodologists, such as Swain, Ellis, and Krashen, were grouped in the orange cluster with M. Rost and a few others whose publications focused on theories and teaching methodologies in L2 listening specifically. Finally, the inclusion of Dörnyei, Gardner, and Oxford (all experts on motivation and learning styles) in the purple cluster of this network map illustrates the importance of learner motivation in learning L2 listening.

4.4. Co-citation analysis of most highly cited publications

The co-citation analysis of the publications in the references was conducted, based on the cited works in the references section of the articles, to identify the most highly cited publications and the co-citation interrelations among these

publications. The minimum citation count of a publication for inclusion in the analysis was set at 10. The results showed that 20 publications met this criterion, and they are listed in Table 3. The co-citation interrelations of the 20 works were plotted in Figure 4.

Table 3 Top 20 most highly cited publications

Publications	Citation Count
Buck, G. (2001). *Assessing listening*. Cambridge University Press.	79
Vandergrift, L. (2007). Recent developments in second and foreign language listening comprehension research. *Language Teaching*, *40*(3), 191-210.	51
Goh, C. A. (2000). Cognitive perspective on language learners' listening comprehension problems. *System*, *28,* 55-75.	42
Vandergrift, L. (2003). Orchestrating strategy use: Toward a model of the skilled second language listener. *Language Learning*, *53*(3), 463-496.	42
Rost, M. (2002). *Teaching and researching listening*. Longman.	39
Rubin, J. (1994). A review of second language listening comprehension research. *Modern Language Journal*, *78*(2), 199-221.	26
Nation, I. S. P. (2006). How large a vocabulary is needed for reading and listening? *Canadian Modern Language Review*, *63*(1), 59-81.	24
Rost, M. (1990). *Listening in language learning*. Longman.	24
Graham, S., & Macaro, E. (2008). Strategy instruction in listening for lower-intermediate learners of French. *Language Learning*, *58*(4), 747-783.	22
Hulstijn, J. (2003). Connectionist models of language processing and the training of listening skills with the aid of multimedia software. *Computer Assisted Language Learning, 16,* 413-425.	21
Field, J. (2008). *Listening in the language classroom*. Cambridge University Press.	20
Vandergrift, L. (2004). Listening to learn or learning to listen. *Annual Review of Applied Linguistics, 24,* 3-25.	20
Goh, C. (2002). Exploring listening comprehension tactics and their interaction patterns. *System, 30*(2), 185-206.	19
Lund, R. J. (1991). A comparison of second language listening and reading comprehension. *Modern Language Journal*, *75*(2), 196-204.	18
Vandergrift, L., & Baker, S. (2015). Learner variables in second language listening comprehension: An exploratory path analysis. *Language Learning*, *65*(2), 390-416.	17
Goh, C., & Taib, Y. (2006). Metacognitive instruction in listening for young learners. *ELT Journal*, *60*(3), 222-232.	16
Vandergrift, L., & Tafaghodtari, M. H. (2010). Teaching L2 learners how to listen does make a difference: An empirical study. *Language Learning, 60,* 470-497.	14
Graham, S., (2006). Listening comprehension: The learners' perspective. *System*, *34*(2), 165-182.	13
Canale, M., & Swain, M. (1980). Theoretical bases of communicative approaches to second language teaching and testing. *Applied Linguistics*, 1, 1-47.	12
Winke, P., Gass, S., & Sydorenko, T. (2010). The effects of captioning videos used for foreign language listening activities. *Language Learning & Technology*, *14*(1), 65-86.	10

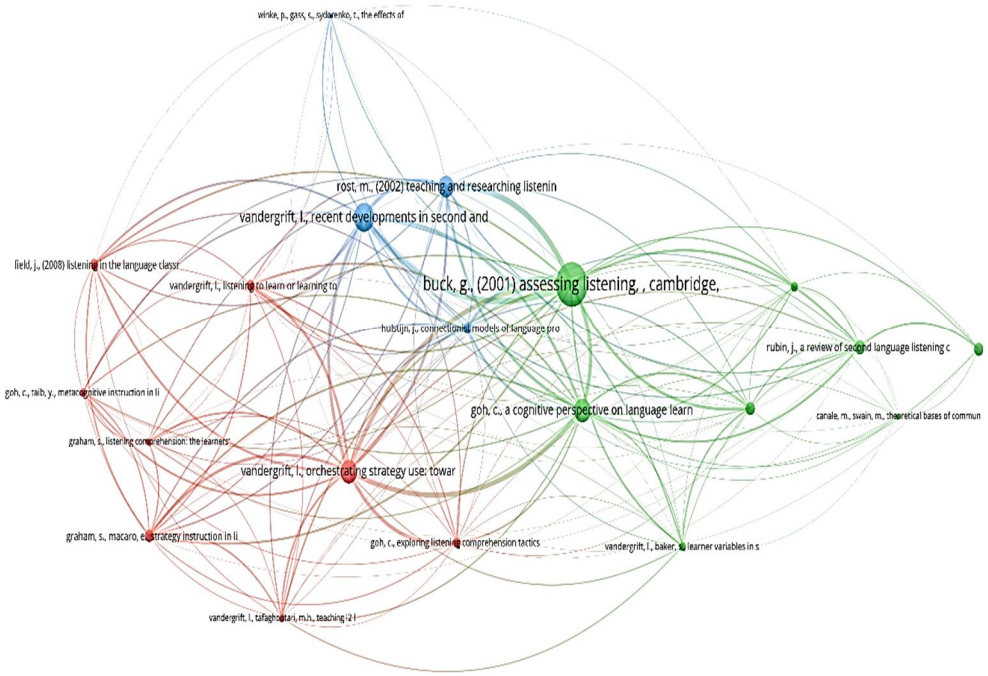

Figure 4 Co-citation analysis of the most highly cited publications

The results in Table 3 show that, with the only exception of Canale and Swain's (1980) seminal article on the theoretical foundations of communicative language teaching approaches, all these most highly cited items were publications specifically on L2 listening, either on overall issues in L2 listening, such as, for example, Field's (2008) and Rost's (1990, 2002) books or Vandergrift's (2007) and Rubin's (1994) review articles, or on one aspect of it, such as the teaching and use of L2 listening strategies (e.g., Graham & Macaro, 2008; Vandergrift, 2003), the assessment of L2 listening (e.g., Buck, 2001), and the use of technology in the training of L2 listening (Hulstijn, 2003). It is important to note that two of the top six most highly cited publications are Vandergrift's (2007) and Rubin's (1994) systematic review articles, with Vandergrift's review boasting the second highest number of citations among all the publications. This fact demonstrates the importance and influence of systematic review articles in research, a finding that has also been reported by Amini Farsani et al.'s (2021) study.

The results of the network map (Figure 4) presenting the interrelations among the 20 most highly cited publications show that these publications were grouped into three clusters (blue, green, and orange). The blue cluster headed by Vandergrift's (2007) review article on recent developments in L2 listening consists of publications that explored new teaching practices, including Rost's

(2002) book on researching and teaching of L2 listening, Hulstijn's (2003) article on the use of multimedia software for training L2 listening skills, and Winke et al.'s (2010) article on the effects of using captioning videos on L2 listening comprehension. The green cluster, with Buck's (2001) book on assessing L2 listening (the most highly cited of all) as its center, is made up of mostly teaching methodology and teaching theory-related publications, such as Canale and Swain's (1980) seminal article on the theoretical foundations of communitive language teaching approaches, Goh's (2000) article expounding a metacognitive perspective on L2 listening, Vandergrift and Baker's (2015) article on learner variables, and Rubin's (1994) review article on L2 listening. The orange cluster, the largest of the three clusters, has Vandergraft's (2003) article on orchestrating strategy use as its main hub and includes quite a few articles related to listening strategies, including Graham and Macaro's (2008) article on strategy instruction, Goh's (2002) article on listening comprehension tactics, and Vandergrift and Tafaghodtari's (2010) article on teaching learners how to listen.

There are a few interesting points about this network map worth discussing. First, while Goh's (2000) metacognitive perspective is in the methodology/theory-focused green cluster, it is also connected to Hulstijn's (2003) article on the use of multimedia software in the blue cluster and also to Vandergrift's (2003) article on orchestrating strategies in the orange cluster. The reason for the connection between Goh's (2000) metacognitive perspective article and Hulstijn's (2003) article was their shared effort in bringing new theories and practices into L2 listing instruction. The connection of Goh's (2000) article to Vandergrift's (2003) strategy-related article was Goh's strife to enhance learners' metacognitive awareness of their learning so as to help learners become better listeners.

Another interesting point worth noting is that Vandergrift's (2007) and Rubin's (1994) review articles are placed in two different clusters: while Vandergrift's is in the blue cluster with the most recent publications on L2 listening teaching, Rubin's (1994) publication is in the green cluster located close to Canale and Swain's (1980) article on communicative language teaching approaches. This fact suggests not only that the two reviews each covered the main theories and issues of their own time but also that the theories and practices changed over time.

4.5. Co-citation analysis of highly cited journals

The co-citation analysis of the journals in the references was conducted, based on the cited works in the references section of the articles, to analyze the highly cited journals and the co-citation interrelations among these journals. The minimum

citation count of a journal was set at 50. The results showed that 40 journals met the criterion. The top 20 most highly cited journals are listed in Table 4. The co-citation interrelations of the 40 journals are presented in a network map in Figure 5.

Table 4 Top 20 most highly cited journals

Journal	Citation Number
Language Learning	783
Modern Language Journal	780
TESOL Quarterly	663
System	576
Applied Linguistics	515
Language Testing	498
Foreign Language Annals	489
Studies in Second Language Acquisition	445
ELT Journal	267
Computer Assisted Language Learning	217
Canadian Modern Language Review	195
Language Learning & Technology	175
Journal of Educational Psychology	157
Language Teaching	146
Language Teaching Research	144
Applied Psycholinguistics	141
ReCALL	140
Calico Journal	136
Journal of the Acoustical Society of America	130
Reading in a Foreign Language	114

The list of journals in Table 4 shows several interesting results. First, with the exception of only a couple (e.g., *Calico Journal* and *Reading in a Foreign Language*), these most highly cited journals cited in L2 listening research all boast a high impact factor in the field of linguistics according to the SSCI impact factor reports (Clarivate Analytics, 2020). Second, while the top highly cited journals are well established leading journals in applied linguistics/SLA, including *Applied Linguistics, Language Learning, Studies in Second Language Acquisition*, *Modern Language Journal*, and *TESOL Quarterly,* quite a few in the list are journals devoted to language teaching using technology, such as *System, Computer Assisted Language Learning, Language Learning and Technology, ReCALL,* and *Calico Journal*. These results reveal a strong influence of the leading journals in applied linguistics on the learning and teaching of L2 listening and the important role that technology now plays in L2 listening.

Furthermore, the fact that *Journal of Educational Psychology* and *Applied Psycholinguistics* made the most highly cited list of journals suggests that psychology also figures quite prominently in L2 listening. Finally, that fact that the journal *Reading in a Foreign Language* was among the most highly cited journals

in L2 listening research indicates that listening and reading, as two receptive language skills, are very closely related and are perhaps often discussed together in research. The latter point can be evidenced by the fact that two of the most highly cited publications shown in Table 3 are publications addressing both listening and reading: Lund's (1991) article "A comparison of second language listening and reading comprehension" and Nation's (2006) article "How large a vocabulary is needed for reading and listening."

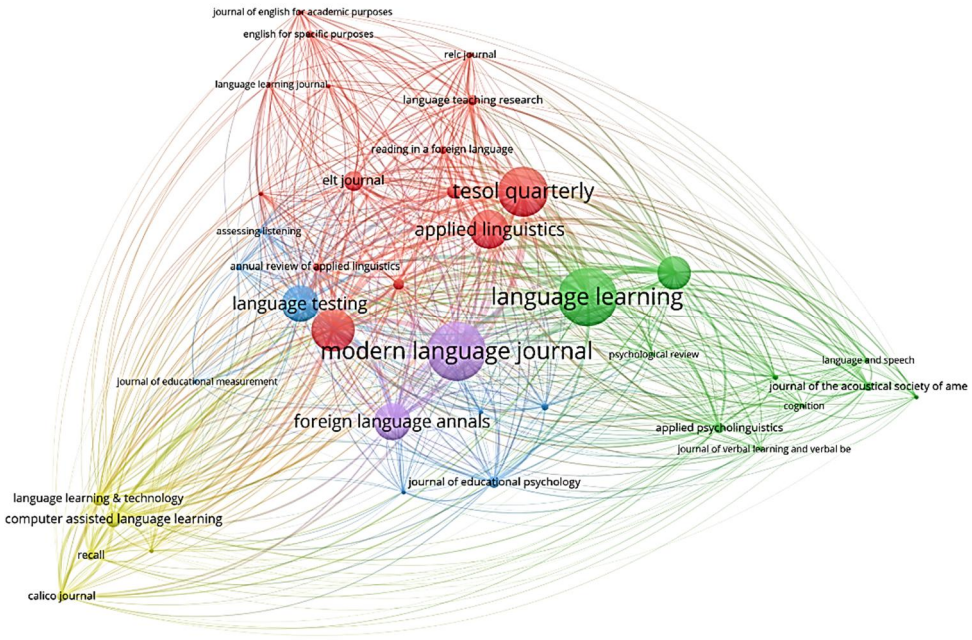

Figure 5 Co-citation analysis of highly cited journals

As for the co-citation analysis of the interrelations among the most highly cited journals, the results in Figure 5 show that they are grouped into five clusters (blue, green, green-yellowish, orange, and purple). The three most conspicuous clusters are: (i) the green cluster headed by *Language Learning* and composed mainly of psychology- and cognition-related journals, such as *Applied Psycholinguistics, Cognition,* and *Psychology Review*; (ii) the orange cluster headed by *Applied Linguistics* and *TESOL Quarterly* and made up of many teaching practice-oriented journals, such as *ELT Journal, Language Learning Journal*, and *Language Teaching Research*; and (iii) the purple cluster formed by only two journals: *Modern Language Journal* and *Foreign Language Annals*. This purple cluster does not appear to be formed mainly by a shared research specialization but

by the close relationship between the professional organizations that own the journals, for *Modern Language Journal* is the publication of the US National Federation of Modern Language Teachers Associations, while *Foreign Language Annals* is the publication of the American Council. Being two journals of closely related professional organizations in the US, they might often publish articles with citations of publications from each other.

The remaining two clusters are smaller ones grouped clearly by their specialized research areas: the blue cluster is formed mostly by journals focused on language assessment headed by *Language Testing* while the green-yellowish cluster is composed exclusively of journals devoted to the use of technology in language learning and teaching, including *Computer Assisted Language Learning, Language Learning & Technology, ReCALL,* and *Calico Journal.* Overall, the network plot clearly illustrates not only what journals have significantly influenced the research on L2 listening but also what theories, issues, and practices that have driven such research.

5. Conclusion

This bibliometric study has analyzed the research on the learning and teaching of L2 listening over the past 73 years divided into three main periods. Via keyword analysis of the research topics and co-citation analyses of the most highly cited authors, publications, and journals, this study has produced some interesting and useful findings. First, although there has been a substantial increase in the number of publications on L2 listening in the past two decades, the amount of research in this area has remained quite small and limited in comparison with those in other areas of applied linguistics, such as EAP, ESP, L2 reading, and especially L2 writing. In other words, L2 listening has stayed as a small research area in applied linguistics, a fact that suggests that there is tremendous room to grow for research on L2 listening.

Second, there have been significant changes in the research topics in L2 listening thanks to the advancements made in linguistic and language teaching theories/practices and technology. For example, increasing attention appears to have been paid to socio-cognitive issues and individual differences. Also, many new technologies have been introduced and used. Even some traditional topics, such as pronunciation and vocabulary, have gained renewed interest from researchers but are studied from new perspectives with new understandings and foci. On the other hand, some other topics have gone out of fashion, such as “dictation” and the use of audio “tapes.” Still some topics have remained issues of interest since they have been continuously explored over time, such as “instruction” and “vocabulary.” Third,

the study has identified the most highly cited, that is, most influential researchers, publications, and journals in the research on L2 listening as well as the interesting interrelations among these authors, publications, and journals respectively.

These findings should be helpful for both teachers and researchers working on the teaching of L2 listening and may have some pedagogical implications. For instance, for classroom teachers, the results show clearly the need for them to use more new technology and integrated tasks as well as to pay more attention to individual differences and metacognitive awareness while turning away from outdated teaching practices, such as dictation and treating listening exclusively as a receptive language skill. Similarly, in dealing with specific aspects of listening, such as vocabulary, teachers may need to consider various dimensions related to vocabulary, such as its size and different types of vocabulary knowledge, including knowledge of collocations and multiword units.

Regarding implications for researchers, the finding that research on L2 listening is limited should encourage more researchers to do research work in this area. Also, the information about what the trending research topics are can help researchers make more informed decisions on what research topics to work on and what topics to avoid (e.g., the use of dictation). The information on the most influential researchers, publications, and journals can help interested researchers to find the most appropriate references for their research and the most appropriate journals as the target venues for the publication of their research.

Of course, this study has a few limitations and implications for future research. First, this study examined only article abstracts. Future bibliometric studies on L2 listening may need to include other genres such as full texts of articles, book chapters, proceedings articles, and monographs. Second, this study did not consider L1 listening. A bibliometric analysis of L1 listening along with a comparison between L1 and L2 listening will be of interest to researchers and educators working either on L1 or L2 listening. Such a comparison may cover both research topics explored and research methods used. Third, since reading is also a receptive language skill like listening, a comparison of bibliometric analyses of L2 listening and L2 reading will also help us better understand the similarities and differences between the research foci on the two different receptive language skills in terms of research topics addressed, citation patterns, evolving research trends, and other issues.

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APPENDIX A

Query syntax in Scopus and the 42 journals for the retrieval

TITLE-ABS-KEY(listening) AND SRCTITLE(„Applied Linguistics" OR "Bilingualism: Language and Cognition" OR "Studies in Second Language Acquisition" OR "Language Teaching" OR "Language Learning" OR "Applied Psycholinguistics" OR "Journal of Second Language Writing" OR "Language Acquisition" OR "Computer Assisted Language Learning" OR "Second Language Research" OR "Journal of English for Academic Purposes" OR "TESOL Quarterly" OR "Language Teaching Research" OR "Language Learning & Technology" OR "Cognitive Linguistics" OR "International Journal of Bilingual Education and Bilingualism" OR "Language Policy" OR "Modern Language Journal" OR "English for Specific Purposes" OR "ReCALL" OR "Assessing Writing" OR "International Journal of Bilingualism" OR "Language Assessment Quarterly" OR "Language and Education" OR "Language Testing" OR "Foreign Language Annals" OR "ELT Journal" OR "Lingua" OR "System" OR "Language Culture and Curriculum" OR "IRAL-International Review Of Applied Linguistics In Language Teaching" OR "International Journal of Corpus Linguistics" OR "Annual Review of Applied Linguistics" OR "Journal of Language Identity and Education" OR "World Englishes" OR "Language Awareness" OR "Canadian Modern Language Review-Revue Canadienne des Langues Vivantes" OR "Applied Linguistics Review" OR "Corpus Linguistics and Linguistic Theory" OR "English Today" OR "English Teaching-Practice and Critique" OR "VIAL-Vigo International Journal of Applied Linguistics")

APPENDIX B

List of journals and their number of articles retrieved and included

Journals	Articles retrieved	Articles included
Foreign Language Annals	122	83
System	111	70
Language Testing	79	49
ELT Journal	66	47
Language Learning	63	39
Modern Language Journal	59	41
TESOL Quarterly	57	41
Computer Assisted Language Learning	41	30
ReCall	35	25
Language Teaching Research	32	22
Studies in Second Language Acquisition	32	20
Language Assessment Quarterly	30	14
Applied Psycholinguistics	28	9
Applied Linguistics	25	16
Journal of English for Academic Purposes	22	13
English for Specific Purposes	21	9
Language Learning & Technology	21	15
International Journal of Bilingual Education and Bilingualism	17	5
Language Awareness	17	9
Iral - International Review of Applied Linguistics in Language Teaching	15	7
International Journal of Bilingualism	13	2
Language, Culture and Curriculum	13	9
Language Teaching	11	5
Lingua	11	1
World Englishes	7	4
Language and Education	6	0
Second Language Research	6	4
Assessing Writing	5	0
Applied Linguistics Review	5	4
Language Acquisition	3	0
Total	973	593

APPENDIX C

Most frequently discussed topics across the three periods

Topic	Period 1 Frequency	P1-P2 Change	Period 2 Frequency	P2-P3 Change	Period 4 Frequency
Those with significant increase from P1 to P2 and remaining popular in P3					
captions	0-4	<	15	~	23
academic purposes	0-4	<	6	~	5
anxiety	0-4	<	10	~	8
[learning/listening] context(s)	0-4	<	7	~	21
EFL	0-4	<	6	~	19
input	0-4	<	9	~	17
interviews	0-4	<	6	~	7
learners	6	<	52	~	84
[learning/listening] process	0-4	<	7	~	7
pronunciation	0-4	<	8	~	7
speech rate	0-4	<	7	~	6
strategy use	0-4	<	10	~	9
technology	0-4	<	10	~	6
Those with emergence or significant increase in P3					
l2 reading	0-4	~	0-4	<	10
metacognitive instruction	0-4	~	0-4	<	10
working memory (capacity)	0-4	~	0-4	<	12
accuracy	0-4	~	0-4	<	6
[language/listening] assessment	0-4	~	0-4	<	5
aural vocabulary knowledge	0-4	~	0-4	<	9
comprehensibility	0-4	~	0-4	<	7
[input] exposure [amount/time]	0-4	~	0-4	<	5
feedback	0-4	~	0-4	<	7
fluency	0-4	~	0-4	<	9
grammar	0-4	~	0-4	<	8
IELTS	0-4	~	0-4	<	5
individual differences	0-4	~	0-4	<	11
integrated tasks	0-4	~	0-4	<	7
intelligibility	0-4	~	0-4	<	6
intervention	0-4	~	0-4	<	7
l2 learners	0-4	~	0-4	<	15
l2 reading comprehension	0-4	~	0-4	<	6
listening strategies	0-4	~	0-4	<	8
listening tasks	0-4	~	0-4	<	5
metacognitive awareness	0-4	~	0-4	<	9
motivation	0-4	~	0-4	<	6
native speakers	0-4	~	0-4	<	5
perceptions	0-4	~	0-4	<	16
reading	13	~	14	<	38
retention	0-4	~	0-4	<	5
semi-structured interviews	0-4	~	0-4	<	5
task difficulty	0-4	~	0-4	<	5
vocabulary acquisition	0-4	~	0-4	<	6

vocabulary knowledge	0-4	~	0-4	<	19
vocabulary learning	0-4	~	0-4	<	13
vocabulary size	0-4	~	0-4	<	6
Those with significant decrease from P1 to P2/3					
receptive skills	5	>	0-4	~	0-4
dictation	6	>	0-4	~	0-4
language acquisition	6	>	0-4	~	0-4
testing	10	>	0-4	~	0-4
TOEFL	8	>	0-4	~	0-4
Those with significant increase from P1 to P2 followed by a significant decrease from P2 to P3					
listening skills	0-4	<	14	>	7
academic listening	0-4	<	6	>	0-4
attention	0-4	<	7	>	0-4
comprehension tests	0-4	<	7	>	0-4
confidence	0-4	<	7	>	0-4
recognition	0-4	<	7	>	0-4
videos	0-4	<	29	>	5
Those with stable frequency across P1-P3					
computer assisted language learning	0-4	~	5	~	13
instruction	7	~	8	~	22
listening comprehension	25	~	40	~	49
tests	9	~	35	~	39
vocabulary	5	~	8	~	16
writing	10	~	11	~	12
Other					
foreign languages	45	>	20	<	50
proficiency	7	>	0-4	<	25
tape	7	>	0-4	~	0-4
communication	0-4	~	5	>	0-4
strategies	9	~	21	>	13
video texts	0-4	~	5	>	0-4