

## **BEHAVIOURAL STRENGTHS OF AUTISTIC STUDENTS THAT SUPPORT EFFECTIVE TEACHING AND LEARNING: A SCOPING REVIEW AND BIBLIOMETRIC ANALYSIS**

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*Autistic students demonstrate distinctive behavioural strengths that can significantly enhance learning experiences when effectively recognised and utilised. However, research has historically focused more on deficits than on strengths-based approaches. This study combines a scoping review and bibliometric analysis to synthesise recent evidence, identify research trends and highlight key behavioural strengths of primary school-age autistic students. Peer-reviewed studies published between January 2022 and August 2025 were retrieved from major scholarly databases. Bibliometric indicators such as publication counts, citation patterns, country productivity, were analysed to map the research landscape. A total of 41 studies met the inclusion criteria. Bibliometric analysis revealed a steady increase in publications, with a peak in 2024. The United States, China and the United Kingdom were the leading contributors. This scoping review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). The findings identified recurring strengths, including exceptional pattern recognition, attention to detail, sustained focus, visual learning preference, and adherence to structured routines. These strengths were integrated into instructional practices such as differentiated instruction, visual aids, peer-mediated activities and technology-supported learning in both inclusive and special education classrooms. The findings support a shift towards strengths-based approaches for children with autism. Leveraging behavioural strengths can promote academic achievement, improve social interaction and foster adaptive skills. This integrated methodological approach provides a comprehensive resource for educators, policymakers and researchers to develop evidence-based, student-centred instructional strategies.*

**Keywords:** Autism Spectrum Disorder, behavioural strengths, instructional strategies, scoping review, bibliometric analysis, inclusive education

## INTRODUCTION

Autistic students are neurodivergent learners whose development is characterised by differences in social communication, sensory processing, and patterns of behaviour. Their profiles are highly heterogeneous, with support needs and abilities varying widely across individuals. Autism Spectrum Disorder (ASD) is characterised by a wide range of behavioural patterns, including unique strengths that can be leveraged to support effective teaching and learning in both inclusive and specialised educational settings (Clark & Dissanayake, 2019). While much of the literature has traditionally focused on deficits and challenges, recent research has emphasised the importance of recognising and harnessing the behavioural strengths of autistic students such as persistence, attention to detail, and adherence to structured routines to optimise classroom engagement (Sanches-Ferreira et al., 2021). These strengths, when understood and integrated into pedagogical strategies, can facilitate not only smoother lesson delivery but also foster mutual respect and cooperation between teachers and students (Aikat et al., 2025).

Positive behavioural attributes such as compliance with instructional routines, consistent participation in structured tasks, and demonstrated reliability in specific skill areas have been shown to reduce instructional barriers and enhance learning environments (Papadopoulos et al., 2022). In this regard, the Positive Behaviour Support (PBS) framework offers a proactive and strengths-oriented approach, encouraging educators to recognise and build upon these assets rather than focusing solely on managing perceived behavioural deficits (Carr et al., 2002). This shift in perspective aligns with inclusive education principles, promoting student engagement and facilitating differentiated instruction tailored to the behavioural profiles of autistic learners (Yuwono, 2023).

However, despite growing awareness, the body of literature remains fragmented, with limited synthesis of evidence on which behavioural strengths are most conducive to effective teaching practices and student achievement in autistic populations. Furthermore, while systematic reviews and meta-analyses have addressed interventions for managing challenging behaviours (Sanches-Ferreira et al., 2022), there is a paucity of research consolidating findings on behaviours that actively support and enhance pedagogical processes. To address this gap, a scoping review is warranted to map the breadth of available evidence, identify recurring behavioural strengths, and explore their implications for instructional practices.

Bibliometric analysis further complements this endeavour by providing an overview of research trends, influential publications, and collaboration networks in the domain of autism and behavioural strengths. Using the ROBINS-I (Risk of Bias in Non-randomised Studies of Interventions) tool ensures a systematic assessment of study quality and bias, thus strengthening the reliability of the review findings (Sterne et al., 2016). This dual-method approach scoping review coupled with bibliometric analysis offers both qualitative mapping and quantitative insights, making it possible to establish an evidence-informed foundation for future

interventions and policy recommendations in autism education. This study therefore seeks to answer the following questions:

1. What are the publication trends and research hotspots, in the field of autistic students' behavioural strengths that support effective teaching and learning?
2. What behavioural strengths of autistic students have been identified in the literature as enabling effective teaching and learning?
3. How are these behavioural strengths applied or integrated into instructional strategies in inclusive and specialised classrooms?

This review is deliberately restricted to behavioural strengths of autistic students within school-based teaching and learning, excluding deficit-focused outcomes, clinical/diagnostic issues, and intervention efficacy; coupled with its scoping-review + bibliometric focus (primarily on non-randomised studies appraised with ROBINS-I), this narrow scope limits generalisability beyond educational contexts and may omit relevant evidence from other settings or study designs.

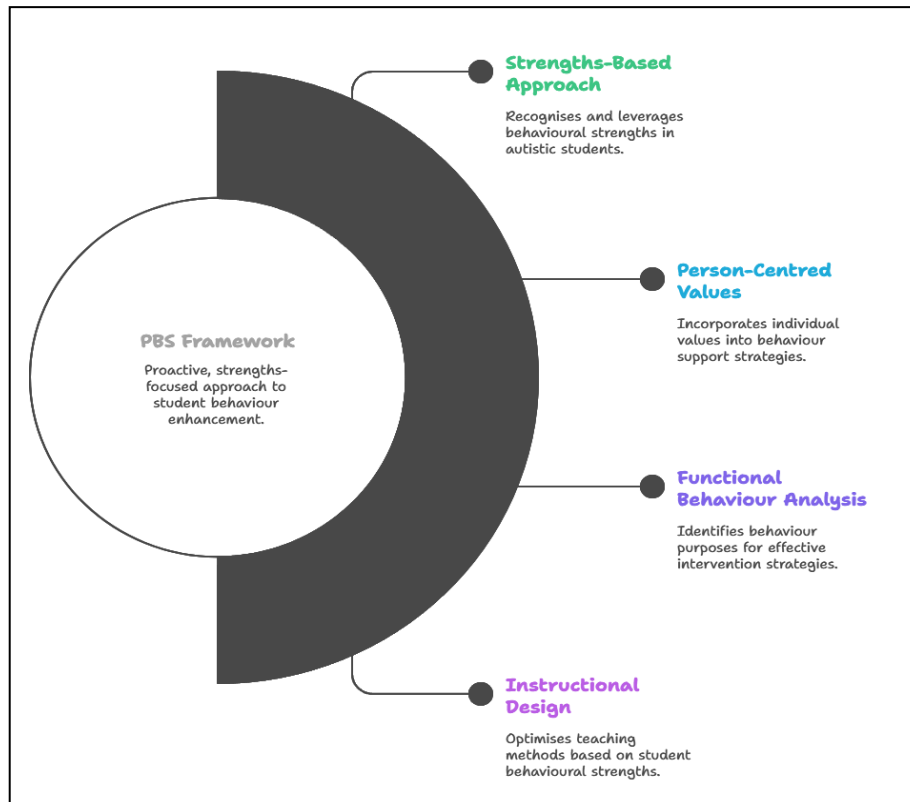
### **POSITIVE BEHAVIOUR SUPPORT (PBS) FRAMEWORK**

The PBS framework offers a proactive, strengths-oriented approach to understanding and enhancing student behaviours in educational contexts. Rooted in Applied Behaviour Analysis (ABA) and enriched with person-centered values, PBS prioritises identifying the functional purpose of behaviours and developing supportive strategies that enhance positive outcomes while reducing learning barriers (Littlefair et al., 2024). For autistic students, this approach shifts focus from deficits to recognising behavioural strengths such as consistency, adherence to routines, and focused attention as teaching assets (Papadopoulos et al., 2022). PBS harmonises with the objectives of this scoping review, particularly in mapping and synthesising autistic students' behavioural strengths. The framework encourages viewing behaviours not merely as issues to be managed but as foundational elements for optimising instructional design. For instance, identifying a student's strength in visual learning can drive strategic adaptations in lesson delivery, making instruction more accessible and engaging (Sanches-Ferreira et al., 2021).

Essentially, PBS transcends basic behaviour modification by embracing holistic, person-centred values. It advocates harnessing behavioural patterns like attention to detail, persistence, and rule-following to guide instructional planning. While older literature often emphasised challenging behaviours, PBS "reframes the conversation" toward establishing the environmental supports and functional contexts for positive behaviours. This fully supports the scoping review's aim to pivot from describing deficits to actively leveraging strengths for inclusive, effective learning environments.

**Figure 1**

*Dimensions of PBS in Education*



Source: Carr et al. (2002)

By embedding PBS as an interpretive framework within this scoping review, the study not only describe the *what* of behavioural strengths but also address the *how* these strengths can be supported, reinforced, and integrated into daily classroom practice. This dual focus ensures that the final outcomes be both academically robust and practically actionable for educators.

## METODOLOGY

This study employs a scoping review with bibliometric analysis guided by PRISMA-ScR. The bibliometric component will map publication trends, research hotspots, and influential contributors and will not undergo risk-of-bias appraisal because it analyses publication metadata rather than study effects. A risk-of-bias assessment will be conducted only for included primary studies that evaluate instructional or educational interventions using non-randomised comparative designs; these will be assessed using ROBINS-I by defining a target trial (intervention, comparator, outcomes) and pre-specifying key confounders relevant to autism education contexts. Studies that are qualitative, descriptive, single-case, or otherwise not amenable to ROBINS-I will be reported without ROBINS-I assessment (or appraised using an appropriate design-specific tool, if included). Risk-of-bias findings will be used to

contextualise the strength of evidence and to highlight methodological gaps, rather than as exclusion criteria.

### *PICO Framework*

The PICO framework has been applied to guide eligibility and search strategy:

1. Population (P): Primary school-age autistic students (ages 5–12 years).
2. Intervention (I): Behavioural interventions, support strategies, and educational approaches targeting strengths or positive behaviours.
3. Comparison (C): Control groups, pre–post comparisons, or alternative interventions.
4. Outcomes (O): Behavioural outcomes, academic performance, social skills, and adaptive behaviours.

### *Eligibility Criteria*

Comprehensive search conducted for electronic databases such as Scopus, WOS and Elsevier. Keywords and Boolean operators developed based on the PICO framework, using terms related to autism, primary school, behavioural strengths, teaching, and learning. Search strings adapted for each database. Reference lists of included studies manually screened to identify additional relevant publications. The ROBINS-I tool used to assess risk of bias for non-randomised studies across seven domains: confounding, selection, classification of interventions, deviations from intended interventions, missing data, measurement of outcomes, and selection of reported results.

### *Inclusion Criteria*

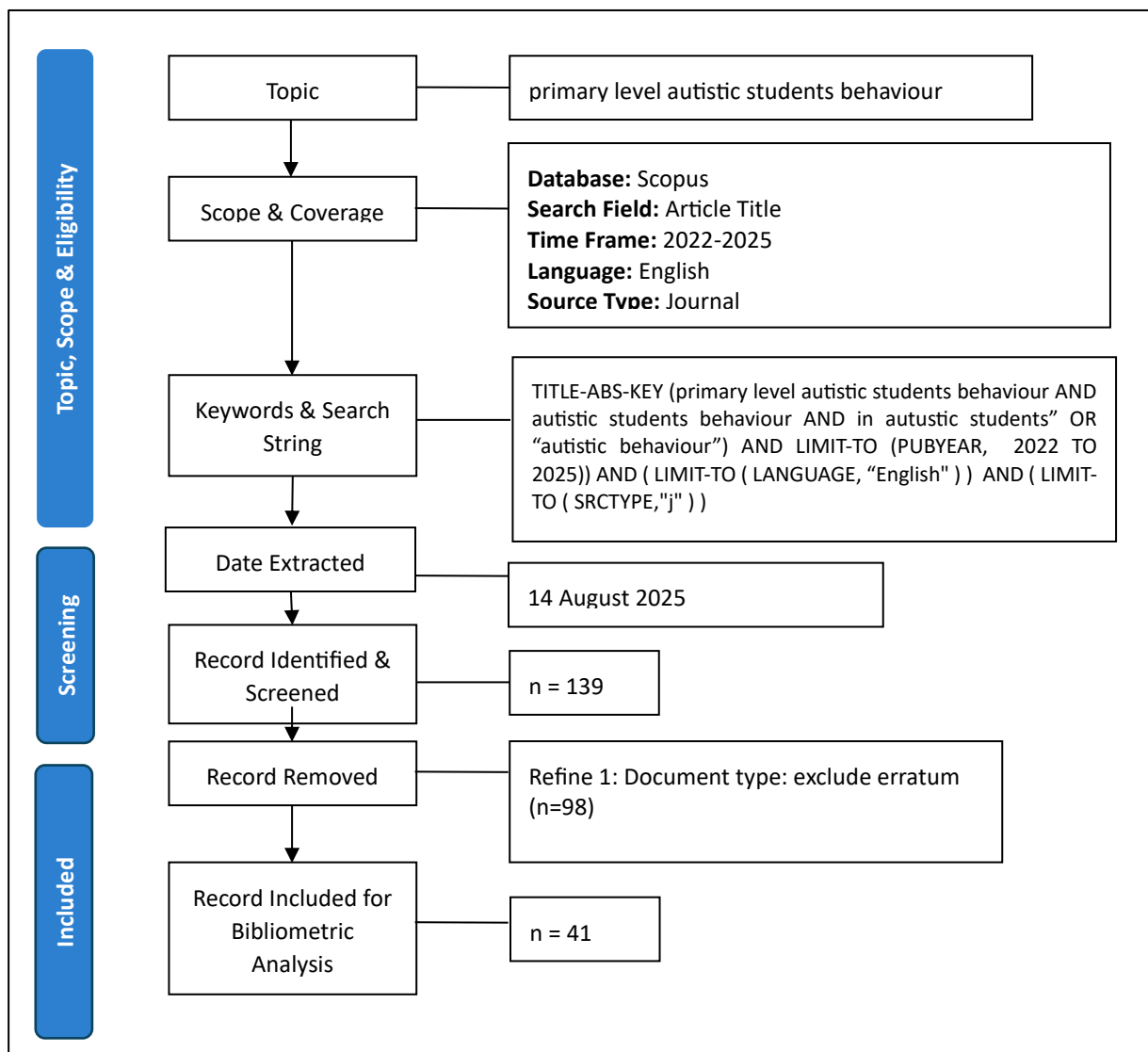
1. Population: Studies involving primary school-age autistic students (ages 5–12 years)
2. Study Focus: Research examining behavioural characteristics, interventions, or outcomes relevant to classroom or learning contexts
3. Publication Period: January 1, 2020 – August 14, 2025
4. Language: English
5. Study Design: Empirical studies

Search results imported into EndNote for reference management, and duplicates removed. Two independent reviewers screen titles and abstracts against the inclusion/exclusion criteria. Full texts of potentially eligible studies then be retrieved and assessed for final inclusion. Any disagreements resolved through discussion or by consulting a third reviewer. The exclusion criteria help to refine the analysis and ensure that the results are relevant and reliable. The exclusion criteria for this scoping study include:

1. Age Group: Studies focusing exclusively on:
  - Preschool children (under 5 years)
  - Secondary school students (over 12 years)
  - Adults with autism
2. Focus: Studies examining only:
  - Neurological or medical aspects without behavioural focus
  - Diagnostic procedures without behavioural outcomes
  - Genetic or biological markers without behavioural implications
3. Language: Non-English publications
4. Accessibility: Studies without full-text availability

**Figure 2**

*PRISMA Flowchart of Data Inclusion and Exclusion*



Source: Page et al. (2021)

## RESULTS

### Publication Trends in the Field of Autistic Students' Behavioural

The first objective of this scoping review was to examine the overall publication landscape on the behavioural strengths of autistic students that enable effective teaching and learning. Bibliometric analysis was employed to map research trends, assess productivity over time, identify key contributors, and evaluate citation impact. This approach provides both a quantitative overview of knowledge production and an understanding of the intellectual structure of the field (Donthu et al., 2021).

### Progress in the Publications on Autistic Students' Behavioural Strengths

The bibliometric results in Table 1 reveal that between 2022 and 2025, a total of 41 publications addressed the behavioural strengths of autistic students in relation to teaching and learning. The annual distribution shows the most substantial output in 2023 with 18 publications (43.9% of total output), followed by 2022 with 12 publications (29.3%). Research activity tapered in 2024 with only five publications (12.2%), while six publications (14.6%) were recorded for 2025 within the review's cut-off period.

**Table 1**

*Annual Progress on Publication of Autistic Students' Behavioural*

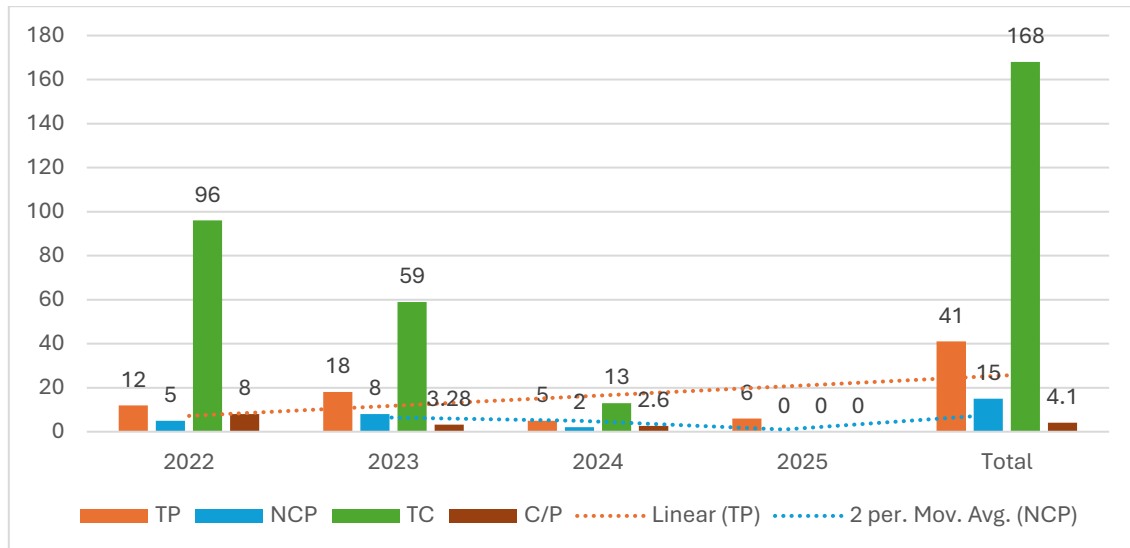
Year	TP	%	NCP	TC	C/P	C/CP	h	g
2022	12	29.3	5	96	8.0	19.2	5	5
2023	18	43.9	8	59	3.28	7.38	5	7
2024	5	12.2	2	13	2.6	6.5	2	2
2025	6	14.6	0	0	0.0	0.0	0	0
Total	41	100.0	15	168	4.1	11.2	9	12

\*Total Publication (TP), Number of Cited Publication (NCP), Total Citation (TC), Citation Per Paper (C/P), Citation per Cited Paper (C/CP), Hirsch index (-h), G index (-g)

In terms of academic influence, the dataset recorded 168 total citations (TC) across the period, with an average of 4.1 citations per publication (C/P) and 11.2 citations per cited publication (C/CP). The highest citation volume was associated with studies from 2022 (96 citations), reflecting that earlier publications had more time to accumulate citations. Notably, although 2023 produced the highest number of papers, its average citation rate per publication (3.28) was markedly lower than that of 2022 (8.00), indicating that many of these newer papers had not yet gained substantial citation traction. The h-index for the full dataset was 9, signifying that nine papers had received at least nine citations each. The g-index was 12, showing that the top 12 publications together received at least 168 citations, highlighting a core group of influential works. Year-specific h-index values were highest in 2022 and 2023 (h = 5 each), while 2024's limited output yielded an h-index of 2.

**Figure 3**

*Annual Progress on Publication of Autistic Students' Behavioural*



These findings indicate that while scholarly interest in this topic peaked in 2023, the most influential studies (as measured by citations) were largely published earlier (Figure 3). This suggests that recent research may still be in its early dissemination phase, and its true impact could become more visible in the coming years. Furthermore, the concentration of high-impact publications in the early years points to foundational studies that shaped the field's discourse on positive behavioural traits in autistic learners.

### **Scientific Productivity Pattern in Autistic Students' Behavioural**

As shown in Table 2, the bibliometric analysis of the top ten most productive countries in research on the behavioural strengths of autistic primary school students reveals clear trends in global scholarship. Australia emerged as the leading contributor, producing nine publications, which represents 21.95% of the total output. This was followed closely by the United States with eight publications (19.51%) and the United Kingdom with six publications (14.63%). Together, these three countries account for more than half of all research in the scope of this study (56.09%), highlighting their dominant role in driving this area of investigation.

Middle-tier contributors included Spain with 9.76% of publications, and both Indonesia and Saudi Arabia with 7.32% each, demonstrating the growing interest and capacity for autism-related educational research in regions outside the traditional Western research hubs. Smaller yet notable contributions came from China, Ireland, Canada, and Greece, each representing 4.88% of total publications. These emerging contributors indicate an encouraging diversification of research efforts across different socio-economic and cultural contexts. From a statistical perspective, the mean publication count among the top ten countries is 4.1 with a standard deviation of 2.5, showing moderate variability in output. While the Gini coefficient

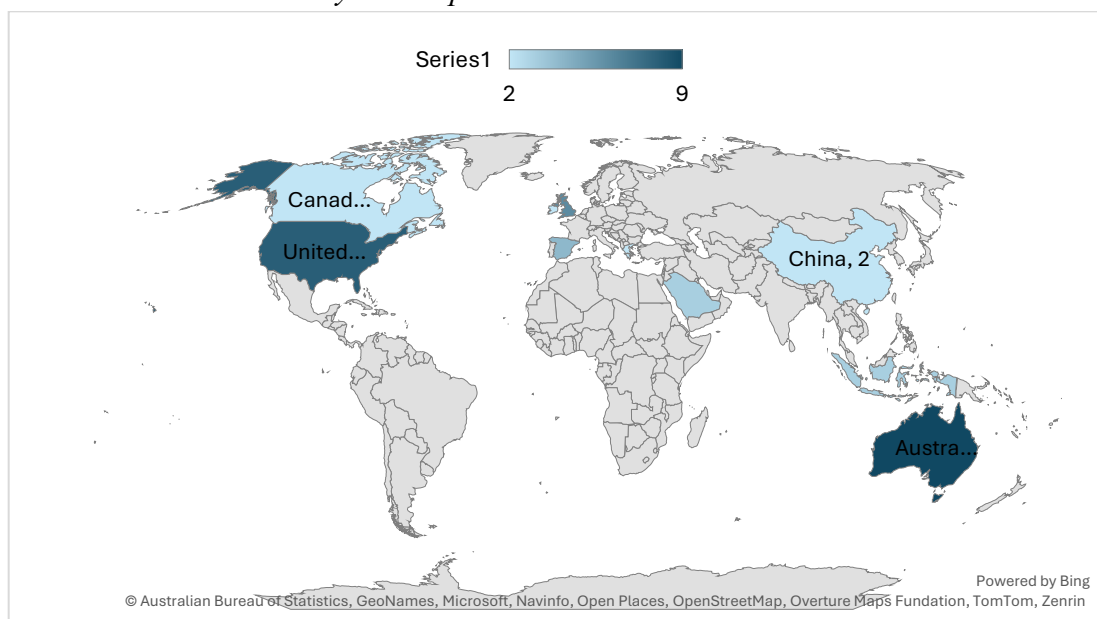
for publication distribution stands at approximately 0.35 indicating a moderate concentration of research production the presence of multiple countries contributing meaningfully suggests a healthy global engagement in the topic. This distribution pattern implies that while research leadership is concentrated in high-income countries with strong educational and healthcare systems, middle-income nations are increasingly making valuable contributions, potentially enriching the diversity of perspectives and approaches in the field (Figure 4).

**Table 2**  
*Top Ten Countries Productivity*

Country	TP	%
Australia	9	21.95
United States	8	19.51
United Kingdom	6	14.63
Spain	4	9.76
Indonesia	3	7.32
Saudi Arabia	3	7.32
China	2	4.88
Ireland	2	4.88
Canada	2	4.88
Greece	2	4.88
Total	41	100

\*Total Publication (TP)

**Figure 4**  
*Top Ten Countries Productivity on Graphic Visualisation*



## **BEHAVIOURAL STRENGTHS OF AUTISTIC STUDENTS**

The scoping review indicates a growing recognition in the literature of the behavioural strengths of autistic students in primary schools, reflecting a shift from a deficit-oriented perspective toward a balanced, strength-based approach (Sanches-Ferreira et al., 2021; Littlefair et al., 2024). Commonly identified strengths include attention to detail, exceptional memory recall, and a strong preference for rules and structured routines qualities that can be leveraged to enhance learning outcomes. Evidence shows that when instructional activities align with autistic students' interests and structured learning preferences, engagement and task completion improve substantially (Vinen et al., 2023; Toolan et al., 2022).

Research conducted between 2020 and 2025 also highlights pattern recognition and analytical thinking as core cognitive-behavioural strengths. Autistic students often demonstrate proficiency in categorisation, sequencing, and factual recall skills that translate into strong performance in mathematics, science, and technology-based learning (Ntalindwa et al., 2022; Kasari et al., 2025). The integration of visual aids, explicit instruction, and predictable routines further amplifies these strengths, enabling students to excel in structured academic environments (Stadnick et al., 2025).

Social and interpersonal strengths were also noted, though these were often context-dependent. With appropriate supports such as peer-buddy systems, clearly defined social rules, and structured group tasks autistic students displayed reliability, honesty, and fairness in peer interactions (Hayes et al., 2023; Wright et al., 2024). These behaviours helped establish trust-based classroom environments that benefited both autistic and neurotypical learners.

Persistence emerged as another consistent strength. When engaged in personally relevant or clearly defined tasks, autistic students showed sustained attention and determination (Yan et al., 2025; Wright et al., 2024). This perseverance not only contributed to skill mastery but also reinforced positive engagement patterns over time.

Overall, the review concludes that autistic students contribute a range of behavioural strengths that, when deliberately nurtured, can significantly enhance academic and social outcomes. These findings align closely with the PBS framework, which emphasises leveraging individual strengths to promote inclusion, active engagement, and meaningful participation in learning (Hayes et al., 2023).

## **INTEGRATION OF BEHAVIOURAL STRENGTHS INTO INSTRUCTIONAL STRATEGIES**

The scoping review found that the behavioural strengths of autistic students such as attention to detail, strong memory recall, preference for structure, persistence, and fairness are being increasingly integrated into differentiated instructional strategies in both inclusive and specialised classrooms (Sanches-Ferreira et al., 2021; Littlefair et al., 2024). In inclusive

classrooms, teachers often harness autistic students' preference for structure by using clear routines, visual schedules, and predictable transitions (Vinen et al., 2023). These methods not only reduce anxiety for autistic learners but also improve classroom organisation for all students. Strengths in memory and factual recall are utilised through fact-based quizzes, knowledge-sharing roles, and peer-teaching activities, enabling autistic students to make meaningful contributions to group learning while building confidence (Toolan et al., 2022).

In specialised classrooms, educators frequently implement highly individualised lesson plans that align with each student's specific interests. This is consistent with evidence showing that autistic students demonstrate greater persistence and motivation when engaged in topics of personal relevance (Ntalindwa et al., 2022). Examples include repetitive practice activities, gamified drills, and thematic projects tailored to a learner's interest area. Teachers also apply strength-based reinforcement, rewarding task completion and social participation with activities or resources related to the student's strengths (Kasari et al., 2025).

Collaboration between special education and mainstream teachers was also a recurring approach. Co-teaching models allow the general educator to present core curriculum content while the special educator adapts tasks to draw on autistic students' strengths in analytical reasoning and rule-based problem-solving (Stadnick et al., 2025). This approach not only supports academic progress but also improves peer perceptions of autistic students. Technology-enhanced learning tools further support the utilisation of behavioural strengths. For instance, interactive whiteboards, structured learning apps, and visual learning platforms build on students' attention to detail and reduce cognitive overload by breaking tasks into smaller, manageable segments (Yan et al., 2025; Wright et al., 2024). Such tools also facilitate self-paced learning, aligning with persistence traits and allowing students to complete work without undue time pressure.

Overall, integrating behavioural strengths into instructional design reflects the Positive Behaviour Support (PBS) framework, where strategies are proactive, personalised, and aimed at enhancing strengths rather than remediating deficits (Hayes et al., 2023). This approach supports improved academic performance, social inclusion, and emotional well-being across both inclusive and specialised educational settings.

## **DISCUSSION**

The findings of this scoping review reveal that the integration of autistic students' behavioural strengths into instructional strategies, both in inclusive and specialised classrooms, closely aligns with trends identified in prior research, while also offering nuanced insights. The emphasis on structured learning environments in our findings is consistent with Littlefair et al. (2024), who highlight the role of adapted participation programmes in enhancing predictability and stability for neurodiverse learners. Similarly, Vinen et al. (2023) emphasise that structured routines benefit not only autistic students but also the broader classroom environment. Our review extends this understanding by noting that such routines can serve as a platform for

leveraging strengths in rule-following and consistency, transforming them into active instructional assets rather than mere compensatory supports.

The use of interest-based and individualised instruction in specialised classrooms echoes findings from Ntalindwa et al. (2022), who demonstrated that tailoring content to students' personal interests, particularly through adapted digital learning materials, enhances motivation and engagement. Our results add that this approach is particularly effective when combined with reinforcement systems linked to the learner's own motivational drivers, as seen in adaptive community-based interventions like those described by Kasari et al. (2025). This dual approach interest alignment plus tailored reinforcement may explain the stronger engagement observed in specialised settings compared to inclusive classrooms, where personalisation is often less intensive.

The collaborative teaching models observed in inclusive settings support Tsegaye et al.'s (2025) findings that teacher attitudes and joint practice significantly influence curriculum adaptation for students with autism. While earlier research often framed co-teaching primarily as a support mechanism, our review highlights that collaboration between mainstream and special educators also facilitates the deliberate integration of cognitive strengths, such as analytical reasoning and memory recall, into whole-class instruction.

The role of technology-enhanced learning tools in leveraging strengths like attention to detail and self-paced persistence resonates with Ntalindwa et al. (2022), who report that digital scaffolding can be adapted to build on existing competencies. Whereas earlier studies tended to view technology primarily as an accessibility aid, our findings suggest a shift toward using it proactively to develop and extend students' abilities, supporting a broader Positive Behaviour Support framework as evidenced by Sanches-Ferreira et al. (2021).

Overall, these findings underscore a conceptual shift in autism education literature from deficit-based approaches to strength-based pedagogies, a change also supported by Sanches-Ferreira et al. (2021) and Littlefair et al. (2024). Whereas older studies often concentrated on mitigating "problem behaviours," both recent evidence and our review advocate for embedding autistic strengths into everyday instructional design. This promotes inclusion, enhances self-efficacy, and fosters long-term skill generalisation goals that align with contemporary inclusive education priorities.

## **IMPLICATION OF THE STUDY**

The findings from this scoping review highlight the need for a paradigm shift in both inclusive and specialised educational settings from a deficit-based approach to a strength-based pedagogy. By recognising and integrating autistic students' behavioural strengths such as structured thinking, persistence, attention to detail, and unique problem-solving approaches teachers can design instructional strategies that not only accommodate but actively build on these capabilities. In practice, this means increased adoption of interest-based learning,

structured routines, and technology-enhanced tools to support skill development. Such strategies align with the Positive Behaviour Support (PBS) framework, which emphasises proactive and preventative interventions tailored to individual strengths, ultimately fostering greater engagement, self-efficacy, and academic success.

From a policy perspective, the results indicate a pressing need for education ministries and school leadership to embed strength-based instructional strategies into national curriculum guidelines and teacher professional development programmes. Current training often focuses on managing challenging behaviours rather than enhancing existing competencies. Integrating modules on PBS, universal design for learning, and differentiated instruction grounded in the findings of this review would better equip educators to meet the needs of autistic learners in both mainstream and special education environments. Furthermore, policies should encourage collaboration between general and special education teachers, recognising co-teaching as a key mechanism for implementing inclusive and strength-based instruction effectively.

The study underscores the need for more empirical research examining how behavioural strengths are operationalised in various cultural and socio-economic contexts. While our review synthesised global literature, there is a gap in longitudinal and cross-cultural studies assessing the sustainability and scalability of strength-based interventions across different education systems. Future research could explore how these strategies interact with other variables such as teacher attitudes, classroom size, and access to assistive technologies. Additionally, applying bibliometric and scoping review methodologies in other domains of special education could generate robust evidence to inform evidence-based, culturally responsive practices that address the diverse needs of autistic students worldwide.

### **RECOMMENDATION FROM THE STUDY**

Educators should intentionally design lesson plans that leverage autistic students' behavioural strengths, such as logical reasoning, sustained attention, and creative problem-solving. This could be achieved through interest-driven projects, structured learning sequences, and tasks that highlight their preferred modes of engagement. Embedding these approaches within both inclusive and specialised classrooms help maximise student participation and reduce behavioural challenges.

It is recommended that teacher training programmes incorporate comprehensive modules on the Positive Behaviour Support framework, with a focus on integrating strength-based approaches into daily practice. This training should include practical examples, case studies, and collaborative learning opportunities between general and special education teachers to ensure consistent implementation across settings. Education policymakers should embed the principles of PBS and strength-based teaching into curriculum standards, teacher evaluation criteria, and school improvement plans. Additionally, resources should be allocated for assistive technologies, classroom adaptations, and teacher mentoring systems that support the implementation of inclusive, strengths-focused practices for autistic students.

## CONCLUSION

This scoping review, supported by bibliometric analysis, has mapped the current landscape of research on the behavioural strengths of autistic students and their integration into teaching and learning practices. The findings highlight that while the majority of studies still focus on deficits, there is a growing recognition of the importance of harnessing students' innate abilities such as attention to detail, pattern recognition, perseverance, and unique problem-solving approaches to improve both academic and social outcomes.

The review also demonstrates that these strengths can be successfully incorporated into instructional strategies in both inclusive and specialised classrooms, particularly when guided by frameworks such as PBS. Evidence suggests that strength-based approaches not only enhance engagement and performance but also reduce behavioural challenges, thereby benefiting the wider classroom environment.

Ultimately, this study underscores the need for a paradigm shift from deficit-oriented models to holistic, strength-based practices. By embedding these approaches into teacher training, curriculum design, and educational policy, educators and institutions can foster more equitable, effective, and empowering learning environments for autistic students, aligning with the principles of inclusivity and personalised education.

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