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What autistic students say about their learning and teaching experiences in mainstream secondary school: a scoping review

Helen Kasztelan Chapman[1] · **Anne Southall**[1] · **Susan Grieshaber**[1]

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Abstract
In Australia, approximately one in 100 people have a diagnosis of autism, with young people on the spectrum less likely to continue education beyond secondary school. Barriers include the school environment, inadequate teacher preparation, a lack of understanding about autism, and the persistence of negative stereotypes that are linked to the deficit-based medical model, which pathologises autism. The under representation of autistic voices in research is well documented. Despite international human rights instruments and Australian federal legislation that obligate educators to listen to and respond to views of children, this is not common. The perspectives of professionals, teachers, and parents dominate the discourse in autism education. A scoping review was conducted to map research that foregrounded the perspectives of students attending regular (mainstream) secondary school to better understand ways in which to support their participation in school. Five online databases identified articles published between 2002–2022, from which 13 articles were selected. All articles focused on the first-hand accounts of autistic students' experiences in regular (mainstream) secondary school. The findings suggested that the needs of autistic students are not being adequately met. Five themes were identified across the studies: the school environment and sensory issues; communication and relationships with staff and peers; inclusion and exclusion; self-perception, autistic identity and negotiating difference; and student wellbeing. To improve autistic students' experiences in school, educators and policy makers need to work collaboratively with students to understand and address their needs.

Keywords Autism · Inclusive education · Scoping review · Regular · Mainstream · Secondary school · School experience

Autism, or autism spectrum disorder (ASD), is a lifelong complex neurodevelopmental disorder characterised by challenges in social and emotional communication, restricted, or repetitive patterns of behaviour, and a preference for sameness

Extended author information available on the last page of the article

(American Psychiatric Association [APA], 2013). In 2022, 290,000 Australians (1.1%) were diagnosed with autism, marking a 41.8% increase from the 205,200 (0.8%) recorded in 2018 (Australian Bureau of Statistics [ABS], 2022). Approximately 75% of people diagnosed with autism are between the ages of 5 and 24 years of age (ABS, 2015), and an estimated 70% of students diagnosed with autism are enrolled in regular primary and secondary schools (Clark et al., 2018). Although autistic students enrolled in regular (mainstream) secondary schools demonstrate intellectual abilities that are average or above that of the general population, they experience poorer educational, social, and post school outcomes than their non-autistic peers (Garrad, 2022; Roberts & Simpson, 2016 Roberts & Webster, 2020). As the number of autistic children enrolling in regular schools continues to grow (Parliament of Australia, 2016), this is a matter that requires urgent attention.

The United Nations (UN) Committee on the Rights of Persons with Disabilities (CRPD) has stipulated that all children have the right to an inclusive education (UN, 2016). While students with disability are entitled to reasonable adjustments to access inclusive education (Australian Government, 1992), these adjustments are not always empirically supported, nor do they meet the needs of the individual (de Bruin et al., 2023; Graham et al., 2018; Tancredi, 2020). Although autistic secondary students may be considered experts concerning their experiences of inclusion in regular (mainstream) secondary school (Humphrey & Lewis, 2008; Saggers et al., 2011), their voices remain underrepresented in published research (Horgan et al., 2023). While Taneja-Johansson's (2023) scoping review had a different focus, she observed that educational research that investigated autistic (and ADHD) students' perspectives and experiences of school, tended to reduce them to a single identity based on their diagnosis. She highlighted the need to move research inquiry away from a medicalised, impairment-focused perspective and explore the experiences and concerns of these students.

International human rights instruments such as the UN Convention on the Rights of the Child (UN, 1989), and General Comment No. 4 on Article 24, the United Nations Convention on the Rights of Persons with Disabilities (UN, 2016); and Australian federal legislation including the *Disability Discrimination Act 1992* (DDA; Australian Government, 1992), and *Disability Standards for Education 2005* (DSE; Commonwealth of Australia [COA], 2006), obligate educators to consult with and listen to children's voices on all aspects of their lives, and respond accordingly. However, most general classroom teachers lack the specialised skills and expertise needed to engage with students who have communication difficulties (Tancredi, 2020). Similarly, homogenised narratives of autistic students' experiences in school reinforce and perpetuate existing stereotypes that can impact teachers' attitudes towards autism (Taneja-Johansson, 2023).

The heterogeneity in autism is now widely accepted (Constantino & Charman, 2016; Rosen et al., 2021); however, it remains unexplained with extensive variation in the way it presents at the level of the individual (Waterhouse, 2022). Heterogeneity in autism refers to the broad range of symptoms, behaviours, and levels of functioning observed among individuals on the spectrum. For example, autistic children may have one or more co-occurring conditions, including anxiety, attention deficit hyperactivity disorder, bipolar disorder, or intellectual disability (APA, 2013;

Casanova et al., 2020) that can impact their functioning in school. Additionally, differences in sensory processing, such as hypersensitivity or hyposensitivity to light, noise, touch, and smells can render school environments overwhelming for some autistic individuals (Howe & Stagg, 2016; Jones et al., 2020; Krieger et al., 2018). This diversity presents several challenges and contributes to gaps in the research. These include added complexity in diagnosis and classification (Cruz Puerto & Vázquez, 2024); limited generalisability (Amaral et al., 2019); the need for larger sample sizes (Taneja-Johansson, 2023) with greater diversity (Botha & Cage, 2022); variability in intervention outcomes (Zachor & Ben-Itzchak, 2017); as well as the underrepresentation of certain groups as for example racially, ethnically, and socioeconomically diverse communities (Bailey & Arciuli, 2020; Maye et al., 2022).

According to Bottema-Beutel et al. (2021), the disabling of people diagnosed with autism is a phenomenon that stems from a sociocultural environment that fails to embrace human diversity. Pathologising autism has shaped the education of autistic people as well as community attitudes towards autism, casting doubt on the capacity of autistic people to demonstrate expertise regarding their own subjectivity and social positionality (Milton, 2014). In her work examining autistic communication in schools, Wood (2022) observed that a focus on deficits resulted in unequal power relationships that robbed autistic individuals of agency. The medical model constructs autism as a deviation from normal human development (O'Dell et al., 2016). Conversely, the social model of disability (Oliver, 1996) views autism as part of human diversity (Bagatell, 2010; de Bruin, 2019) and calls for society to change rather than seek to normalise or change autistic individuals (Milton, 2014). This model asserts that disability does not arise solely from individual impairments but is largely shaped by societal barriers and attitudes (Oliver, 1996).

Tensions between inclusive ideology and the way autism is diagnosed and funded in regular (mainstream) schools can impact stakeholder attitudes towards autistic students (Cumming et al., 2024). In Australia, the Australian Government provides funding to schools for students with disability (Sinclair & Brooks, 2024). The tension arises from the emphasis on impairment as the determinant for funding allocation, wherein greater levels of impairment correspond to higher funding. However, the social model of disability requires a focus on the disabling structures and policies that influence the student's experience (de Bruin et al., 2023; Slee, 2014). A lack of understanding about autism and perpetuation of negative stereotyping places autistic students at risk of labelling, stigmatisation, and bullying in regular (mainstream) settings (Goodall, 2020).

More recent research in the field of autism education and education generally suggests that listening to the voices of autistic students could provide valuable information about ways to improve learning and teaching experiences for autistic students attending mainstream secondary schools (Flutter & Ruddock, 2004; Saggers, 2011).

There has been a shift in the landscape of autism research over the past two decades, with autism researchers and activists calling for greater inclusion of autistic voices in research (den Houting et al., 2021; Milton, 2014; Orsini & Davidson, 2013; Waldock & Keates, 2023). Hence a scoping review was conducted to identify the extant literature relating to autistic students'

perspectives of their experiences in mainstream secondary school. A scoping review methodology was selected because the aim was to answer an exploratory research question, identify key concepts, and synthesise findings rather than assess the effectiveness of an intervention, as would be the case with a systematic review. Most of the research in autism education is conducted by non-autistic professionals and researchers using teachers' and parents' perspectives to make recommendations for autistic students. The authors' position is that autistic students are experts in identifying what does and does not work for them in a regular (mainstream) school environment; a view they share with Aubineau and Blicharska (2020).

Conceptual framework

The conceptual framework used in this scoping review is critical autism studies (CAS). Critical autism studies advocate for autistic people to be included in autism research and as co-creators of knowledge about autism in ways that extend beyond being the subjects of research (den Fletcher-Watson et al., 2019; Houting, et al., 2021; Milton, 2014). The framework views autism as difference, not disability or deficit; challenges deficit-focused understandings of autism; interrogates power relationships; seeks to develop novel approaches to examine the nature of autism and calls for the emancipation of autistic voices (Ryan & Milton, 2023). The authors prioritised certain aspects of the literature to foreground autistic voices and draw attention to ableist and discriminatory educational practices used in regular (mainstream) secondary schools.

Methods

This scoping review used the first five steps of Arksey and O'Malley's (2005) six step approach for conducting scoping reviews: identify the research question/s; identify relevant studies; select studies using inclusion/exclusion criteria; chart the data; and collate, summarise, and report the findings of the selected articles. We did not include Arksey and O'Malley's sixth step – the consultation exercise – as it is considered optional. According to Arksey and O'Malley (2005), this is not needed if the initial five steps are sufficient to achieve the study's objectives (Buus et al., 2022; Tricco et al., 2016). Table 1 provides a flow diagram of the scoping process. Additional steps adapted from Levac et al. (2010) included assembling a scoping team (Table 1; Step 1) with at least two reviewers to independently review titles and abstracts for inclusion (Table 1; Step 3), as well as creating a descriptive numerical summary and thematic analysis to report the findings (Table 1; Step 5).

Table 1 Scoping process (Adapted from Parks et al., 2023)

Step 1	Identifying the research question	• Assemble scoping team • Formulate research question based on prior research • Conduct a preliminary search to determine volume of literature
Step 2	Identifying relevant studies	• Develop inclusion/exclusion criteria • First author searched three databases • Meetings with scoping team to refine search terms and reduce number of irrelevant articles
Step 3	Selecting studies for inclusion	1. Title and abstract screening • Articles imported into Covidence • Invited graduate researcher to join first author to screen titles and abstracts • Applied pre-determined inclusion/exclusion criteria • Initial meeting to discuss criteria • Subsequent meetings to discuss and resolve differences 2. Full text review • Review of research question and inclusion/exclusion criteria (authors) • Compliance with Lincoln and Guba's (1985) trustworthiness criteria: credibility, transferability, dependability, conformability • The authors utilised reflexive practices (Arksey & O'Malley, 2005) to determine if studies met the inclusion/exclusion criteria • Fortnightly Zoom meetings
Step 4	Charting the data	• Charting form developed by the scoping team • Data extraction reviewed and coded by first author
Step 5	Collating and summarising the findings	• Descriptive numerical summary (developed collaboratively in fortnightly Zoom meetings) • Qualitative thematic analysis of coded data

Identifying the research question

We wanted to scope the body of extant literature that included autistic student voices regarding their experiences in regular secondary schooling. The research question formulated was: *What do autistic students say about their learning and teaching experiences in regular (mainstream) secondary school?* The term *mainstream* has been problematised by Slee (2011) and others (de Bruin, 2019; Goodall, 2020; Humphrey & Lewis, 2008) and has different meanings depending upon context. The term is usually understood to distinguish regular, non-specialist schools, from irregular or specialist schools which are segregated settings designed to address different impairments independently from students without disabilities (de Bruin, 2019; Slee, 2011). Students who are *mainstreamed*, attend a regular school and participate alongside their peers in selected classes such as art or music. Inclusive schools are regular (mainstream) schools where students with disability participate in all classes and activities alongside their peers. Inclusion involves systemic reform that includes adjustments in educational content, pedagogical practices, and the learning environment to overcome barriers (UN, 2016, p. 4). Inclusive schools should provide all students with an equal opportunity to participate in age-appropriate learning experiences (de Bruin, 2019).

Identifying relevant articles

The scoping team developed a plan that outlined where to search, which terms to use, which sources to consult, as well as the time span and language parameters (Levac et al., 2010). Boolean search terms were developed by combining terms for autism and secondary school. These were Autis*, ASD, Autism Spectrum Disorder, Asperger* AND Secondary school, middle school, Adolescents, Teen*, OR Facilit*, barriers OR student voice, teacher voice OR school engagement, school participation, learning experience, social experience. An initial and comprehensive library search to find extant literature relating to the research question was conducted between 1 August 2022 and 29 June 2023 using various combinations of the search terms and returned 75,066 results. Filters were applied by selecting five databases (ProQuest One Academic, ProQuest Central, Education Collection, ERIC, Education Database), which returned 41,733 results. Filters were applied selecting qualitative research and scholarly articles resulting in 4478 articles. Additional inclusion and exclusion filters were applied to refine the search, and 232 articles were identified for inclusion. A further search of Google Scholar was conducted in July 2023. This was done to check for any articles that we may have missed. Systematic and scoping reviews were included in this search. The search did not return any additional articles from the inclusion dates.

Selecting articles

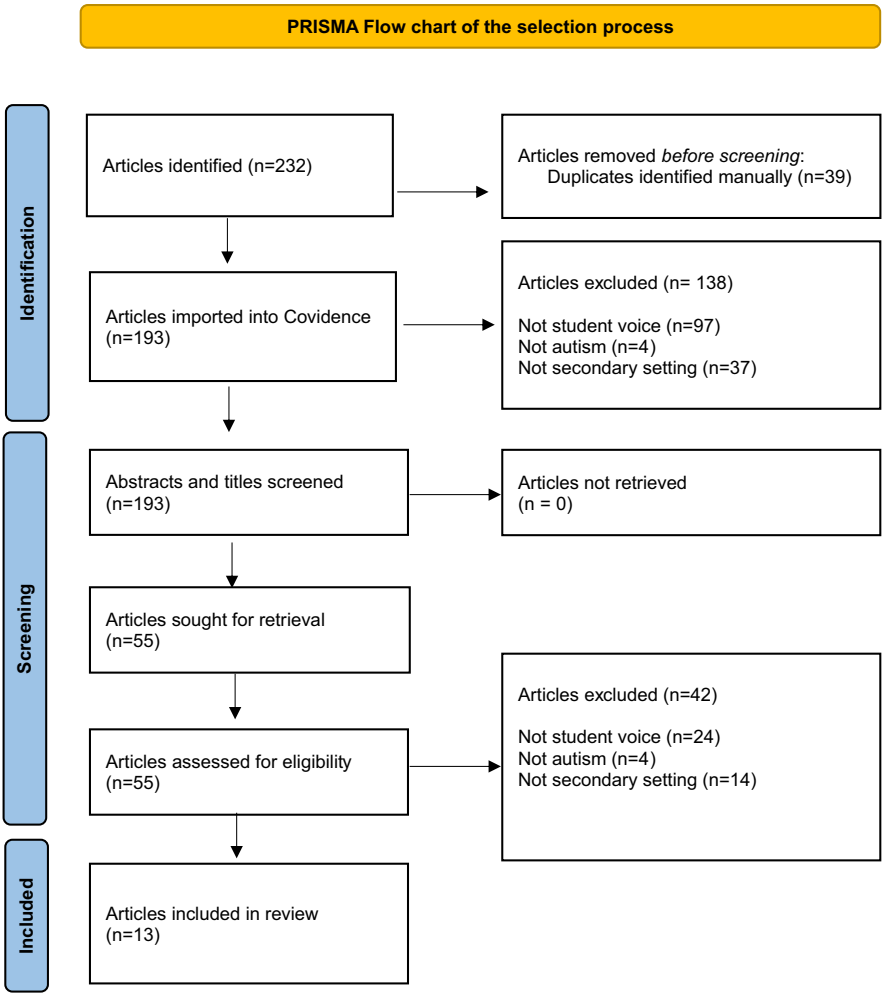
Articles were selected if they represented the first-hand experiences of autistic secondary students in regular (mainstream) secondary school. To be eligible for inclusion, articles had to be published in English between 2002 and 2022 and appear in peer reviewed journal articles or literature reviews. Articles were excluded if they did not include autistic students' experiences in mainstream secondary school, focused on specialist schools, early education, primary school, or teacher, parent, and other stakeholder perspectives.

Following a manual search that was conducted to eliminate duplicates, 193 articles were selected for abstract and title screening. These were converted to xml files and imported into Covidence. A Ph.D. graduate researcher was provided with the eligibility criteria and invited to join the first author to systematically screen titles and abstracts. In the first stage of the review process, titles and abstracts were coded independently by each reviewer as: No, Maybe, or Yes. Once this stage was completed, a follow up meeting with the graduate researcher resulted in eliminating 138 articles and retaining 55 for full text review. Reflexive practices were utilised during the title and abstract search as well as for full text screening. These practices involved the team's ongoing reflection on and examination of personal belief systems that may have affected decisions during the screening process (Olmos-Vega et al., 2023).

The review adhered to Lincoln and Guba's (1985) trustworthiness criteria of credibility, transferability, dependability, and conformability. These four dimensions comprised assembling a scoping team (credibility), formulating inclusion and exclusion criteria (transferability), member checking (dependability), and maintaining an audit trail (conformability). The scoping team met fortnightly via Zoom to engage in ongoing discussion to determine which articles conformed to the inclusion/exclusion criteria. After an iterative process involving multiple discussions with the team, a further 42 articles were excluded on the grounds that they did not relate to autism, student voices, or mainstream secondary school, features which were not apparent from initial title and abstract screening. Thirteen articles were retained for inclusion. Figure 1 provides a PRISMA flow chart of the selection process (Page et al., 2021).

Charting the data

Charted information included author(s), year of publication, country of origin, methodology, setting, and participants/diagnosis/age range/gender, and was recorded in a table. Information relating to the aims and findings in each study was recorded on a separate table (Appendix). Approaches to theming are not specified in Arksey and O'Malley's (2005) framework. We drew on Braun and Clarke's (2006) approach to thematic analysis to organise, code, and interpret the data. This approach embraces researcher subjectivity and reflexivity and rejects positivist views of researcher bias commonly associated with other forms of thematic analysis (Braun & Clarke, 2023). The coding process began with an inductive approach with the aim of



Note: Adapted from *PRISMA 2020 flow diagram* (Page et al., 2021).

Fig. 1 Flow chart of the selection process. Adapted from *PRISMA 2020 flow diagram* (Page et al., 2021)

identifying patterns that emerged from the experiences of autistic students in regular (mainstream) secondary school. Strong connections to theoretical concepts were identified early in the process. Subsequently, the codes were reviewed and refined using a deductive approach (Cohen, Manion & Morrison, 2018; Creswell & Poth, 2024), guided by a CAS perspective. Critical autism studies contest the normative assumption that autistic individuals are impaired, and less able than non-autistic individuals (Ryan & Milton, 2023). We used this concept to understand autistic students' experiences of feeling different and less valued, and their potential need to conform to ableist behavioural norms. Coding was done by the first author and 92

codes, and 27 patterns were identified across the dataset. These were reviewed and revised in consultation with the scoping team across many meetings. Related codes were joined, creating 34 categories before reducing seven provisional themes to five themes, and 25 subthemes to 13 subthemes.

The analysis aimed to move beyond description by interpreting and applying meaning to the findings (Maguire & Delahunt, 2017). This was done by considering the practical implications for supporting autistic students in regular (mainstream) secondary school. The findings are presented in two ways. First, a numerical analysis is used to display summary information related to authors, geographical locations, methodologies, settings, and participants. Second, the literature is organised thematically (Braun & Clarke, 2006), to synthesise and summarise the findings.

Collating and summarising the findings

The studies in Table 2 were conducted in Australia (n = 4), England (n = 3), Ireland (n = 3), Japan (n = 1), Norway (n = 1); and France and Quebec (n = 1). Methods of data collection comprised qualitative (n = 10), mixed method (n = 1), and literature reviews (n = 2). Qualitative methods included interviews (n = 9), photo voice (n = 1), photo elicitation (n = 1), participatory methods (n = 1), student diaries and drawings (n = 1), and self-report questionnaires (n = 1). Quantitative data (n = 1) consisted of self-report measures, and comprised *The Teenage Inventory of Social Skills*, *Quality of Student–Teacher Relationship Scale*, and the *Behavioural and Emotional Scale (BERS)–Youth* (Dillon et al., 2016).

Studies were conducted with students attending a regular (mainstream) secondary school (n = 11), regular (mainstream) primary school students transitioning to secondary school (Stack et al., 2021), and students who had experienced or were experiencing challenges in a regular (mainstream) secondary school (Goodall, 2020). All participants in Goodall (2020) had attended a regular (mainstream) school. Their perspectives highlighted ways in which students felt excluded and isolated in an inclusive setting. Only data relevant to the research question was considered in articles that included other stakeholder perspectives (e.g., Roberts & Simpson, 2016), or that examined the transition from primary to secondary school (Stack et al., 2021). The latter provided a comparison between students' experiences in primary and secondary school and highlighted additional challenges these students faced in a secondary setting.

A total of 282 participants between the ages of 11 and 18 were included in the articles. Participant groups in qualitative studies that focused on student voice other than literature reviews (n = 11) ranged from five to 26 autistic individuals. Although gender balance was not reported in two of the articles (Humphrey & Lewis, 2008; Roberts & Simpson, 2016); in all articles where this data was provided, male (83%) participants outnumbered female (17%). These characteristics are summarised in Table 2.

Table 2 Articles included

Author/Year	Country of origin	Methodology	Setting	Participants: Diagnosis, age range, gender
Aubineau and Blicharska (2020)	France Canada	Qualitative Semi-structured interviews	Mainstream secondary schools in France & Quebec, Canada	HF ASC (n = 26) Age range: 12–16 France (n = 17) Male n = 16 Quebec (n = 9) Male n = 8
Danker et al. (2019)	Australia	Qualitative Photo voice	Eight mainstream secondary schools in Sydney, Australia	ASD (n = 16) Diagnoses: ASD (n = 11), AS (n = 3), ASD + Mild ID (n = 1), ASD + AD/HD (n = 1) Age range: 13–17 Average age: 14 Male n = 15, Female n = 1
Dillon, Underwood, & Freemantle (2016)	England, UK	Mixed methods, Self-report questionnaire, semi-structured interviews	Mainstream secondary school in England	Autistic (n = 14) Male n = 11, Female n = 3 Average age 13–14 Non-autistic (n = 14) Male n = 9, Female n = 5
Goodall, C. (2020)	Ireland, UK	Qualitative participatory methods, Semi-structured interviews	Alternative Education Provision (AEP) school Home schooled students attending a Study Hub within a local church	Autistic (n = 12) Age range: 11–17 Male n = 10, Female n = 2 AEP (n = 7) Study hub (n = 5) (All participants had previously attended a mainstream school)
Humphrey and Lewis (2008)	England, UK	Qualitative Semi-structured interviews, student diaries, drawings	Four mainstream secondary schools in north-west England	AS (n = 20) Age range: 11–17 Gender balance: Not specified

Table 2 (continued)

Author/Year	Country of origin	Methodology	Setting	Participants: Diagnosis, age range, gender
Kelly et al. (2018)	Ireland, UK	Qualitative In-depth interviews (×2)	Youth café for adolescents on the spectrum (n = 3) Local speech and language therapy service (n = 2)	HF-ASD (n = 5) Ages: 15–17 Male n = 3, Female n = 2 All participants attended a mainstream school
Lamb et al. (2014)	England, UK	Qualitative Photo elicitation	Small rural secondary school in Eastern England	ASD (n = 5) Age range: 11–16 Male n = 4, Female n = 1
Roberts and Simpson (2016)	Australia	Review article	23 studies USA n = 9 UK n = 7 Australia n = 3 Canada n = 2 Türkiye n = 1 India n = 1	Autistic students (n = 75) Primary (n = 4) Secondary (n = 41) Ages: 6–18
Saggers (2015)	Australia	Qualitative Semi-structured interviews (×2)	Large urban mainstream secondary school in Brisbane, Australia	ASD (n = 9) Grades 8–12 Age range: Not specified Male n = 7, Female n = 2
Saggers et al. (2011)	Australia	Qualitative Interviews (×2)	Inclusive mainstream high school in Brisbane, Australia	9 students with ASD ASD (n = 9) Age range: 13–16 Male n = 7, Female n = 2
Skafle et al. (2020)	Norway	Qualitative Semi-structured interviews	Inclusive high school schools	AS (n = 5) Age range 16–18 years Male n = 4, Female n = 1

Table 2 (continued)

Author/Year	Country of origin	Methodology	Setting	Participants: Diagnosis, age range, gender
Stack et al. (2021)	Ireland, UK	Systematic literature review	9 studies	ASD (n = 61) Age range: 10–13 Male n = 53, Female n = 8
Sumiya, Igarashi, & Miyahara, (2018)	Japan, Tokyo, Okayama	Qualitative Semi-structured interviews	Elementary & junior high schools	HFA (n = 11) Diagnoses: AD (n = 2), AS (n = 7), PDD (n = 2) Associated diagnoses: OCD (n = 1), Depression (n = 2), ADHD (n = 1), LD (n = 2) Age range: 10–15 Male n = 8, Female n = 3

Note. Abbreviations and terms used in the articles: *ASC* Autism spectrum conditions, *ASD* Autistic spectrum disorders, *ADHD* Attention-deficit hyperactivity disorder, *AS* Asperger's syndrome, *HFA* High functioning autism, *HF-ASD* High functioning autism spectrum disorder, *AD* Autistic disorder, *AS* Asperger's disorder, *PDD* Pervasive developmental disorder, *OCD* Obsessive–compulsive disorder, *LD* Learning disorder

Findings: themes

Five themes were identified across the articles; however, only three pertained to the research question: *What do autistic students say about their learning and teaching experiences in regular (mainstream) secondary school?* These were: school environment and sensory issues; communication and relationships with staff and peers; and inclusion and exclusion (Table 3). Implications for practice are included in the findings.

Theme 1: school environment and sensory issues

The school environment and sensory issues were identified by students as key factors that impacted their learning and teaching experiences in secondary school. They identified spaces that caused anxiety and stress as well as spaces that felt safe. Students also spoke about the challenges they experienced with managing the workload and ways that they engaged with technology. Each of the five subthemes (Table 3) is discussed in turn.

Noise and school as a chaotic environment

Students described the secondary school environment as noisy, chaotic, and crowded. Many found shared areas such as playgrounds and canteens challenging: 'The exit, at the front gate! There is a long queue, we are all squashed in, everyone is shifting' (Aubineau & Blicharska, 2020, p. 542). They disliked stuffy environments that made it 'hard to stay awake … hard to think' (Danker et al., 2019, p. 135); crowded corridors as 'everything is going on around me, the noise, the noise makes me lose focus of the lesson' (Lamb et al., 2014, p. 711); and noisy classrooms, 'because my brain seems to, like, just start pulling itself apart … I'll forget things because I'm trying to block out the noise' (Danker, 2019, p. 135). While one student remarked that 'noisy and echoey' school bells triggered migraines (Danker, 2019, p. 135), another summed up the feeling of many: 'There are too many people – it is too noisy, busy and stressful for children with autism' (Goodall, 2020, p. 1303).

Table 3 Themes and subthemes

Themes	Subthemes
School environment and sensory issues	Noise and school as a chaotic environment Spaces that cause anxiety and stress Spaces that feel safe Technology and learning in the school Academic workload, fatigue and exhaustion
Communication and relationships with staff and peers	Relationships with staff Relationships with peers
Inclusion and exclusion	Facilitators of positive classroom dynamics Barriers to positive classroom dynamics

Spaces that cause anxiety and stress

Informal learning spaces such as physical education classes, were described as places that caused feelings of anxiety and distress (Goodall, 2020; Lamb et al., 2014). Physical education classes included sports fields, echoey gymnasiums, swimming pools, and changing rooms. Fluorescent lights, rapid movement, banging equipment, whistles, and shouting left some students feeling 'sort of lost' (Lamb et al., 2014, p. 710). The unpredictable behaviour of peers in changing rooms was distressing for others: 'people get other peoples' stuff and they start throwing it around like bags, shoes, ties … anything they can find out of the bags … (Danny)' (Lamb et al., 2014, p. 707). Some students said they changed in shower cubicles to avoid peers' behaviours: 'it's not so loud in there, it's nice, it's, it's kind of quiet, yer (Josie)' (Lamb et al., 2014, p. 707).

Spaces that feel safe

While some students described physical education spaces as stressful, the physical education teacher's office was referred to as a place where students felt secure: 'always someone there that you can talk to, and they'll listen to what you have to say' (Lamb et al., 2014, p. 710). One student explained that this space provided somewhere during break and lunch times to escape from 'all the noises and people who don't like me' (p. 710–11). Students reported that access to break cards allowed them to withdraw from classrooms to quieter, uncrowded spaces such as the school library or garden, which reduced stress and anxiety. The garden was described as a calming space: 'you get a bunch [of leaves], and throw it in the air, and they spin like a helicopter … it's nice. It's relaxing' (Danker et al., 2019, p. 134). Listening to music was identified as another calming strategy that assisted students to regulate their emotions and focus while studying: 'music sort of calms me down … it helps me concentrate a bit better on what I'm doing. (Rebecca)' (Saggers et al., 2011, p. 1801). Other students preferred to use noise cancelling headphones or earplugs (Aubineau & Blicharska, 2020).

Technology and learning in school

Students reported that access to computers and technology helped them with schoolwork (Aubineau & Blicharska, 2020; Danker et al., 2019; Saggers et al., 2011). A demand for handwriting was identified as a barrier by many. One student used a metaphor to explain how typing was easier and quicker than writing: 'In fact, the computer would be like a penguin in water: 'I go really fast. And as soon as I come back to the pen: it's like putting a penguin on the floor' (Aubineau & Blicharska, 2020, p. 545). Others described handwriting as physically draining: 'well it just sort of hurts my arms when I write a lot' (Saggers et al., 2011, p. 1801). Computers were also regarded as a way to stay connected with friends

(Danker et al., 2019). While most students found it was easier to talk to their friends by text, some preferred face-to-face interactions (Kelly et al., 2018).

Academic workload, fatigue and exhaustion

Many students spoke about feeling overwhelmed in school: 'I come back home so tired, I can't even do my homework' (Aubineau & Blicharska, 2020, p. 542). Heavy workloads and meeting deadlines for assignments were identified as factors that caused students to experience high levels of stress: 'Sometimes it's a bit crazy how we have to hand in all the assignments at once' (Saggers, 2015, p. 40); and 'sometimes I get pretty freaked out about assignments' (Saggers, 2015, p. 41). Students also voiced resentment when they thought that schoolwork encroached on their homelife: 'Homework's pointless … Been at school all day, then you get more work in your own time' (Dillon et al., 2016, p. 227). Home was described as a place where students could de-stress and decompress to cope with the academic and sensory overload they experienced at school (Aubineau & Blicharska, 2020; Danker et al., 2019; Kelly et al., 2018). One student explained that home was the only place that he did not feel overwhelmed '… because it's somewhere to be by myself if there's too much [at school], so I can just come home and be like … (exhales) phew' (Danker et al., 2019, p. 134).

Theme 2: communication and relationships with staff and peers

Relationships with staff and peers were seen as critical determinants by students in relation to their social, emotional, and academic wellbeing in school. They reported the complexities of establishing and maintaining relationships with peers as well as the ways both positive and negative teacher-student relationships impacted their learning experiences in school. The barriers students identified related primarily to differences in verbal and social communication styles associated with autism. For example:

> They say everybody's wired to a red frequency, or something, and they're all the red wires, but then some people are sometimes born with a disorder that changes their frequency from red, say, to blue. And blue interacts with other blues, but when interacting with red, the red has to understand the blue to be able to connect, otherwise it runs away. (Danker et al., 2019, p. 137)

Many students spoke about the challenges they experienced talking to people. These included a fear of misreading social cues, and not knowing how to begin and end a conversation (Kelly et al., 2018; Roberts & Simpson, 2016; Saggers, 2015). As one student explained:

> I'm a bit shy to meet other people, because I don't really know what to say after saying, 'Hello, nice to meet you'. I don't know how to keep the conversation going fully, so it's difficult to meet new people. (Danker et al., 2019, p. 135)

Strategies that students devised to mitigate these challenges included formulating a script for conversations, thinking of topics that might interest peers, and being prepared to change the subject if that didn't work (Kelly et al., 2018). Theme 2 has two subthemes: relationships with staff, and relationships with peers.

Relationships with staff

Students disliked teachers who were authoritarian and inflexible: 'my teacher is horrible. She's very strict and mean. She yells at people' (Saggers et al., 2011, p. 178); or patronising, '[teachers] telling you to go and sit on your own until you are ok' (Goodall, 2020, p. 1303). Students recognised that poor relationships with teachers stemmed from a lack of knowledge about autism: 'Teachers are not trained enough or understand' (Goodall, 2020, p. 1302). Students identified positive teacher attributes as kindness, fairness, and relatability (Saggers, 2015; Stack et al., 2021; Sumiya et al., 2018): 'I think it's the feeling where you can talk to them [the teachers] like another student, kind of thing. So you can relate to them, they can relate to you' (Saggers, 2015, p. 41).

Relationships with peers

Students related mixed experiences regarding interactions with peers. While some described secondary school as a place where they could make a fresh start, make friends, develop social skills, and learn more about social cues (Skafle et al., 2020), others reported feeling isolated and excluded (Danker et al., 2019; Goodall, 2020; Humphrey & Lewis, 2008; Kelly et al., 2018; Sumiya et al., 2018). For example, one student said: 'I told them it's a mental syndrome [Asperger] and they think *Ah he's a retard*' (Humphrey & Lewis, 2008, p. 31). Similarly, 'People call you names like *retard*, *special bastard* and *spastic*' (Danker et al., 2019, p. 137). One student related how he was excluded by peers: 'They think of me as a piece of shit, basically… I can tell, literally. I walk into anything, they just tell me to eff off' (Danker et al., 2019, p. 136). Another reflected, '[when] you're seen as different in this society, you are targeted and bullied' (Danker et al., 2019, p. 137).

Nonetheless, students indicated that having a friend at school with whom they shared common interest increased their feeling of belonging: 'I don't like being alone … It makes you happier – you're not a loner or a geek' (Dillon et al., 2016, p. 226). Playing sport with others during break times provided structured opportunities to connect with peers. One student said that during lunch he liked to 'Kick the soccer ball or play tennis' with a group of six friends (Saggers, 2015, p. 38).

Theme 3: Inclusion and exclusion

All articles touched on students' experiences of inclusion and exclusion in regular (mainstream) school classrooms. The barriers that students reported included too much teacher talk, heavy workloads, and boring lessons (Danker et al., 2019). Additional barriers involved being singled out for obvious assistance by teachers

and teaching assistants (Humphrey & Lewis, 2008; Saggers et al., 2011), and a lack of autism awareness (Goodall, 2020; Saggers et al., 2011). Students also mentioned being mocked in the classroom (Aubineau & Blicharska, 2020; Humphrey & Lewis, 2008; Roberts & Simpson, 2016; Saggers, 2015; Saggers et al., 2011). This theme had two subthemes: facilitators of positive classroom experiences and barriers to positive classroom dynamics.

Facilitators of positive classroom dynamics

Students identified several facilitators of positive classroom dynamics, highlighting teachers who fostered inclusive and supportive environments for all. These teachers were described as calm, friendly, helpful, active listeners, who provided a structured environment, and were consistent and fair (Saggers, 2015). Students also liked teachers who were flexible, possessed a sense of humour and made learning fun (Dillon et al., 2016; Saggers et al., 2011). Students reported enjoying group work (Aubineau & Blicharska, 2020; Dillon et al., 2016) because it provided structured opportunities to work collaboratively and build connections with peers. One student shared: 'I like working with my friend when we have to do group stuff, he knows more people than me' (Dillon et al., 2016, p. 226).

Barriers to positive classroom dynamics

Students disliked teachers with poor classroom management skills (Aubineau & Blicharska, 2020; Danker et al., 2019; Dillon et al., 2016; Saggers et al., 2011), including those who did not have a classroom routine (Dillon et al., 2016) or were not responsive in their teaching approach (Danker et al., 2019; Saggers et al., 2011). For example, '[when teachers] don't take their time and do go fast... When they just write loads on the board to copy […] it gets too complicated' (Dillon et al., 2016, p. 226). These challenges, along with others identified in the literature, posed substantial barriers to creating a positive educational experience for students. Despite this, secondary schools were also recognised as playing a crucial role in the lives of autistic students.

Discussion and implications for practice

A consistent finding was that secondary school serves as a significant social environment for autistic students. Student-shared experiences suggested that schools could promote more inclusive ways of working with autistic students (Humphrey & Lewis, 2008). However, teachers' and peers' lack of understanding of autistic students' sensory, academic, and social needs were identified as significant barriers to inclusion. Although secondary school provided students with opportunities to develop social skills and make new friends (Skafle et al., 2020; Stack et al., 2021), they experienced challenges in maintaining relationships with peers and teachers (Aubineau & Blicharska, 2020; Danker et al., 2019; Humphrey & Lewis, 2008; Kelly et al., 2018). Many students reported feelings of isolation, exclusion,

and bullying (Aubineau & Blicharska, 2020; Danker et al., 2019; Goodall, 2020; Humphrey & Lewis, 2008; Lamb et al., 2014; Saggers, 2015; Saggers et al., 2011; Sumiya et al., 2018).

Sensory aspects of the school environment were also described as a considerable barrier by many (Aubineau & Blicharska, 2020; Danker et al., 2019; Goodall, 2020; Humphrey & Lewis, 2008; Kelly et al., 2018; Lamb et al., 2014; Sagers, 2015; Skafle et al., 2020; Stack et al., 2021). Suggestions included implementing strategies and time for students to decompress to mitigate sensory overload (Aubineau & Blicharska, 2020; Danker et al., 2019). This could occur by scheduling more frequent breaks and providing designated safe spaces for de-stressing (Goodall, 2020; Saggers et al., 2011). Schools can engage in processes where leaders collaborate with the school community to actively build teacher capacity, strengthen organisational structures, and embed evidence-based practices into their school culture and programs (Roberts & Webster, 2020). Although interventions for autistic students have been researched and evaluated, there remains a gap in applying this knowledge to practice (Roberts & Simpson, 2016).

Implications for practice informed by student perspectives included the importance of teachers listening and responding to autistic voices and working collaboratively with students to develop individual learning plans (Aubineau & Blicharska, 2020; Saggers, 2015). Students can also be involved in classroom activities and the social aspects of learning (Goodall, 2020), which would capitalise on individual interests to enhance learning (Aubineau & Blicharska, 2020; Goodall, 2020; Saggers et al., 2011; Skafle et al., 2020). Providing routine and predictability was important (Humphrey & Lewis, 2008), as was supporting students to manage workloads (Danker et al., 2019). Workloads can be better managed by scaffolding learning and reducing unnecessary homework tasks (Aubineau & Blicharska, 2020; Saggers, 2015); allowing extra time to complete exams (Saggers et al., 2011); reducing demands for handwriting and providing access to technology (Saggers, 2015; Saggers et al., 2011), and providing support without drawing attention to individual students (Humphrey & Lewis, 2008; Saggers et al., 2011).

The authors acknowledge that the selection of articles in the review was influenced by the research question and the decisions made by the researchers, and that some important articles may have been excluded. The scoping review could be strengthened by including a consultation exercise, which is Arksey and O'Malley's (2005) optional sixth step. Nonetheless, strengths include foregrounding the voices of autistic secondary students, involving a scoping team, and using a CAS lens to interpret the data.

Conclusion

This scoping review has revealed that there is a paucity of published material that captures the voices of autistic secondary school students. The lived experiences of these students revealed that the environment in regular secondary schools is a significant barrier to inclusion. Regular school environments have not been designed for autistic students and students with diverse learning needs. The noisy and chaotic

environment was overwhelming for many. Similarly, a lack of knowledge about autism, and the persistence of negative stereotypes impacted relationships with staff and peers, leaving many students feeling stigmatised and excluded. For regular schools to be truly inclusive and autism friendly, environmental barriers can be avoided at the design stage. Beyond the design stage, changes to address sensory overload such as more frequent breaks and providing safe spaces can make a big difference for students. Inclusivity is enhanced when stakeholders have ready access to support and information about autism; and teachers are provided with adequate training and resources to meet the needs of all students. A student-centred pedagogy where teachers listen to and respond to the voices of all students can lead to meaningful change. The review revealed that to elicit the views of autistic students, data collection methods that successfully engage these students are required. Such methods go beyond traditional interviewing approaches. Researchers, advocates, parents, and professionals listening to and responding to students' voices provides a firm direction for the learning and teaching experiences of these students to improve.

Appendix

Author/Year	Aims of the study	Findings, recommendations and/or implications for schools
Aubineau and Blicharska (2020)	Explore the school experience of autistic teenagers. Identify inhibitors and enablers promoting successful educational experiences in a Francophone context	Main findings: Barriers included managing sensory aspects and peer relationships. Recommendations: Involve students in drafting Individual Learning Plans, provide choice regarding disclosure, implement strategies and time for decompression, mitigate sensory issues, provide discreet support, evaluate and invest in individual strengths, support students to understand their diagnosis, promote understanding of neurodiversity and an inclusive school culture to mitigate bullying

Author/Year	Aims of the study	Findings, recommendations and/or implications for schools
Danker et al. (2019)	Explore autistic students' perspectives regarding barriers and ways to improve their wellbeing in school	Main findings: Researchers identified four domains of student wellbeing: emotional, social, academic and well-becoming. Recommendations: Implement strategies to manage workload, mitigate sensory issues, promote understanding of neurodiversity. Foster an inclusive culture to mitigate bullying and establish good relationships with teachers and peers, promote opportunities for socialisation by organising non-academic clubs during breaktime
Dillon, Underwood, & Freemantle (2016)	Investigate autistic students' experiences in mainstream secondary school	Main findings: Quantitative tools did not identify significant differences in the way autistic and non-autistic students experienced secondary school. However, qualitative interviews highlighted some differences. Recommendations: Promote understanding of neurodiversity and an inclusive school culture, inclusive practices. Teachers who are clear, consistent and supportive, can improve the experience for all students
Goodall, C. (2020)	Investigate autistic students' perspectives for whom mainstream school was or is challenging	Main findings: inclusion is a sense of belonging not a place. Recommendations: Need for greater support and training for teachers to understand sensory challenges autistic students experience in the school environment. Promote understanding of neurodiversity and an inclusive school culture, modify teaching approaches and methods, flexible homework requirements, support instructions visually, exploit individual interests in learning, provide students with more regular breaks and safe spaces to de-stress, include autistic students in classroom activities and the social aspects of learning. Preference for small class sizes

Author/Year	Aims of the study	Findings, recommendations and/or implications for schools
Humphrey and Lewis (2008)	Examine how autistic students experience school, construct their understanding of autism, negotiate difference, barriers and enablers to learning	Main findings: negative perceptions of self, and difficulties relating to staff and peers. Recommendations: Explore the views of all stakeholders (parents, teachers as well as students), document practice in classrooms, develop a greater understanding of sensory and social challenges autistic students face, preference for routine and predictability. Promote understanding of neurodiversity and an inclusive school culture, more inclusive ways of working, mitigate vulnerability to bullying and social isolation
Kelly et al. (2018)	Explore the perspectives of autistic adolescents regarding their communication skills, what (if any) difficulties they experience, explore if they would like support with social communication, and what type of support would be helpful	Main findings: the school environment, limited opportunities for conversation, unfamiliar conversation partners, anxiety, rejection, self-segregation, use of social media and the internet for communication, a desire to improve social communication skills, and have support in developing social communication strategies and skills. Recommendations: Provide students with support to develop social communication skills and implement a peer mentor system
Lamb et al. (2014)	Use photo elicitation to gain autistic students' perspectives on physical education	Main findings: While some physical education activities and spaces provided opportunities for positive experiences, others caused dread, anxiety and fear. Recommendations: Awareness of students' individual sensory needs, embedding policies and practices to mitigate potential barriers, and create an inclusive learning space for all students

Author/Year	Aims of the study	Findings, recommendations and/or implications for schools
Roberts & Simpson (2016)	Examine stakeholder attitudes of educators, parents and autistic people to inclusion in mainstream school, exploring the relationship between the school environment and social communication	Main findings: Identified five key themes: attitudes to inclusion, knowledge and understanding of autism, social communication behaviours, perceived challenging behaviours and support networks. Recommendations: Research has identified what does and does not work for autistic students. Further work needs to be done to translate theory into practice
Saggers (2015)	Foreground autistic student voices. The study mapped students' educational experiences onto four themes drawn from a study by Humphrey and Lewis (2008). Identify enablers and inhibitors to promote successful educational experiences	Main findings: The school environment creates barriers. A need for policies that foster peer support, social communication, acceptance and understanding of autism, including a strict no-bullying policy. Students identified the need for quiet times and spaces, flexibility in workload and assessment tasks, scaffolding and visual aids to support learning, and access to technology to minimise need for handwriting, and meet students' individual needs

Author/Year	Aims of the study	Findings, recommendations and/or implications for schools
Saggers et al. (2011)	Examine autistic students' perspectives on facilitators and constraints to learning in relation to characteristics of successful inclusive schools identified by Kluth (2003)	Main findings: Six categories emerged as critical to student experiences: committed leadership, democratic classes, reflective educators, a supportive school culture, an engaging and relevant curriculum, and responsive instruction. Recommendations: Factor in teacher characteristics when assigning autistic students to classes, consider how work is presented in class, support, ways in which students are involved in decisions about their learning, name key people in the school to talk to if needed, only set essential homework, provide technological options if handwriting is a challenge, provide quiet times and spaces, encourage teachers to be flexible in their approach to teaching, balance non-preferred with preferred activities, support for exams and completion of assignments that include quiet spaces and additional time, adopt a strict no bullying policy that is consistently adhered to by all staff
Skafle et al. (2020)	Explore how five autistic students in Norway experience high school, focusing on strengths as well as challenges	Main findings: High school is an important social domain, provides opportunities to develop social skills in an inclusive environment, and a new beginning. Despite positives, the school environment is socially demanding. Recommendations: The school environment needs to be supportive and recognise students' individual strengths
Stack et al. (2021)	Investigate autistic students' experiences of transition from primary to secondary school	Main findings: Identified four themes: relationships, feelings and expectations regarding transition, facilitators and barriers of a successful transition, and heterogeneity of needs relating to autism. Recommendations: Individualised transition planning, familiarisation with the new school environment, and teacher support to reduce the concerns of students

Author/Year	Aims of the study	Findings, recommendations and/or implications for schools
Sumiya, Igarashi, & Miyahara, (2018)	Explore friendships and social interactions as experienced by 11 autistic adolescents attending elementary or junior high schools in Japan	Main findings: Identified four themes: social motivation, loneliness, anxiety, and distress. Students differed in their motivation and interest to make and retain friends. Some wanted friends, while others were uninterested. Students used internal coping strategies to fit in socially, even though these caused personal stress. Recommendations: need to research changes in people's emotional life across different life stages

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Helen Kasztelan Chapman Helen is a Ph.D student in the field of special education. She is also the parent of an autistic child. Helen has a PhD in music education and has over 30 years' experience as an instrumental teacher working with neurodiverse as well as neurotypical students. Helen is exploring ways in which teacher critical reflection can support students with autism to thrive in school.

Anne Southall Dr. Anne Southall is a senior lecturer in Inclusion with over 30 years' experience working in the field of special education and mainstream primary schools in both Australia and the UK. Her research involves working in partnership with education providers in regional Victoria Australia to develop more inclusive pedagogies and critically reflective processes.

Susan Grieshaber Sue is a Professor of Early Childhood Education in the School of Education. Her research interests are informed by a range of critical, feminist, and feminist poststructural theories that address social justice and equity.

Authors and Affiliations

Helen Kasztelan Chapman[1] · **Anne Southall**[1] · **Susan Grieshaber**[1]

✉ Helen Kasztelan Chapman
H.KasztelanChapman@latrobe.edu.au

Anne Southall
a.southall@ltu.edu.au

Susan Grieshaber
S.Grieshaber@latrobe.edu.au

[1] School of Education, La Trobe University, Bundoora, VIC, Australia