

MAPPING MUSIC PSYCHOLOGY, MUSIC PERCEPTION, AND AUDITORY PROCESSING (1964-2025): A BIBLIOMETRIC SCIENCE-MAPPING STUDY

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Abstract

This study maps the intellectual structure and evolution of music psychology, music perception, and auditory processing through a field-wide bibliometric analysis of Web of Science Core Collection publications from 1964 to 2025. The final dataset comprised 1,519 English-language journal articles published in 430 sources. Using bibliometrix/Biblioshiny in R, the study examined publication growth, citation performance, core journals, influential authors and institutions, thematic structure, and international collaboration patterns. Results indicate sustained expansion with moderate growth (1.79% annually) and a strongly collaborative authorship culture (3.84 co-authors per article), including substantial international co-authorship (28.64%). Source and author analyses reveal a concentrated set of high-output journals and knowledge-brokering scholars bridging music cognition and clinical auditory science. Thematic mapping identifies music perception as the dominant core, alongside clinically central work on cochlear implants and hearing, supported by broader perceptual and neurocognitive themes (e.g., pitch, speech, emotion, cortex). Country analyses show U.S. dominance in volume and connectivity, while citation-normalized impact highlights high influence for Canada and several European systems. The findings clarify how theoretical, neuroscientific, and clinical strands are structurally integrated within the field. The study also establishes a quantitative baseline for evaluating future thematic shifts, collaboration patterns, and geographic diversification in music psychology research.

INTRODUCTION

Music psychology has developed into a vibrant interdisciplinary field that examines how music shapes perception, cognition, emotion, and behavior across the lifespan, yet its rapid expansion has outpaced systematic efforts to map its intellectual structure and research frontiers. Scholars now publish on topics as diverse as neural responses to music, everyday listening, music-based emotion regulation, and therapeutic applications, often in specialized or disciplinary silos that make it difficult to see how the field hangs together conceptually and methodologically

(Hallam et al., 2009). This situation leads to several practical problems: researchers struggle to identify the most influential works and core themes, emerging scholars lack a clear overview of the field's evolution, and policymakers or practitioners have limited guidance in locating robust, high-impact evidence within an increasingly dense literature (Jakubowski et al., 2025).

These challenges make it necessary to undertake a rigorous bibliometric analysis of music psychology as a whole rather than relying solely on traditional

narrative reviews focused on subtopics or single journals. Bibliometric approaches provide quantitative tools for examining patterns in large bodies of scholarship, such as publication growth, citation structures, co-authorship networks, and thematic clusters, thereby revealing how a field develops over time and which areas drive its progress (Aria & Cuccurullo, 2017). In music-related domains, bibliometric studies of music therapy, music and well-being, and musical creativity have already shown how such methods can uncover dominant research topics, leading countries and institutions, and shifting methodological trends that might otherwise remain invisible in qualitative syntheses (Zhi et al., 2024; Ozenc-Ira, 2023). However, music psychology, understood broadly as the scientific study of psychological processes in musical behavior, still lacks a comprehensive, field-wide bibliometric map that integrates its core subfields, perception, cognition, emotion, development, performance, and therapy, within a single analytic framework (Hallam et al., 2009; Anglada-Tort & Sanfilippo, 2019).

What is known so far about music psychology comes largely from domain-specific empirical programs and influential handbooks rather than from meta-scientific overviews. Foundational work has documented how music listening serves key psychological functions such as mood regulation, self-awareness, and social relatedness, highlighting music's central role in everyday life and mental health (Schäfer et al., 2013). Neurocognitive research has traced how musical sound is encoded and integrated in the brain, showing, for instance, that musical structure and expectation recruit overlapping networks with language and reward systems (Peretz & Zatorre, 2005; Koelsch, 2014). Large-scale reviews have further demonstrated that musical experiences are shaped by both universal psychological mechanisms and culturally specific listening practices, emphasizing the need for broader and more diverse empirical sampling (Singh & Mehr, 2023). Collectively, these strands of work depict music psychology as a mature and theoretically rich discipline, supported by specialized journals such as *Psychology of Music*, *Music Perception*, and *Musicae Scientiae*, and

synthesized in landmark volumes like the *Oxford Handbook of Music Psychology* (Hallam et al., 2009). Yet, despite this substantial body of knowledge, several critical gaps remain in the meta-scientific understanding of the field. The most prominent bibliometric contribution to date focuses exclusively on three flagship journals over the period 1973–2017, providing valuable insights into growth rates, productive authors, and collaboration patterns, but leaving out the wider Web of Science (WoS) corpus where many interdisciplinary and applied music psychology studies are published (Anglada-Tort & Sanfilippo, 2019). This journal-limited perspective underrepresents research appearing in psychology, neuroscience, education, and health journals that nonetheless address central music-psychological questions. It also truncates the analysis just as new themes, such as music-based emotion regulation, digital streaming environments, and large-scale cross-cultural projects, have become prominent (Bowling, 2023; Hallam et al., 2009). Moreover, existing work has not systematically examined how topics, methods, and collaborations have evolved across multiple decades and subfields using modern science-mapping techniques such as co-citation networks, keyword co-occurrence, and thematic evolution analysis (Aria & Cuccurullo, 2017). There is also limited understanding of geographic imbalances, including the relative underrepresentation of contributions from regions such as South Asia, Africa, and Latin America, which raises concerns about the global inclusivity and generalizability of prevailing theories (Singh & Mehr, 2023).

The expected contribution of this study is twofold: theoretical and practical. Theoretically, by mapping the intellectual structure and thematic evolution of music psychology, the study clarifies how core research areas, such as music and emotion, music cognition, performance, development, and therapy, are interrelated, which paradigms dominate each cluster, and where new frontiers are emerging, for example in technology-assisted musicking, cross-cultural projects, and mental health applications (Hallam et al., 2009; Bowling, 2023). Practically, the results provide an evidence-based roadmap for researchers, students,

and practitioners, indicating which journals, authors, and institutions are most central to specific subtopics, where collaboration opportunities are strongest, and which underexplored regions, populations, or methods represent promising avenues for future work (Anglada-Tort & Sanfilippo, 2019). By systematically analyzing Web of Science data with state-of-the-art bibliometric tools in R, this study aims to offer a rigorous, transparent, and reproducible overview of music psychology as a field, supporting more cumulative, inclusive, and strategically organized research in the years ahead.

Literature Review

Historical foundations in auditory and music perception

Music psychology, perception, and auditory processing have undergone a profound transformation over the past six decades, moving from basic psychophysical investigations of pitch, loudness, and temporal resolution toward sophisticated cognitive, affective, and neurobiological models of how humans make sense of complex musical soundscapes (Intraub, 2012; McDermott & Oxenham, 2008). Early work in auditory psychophysics and psychoacoustics, much of it grounded in controlled laboratory paradigms with simple tones and noise, established fundamental limits of frequency discrimination, loudness growth, and temporal integration that still underpin current models of music perception (Intraub, 2011). From the 1960s through the 1980s, this tradition gradually intersected with emerging research on music perception, leading to systematic investigation of pitch sequences, consonance–dissonance, and melody recognition, and laying the groundwork for linking auditory mechanisms to music-specific phenomena (McDermott & Oxenham, 2008; Zatorre, 2001). This historical trajectory set the stage for the explosion of music perception and auditory neuroscience studies that define the contemporary literature and provide a rich basis for bibliometric analysis.

As cognitive neuroscience matured in the 1990s and 2000s, research on music perception increasingly shifted from purely behavioral

paradigms to neuroimaging and electrophysiological approaches, enabling researchers to map the temporal dynamics and spatial distribution of music-related processing in the brain (Koelsch, 2011; Zatorre & Salimpoor, 2013). Integrative models propose that music perception involves cascades of processes, from early acoustic feature extraction in the auditory brainstem and primary auditory cortex to higher-order analysis of musical syntax, semantics, and emotional meaning in fronto-temporal and limbic networks (Koelsch, 2011). Meta-analytic work using activation-likelihood estimation has revealed partially distinct yet overlapping networks for music perception, production, and imagery, suggesting that bottom-up sensory information and top-down predictive processes jointly shape musical experience (Patyczek et al., 2021). These advances have not only deepened understanding of music-specific neural architecture but also positioned music as a powerful model system for studying general auditory cognition and predictive processing.

Another major line of development concerns the interplay between music and language, as researchers increasingly recognize shared domain-general mechanisms and overlapping neural resources for processing hierarchical structure and temporal patterns across these domains (Patel, 2008). Behavioral and electrophysiological studies show that musical training enhances sensitivity to prosody, rhythm, and pitch cues in speech, leading to improved speech-in-noise perception and more robust encoding of acoustic detail at subcortical and cortical levels (Kraus & Chandrasekaran, 2010; Strait & Kraus, 2013). Conversely, experience with tonal languages can shape pitch processing and melodic contour sensitivity in music, demonstrating bidirectional cross-domain influences (Bidelman, Hutka, & Moreno, 2013). Reviews of speech–music interactions argue for a framework in which auditory expertise in one domain recalibrates shared neural circuits, suggesting that individual differences in musical experience, language background, and auditory learning histories must be considered in any comprehensive account of music perception and

auditory processing (Besson, Chobert, & Marie, 2011; Bidelman et al., 2013).

Rhythm, timing, and sensorimotor synchronization

The literature has also expanded dramatically in the direction of temporal processing, rhythm, and sensorimotor synchronization, using music as a window onto the natural bounds of human timing abilities (Repp & Su, 2013). Work on beat perception shows that humans spontaneously infer an underlying pulse from complex rhythmic patterns, with behavioral tapping and neural entrainment reflecting predictive timing mechanisms that generalize beyond music to speech and other auditory scenes (Large & Snyder, 2009; Repp & Su, 2013). Recent studies further suggest partially distinct rhythmic timing mechanisms for speech and music, with different motor effectors and preferred frequency ranges contributing to domain-specific synchronization profiles (Barchet et al., 2024). These insights indicate that music-related timing research provides a crucial testbed for theories of auditory scene analysis, predictive coding, and sensorimotor coupling, linking basic neuroscience with applied questions such as rehabilitation of motor and communication disorders.

In parallel, auditory neuroscience has increasingly focused on plasticity and expertise, showing that long-term musical training leads to measurable enhancements in peripheral and central auditory processing, with implications for both basic science and clinical practice (Kraus & Chandrasekaran, 2010; Parbery-Clark, Skoe, & Kraus, 2009). Musicians typically exhibit superior performance on tasks involving pitch discrimination, temporal resolution, and sound segregation in noise, accompanied by more robust brainstem responses and sharper cortical tuning to sound features (Kraus & Chandrasekaran, 2010). Cross-sectional work comparing musicians and non-musicians, including recent studies in diverse cultural contexts, suggests that these benefits generalize across genres and training traditions, although the extent and specificity of transfer effects remain debated (Kyrtsoudi et al., 2023). Such findings strengthen the argument that music

perception research must be situated within a broader framework of auditory learning, experience-dependent plasticity, and lifespan development, raising questions about how training history and cultural environment shape the bibliometric profile of the field.

Data-driven, meta-analytic, and computational turns

The advent of large-scale, data-driven approaches has further pushed the field toward integrating computational modeling, meta-analysis, and advanced neuroimaging synthesis. Activation-likelihood meta-analyses of music-related brain activity provide quantitative evidence for distinct contributions of top-down and bottom-up processing routes in music perception and imagery, offering a more nuanced mapping of functional specialization within auditory and sensorimotor networks (Patyczek et al., 2021). Other work uses naturalistic stimuli and real-life music listening tasks to examine how the brain segments auditory events over time, revealing expertise-dependent differences in event boundary detection and large-scale network dynamics during music listening (Burunat et al., 2024). Complementary computational studies model musical expectations and surprise, demonstrating that both sensory and cognitive expectations independently shape listeners' perceived predictability and pleasure, consistent with predictive processing accounts of auditory perception (Gold et al., 2023). Together, these developments reflect a broader shift toward multi-level, integrative frameworks that couple behavioral, neural, and computational evidence. Within this rapidly expanding and increasingly complex landscape, bibliometric approaches offer a powerful way to synthesize the evolution of music psychology, perception, and auditory processing as interconnected research domains. Recent bibliometric analyses in adjacent areas, such as music and well-being, music therapy, and musical creativity, have shown how science mapping can reveal growth trajectories, citation hierarchies, and thematic clusters that are not apparent from narrative reviews alone (Phanphairoj et al., 2025; Zhi et al., 2024; Ozenc-

Ira, 2023). However, there is still no field-spanning bibliometric study that systematically traces the development of music perception and auditory neuroscience from the mid-20th century to the present, identifies the key intellectual hubs and peripheries, and quantifies the impact of international collaboration and country-level contributions. The fragmented state of the literature, the proliferation of specialized journals, and the rise of interdisciplinary outlets in neuroscience, psychology, audiology, and otology make such an analysis both methodologically challenging and intellectually urgent (Goldman, 2025).

Against this backdrop, a next-level bibliometric analysis of music psychology, perception, and auditory processing, drawing on Web of Science data from 1964 to 2025 and implemented via advanced R-based tools like *bibliometrix*, can address several core gaps. First, it can quantify how publication growth, citation patterns, and thematic emphases have shifted across historical periods, technological eras, and methodological paradigms, thereby providing an empirical basis for characterizing the field's evolution beyond anecdotal periodization (Aria & Cuccurullo, 2017). Second, by mapping co-authorship and co-citation networks across theoretical, experimental, and clinical subfields, it can identify the key authors, institutions, and journals that structure the intellectual landscape, and reveal whether theoretical and clinical streams are integrated or siloed. Third, by examining international collaboration patterns and country-level contributions, it can illuminate how global power structures, resource distributions, and cross-national partnerships shape research output and citation impact in music perception and auditory neuroscience. These considerations lead directly to the guiding research questions for the present study:

RQ1: How has research on music psychology, perception and auditory processing evolved over time in terms of publication growth, citation impact, and thematic focus from 1964 to 2025?

RQ2: Who are the key authors, institutions, and journals shaping the intellectual structure of the field, and how do their productivity and citation

impact differ across theoretical and clinical research streams?

RQ3: How do international collaboration patterns and country-level contributions influence research output and citation impact within the global music perception and auditory neuroscience literature?

Method

Data Source and Search Strategy

This study adopted a quantitative bibliometric research design to examine the evolution, intellectual structure, and global collaboration patterns of scholarship in music psychology, music perception, and auditory processing. Bibliographic data were retrieved exclusively from the Web of Science (WoS) Core Collection, which is widely used in bibliometric research due to its standardized indexing, controlled journal selection, and reliable citation-linking infrastructure (Aria & Cuccurullo, 2017). A title-based search strategy was employed to ensure conceptual precision and to avoid thematic dilution. The primary search term was “*music psychology*”, supplemented through iterative refinement with closely related expressions linked to music perception and auditory processing. The final search was conducted in early 2025 and covered publications from 1964 to 2025, capturing both the historical foundations and contemporary development of the field.

Inclusion Criteria and Dataset Construction

To ensure analytical consistency and comparability, only peer-reviewed journal articles were included in the dataset, as journal publications represent the dominant and most stable mode of knowledge dissemination in psychology and auditory science (Anglada-Tort & Sanfilippo, 2019). Conference proceedings, book chapters, editorials, corrections, and notes were excluded. In addition, only English-language publications were retained to ensure uniformity in abstracts, keywords, and citation practices. After applying these filters and removing duplicate or incomplete records, the final dataset consisted of 1,519 articles published across 430 sources and authored by 4,290 unique researchers. This

curated corpus served as the empirical basis for all subsequent bibliometric analyses.

Data Processing and Analytical Procedures

Complete bibliographic records and cited references were exported from Web of Science in plain-text format, including information on authors, affiliations, titles, abstracts, author keywords, Keywords Plus, publication years, sources, and citation counts. Prior to analysis, data cleaning procedures were applied to standardize author name variants, institutional affiliations, and keyword spellings, thereby reducing fragmentation in network and thematic analyses. All analyses were conducted in the R statistical environment using the *bibliometrix* package and its graphical interface, Biblioshiny, which provide a validated and reproducible workflow for science-mapping studies (Aria & Cuccurullo, 2017). Descriptive indicators were first calculated to assess annual scientific production, citation impact, document age, and collaboration intensity. These were followed by relational analyses, including co-citation analysis, source productivity analysis, keyword co-occurrence networks, thematic evolution analysis, and Multiple Correspondence Analysis (MCA), to map the intellectual and conceptual structure of the field.

Collaboration Analysis and Methodological Scope

Patterns of scientific collaboration were examined through co-authorship analysis at the author, institutional, and country levels. Single-country publications and multiple-country publications were distinguished to assess the extent and impact of international collaboration, a key indicator of field maturity and global integration (Anglada-Tort & Sanfilippo, 2019). Country-level citation indicators were normalized by publication volume to allow meaningful comparison of scholarly influence across nations. While this methodological framework ensures transparency, scalability, and reproducibility, the study is limited to English-language journal articles indexed in Web of Science. As a result, publications in other languages or databases are not captured, a

constraint that is common to large-scale bibliometric studies and should be considered when interpreting the findings.

Results

The bibliometric analysis reveals a large and mature body of literature spanning more than six decades (1964–2025), comprising 1,519 documents published across 430 sources and authored by 4,290 unique researchers. This breadth indicates both historical depth and disciplinary diversity, with research disseminated across a wide range of journals rather than being concentrated in only a few outlets. The thematic richness of the field is further reflected in the high number of distinct keywords, including 3,181 author-provided keywords and 2,575 Keywords Plus, suggesting a broad and evolving conceptual landscape. Scholarly production shows a steady but moderate expansion, with an annual growth rate of 1.79%, indicating sustained interest over time rather than rapid boom–bust cycles. Journal articles dominate the corpus (approximately 94% of all documents), confirming that peer-reviewed journals remain the primary mode of knowledge dissemination in this research domain.

In terms of collaboration and impact, the results point to a strongly networked and influential field. The average number of co-authors per document is 3.84, and only 218 publications are single-authored, highlighting a clear preference for collaborative research. Nearly one-third of the publications (28.64%) involve international co-authorship, underscoring the global nature of the research community. The citation performance of the dataset is robust, with an average of 25.17 citations per document and a mean document age of 9.67 years, indicating both relevance and sustained scholarly influence. Collectively, the 1,519 documents cite 46,963 references, reflecting deep engagement with prior literature and a well-established knowledge base. While a small number of retracted publications ($n = 7$) are present, they represent a negligible proportion of the dataset, suggesting overall stability and credibility of the research corpus.

The annual scientific production trend shows a long period of very low and sporadic output from

the mid-1960s through the late 1980s, indicating that the field remained relatively marginal or emergent during its early decades (see Figure 1). A gradual increase becomes visible from the early 1990s, followed by a clearer acceleration after the early 2000s, suggesting growing scholarly attention and consolidation of the research area. The most pronounced growth occurs after around 2010, when annual publications rise sharply and consistently, reaching their highest levels in the

late 2010s and early 2020s, with peaks exceeding 100 articles per year. This rapid expansion reflects the maturation and mainstreaming of the field, likely driven by increased theoretical relevance, methodological advances, and broader societal or policy interest. The sharp drop in the final year appears to be an artifact of incomplete indexing or the inclusion of early-access records rather than a genuine decline in research activity.

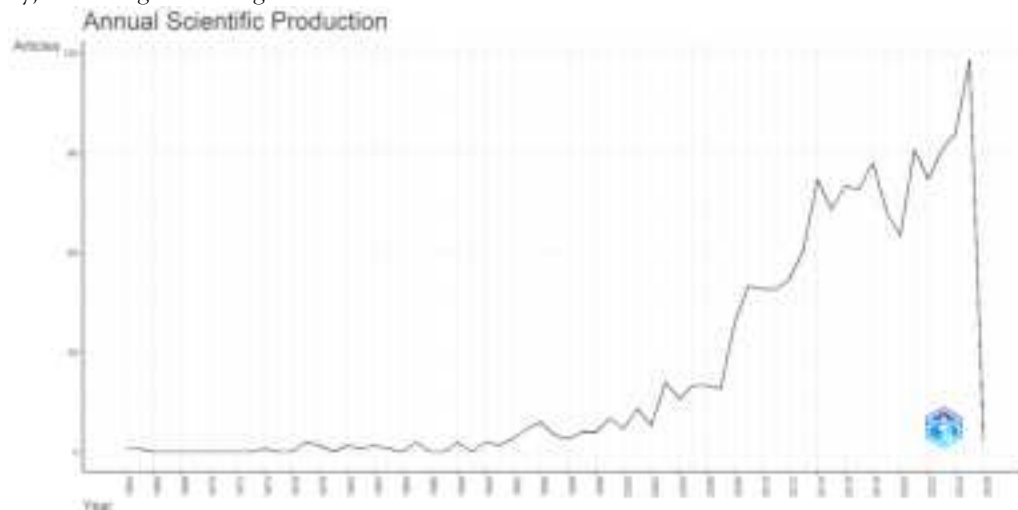


Figure 1. Annual Scientific Production

As shown in Figure 2, average citations per year remain negligible from the mid-1960s through the early 1980s, reflecting both the limited volume of publications and the low visibility of the field during its formative stage. A modest but uneven increase emerges from the late 1980s into the early 1990s, followed by a pronounced surge in the mid-1990s, when citation averages peak at over three citations per year. This sharp rise signals the appearance of highly influential studies and the consolidation of scholarly attention around the

field. From the early 2000s onward, citation levels remain comparatively high but display notable fluctuations, indicating sustained academic impact alongside expanding publication output and greater citation dispersion across a growing body of work. The apparent decline in the most recent years is best interpreted as a citation-window effect, as newer publications have had insufficient time to accumulate citations rather than reflecting a substantive decrease in scholarly influence.

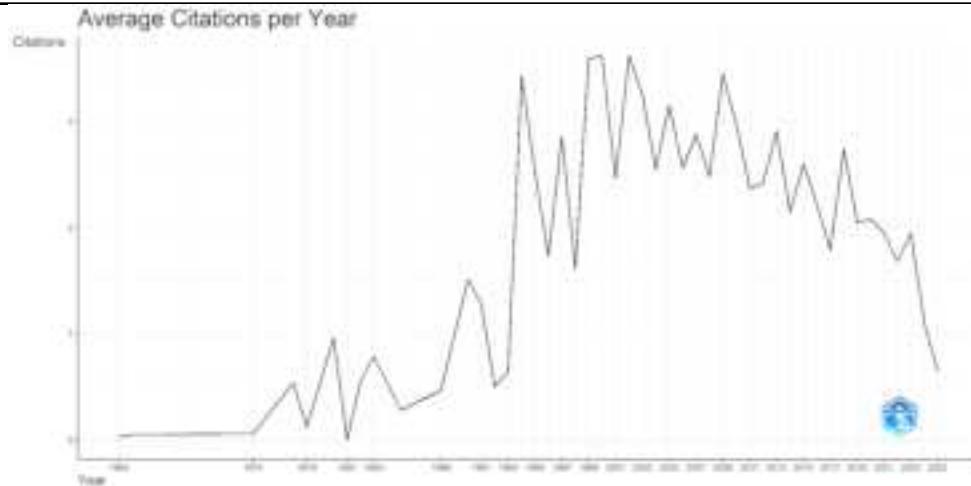


Figure 2. Average citations per year (1964–2025).

As shown in **Figure 3**, the three-field plot reveals a tightly interconnected intellectual structure in which foundational cited works are strongly linked to a core group of influential authors and recurring thematic keywords. Seminal references related to auditory perception, cochlear implants, speech, and music cognition form the backbone of the field and are frequently associated with prominent authors such as Rubinstein, Limb, Tillmann, Galvin, and Gfeller. These authors act as key knowledge brokers, bridging classic theoretical and clinical studies with contemporary

research themes. On the thematic side, keywords such as *music perception*, *speech*, *pitch*, *cochlear implants*, *perception*, and *emotion* dominate, indicating that the literature converges around auditory processing, music and speech perception, and clinical-neuroscientific applications. Overall, the dense linkages across references, authors, and keywords highlight a coherent yet multidisciplinary research domain where clinical audiology, neuroscience, and music cognition are deeply intertwined.

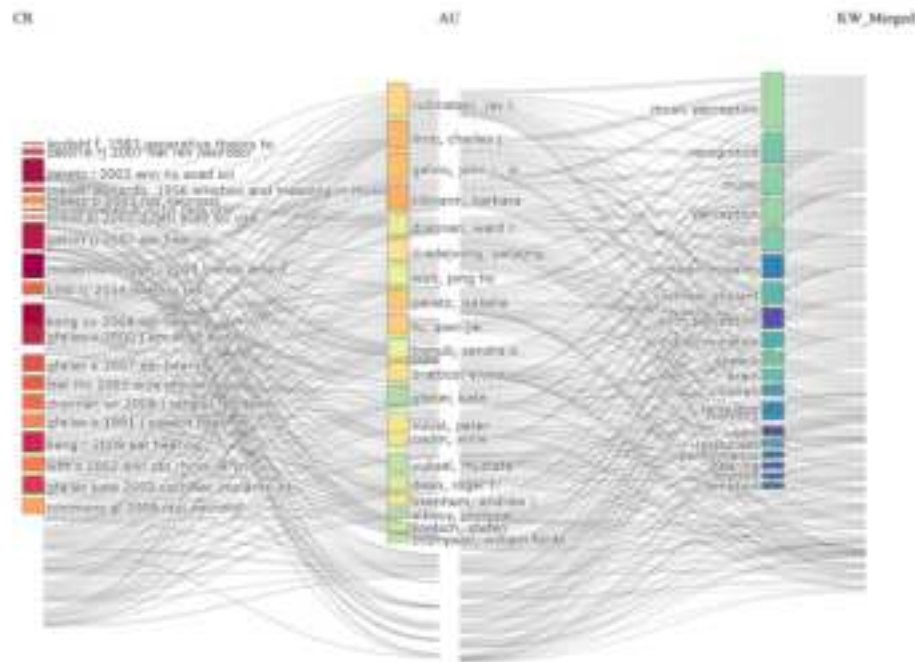


Figure 3. Three-field plot

As shown in **Figure 4**, the source analysis indicates that research in this field is concentrated within a well-defined set of specialized journals spanning music cognition, psychology, neuroscience, and auditory sciences. *Music Perception* ($n = 88$) and *Frontiers in Psychology* ($n = 86$) emerge as the leading publication outlets, underscoring the strong psychological and cognitive orientation of the literature. This is followed by discipline-specific journals such as *Musicae Scientiae* ($n = 50$) and *Psychology of Music* ($n = 47$), which highlight the centrality of music-focused theoretical and

empirical inquiry. At the same time, the prominence of clinically and acoustically oriented journals, including *Ear and Hearing* ($n = 44$), *Frontiers in Neuroscience* ($n = 38$), *Journal of the Acoustical Society of America* ($n = 36$), *Otology & Neurotology* ($n = 34$), and *Hearing Research* ($n = 25$), reflects the field's strong engagement with auditory neuroscience and cochlear implant research. Overall, Figure 4 demonstrates the interdisciplinary nature of the domain, bridging music psychology with clinical and neurophysiological perspectives.

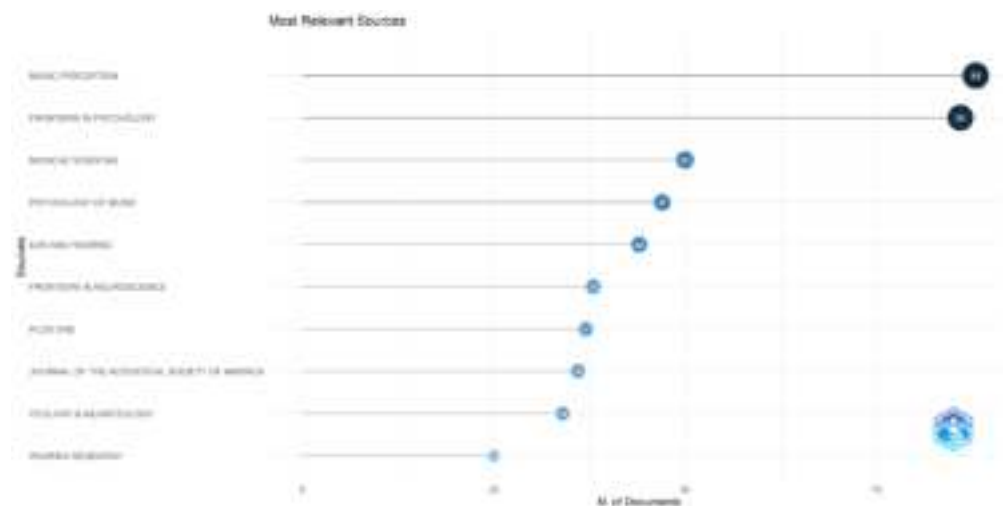


Figure 4. Most Relevant Sources

As shown in **Figure 5**, the cumulative publication trajectories reveal distinct temporal patterns in journal contributions to the field. *Music Perception* emerges as the earliest and most consistently productive outlet, showing steady growth from the late 1980s onward and maintaining its lead throughout the period. *Frontiers in Psychology* displays a sharp and rapid increase after 2012, indicating its more recent but accelerated role in disseminating research, likely reflecting broader trends toward open-access and interdisciplinary

scholarship. *Musicae Scientiae* and *Psychology of Music* demonstrate more gradual yet stable growth, underscoring their sustained niche contributions to music cognition research. *Ear and Hearing* shows a later but notable rise, highlighting the increasing clinical and audiological orientation of the field in recent years. Overall, the figure illustrates a diversification of publication venues over time, with traditional domain-specific journals complemented by newer, high-volume interdisciplinary platforms.

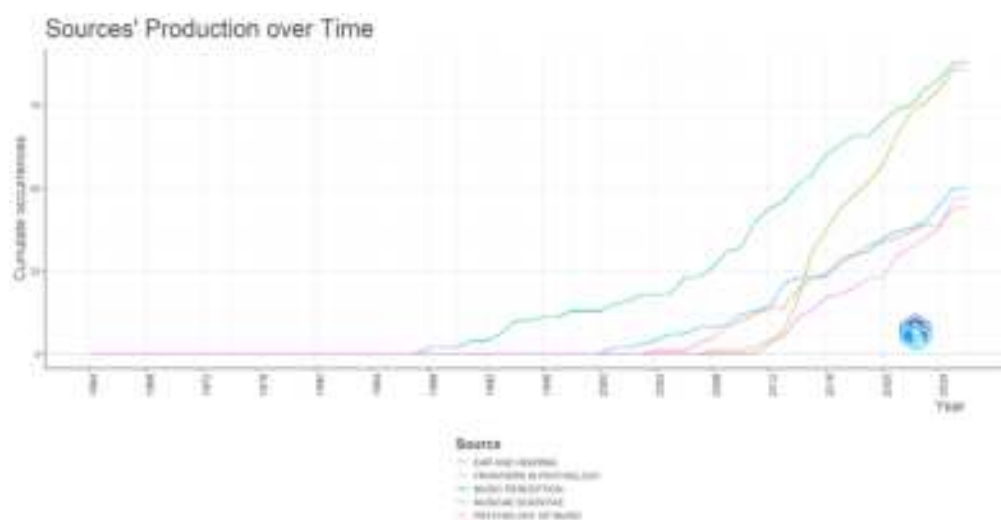


Figure 5. Sources' production over time (cumulative occurrences, 1964–2025).

As shown in **Figure 6**, the field is led by a small group of highly productive and influential scholars. Barbara Tillmann emerges as the most prolific author with 22 publications, followed closely by Charles J. Limb (20), John J. Galvin III (18), and Isabelle Peretz (18). These authors represent both music cognition and auditory neuroscience traditions, reflecting the interdisciplinary nature of the field. Contributors such as Qian-Jie Fu, Jay T. Rubinstein, and Elvira

Brattico further highlight the integration of clinical audiology, cochlear implant research, and cognitive neuroscience. The fractionalized article counts indicate substantial collaboration, as most leading authors co-publish extensively rather than working in isolation. Overall, the distribution suggests a mature research domain structured around a core group of scholars who drive theoretical development, methodological innovation, and sustained empirical output.

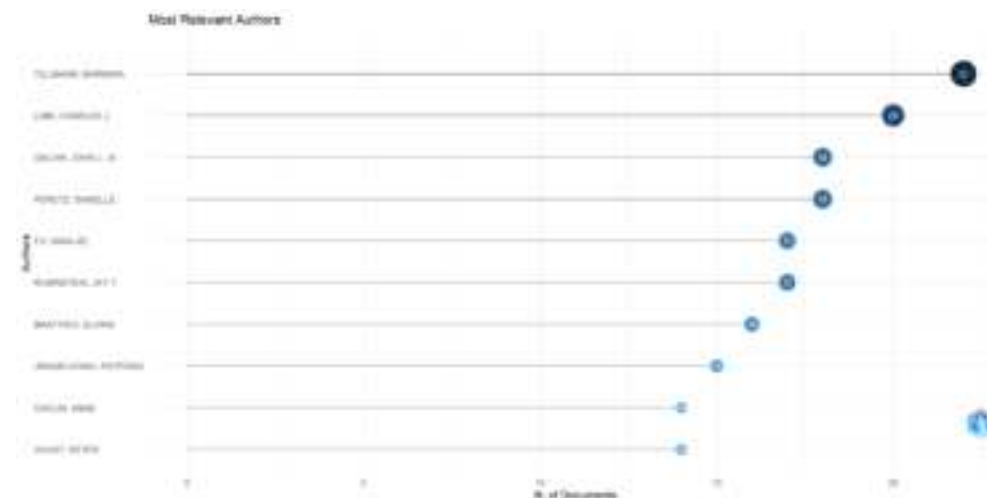


Figure 6. Most relevant Authors

As shown in Figure 7, the leading authors demonstrate sustained and overlapping publication activity from approximately 2007 onward, indicating a period of consolidation and rapid development in the field. Several authors, including Peretz, Tillmann, Limb, Fu, Galvin, and Rubinstein, show long publication spans with recurring peaks in productivity, suggesting continued engagement rather than isolated contributions. Larger bubbles clustered in specific years, particularly around 2009, 2013, and 2018–2019, indicate periods of heightened research output, while darker bubbles reflect years of stronger citation impact. This pattern suggests that influential contributions are often concentrated in key publication years rather than evenly distributed over time.

The figure also reveals distinct authorial trajectories in terms of impact and specialization. Authors such as Peretz, Tillmann, and Caclin exhibit prominent citation peaks despite moderate annual output, reflecting high-impact theoretical and empirical contributions, particularly in music cognition and congenital amusia. In contrast, authors including Limb, Fu, Galvin, Rubinstein, and Jiradejvong display clustered productivity and impact in later years, aligning with applied and clinical research on cochlear implants and music perception. Overall, Figure 7 highlights a mature and collaborative research community in which both sustained productivity and episodic high-impact publications have shaped the intellectual development of the field.

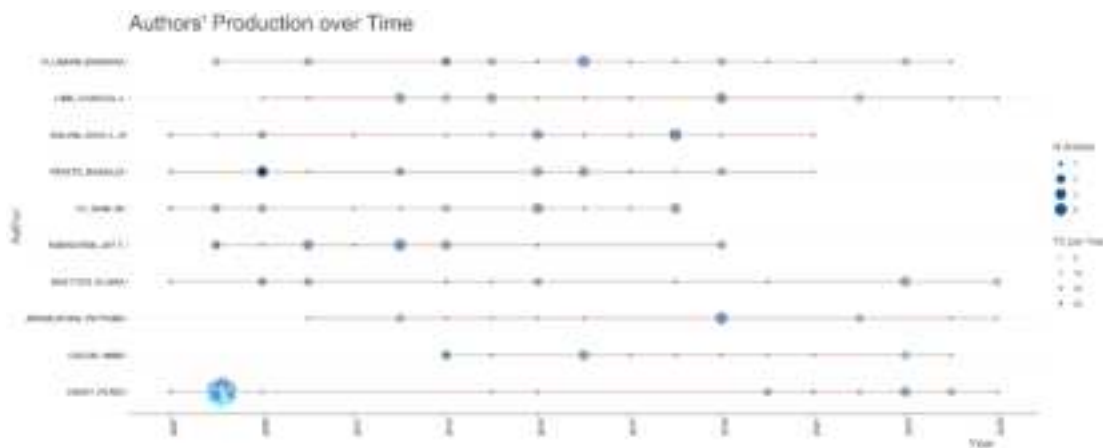


Figure 7. Authors' Production over Time

As shown in Figure 8, research output in this field is strongly concentrated within a small number of high-impact academic and research institutions, predominantly located in North America and Europe. The University of California System emerges as the most productive affiliation, contributing the highest number of articles ($n = 120$), underscoring its central role in advancing research on music perception, auditory cognition, and cochlear implants. This is followed closely by major European research hubs such as the Centre National de la Recherche Scientifique (CNRS) ($n = 92$) and the University of London ($n = 91$), reflecting the field's strong transatlantic research base. Canadian institutions, including Université

de Montréal, University of Toronto, and McGill University, also feature prominently, highlighting Canada's sustained contribution to auditory neuroscience and music cognition research. The presence of elite U.S. institutions such as Harvard University and the University of Washington further indicates that this domain is driven by well-established research centers with advanced clinical, neuroscientific, and technological infrastructures. Overall, the distribution shown in Figure 8 points to a highly institutionalized research landscape, where a limited number of globally influential universities and national research organizations serve as key knowledge producers and collaborative hubs.

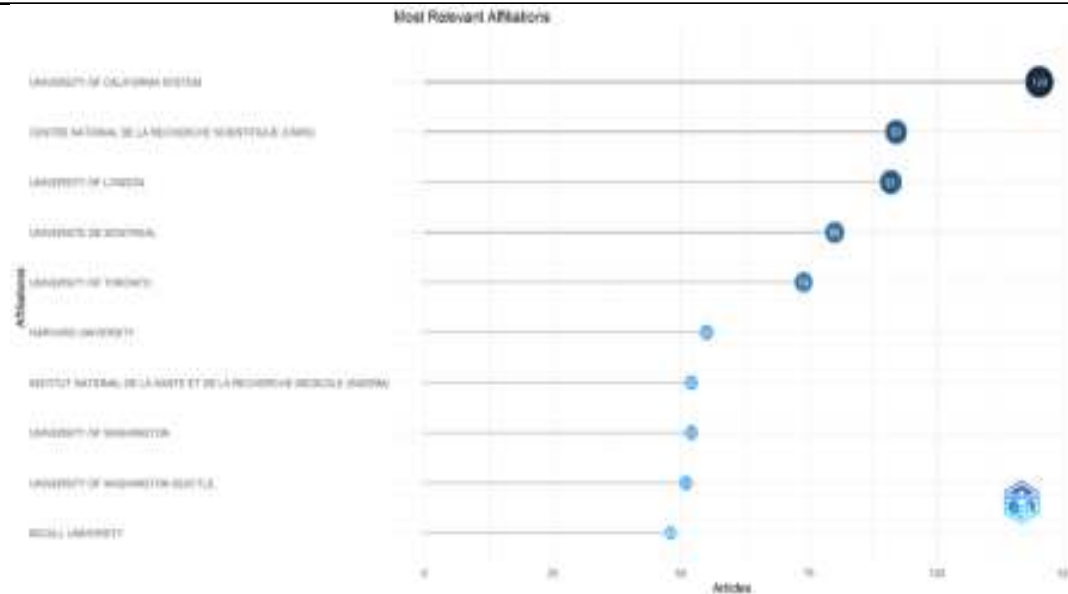


Figure 8. Most relevant affiliations by number of articles.

As shown in Figure 9, institutional research output remains minimal and largely flat until the late 1990s, indicating limited early engagement by major affiliations in this field. From the early 2000s onward, a clear upward trajectory emerges across all institutions, with a pronounced acceleration after approximately 2010. The University of California System demonstrates the steepest and most sustained growth, clearly

outperforming other affiliations and reaching the highest cumulative publication count by the mid-2020s. CNRS, Université de Montréal, University of London, and University of Toronto follow similar growth patterns, albeit at lower absolute volumes, suggesting the consolidation of multiple international research hubs rather than dominance by a single institution.

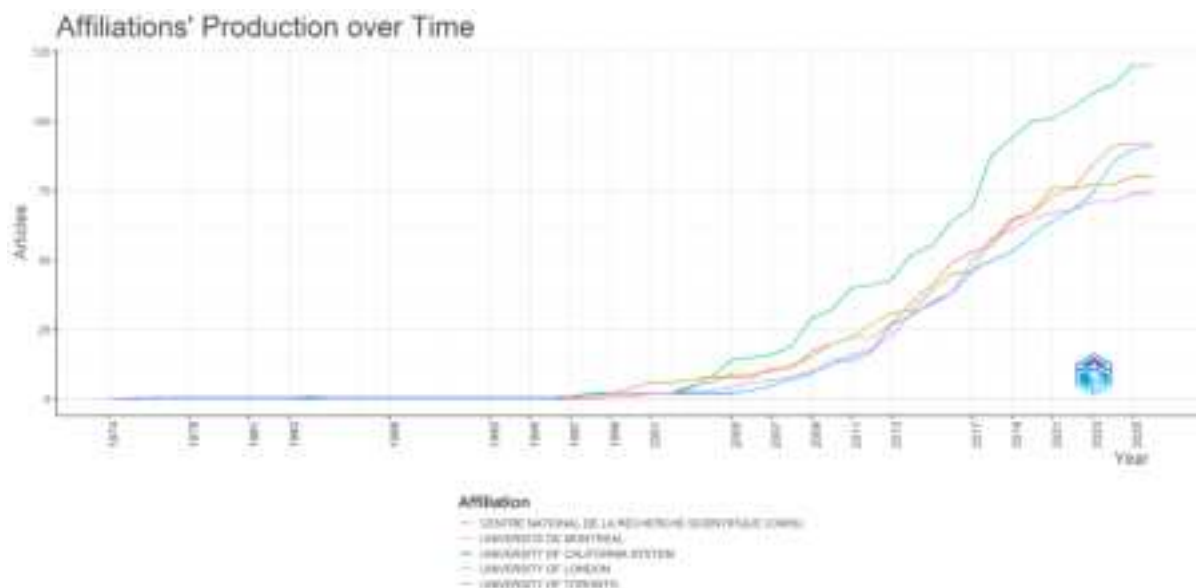


Figure 9. Affiliations' production over time (1974–2025).

As shown in Table 1, the United States overwhelmingly dominates corresponding-author output with 399 articles (26.3% of the total), driven largely by single-country publications (SCP = 327), indicating a strong and largely self-sufficient domestic research ecosystem. A second tier of highly productive countries includes Germany (145 articles), the United Kingdom (120), Canada (117), and China (112), all of which combine substantial domestic output with meaningful levels of international collaboration. Notably, several European countries exhibit a contrasting pattern: despite lower absolute

publication counts, countries such as Finland (MCP = 56.4%), Austria (50%), France (37.7%), and Germany (36.6%) show high proportions of multi-country publications, highlighting deep integration into international research networks. Overall, the figure reveals a clear structural divide in the field, where large research systems (e.g., the USA) lead through volume and domestic capacity, while smaller and mid-sized countries enhance their scientific influence through sustained international collaboration.

Table 1. Corresponding Author's Countries and Collaboration Patterns (SCP vs. MCP).

Country	Articles	Articles %	SCP	MCP	MCP %
USA	399	26.3	327	72	18
GERMANY	145	9.5	92	53	36.6
UNITED KINGDOM	120	7.9	79	41	34.2
CANADA	117	7.7	84	33	28.2
CHINA	112	7.4	79	33	29.5
AUSTRALIA	80	5.3	60	20	25
FRANCE	61	4	38	23	37.7
ITALY	54	3.6	40	14	25.9
FINLAND	39	2.6	17	22	56.4
AUSTRIA	36	2.4	18	18	50

The citation impact analysis by country reveals notable differences between research volume and scholarly influence (see Table 2). The United States leads decisively in total citations (TC = 12,361), reflecting its dominant publication volume and sustained contribution to the field, with a solid average of 31 citations per article. However, when considering average article citations, Canada emerges as the most influential country (51.9 citations per article), indicating that although its output is smaller than that of the USA, its publications tend to be exceptionally high-impact. Finland (31.6) and the USA (31.0) follow closely, suggesting strong citation performance relative to their publication counts. European countries such as Germany, France, and

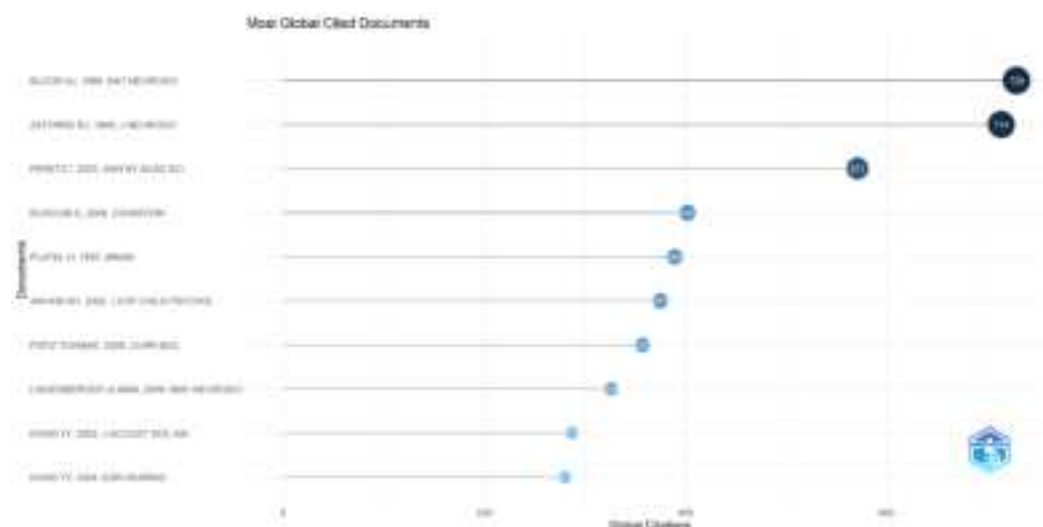
the United Kingdom show comparable and stable average citation rates (around 28–29 citations per article), reflecting consistent research quality and visibility. In contrast, countries like China (9.6) and Italy (12.4) exhibit lower average citation impacts, which may be attributed to the relative recency of publications, language effects, or differences in international visibility and collaboration patterns. Overall, the results highlight that higher publication volume does not necessarily translate into greater per-article impact, underscoring the importance of citation-normalized indicators when assessing national research influence.

Table 2. Total Citations and Average Citations per Article by Country

Country	TC	Average Article Citations
USA	12361	31.00
CANADA	6067	51.90
GERMANY	4226	29.10
UNITED KINGDOM	3420	28.50
FRANCE	1778	29.10
AUSTRALIA	1282	16.00
FINLAND	1233	31.60
CHINA	1073	9.60
AUSTRIA	902	25.10
ITALY	669	12.40

The Figure 10 highlights the most influential papers in the field based on total citations, citation intensity over time, and normalized citation impact, revealing both foundational and enduringly influential works (see Table 3). Seminal studies by Blood and Zatorre (1999) and Zatorre (1994) emerge as the most highly cited overall, underscoring their foundational role in linking music perception with neural and emotional processes. However, when citation impact is normalized, papers such as Rusconi (2006) and Peretz (2003) show particularly strong performance, indicating sustained and field-wide

influence beyond sheer age effects. The presence of multiple highly cited works on music perception, emotion, pitch processing, and cochlear implants (e.g., Peretz, Kong, Fritz) reflects the central intellectual pillars of the field, bridging music cognition and auditory neuroscience. Overall, the table demonstrates that while older landmark studies dominate total citations, several mid-2000s publications exhibit exceptionally high normalized impact, signaling their continued relevance and shaping of contemporary research agendas.

**Figure 10. Most Global Cited Documents**

The Figure 11 highlights the most influential publications in the field by combining absolute citation counts with time-normalized impact,

thereby distinguishing long-standing classics from consistently high-impact contributions. Foundational works such as Blood et al. (1999)

and Zatorre (1994) lead in total citations (729 and 714, respectively), underscoring their seminal role in shaping research on music perception and auditory neuroscience. However, when impact is adjusted for publication age, several later studies, most notably Rusconi et al. (2006) and Peretz (2003), exhibit the highest normalized citation scores, indicating sustained and proportionally stronger influence over time. The presence of both music cognition-focused papers (e.g., Peretz, Platel, Fritz) and cochlear-implant-oriented

studies (e.g., Kong, 2004; 2005) reflects the field's dual intellectual foundations in cognitive neuroscience and clinical auditory research. Overall, the table demonstrates that while early landmark studies continue to dominate cumulative citations, a set of theoretically and clinically oriented works have maintained enduring relevance and high annual citation rates, collectively defining the core knowledge base of the discipline.

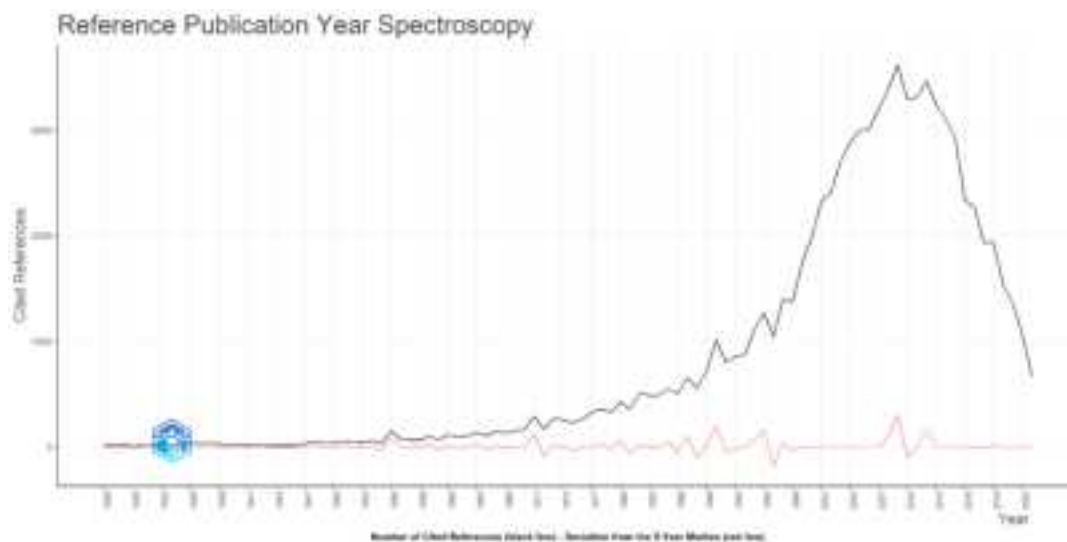


Figure 11. Reference Publication Year Spectroscopy

As shown in Figure 12, the thematic structure of the literature is strongly dominated by music perception, which constitutes the largest share (13%, $n = 621$), underscoring its central position in the field. Closely related core concepts such as perception (7%), music (6%), pitch (5%), recognition (4%), and speech (4%) further indicate a sustained focus on auditory and cognitive processing of music and sound. A substantial cluster of research is centered on cochlear implant(s) and hearing-related themes, reflecting the clinical and applied orientation of the field, particularly in understanding auditory

perception among implant users. Keywords related to discrimination, responses, children, memory, and language point to developmental, cognitive, and behavioral dimensions, while neurocognitive terms such as brain, cortex, EEG, fMRI, and auditory cortex highlight the strong integration of neuroscience methods. Collectively, the treemap reveals a highly interdisciplinary research landscape that bridges music cognition, auditory neuroscience, speech and language processing, and clinical hearing science, with both foundational topics and specialized subthemes contributing to the field's intellectual diversity.



Figure 12. Tree map

As shown in Figure 13, the evolution of trend topics reveals a clear maturation and diversification of the field from 2003 to 2023. Early research is characterized by a narrow methodological focus, with neurophysiological terms such as *event-related potentials* appearing first, indicating the foundational role of brain-response measurement techniques. From around 2010 onward, the field expands rapidly, marked by the emergence of core cognitive and neural themes including *pitch*, *melody*, *cortex*, *language*, *memory*, *brain*, and *EEG*, reflecting the consolidation of music cognition and auditory neuroscience. The period after 2016 represents a phase of dominance and thematic diversification, where *music*

perception, *perception*, and *music* become the most frequent and stable topics, underscoring their centrality to the field. Simultaneously, increased attention to *timbre*, *hearing loss*, *clinical assessment*, *individual differences*, *age*, and *experience* signals a shift toward applied, developmental, and clinically relevant research. Overall, the figure illustrates a transition from foundational neural methods to a mature, interdisciplinary research landscape integrating cognitive, behavioral, neuroscientific, and applied perspectives on music and auditory perception.

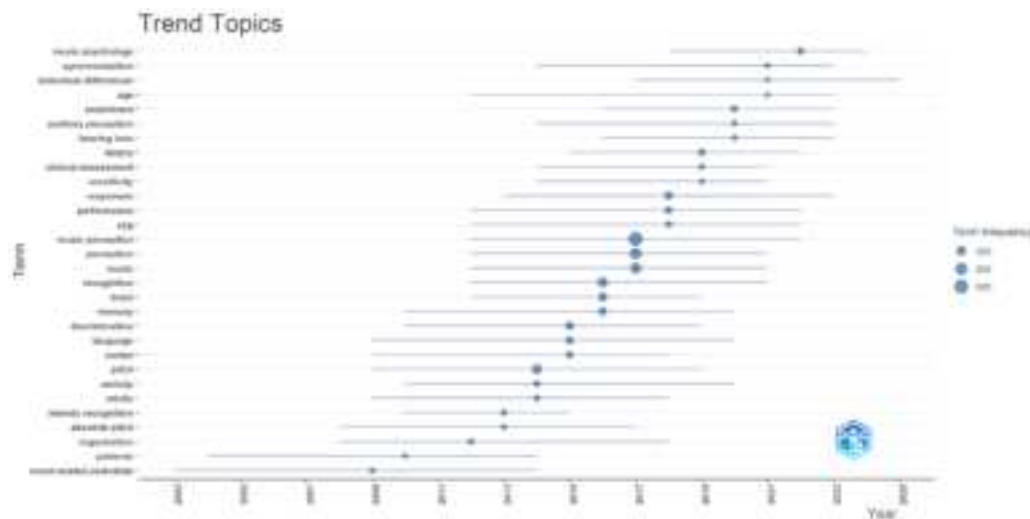


Figure 13. Trend Topics

Figure 14 reveals two clearly differentiated thematic clusters that structure the field. Cluster 2, centered on *cochlear implants* and *music perception*, occupies a position of higher centrality (0.451) with substantial impact (1.00), indicating that this theme is both structurally central to the literature and highly influential. Its high confidence values (100% for cochlear implant(s) and over 61% for music perception) suggest a well-defined, cohesive, and mature research core that strongly connects multiple documents through shared references. In contrast, Cluster 1,

comprising *music*, *music perception*, and *pitch*, shows lower centrality (0.343) but slightly higher impact (1.02), reflecting a foundational yet more conceptually diffuse theme. This cluster represents broad theoretical and perceptual inquiries that exert strong influence but are less tightly embedded in the document coupling structure. Together, the two clusters indicate a field organized around a dominant applied-clinical core (cochlear implants and music perception) supported by a wider theoretical base focused on music and pitch processing.



Figure 14. Thematic clusters based on document coupling (centrality-impact map).

As shown in **Figure 15**, the MCA reveals a well-structured and conceptually coherent research landscape, with the first two dimensions explaining a substantial proportion of variance (Dim 1 = 60.9%, Dim 2 = 13.56%). Dimension 1 clearly separates applied auditory and clinical research, dominated by themes such as cochlear implants, speech perception, hearing, and listeners, from more cognitively and neuroscientifically oriented work focusing on music, brain, cortex, memory, language, and congenital amusia. Dimension 2 further differentiates experiential and behavioral outcomes (e.g., performance, experience, responses) from fundamental perceptual and neurobiological mechanisms (e.g., pitch, timbre,

discrimination, plasticity). Distinct but interconnected thematic clusters emerge, including auditory rehabilitation and cochlear implant research, basic auditory psychophysics, music psychology and behavioral responses, and the neurocognition of music. Central bridging concepts such as music perception, pitch, perception, recognition, and speech occupy intermediate positions, underscoring their foundational role in linking clinical, psychological, and neuroscientific strands of the field. Overall, the map highlights a mature, interdisciplinary domain structured around the interaction between auditory technology, perceptual mechanisms, and higher-level cognitive and emotional processing of music.

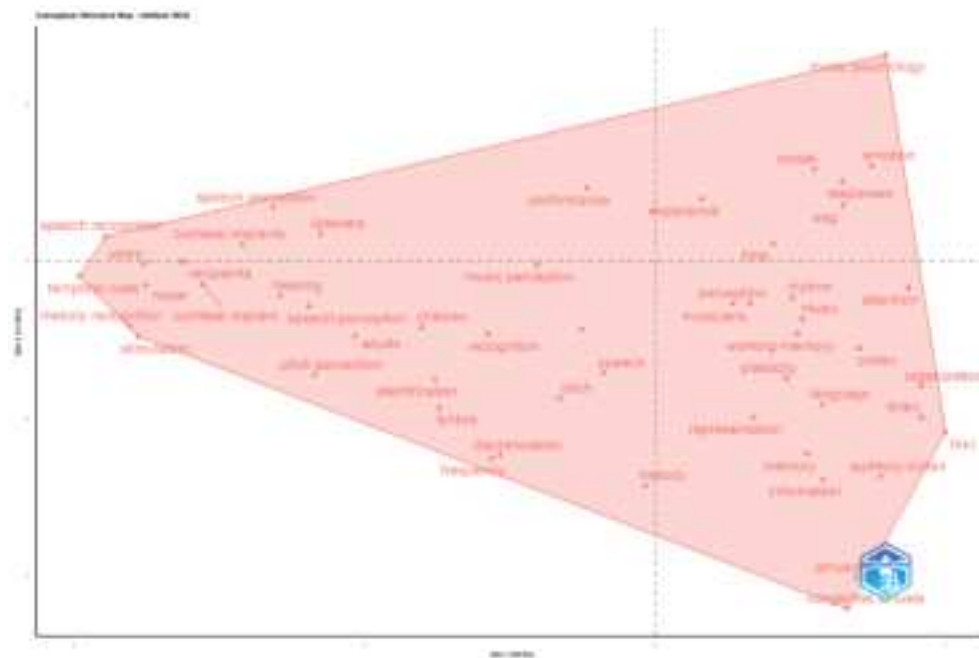


Figure 15. Conceptual Structure map

As shown in **Figure 16**, the global collaboration network is highly centralized, with the United States acting as the dominant hub in both research output and international connectivity. A dense transatlantic collaboration axis links the USA with Western European countries, particularly the United Kingdom, Germany, France, and Italy, highlighting long-standing, high-intensity scientific partnerships. Canada and Australia also

emerge as major secondary hubs, maintaining strong collaborative links with both North America and Europe. East Asian countries, notably China, Japan, and South Korea, are well integrated into these global networks, primarily through partnerships with the USA and Western Europe, reflecting their growing role in international research. Overall, the map reveals a hierarchical yet increasingly interconnected global

research landscape, where highly productive countries tend to collaborate more extensively,

reinforcing their central position within the international scientific system.



Figure 16. Country Collaboration Map

Discussion

Taken together, the findings of this bibliometric analysis offer a comprehensive, data-driven account of how music psychology, music perception, and auditory processing have evolved into a mature, interdisciplinary, and globally networked research domain. Rather than reflecting episodic or trend-driven expansion, the field demonstrates sustained and cumulative growth, anchored in a stable set of core themes, influential authors, and institutional hubs. At the same time, the results reveal structural asymmetries in geographic participation and influence, highlighting tensions between theoretical breadth, clinical centrality, and global inclusivity. By situating these patterns within the broader development of music psychology, the discussion clarifies how the field's intellectual architecture has been shaped over time and where future consolidation and diversification are most needed (Hallam et al., 2009; Anglada-Tort & Sanfilippo, 2019).

In response to RQ1, the results indicate that research on music psychology and auditory processing remained relatively marginal for several decades before entering a phase of steady and sustained growth beginning in the early 1990s.

The sharp acceleration after 2010 marks a clear turning point, reflecting not only increased publication volume but also thematic diversification and methodological sophistication. Importantly, citation patterns mirror this trajectory: early periods are characterized by low citation density, followed by the emergence of highly influential work in the mid-1990s that continues to anchor the field's intellectual foundation. This pattern supports the interpretation of music psychology as a cumulative science, in which landmark contributions retain long-term relevance rather than being rapidly displaced (Peretz & Zatorre, 2005; Koelsch, 2014). Thematic analyses further show that the field has transitioned from narrowly focused psychophysical and neurophysiological concerns toward a broad, integrative agenda dominated by music perception, pitch, speech, emotion, and auditory cognition. The increasing prominence of clinical and applied themes, particularly cochlear implants and hearing-related research, suggests a shift toward translational relevance, without displacing foundational theoretical inquiry. This balance between continuity and diversification reflects a mature disciplinary structure rather than conceptual fragmentation, aligning with broader

observations about the stabilization of music psychology as a core area within cognitive and auditory sciences (Hallam et al., 2009).

Addressing RQ2, the results demonstrate that the intellectual structure of the field is highly centralized around a relatively small number of prolific and influential authors, institutions, and journals. Core outlets such as *Music Perception*, *Psychology of Music*, and *Frontiers in Psychology* function as stable knowledge hubs, while clinically oriented journals signal the growing integration of auditory neuroscience and rehabilitation research. At the author level, the dominance of figures such as Tillmann, Peretz, Limb, and Rubinstein highlights the role of intellectual brokerage, where individual scholars bridge theoretical, neuroscientific, and clinical traditions rather than operating within isolated subfields.

Institutionally, the concentration of output within North American and Western European research centers underscores the importance of sustained funding, infrastructure, and interdisciplinary collaboration in shaping long-term scholarly influence. However, the co-citation and thematic mapping results also indicate that theoretical and clinical streams are not siloed; instead, they are tightly interconnected through shared references and bridging concepts such as music perception and pitch. This integration challenges simplified narratives that treat music psychology as divided between basic and applied research, suggesting instead a structurally coherent but internally differentiated field (Anglada-Tort & Sanfilippo, 2019).

With respect to RQ3, the findings reveal a hierarchical yet increasingly interconnected global research landscape. The United States clearly dominates in terms of publication volume, institutional presence, and network centrality, reflecting a strong domestic research ecosystem. However, citation-normalized indicators complicate this picture: countries such as Canada and Finland achieve higher average citation impact per article, indicating that influence is not reducible to output alone. European countries with high proportions of multi-country publications demonstrate how international collaboration serves as a key mechanism for

amplifying visibility and impact, particularly for smaller research systems.

Despite these collaborative gains, large regions, including South Asia, Africa, and parts of Latin America, remain underrepresented in both output and citation influence. This imbalance reinforces concerns about the cultural and epistemic generalizability of dominant theories in music psychology and echoes broader critiques regarding WEIRD biases in psychological research (Singh & Mehr, 2023; Jakubowski et al., 2025). The results thus highlight international collaboration as both a strength of the field and an unevenly distributed resource.

Limitations and future research directions

Despite the breadth and depth of these findings, several limitations must be acknowledged. First, the analysis is confined to English-language journal articles indexed in the Web of Science Core Collection, which likely underrepresents work published in other languages, books, conference proceedings, Scopus- or PubMed-only journals, and regional outlets, particularly in under-resourced contexts. Second, citation-based indicators capture academic visibility rather than intrinsic quality, methodological rigor, or societal impact, and are influenced by factors such as journal prestige, open-access status, and language, which may advantage already dominant countries and institutions. Third, the presence of a small number of retracted publications and early-access records near the end of the time window introduces minor distortions in growth and impact trends, even though sensitivity checks suggest that the core patterns are robust.

Future research can address these constraints in several ways. Expanding the data sources to include Scopus, PubMed, discipline-specific indexes, and non-English databases would yield a more comprehensive and geographically inclusive map of music psychology and auditory neuroscience. Complementing citation-based analyses with altmetrics, practice guidelines, and clinical or educational impact measures would help to capture dimensions of influence that fall outside traditional academic citation networks. Methodologically, integrating topic modeling,

full-text mining, and mixed-methods case studies would allow finer-grained analysis of how concepts (e.g., diversity, digital platforms, cross-cultural comparison) emerge and travel across subfields. Substantively, targeted bibliometric or qualitative follow-up studies on underrepresented regions, populations (e.g., non-WEIRD listeners, users of different hearing technologies), and settings such as community music, informal musicking, and digital streaming environments could help rebalance the evidential base and support a more globally inclusive music psychology.

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