

# Scientific Mapping Of Software For Neurodivergence Screening And Diagnosis

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## **Abstract**

*The growth of digital technologies, especially those based on artificial intelligence, has driven the development of software aimed at the screening and diagnosis of neurodivergences. Such tools have been widely promoted as innovative strategies for the early identification of neurodevelopmental conditions, particularly Autism Spectrum Disorder (ASD). Despite this progress, studies that systematize and critically analyze the scientific output on this topic—considering its maturity, distribution, and conceptual foundations—remain scarce. This study aims to map the international scientific output related to software applied to the screening and diagnosis of neurodivergences through a bibliometric analysis. This is a quantitative study based on secondary data extracted from the Scopus database, covering the period from 2006 to 2026. Initially, 2,546 documents were identified using the descriptor "neurodiversity." After applying specific filters, the final sample comprised 2,282 studies. The results indicate significant growth in scientific output from the 2010s onward, geographic concentration in countries with greater technological investment, and a predominance of computer science and engineering areas over clinical areas. It is concluded that the field shows relevant quantitative expansion but still lacks greater integration between technological development, clinical validation, and conceptual clarity.*

**Keywords:** *neurodiversity, bibliometrics, health software, digital diagnosis, artificial intelligence*

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## **I. Introduction**

The concept of neurodiversity has gained prominence in recent decades by proposing a broader understanding of human neurological variations, moving away from an exclusively pathologizing perspective and incorporating social, cultural, and identity dimensions (Singer, 1999; Armstrong, 2010). In the fields of health and education, however, the need remains to early identify neurodevelopmental conditions that require specialized follow-up, such as Autism Spectrum Disorder (ASD), Attention Deficit Hyperactivity Disorder (ADHD), and specific learning disorders.

The literature indicates that early identification and diagnosis are associated with better developmental outcomes and expanded access to appropriate interventions (Zwaigenbaum et al., 2015; Lord et al., 2020). Traditionally, these processes depend on clinical assessments conducted by multidisciplinary teams, based on diagnostic protocols and specialized observation. However, the increasing demand for these services, combined with access inequalities, has driven the development of technological solutions as auxiliary tools.

In this context, software and digital systems based on artificial intelligence, machine learning, and automated data analysis have been developed to support the screening and, in some cases, the diagnosis of neurodivergences. These technologies employ different strategies such as behavioral analysis, natural language processing, visual pattern recognition, and interactive digital games (Topol, 2019; Dwyer et al., 2018).

Despite the innovative potential of these tools, authors warn of risks associated with the uncritical adoption of health technologies, especially when there are weaknesses in clinical validation, conceptual standardization, and ethical regulation (World Health Organization [WHO], 2021; Obermeyer & Emanuel, 2016). The literature also shows the imprecise use of the terms screening and diagnosis, which can generate misinterpretations and inadequate practices.

Given this context, it is essential to understand how international scientific output has approached software applied to the screening and diagnosis of neurodivergences.

## **Objective**

To map the international scientific output on software applied to the screening and diagnosis of neurodivergences.

## II. Method

This is a bibliometric study with a quantitative and descriptive approach, developed from secondary data, with the objective of mapping the international scientific output related to software applied to the screening and diagnosis of neurodivergences. The research timeframe covers the period from 2006 to 2026, enabling the analysis of the historical evolution of scientific output over approximately two decades.

The database used was Scopus, selected for its broad multidisciplinary coverage and international recognition in indexing high-impact scientific journals. The methodological procedure began with access to the Scopus document search tab, where the search code *neurodiversity* was entered in the title, abstract, and keyword fields, resulting in an initial universe of 2,546 studies. The records obtained were exported in Excel format, enabling the organization, processing, and analysis of bibliometric data.

In order to meet the specific focus of the research, studies were filtered that simultaneously contained the following keywords: *autism AND software AND disorder AND spectrum AND diagnos*. After applying this filter, the sample was reduced to 2,282 studies, which constituted the final corpus of the bibliometric analysis.

The data analysis considered classic bibliometric indicators, including the temporal evolution of publications, the geographic distribution of scientific output, the predominant knowledge areas, the recurrence of terms and concepts, the profile of the most productive journals, the distribution by document type, and thematic trends related to the use of software in the screening and diagnosis of neurodivergences. The data were processed descriptively, with support from figures generated from data exported from the Scopus database.

## III. Results

The bibliometric analysis of the international scientific output related to software applied to the screening and diagnosis of neurodivergences revealed progressive growth in publications throughout the analyzed period (2006–2025), with more pronounced intensification from the 2010s onward. This temporal behavior reflects the broadening of scientific interest in the use of digital technologies, especially those based on artificial intelligence, in the context of health and education. Table 1 presents the annual distribution of publications in absolute, percentage, and cumulative terms.

Table 1

**Annual Distribution of Publications on Neurodiversity in the Scopus Database (2006–2025)**

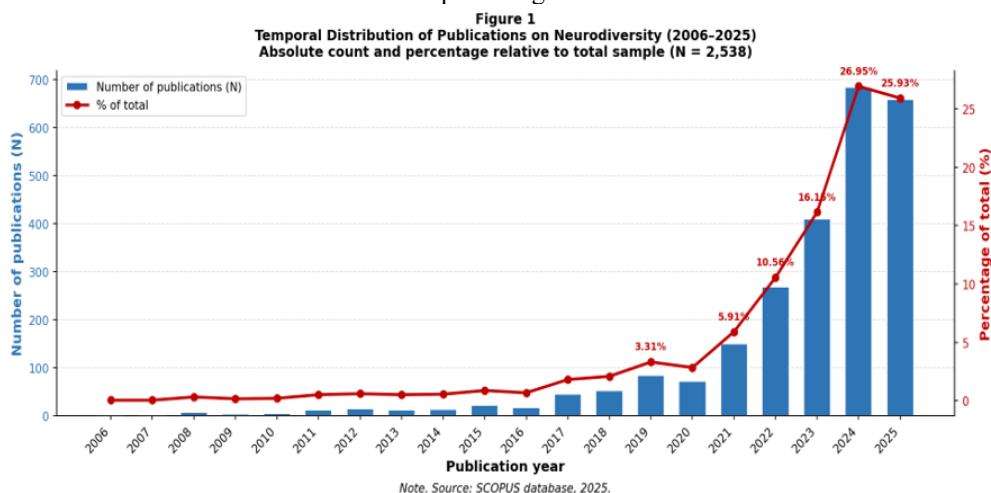
Year	N publications	% of total	Cumulative %
2006	1	0.04%	0.04%
2007	1	0.04%	0.08%
2008	8	0.32%	0.39%
2009	4	0.16%	0.55%
2010	5	0.20%	0.75%
2011	13	0.51%	1.26%
2012	15	0.59%	1.85%
2013	13	0.51%	2.36%
2014	14	0.55%	2.92%
2015	22	0.87%	3.78%
2016	17	0.67%	4.45%
2017	46	1.81%	6.26%
2018	53	2.09%	8.35%
2019	84	3.31%	11.66%
2020	72	2.84%	14.50%
2021	150	5.91%	20.41%
2022	268	10.56%	30.97%
2023	410	16.15%	47.12%

2024	684	26.95%	74.07%
2025	658	25.93%	100.00%
<b>Total</b>	<b>2538</b>	<b>100.00%</b>	—

Note. N = 2,538 (total raw sample prior to filtering). Source: SCOPUS database, 2025.

Figure 1 visually illustrates the same distribution, highlighting the acceleration of the growth curve from 2021 onward. The years 2024 and 2025 alone represent 52.88% of all the scientific output identified in the period, evidencing the recency and acceleration of the field.

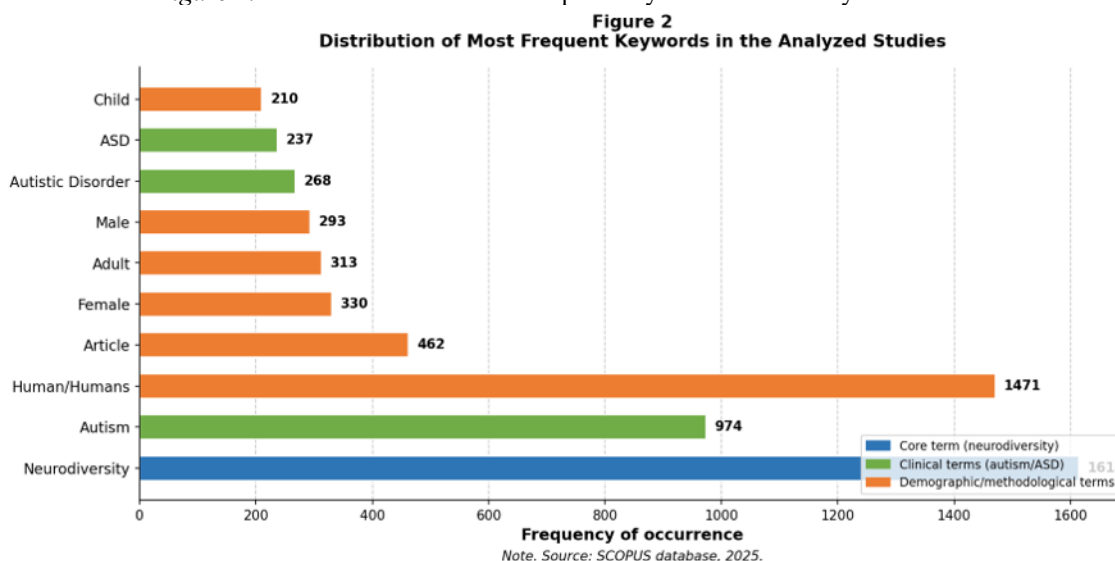
Figure 1. Temporal evolution of publications on neurodiversity (2006–2025): absolute N and relative percentage.



Note. Left axis: absolute number of publications (bars). Right axis: percentage relative to the total sample (line). Source: SCOPUS database, 2025.

Regarding terminological analysis, the distribution of keywords identified in the abstracts of the analyzed studies reveals a predominance of clinical terms. A higher frequency of the terms *autism* (974 occurrences), *disorder* and *spectrum* was observed, in contrast to the relatively low frequency of the term *software*. This result shows that, although autism and neurodevelopmental disorders are widely covered in the literature, the direct association with technological solutions still appears less explicitly in study abstracts.

Figure 2. Distribution of the most frequent keywords in the analyzed studies.

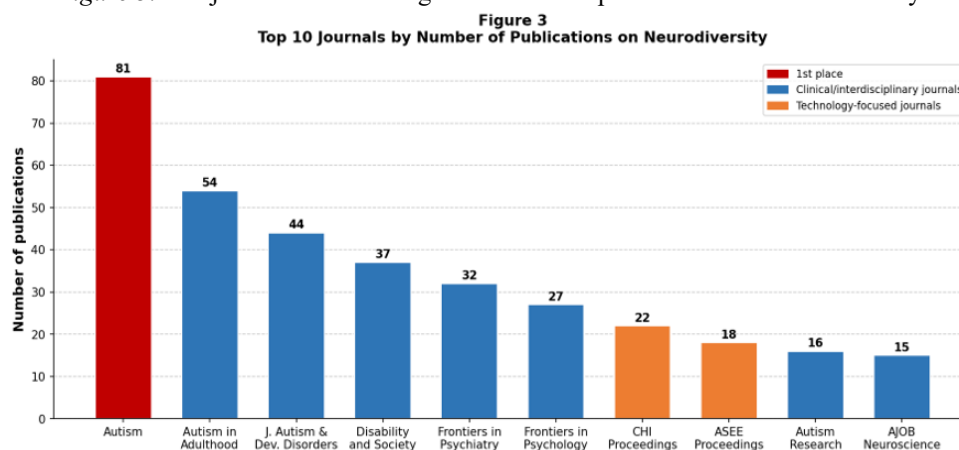


Note. Source: SCOPUS database, 2025.

Figure 2 allows us to visualize this conceptual asymmetry, indicating that studies tend to prioritize the clinical dimension of neurodivergences, while the technological component, although present, remains less central in the description of the works. This finding suggests that the use of software in screening and diagnosis is often treated as a complementary tool rather than as the main axis of scientific investigation.

The analysis of editorial sources revealed a concentration of scientific output in a limited set of journals. The ten most productive journals account for a significant portion of the analyzed studies, indicating centralization of the scientific debate in specific outlets, predominantly associated with clinical, technological, and digital health areas.

Figure 3. Ten journals with the highest number of publications on neurodiversity.



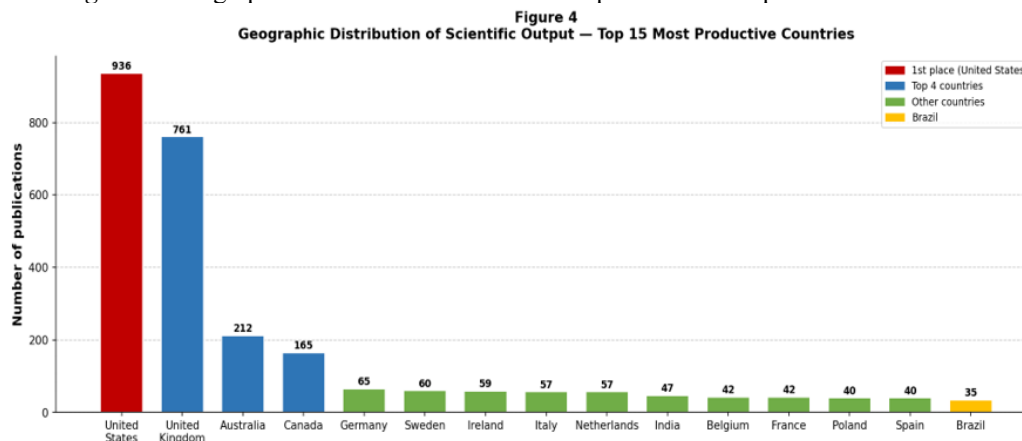
Note. Source: SCOPUS database, 2025.

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Figure 3 shows that the scientific debate has been predominantly published in journals with a clinical-interdisciplinary profile (e.g., Autism, Autism in Adulthood, Journal of Autism and Developmental Disorders), reinforcing the emerging and still consolidating nature of the technological field.

Regarding geographic distribution, the results reveal a marked concentration of scientific output in English-speaking countries with greater investment in research and technological development. The United States leads with 936 publications, followed by the United Kingdom (761) and Australia (212).

Figure 4. Geographic distribution of scientific output — 15 most productive countries.



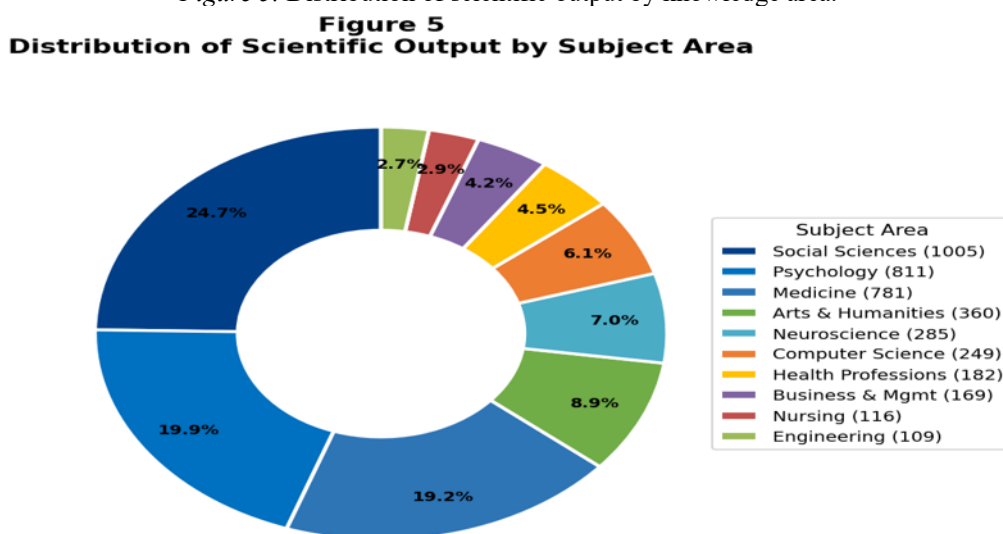
Note. Source: SCOPUS database, 2025.

Note. Source: SCOPUS database, 2025.

Figure 4 illustrates this geographic asymmetry, emphasizing that Brazil, although present in the corpus with 35 publications (1.4% of the total), still shows an incipient contribution, indicating an opportunity for expanding national research in the field.

In relation to knowledge areas, the analysis revealed a predominance of Social Sciences (1,005 documents, 25.4%), followed by Psychology (811, 20.5%) and Medicine (781, 19.7%). Computer Science, although relevant to the topic, appears in sixth place (249, 6.3%).

Figure 5. Distribution of scientific output by knowledge area.



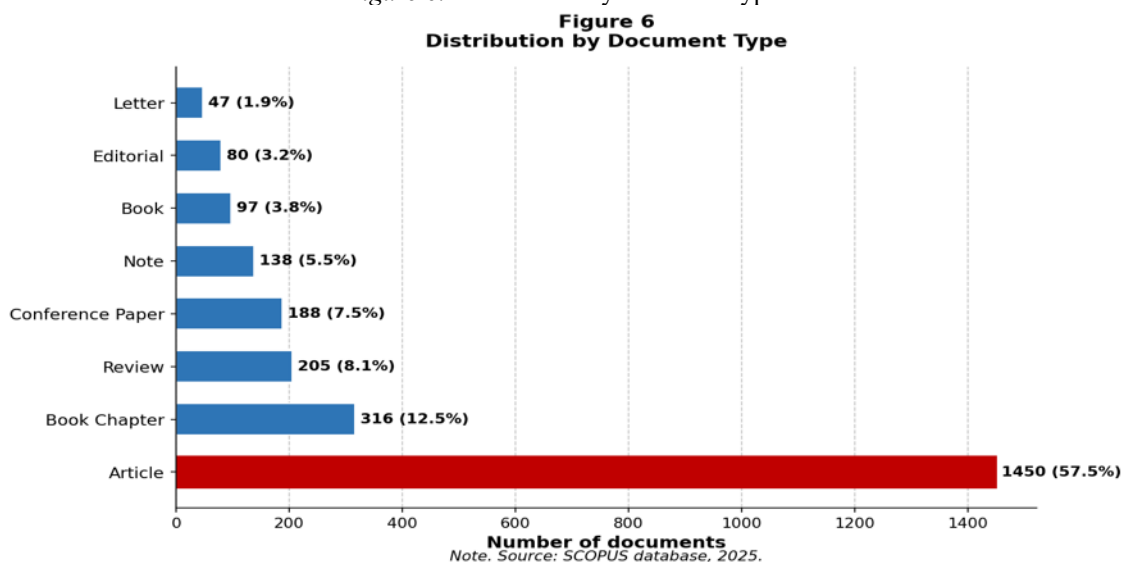
Note. Source: SCOPUS database, 2025.

Note. Source: SCOPUS database, 2025.

Figure 5 shows that, despite the technological focus of the subject, clinical and social approaches predominate in the indexed literature, corroborating the view that most studies address the technological component as an auxiliary instrument rather than as the central object of investigation.

Regarding the profile of the analyzed documents, scientific articles constitute the most expressive portion of the output (1,450 documents, 58.7%), followed by book chapters (316, 12.8%) and reviews (205, 8.3%). Conference articles total 188 works (7.6%), while complete books represent 97 documents (3.9%).

Figure 6. Distribution by document type.



Note. Source: SCOPUS database, 2025.

Note. Source: SCOPUS database, 2025.

Figure 6 confirms the predominance of original articles, indicating relative methodological maturity in the field, although the high proportion of book chapters suggests that part of the knowledge produced still circulates in formats less accessible to the broader scientific community.

Overall, the results indicate that the scientific output on the subject shows relevant quantitative growth but is marked by conceptual heterogeneity and the predominance of clinical and social approaches over robust technological studies. These findings reinforce the need for deeper scientific inquiry, greater terminological clarity, and integration between technology and clinical practice.

#### IV. Discussion

The results of this bibliometric study demonstrate that scientific output related to software applied to the screening and diagnosis of autism and other neurodivergences shows significant growth from the 2010s onward, accompanying the consolidation of digital technologies and artificial intelligence in the health field. This finding is consistent with broader analyses of the digital transformation of medicine, which point to the growing incorporation of algorithms and computational systems into screening processes, diagnostic support, and clinical decision-making (Topol, 2019; Dwyer et al., 2018).

However, despite the quantitative increase in publications, the data reveal relevant qualitative weaknesses, particularly regarding the centrality of the technological component in scientific investigations. The low frequency of the term *software* in abstracts, compared to the high frequency of clinical terms such as *autism*, *disorder* and *spectrum*, suggests that many studies approach neurodivergences from a traditional perspective, using digital technologies in a peripheral or instrumental manner rather than as the central object of analysis. This result indicates that the field is still in a transitional stage, in which technological innovation advances more rapidly than its systematic scientific examination.

This mismatch between technological innovation and scientific validation has been widely discussed in the critical literature on artificial intelligence in health. Obermeyer and Emanuel (2016) warn that the adoption of computational systems without rigorous evaluation of performance, biases, and clinical impact can compromise the safety of care and amplify existing inequalities. In the context of neurodivergences, this risk is heightened by the complexity of diagnostic processes, which involve behavioral, cognitive, contextual, and cultural variables that are difficult to fully capture by algorithmic models.

Another relevant finding concerns the conceptual heterogeneity identified in the analyzed literature, especially in the indiscriminate use of the terms screening and diagnosis. The lack of conceptual standardization observed in part of the studies can generate misinterpretations about the real role of software in health care.

As Lord et al. (2020) emphasize, the diagnosis of autism requires specialized clinical evaluation, based on well-defined criteria and longitudinal observation, and cannot be replaced by isolated automated tools. In this sense, the imprecise use of the term diagnosis in studies that do not present robust clinical validation represents a scientific and ethical weakness.

Ethical concerns associated with the use of artificial intelligence in health also emerge as a central element of the discussion. The WHO (2021) emphasizes that artificial intelligence systems must be transparent, explainable, auditable, and used as support for human decision-making rather than as substitutes for clinical judgment.

In the case of software applied to the screening and diagnosis of neurodivergences, these recommendations are especially relevant, considering the potential impact of these tools on children, families, and educational and health systems.

Furthermore, the concentration of scientific output in English-speaking countries—especially the United States and the United Kingdom—reinforces the perception of geographic asymmetry in the field, with still incipient participation from Global South countries, including Brazil. This scenario corroborates analyses that highlight the need for interdisciplinary and internationally distributed approaches to the responsible development of health technologies (Floridi et al., 2018).

The concentration of output in clinical and interdisciplinary journals, in turn, reinforces the perception that the debate has been conducted predominantly from the perspective of clinical understanding of neurodivergences, with lesser participation of approaches centered on the development and evaluation of technological solutions. This scenario indicates the need for greater dialogue between the fields of technology, medicine, psychology, education, ethics, and social sciences (Floridi et al., 2018).

From a conceptual standpoint, the literature on neurodiversity also offers important insights for interpreting the results. Singer (1999) and Armstrong (2010) argue that neurological differences should be understood within a spectrum of human variations and not exclusively as deficits to be corrected.

The incorporation of software in the context of neurodivergences must therefore be carefully aligned with this perspective, avoiding practices of premature or reductive labeling based exclusively on algorithmic metrics.

Thus, the findings of this study indicate that, although the field of software applied to the screening and diagnosis of neurodivergences is in full expansion, significant scientific, conceptual, and ethical gaps persist. The responsible advancement of this field requires greater methodological rigor, expanded clinical validation studies, terminological clarity, and effective integration between technology and clinical practice. These elements are fundamental to ensuring that these tools contribute positively and safely to health care and to the development of evidence-based public policies.

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