

# **A Systematic Review of Studies on Pragmatic Language Skills in Individuals With Autism: A Bibliometric Analysis**

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## **Abstract**

Autism spectrum disorder is a neurodevelopmental disorder characterised by significant difficulties in social communication and interaction. A key component of these difficulties is the impairment in pragmatic language skills, which refers to the ability to use language appropriately and functionally within a social context. Pragmatic language skills play a critical role in the social adaptation and communication competence of individuals with autism in daily life. The aim of this study is to present the studies conducted on the pragmatic language skills of individuals with autism in literature using bibliometric methods. In this study, publications on the pragmatic language skills of individuals with autism were examined both in terms of content and bibliometrics, and general trends, authors, distribution by year, and other characteristics were presented with scientific and visual maps. Web of Science (WoS) was used to collect data. A total of 500 publications were identified by searching for the term's "autis\*" and "pragmatic language" and passing through various screening processes. Content analysis and bibliometric analysis were used to analyse the data. The study identified the distribution of publications by year, the most prolific authors, the journals with the most publications, and the countries. Furthermore, visual maps were created using co-author, co-citation, and co-word analyses, and the findings were discussed considering the literature in the field.

*Keywords:* autism, pragmatic language, bibliometric analysis

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## **Introduction**

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by difficulties in social communication and interaction, as well as restricted and repetitive patterns of behavior (American Psychiatric Association [APA], 2013). Pragmatic language difficulties, a core feature of ASD, involve impairments in the functional use of language in social contexts; this negatively impacts individuals' daily communication skills, peer relationships, and social adaptation (Bishop, 1998; Tager-Flusberg, 2000). Pragmatic language encompasses complex communicative skills such as taking turns in conversation, maintaining a topic, making contextual inferences, interpreting nonverbal cues, and understanding figurative language (Adams, 2002; Martin & McDonald, 2003).

The nature and scope of pragmatic language disorders in ASD have been the subject of growing research interest over the past three decades. Early studies have shown that individuals with ASD experience significant difficulties at the pragmatic level, even when their structural language skills are relatively intact (Volden & Phillips, 2010; Young et al., 2005). This finding suggests that pragmatic language serves as a critical indicator for an ASD diagnosis and should be a primary target of intervention programs (Parsons et al., 2017).

The rapid proliferation of research in the fields of OSB and pragmatic linguistics necessitates a systematic evaluation of this body of work. Bibliometric analysis is a research approach that examines scientific publications in a specific field using quantitative methods and holistically reveals the field's structure, development process, and intellectual patterns (Aria & Cuccurullo, 2017). This method allows for the systematic identification of leading researchers in the field, high-impact studies, core journals, international collaboration networks, and thematic research clusters (Donthu et al., 2021). Bibliometric analyses offer a panoramic perspective that goes beyond traditional systematic reviews, particularly in large-scale and multidisciplinary fields (Zupic & Čater, 2015).

The aim of this study is to comprehensively examine the bibliometric characteristics of research conducted in the fields of autism spectrum disorder and pragmatic language, thereby elucidating the scientific development of the field. Accordingly, 500 publications identified in the Web of Science Core Collection database using the keywords “autis\*” and “pragmatic language” were analyzed for their publication years, leading journals, most productive researchers, and countries. Additionally, the study aimed to present an overview of the current body of knowledge by mapping the field's intellectual structure, collaboration networks, and research themes through analyses of co-authorship, co-citation, and keyword co-occurrence.

## **Method**

This section provides detailed information on the research model, the research process, and the analysis of the data.

### **Research Model**

This study conducted a bibliometric analysis of scientific publications on autism spectrum disorder and pragmatic language. Bibliometric analysis is a systematic method based on quantitative measurements of publications, authors, journals, and citations, aimed at revealing the structure, development, and impact of a research field (Zupic & Čater, 2015). This approach enables the visualization of the body of knowledge in the field and the

identification of key research patterns. Within the scope of this study, the bibliometric analysis method was chosen to systematically and objectively identify the development trends, influential researchers, publication sources, and research themes within the extensive literature on autism spectrum disorder and pragmatic language.

## **Process**

The data for this study were obtained from the Web of Science (WoS) Core Collection, which is recognized as one of the most comprehensive and reliable academic databases worldwide. The database search was initiated in January 2026 and completed in June 2026; an advanced search strategy was applied using the keywords “autis\*” and “pragmatic language” together in the Topic (TS) field. The use of the wildcard (\*) operator allowed for the simultaneous search of different forms such as autism, autistic, and autistics. No restrictions were applied regarding publication year or language; the search was limited only to journals indexed in the Web of Science Core Collection. This search yielded a total of 500 publications published between 1991 and 2026.

The study examined the following bibliometric indicators: (1) Distribution of publications by year—to reveal the field’s growth trends over time; (2) Top-producing journals — to determine the publication ecology of the field; (3) Most productive authors — to identify leading researchers in the field; (4) Publication distribution by country — to identify geographical contributions and patterns of international collaboration. These findings were obtained through the WoS Citation Report. In addition, co-authorship analysis was conducted to reveal collaboration relationships among researchers; co-citation analysis was performed to visualize relationships among co-cited sources and the field’s intellectual structure; and co-word analysis was carried out to determine thematic structure and research foci within the field.

## **Data Analysis**

The Web of Science platform’s built-in “Analyze Results” tool was used to process and analyze the data. Through this tool, frequency distributions were obtained for basic bibliometric indicators such as publication year, source journal, author, country/region, and citations. The obtained data were exported in the plain text (txt) format, which is widely preferred for academic use, and imported into the VOSviewer software for bibliometric mapping analyses.

## **Findings**

The findings are presented under this heading.

A search conducted in the Web of Science Core Collection database using the keywords “autis\*” and “pragmatic language” yielded a total of 500 publications. The publications in the dataset span the years 1991–2026. The studies included in the analysis represent more than 15 countries, and it was determined that the most cited publication had 256 citations. This overall picture indicates that the topic of pragmatic language skills in autism is a field of study that has been evolving over time and is being researched at the international level.

**Figure 1**  
*Distribution by Year*

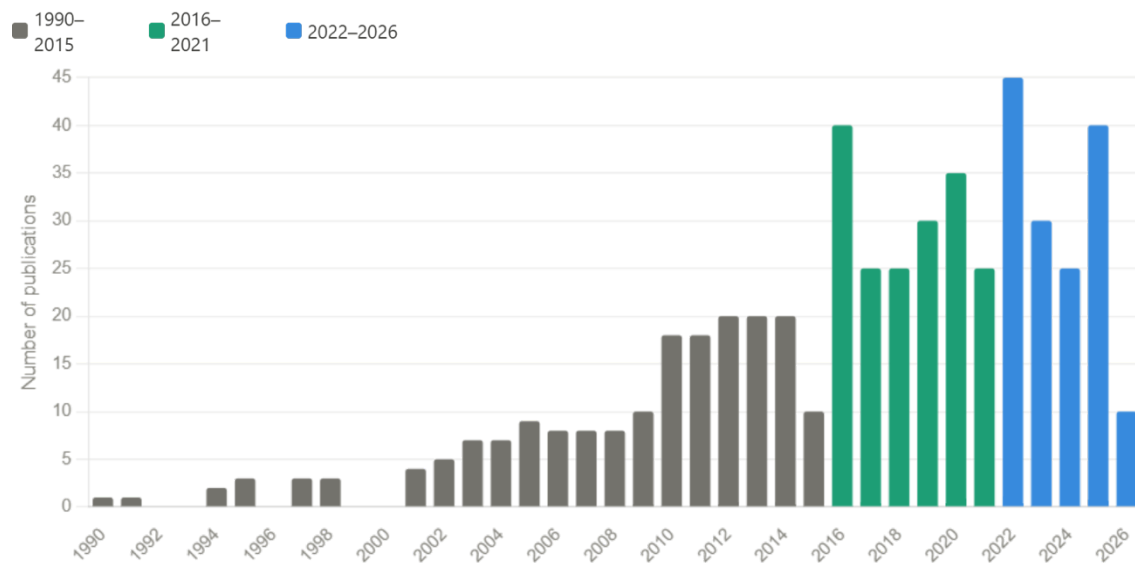


Figure 1 shows the distribution of publications in the field of autism and pragmatic language skills by year. The publications examined were published between 1991 and 2026. Publication numbers remained quite low in the early years but began to increase starting in the mid-2000s. A significant rise in publication output was observed after 2011, reaching 41 publications in 2017. The highest number of publications during the examined period was recorded in 2022, at 46. This was followed by 40 publications in 2025, 41 in 2017, and 35 in 2021. In recent years, publication numbers have generally remained at a high level, with 16 publications recorded for 2026.

**Figure 2**  
*Distribution of Authors by Number of Publications*

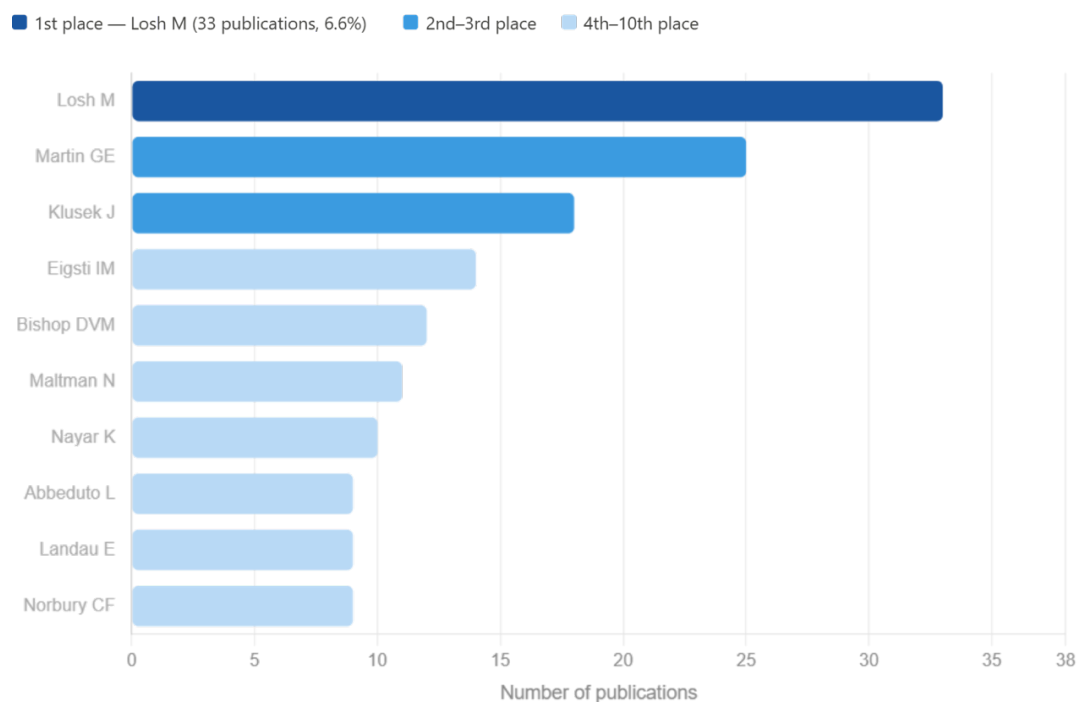


Figure 2 shows the authors who have published the most in the field of autism and pragmatic language skills. According to the analysis results, Losh M. ranks first as the most productive author with 33 publications. This author is followed by Martin G.E. (25 publications) and Klusek J. (17 publications). Other leading authors include Eigsti I.M. (14 publications), Bishop D.V.M. (12 publications), McIntyre N. (11 publications), Nayar K. (10 publications), Abbeduto L. (9 publications), Landau E. (9 publications), and Norbury C.F. (9 publications). The findings indicate that the field's publication output is concentrated around specific researchers, with Losh M., Martin G.E., and Klusek J. standing out as the authors who have contributed the most to the literature.

**Figure 3**  
*Distribution of Journals by Number of Issues*

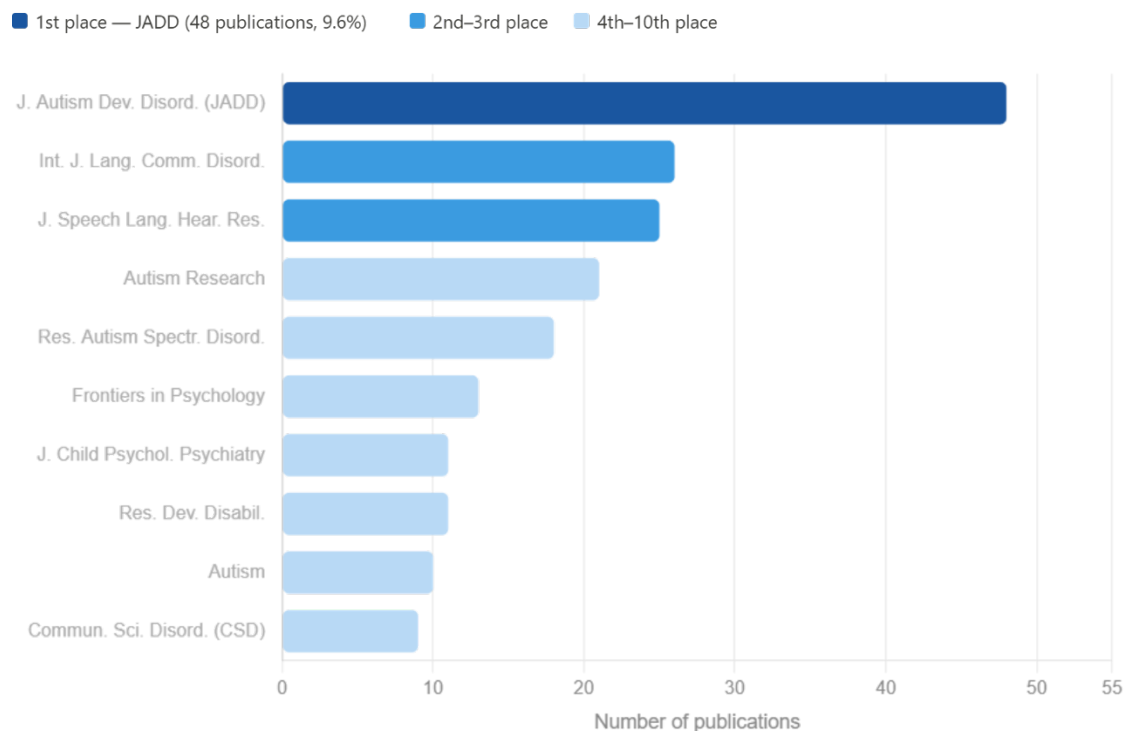


Figure 3 shows the journals with the highest number of publications in the field of autism and pragmatic language skills. According to the analysis results, the journal with the highest number of publications is the \*Journal of Autism and Developmental Disorders\* (JADD), which ranks first with a total of 48 publications. This journal is followed by the \*International Journal of Language and Communication Disorders\* (26 publications) and the \*Journal of Speech, Language, and Hearing Research\* (23 publications). Other leading journals include Autism Research (20 publications), Research in Autism Spectrum Disorders (17 publications), Frontiers in Psychology (13 publications), the Journal of Child Psychology and Psychiatry (11 publications), Research in Developmental Disabilities (11 publications), Autism (10 publications), and Communication Sciences and Disorders (CSD) (8 publications). The findings indicate that the research is concentrated primarily in journals publishing in the fields of autism, language and communication disorders, and speech-language pathology.

**Figure 4**  
*Distribution of Publications by Country*

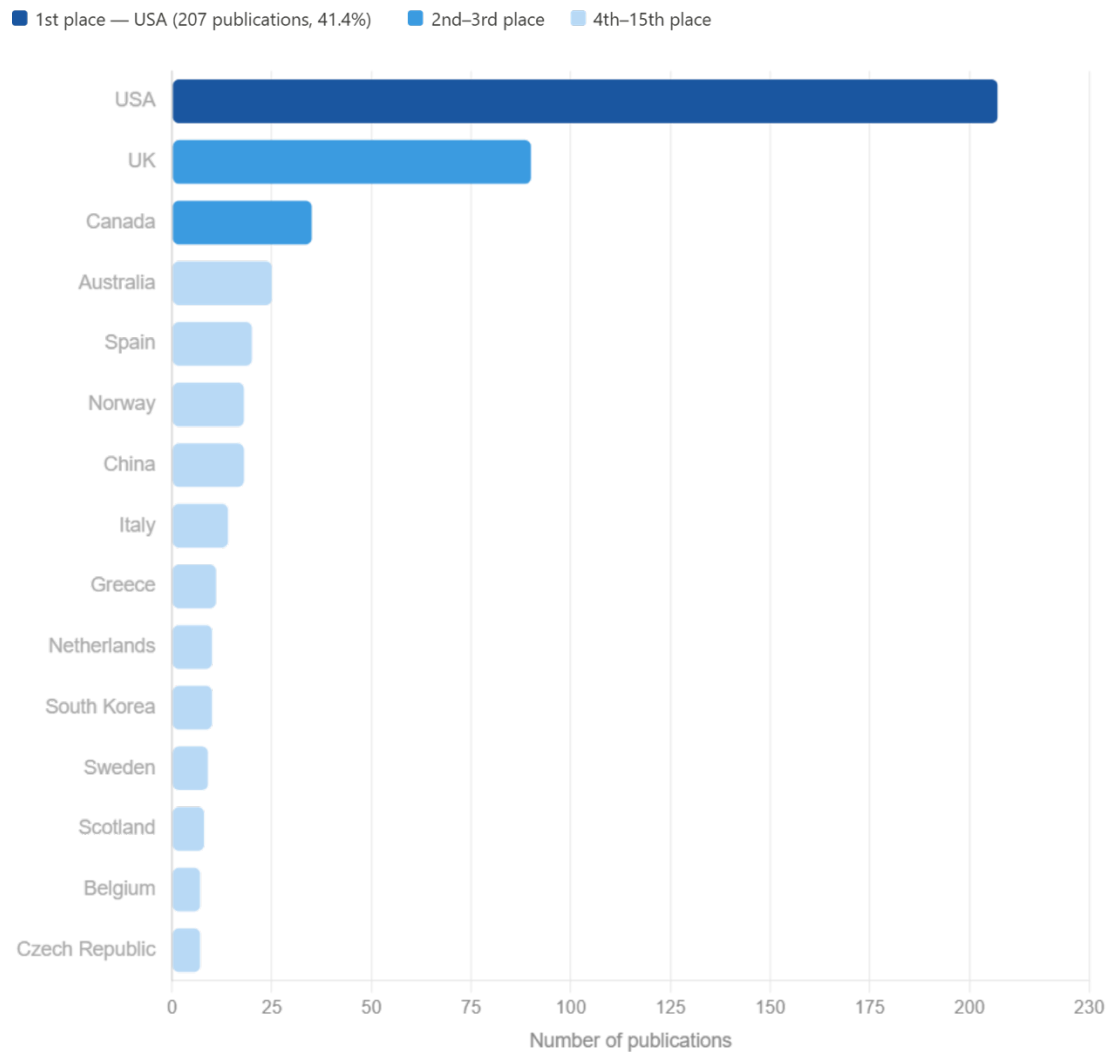


Figure 4 shows the distribution of publications in the field of autism and pragmatic language skills by country. According to the analysis results, the United States (U.S.) ranks first as the country with the highest number of publications, with 207 publications (41.4%). The US is followed by the United Kingdom (86 publications) and Canada (36 publications). Other leading countries include Australia (30 publications), Spain (26 publications), Norway (22 publications), China (21 publications), and Italy (19 publications). Additionally, Greece, the Netherlands, South Korea, Sweden, Scotland, Belgium, and the Czech Republic are among the countries contributing to this field of research. The findings indicate that publications in the fields of autism and pragmatic language skills are significantly concentrated in North American and European countries.

**Figure 5**  
*Authors' Collaboration Network*

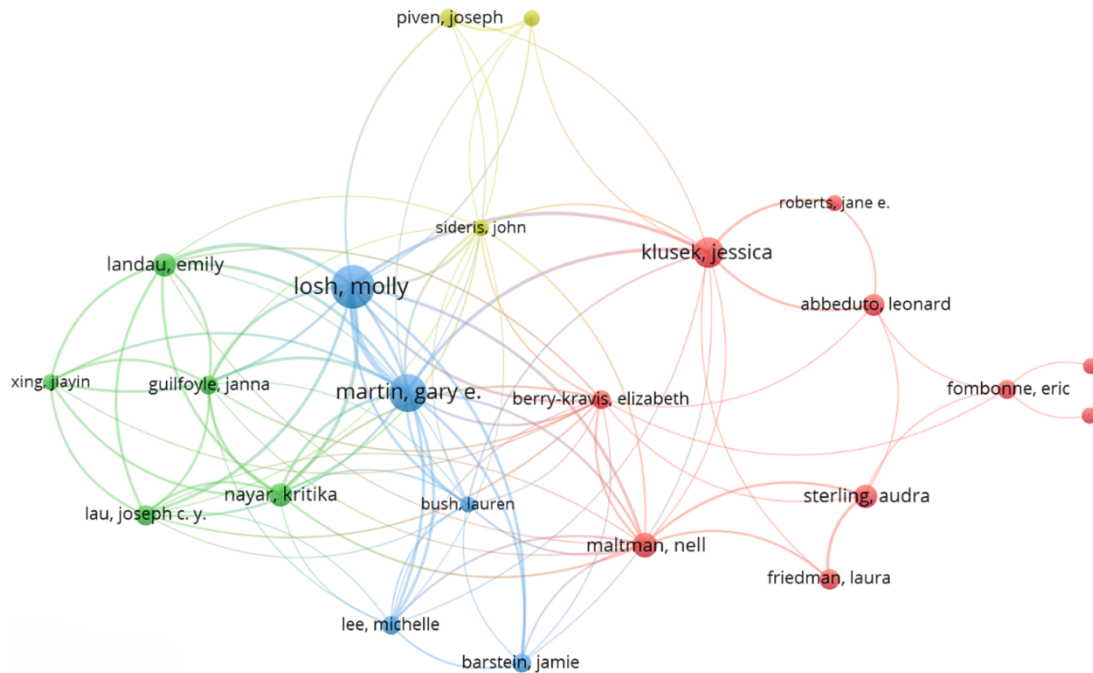


Figure 5 illustrates the co-authorship relationships among researchers publishing in the field of autism and pragmatic language skills. An examination of the network map reveals that researchers are grouped within multiple collaboration clusters. In the map, node sizes represent authors' levels of productivity, while connection lines represent co-authorship relationships. The analysis reveals that Molly Losh and Gary E. Martin stand out as the most central researchers in the network with the densest connections. These authors seem to have established strong collaborative relationships with researchers in different clusters. Additionally, researchers such as Jessica Klusek, Emily Landau, John Sideris, Kritika Nayar, and Joseph Piven were identified as key connection points in the co-authorship network. The network structure is divided into four primary collaboration clusters. While collaborations centered on Molly Losh and Gary E. Martin are concentrated in the blue cluster, the red cluster features a group of researchers centered around Jessica Klusek, Leonard Abbeduto, and Nell Maltman. The green cluster includes researchers such as Emily Landau, Janna Guilfoyle, and Kritika Nayar, while the yellow cluster has formed around John Sideris and Joseph Piven. The connections between the clusters demonstrate that researchers in the field collaborate not only within their own research groups but also across different research teams.

**Figure 6**  
*Co Citation Network*

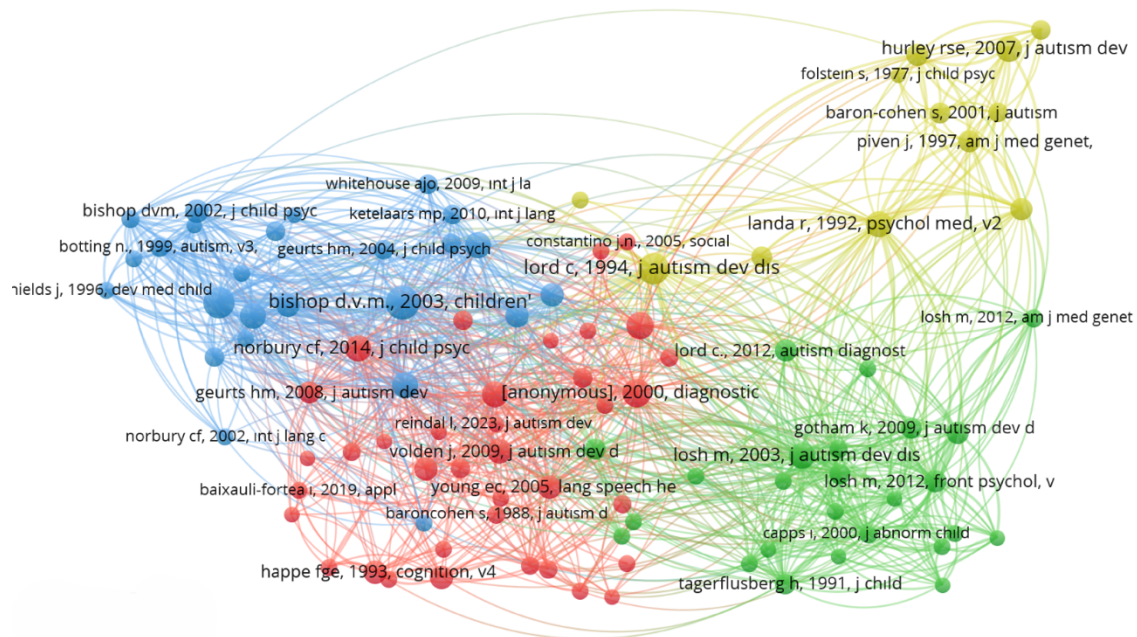


Figure 6 shows the co-citation network of studies in the fields of autism and pragmatic language skills. In the network map, nodes represent cited sources, node sizes represent the frequency of co-citations, and links represent the co-citation relationships between sources. The analysis identified four main clusters that are interconnected within the co-citation network.

The blue cluster includes studies focusing on language and communication disorders and pragmatic language development. In this cluster, studies conducted by Norbury (2014), Bishop (2002), Ketelaars (2010), and Whitehouse (2009) stand out. The red cluster contains foundational studies on pragmatic language characteristics, communication skills, and social interaction in autism. In this cluster, the works of researchers such as Young (2005), Eigsti (2007), and Happé (1993) are noteworthy.

In the green cluster, research focuses on social communication and pragmatic language competencies in autism, with studies by Losh (2003, 2012), Klusek (2014), Capps (2000), and Tager-Flusberg (1991) standing out as key nodes. In the yellow cluster, studies on the diagnosis of autism, its phenotypic characteristics, and genetic foundations are included, and it is observed that the studies conducted by Landa (1992), Baron-Cohen (2001), Piven (1997), and Hurley (2007) have high citation counts.

Overall, the network structure indicates that the literature in the fields of autism and pragmatic language skills is based on a knowledge base centered around language and communication skills, social communication, pragmatic language development, and the clinical characteristics of autism.

**Figure 7**  
*Shared Co Word Network*

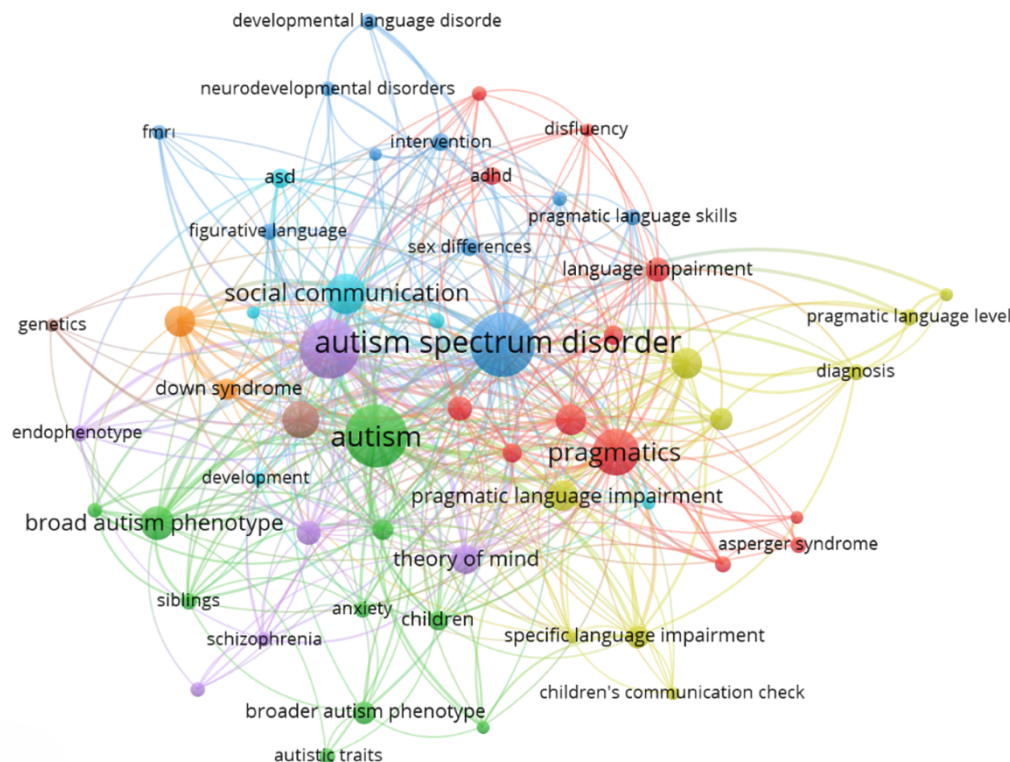


Figure 7 presents a co-occurrence network of keywords used in the field of autism and pragmatic language skills. In the network map, node sizes represent the frequency of keyword usage, while the links indicate the co-occurrence relationships between the words. The analysis revealed that the most frequently used keywords in the literature are “autism spectrum disorder,” “autism,” “pragmatics,” and “social communication.” These concepts are located at the center of the network and are seen to form dense connections with other keywords.

The co-occurrence analysis revealed various clusters representing different research themes. The blue cluster primarily includes concepts such as social communication, pragmatic language skills, developmental language disorder, neurodevelopmental disorders, and intervention. In the red cluster, terms such as pragmatics, language impairment, autism spectrum disorders, high-functioning autism, and Asperger syndrome stand out. The green cluster is centered around concepts such as theory of mind, children, anxiety, broad autism phenotype, and autistic traits. The yellow cluster includes assessment and intervention-focused concepts such as pragmatic language impairment, specific language impairment, diagnosis, assessment, and speech and language therapy. Additionally, the purple and orange clusters contain keywords related to research areas such as executive function, schizophrenia, fragile X syndrome, Down syndrome, and genetics.

Overall, the keyword network indicates that the literature is concentrated around themes such as autism spectrum disorder, pragmatic language skills, social communication, language disorders, assessment processes, and the broad autism phenotype.

## Discussion

In this study, scientific publications in the field of autism spectrum disorder and pragmatic language skills were analyzed using bibliometric methods; a search of the Web of Science Core Collection database identified a total of 500 publications published between 1991 and 2026. The findings provide a comprehensive overview of the field's historical development, publication patterns, leading researchers, and intellectual structure.

An analysis of the distribution of publications by year reveals a marked increase in scientific output in the fields of autism and pragmatic language skills over time. In particular, there has been a notable rise in the number of publications since 2011, with the highest number of publications reached in 2022 ( $n = 46$ ). This upward trend parallels the general growth in autism research and can also be linked to the increased research interest in social communication and pragmatic language skills following the publication of the DSM-5 (APA, 2013). Furthermore, current epidemiological findings indicating an increase in the prevalence of ASD (Maenner, 2023) and bibliometric studies highlighting the rise in publication output in the field of neurodevelopmental disorders (Donthu et al., 2021) support this growth trend.

According to the results of the journal analysis, the \*Journal of Autism and Developmental Disorders\* (JADD) stands out as the journal with the highest number of publications in the field, with 48 articles. This finding reflects JADD's central role in autism spectrum disorder research and aligns with the results of other bibliometric studies in the literature (Yin et al., 2022). JADD is followed by the International Journal of Language and Communication Disorders ( $n = 26$ ) and the Journal of Speech, Language, and Hearing Research ( $n = 23$ ). This indicates that research on pragmatic language skills is not limited to autism-focused journals but is also heavily represented in publications specializing in language and communication disorders. Furthermore, the fact that the top ten most productive journals account for 37.4% of all publications indicates that the literature is concentrated around a specific core group of journals.

The results of the author analysis indicate that scientific output in the fields of autism and pragmatic language is concentrated around certain researchers. The prominence of Molly Losh, Gary E. Martin, and Jessica Klusek as the most productive authors can be attributed to their comprehensive studies on pragmatic language skills, social communication, and the broad autism phenotype. Furthermore, findings from the co-authorship analysis also support these researchers' central positions within the field. In particular, the fact that Losh and Martin emerge as key actors connecting different research groups indicates that these researchers are influential not only in terms of publication numbers but also in fostering research collaborations and guiding knowledge production. These findings suggest that research in the fields of autism and pragmatic language is shaped around specific centers of expertise and research teams.

In the analysis of geographic distribution, the United States is the clear leader with 207 publications (41.4%), followed by the United Kingdom (86 publications) and Canada (36 publications). The United States' clear lead with 207 publications can be attributed to the country's strong research infrastructure and academic productivity in the field of autism research. The fact that the United Kingdom and Canada also rank high reflects these countries' research capacity in the fields of neurodevelopmental disorders and language and communication. The findings align with previous bibliometric studies that highlight the concentration of scientific output in specific geographic regions (Sweileh et al., 2016).

Publications from various countries indicate that research on autism and pragmatic language is an internationally recognized and increasingly expanding field of study.

A joint citation analysis reveals that the body of knowledge in the fields of autism and pragmatic language is structured around language and communication disorders, pragmatic language features, the broad autism phenotype, and the diagnostic and developmental characteristics of autism. The emerging thematic clusters reveal that the field is not limited to focusing solely on linguistic performance but encompasses a multidimensional research framework that also includes social communication, cognitive processes, and the developmental characteristics of autism. This finding aligns with theoretical approaches that emphasize the need to address the linguistic, cognitive, and social interaction dimensions of pragmatic language difficulties together (Martin & McDonald, 2003). The fact that the foundational studies included in the shared citation network have guided the conceptual and methodological development of the field for many years demonstrates that these sources form the intellectual foundation of autism and pragmatic language research.

An analysis of co-occurrence of keywords reveals that literature has developed around studies on autism spectrum disorder, pragmatic language, social communication, theory of mind, and intervention. The fact that the concepts of “autism spectrum disorder” and “pragmatics” are at the center of the network demonstrates that these concepts form the core research axes of the field. Furthermore, the prominence of keywords such as “social communication,” “theory of mind,” and “intervention” indicates that research focuses on both theoretical explanations and applied studies. Furthermore, the fact that concepts such as “fragile X syndrome,” “broad autism phenotype,” and “genetics” are grouped together indicates that studies examining the relationship between pragmatic language skills and genetic and phenotypic characteristics hold a significant place in the literature (Losh et al., 2012). Similarly, the fact that concepts such as “anxiety,” “ADHD,” and “schizophrenia” form a distinct cluster within the network reveals that pragmatic language skills are also addressed in the context of various neurodevelopmental and psychiatric conditions (Carruthers et al., 2022).

## **Conclusion**

When the findings are evaluated as a whole, it is evident that the field of autism and pragmatic language skills has grown significantly in recent years, and that research output has concentrated around specific researchers, institutions, and journals. It is clear that the intellectual structure of the field has taken shape around interrelated themes such as language and communication disorders, social communication, genetic factors, and intervention research. Findings derived from keyword, co-citation, and co-authorship analyses reveal that the theoretical and applied dimensions of the field are developing in tandem. Furthermore, contributions from different countries and research groups indicate that research in the field of autism and pragmatic language is becoming an increasingly broad area of scientific interest. This study provides a comprehensive overview of the field’s current structure and serves as a fundamental reference source for future research.

Based on the findings of this study, it is recommended that research in the fields of autism and pragmatic language skills be diversified to encompass different cultural and linguistic contexts, that interdisciplinary and international collaborations be increased, and that studies examining the relationship between pragmatic language skills and various neurodevelopmental characteristics be supported. Increasing research focused on assessment and intervention, particularly studies demonstrating the effectiveness of evidence-based

practices, could contribute to the field's development. Furthermore, expanding future bibliometric studies to include different databases and supporting bibliometric findings with systematic reviews and meta-analyses will enable a more comprehensive assessment of the body of knowledge in the field.

#### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

The author declares that DeepL, an AI-assisted language tool, was used during the preparation of this manuscript for translation and language refinement purposes. The use of DeepL was limited to improving linguistic accuracy, readability, and clarity. All ideas, analyses, interpretations, and conclusions presented in this manuscript are the author's own.

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