

Concurrent and Longitudinal Predictors of School Non-attendance in Autistic Adolescents

Author

Adams, D, Gray, KM, den Houting, J, Paynter, J, Melvin, G, Simpson, K

Published

2025

Journal Title

Journal of Autism and Developmental Disorders

Version

Version of Record (VoR)

DOI

[10.1007/s10803-025-06976-9](https://doi.org/10.1007/s10803-025-06976-9)

Rights statement

© The Author(s) 2025. Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

Downloaded from

<https://hdl.handle.net/10072/438421>

Funder(s)

ARC

Grant identifier(s)

DP230100701

Griffith Research Online
<https://research-repository.griffith.edu.au>



Concurrent and Longitudinal Predictors of School Non-attendance in Autistic Adolescents

Dawn Adams^{1,2} · Kylie M. Gray^{3,4} · Jac den Houting¹ · Jessica Paynter⁵ · Glenn Melvin⁶ · Kate Simpson²

Accepted: 9 July 2025
© The Author(s) 2025

Abstract

Recent research has shown that autistic children are reported to have lower school attendance than non-autistic students. School non-attendance can occur for multiple reasons, including attendance at medical/health appointments and school refusal/emotionally based school avoidance. Providing support to improve autistic children's school attendance requires an understanding of the factors that potentially lead to or influence specific types of school non-attendance. The aim of this study was to identify concurrent and longitudinal school, family, and child factors associated with school non-attendance in autistic children. Parents/caregivers who had previously participated in a 6 year longitudinal study in Australia were invited to complete a follow-up online survey about their child's school attendance. Seventy-seven parents of autistic children aged 11–14 years participated. Over 40% of children had persistent absence (>10% days) from school. Based on multivariate negative binomial regression models, child anxiety was a significant predictor of days missed for multiple types of school non-attendance. Other factors, including child sensory processing differences, child behavioural and emotional challenges, parent stress, family income, and parent employment, were correlated with specific absence types. Child anxiety was the strongest and most consistent longitudinal predictor, with higher child anxiety significantly predicting more days of school non-attendance 3, 4, and 6 years later. Findings highlight the importance of considering school, child, and family factors specific to different types of school non-attendance to support autistic children. Identifying factors that lead to child anxiety and preventing/reducing child anxiety early is a potentially promising avenue to support attendance.

Keywords Education · Mental health · Wellbeing · Predictor · Absence

Introduction

School non-attendance is a global challenge, recognised as a complicated and multifaceted issue associated with multiple risk and protective factors (Kearney et al., 2022). It is associated with poorer academic and social outcomes, that persist into adulthood (Tekin & Aydin, 2022). In 2023, the general student population missed 7–11% of days of school, equivalent to an attendance rate of 89–93% (Long & Roberts, 2024). A little over one third of these children (38.4%) had “persistent absence” (missing 10% or more of possible school sessions, also known as chronic absenteeism) in the same period (Long & Roberts, 2024). Population-based studies indicate that autistic children around the world face even higher absence rates; in the UK, autistic children are twice as likely to have persistent absences compared to the general student population (John et al., 2022), while autistic children in New Zealand miss 6 more school days each year than their non-autistic peers (Bowden et al., 2025). The

✉ Dawn Adams
Dawn.Adams@LaTrobe.edu.au

¹ Olga Tennison Autism Research Centre (OTARC), La Trobe University, Melbourne, Australia

² Autism Centre of Excellence, Griffith Institute for Educational Research, Brisbane, Australia

³ School of Social Policy and Society, Intellectual Disabilities Research Institute (IDRIS), University of Birmingham, Birmingham, UK

⁴ Department of Psychiatry, School of Clinical Sciences at Monash Health, Monash University, Melbourne, Australia

⁵ School of Applied Psychology, Griffith University, Gold Coast, Australia

⁶ School of Psychology, Deakin University, Melbourne, Australia

frequency of school absences is further elevated in autistic children with multiple co-occurring conditions (e.g., Attention Deficit Hyperactivity Disorder [ADHD], anxiety); the odds ratio of being absent was 2.2 for all autistic participants and 2.5 for those with two or more co-occurring diagnoses (John et al., 2022).

There are many reasons for school non-attendance, including absence due to illness or healthcare appointments, truancy (absence without authorisation from parents or school), school withdrawal (parent-initiated absence), and school exclusion (school-initiated absence). Particularly relevant for autistic students is absence due to school refusal, which is also referred to as emotionally based school avoidance (EBSA): that is, severe difficulty attending school due to significant emotional distress associated with attendance. There are both anecdotal and scientific reasons for considering absences due to specific reasons (referred to as absence types) independently of each other, with a clear justification for doing so when considering predictive factors and treatments or supports (Heyne et al., 2019).

Nordin et al. (2024) conducted a scoping review of research on school absenteeism in autistic students, identifying 42 studies, three of which report on the frequency of multiple types of school non-attendance. All three studies used the School Non-Attendance CheckList (SNACK; Heyne et al., 2019), a measure that asks parents to report on the number of days missed in the last 4 school weeks (20 days) and to select a reason for any absence from 14 possible reasons. Average attendance rates in these studies ranged from 68.5% (Adams, 2022; recruited through social media) to 80% (Totsika et al., 2020; recruited through schools), both notably lower than the general student population average rates of 89–93% (Long & Roberts, 2024). EBSA was the reason for absence in 43–55% of the absences reported. The third study to use the SNACK was Melvin et al. (2023), who reported on data on 321 autistic students with a co-occurring intellectual disability. They reported that 5.6% of students missed at least one day in the last 20 school days due to EBSA; 10% missed at least one day due to school withdrawal, 2.2% due to school exclusion, and 0.6% due to truancy. Sampling or selection bias may explain at least some of the heterogeneity in attendance levels across these studies.

Identifying school, family, and child factors that are associated with school non-attendance can help with both the early identification of children “at risk” of school non-attendance and informing programs or supports to prevent or reduce school non-attendance. In the general student population, 75 studies have evaluated 781 variables as potential correlates or risk factors for school non-attendance (Gubels et al., 2019), which included physical and mental health problems, problems at or with school (i.e., bullying), school

characteristics (i.e., type of school), and parental problems or difficulties. The presence of risk factors across all levels of a child’s ecosystem informed Melvin et al.’s (2019) Kids and Teens at School (KiTeS) Framework, an application of Bronfenbrenner’s bioecological systems model which incorporates candidate factors for school absenteeism and attendance problems in diverse student populations. It places child (e.g. age, gender, mental health, behavioural and emotional challenges), family (e.g. mental health, economic hardship) and school (e.g. student–teacher relationships) in the centre, at the micro- and mesosystem level (see Melvin et al., 2019, for a diagrammatic representation of the model). These are influenced by factors in the exosystem (e.g. community support, school type, school climate) which in turn are shaped by the macrosystem (e.g. geographical location, government policy). The KiTeS framework emphasises dynamic interplay between these levels, as well as an interplay across time (chronosystem).

Two recent systematic reviews identified 18 and 23 studies each evaluating risk and influencing factors for non-attendance specifically in autistic students (Nordin et al., 2024; Sasso & Sansour, 2024). Using the KiTeS framework, Sasso and Sansour (2024) conclude that existing evidence, albeit limited, indicates potential individual (age, gender, intellectual ability, psychiatric conditions), school (bullying, school type, school environment), and family (parental unemployment, family health) factors associated with non-attendance. The authors note that the current evidence base almost exclusively comprises cross-sectional data; indeed, the Nordin et al. (2024) and Sasso and Sansour (2024) systematic reviews found only one longitudinal study each, both of which described longitudinal trajectories rather than identifying predictors or risk factors (Chen et al., 2016; Mattson et al., 2022). Longitudinal studies identifying risk factors or predictors of non-attendance are critical to help identify students who are more likely to develop school non-attendance and who therefore may benefit from proactive supports across the system (Sasso & Sansour, 2024). Ideally, longitudinal studies should cover a broad range of child, family, and school factors and include a comprehensive outcome measurement that documents both the frequency and types of school non-attendance. One such way that this could be achieved without the delay and cost of establishing a new longitudinal study is by introducing a measure of school non-attendance to an existing longitudinal cohort of autistic children. This is the method and approach used in this current study.

Current Study

The LASA study was established in 2015. Described in full in the published protocol Roberts et al., (2018), the original purpose of the LASA study was to examine predictors of academic attainment and participation in autistic children across Australia (see Roberts et al., 2018). Parent-report data were collected annually at six time points (2015–2020) across two cohorts of autistic children, aged either 4–5 years or 9–10 years at study enrolment. The annual questionnaire included measures relating to school (e.g., school type [mainstream/ special] and school size) family (e.g., socioeconomic status, number of children in house), and child factors (e.g., anxiety, behaviour). The younger cohort of the LASA study, who have a well-established longitudinal dataset of relevant factors and are still within the age of compulsory education in Australia, provide an excellent opportunity to explore predictors of school non-attendance in autistic children.

The aim of this study was therefore to identify both concurrent and longitudinal school-, family-, and child-related factors associated with school non-attendance in Australian autistic children using the KiTees model as an organising framework. To address this aim, the following research questions were posed:

What is the frequency of school non-attendance in 11–14 year-old autistic children?

1a. What is the frequency of specific types of school non-attendance in 11–14 year-old autistic children?

2. Which (if any) child, family, or school factors are concurrently associated with the frequency of school non-attendance in 11–14 year-old autistic children?

2a. Do these factors, or their strength of association, differ based on the type of school non-attendance reported?

3. Are child or family factors measured in earlier childhood associated with the frequency of school non-attendance in 11–14 year-old autistic children?

3a. Do these factors, or their strength of association, differ based on the type of school non-attendance reported?

Method

The study uses pre-existing data (Time points 1–6, hereafter T1–T6) from the LASA study as predictors. It also reports on data collected specifically for this follow-up study, hereafter referred to as T7. Ethical approval for this study, including the use of the pre-existing data from the LASA cohort, was provided by Griffith Human Research Ethics Committee. At each time point, parents provided informed consent to participate; at T7, parents who completed the questionnaire

were provided with an AUD\$50 gift voucher to thank them for their contribution and time.

Participants

The full recruitment procedure for the LASA study is described in the published protocol (Roberts et al., 2018). As the current study focuses solely on the younger cohort of the larger study, the following information is relevant to that cohort only. In brief, parents of autistic children aged 4–5 years in Australia were invited through clinics, LASA team networks, and advertisements on social media to participate in a 6 year longitudinal online survey study. The sample was therefore self-selecting and for reasons of confidentiality and practicality, the research team was not provided with any information on families who may have been provided with recruitment information but who did not choose to enrol into the study. Upon enrolment, all participants provided documentation (clinical report) confirming the child's autism diagnosis and/or they scored above the cut-off on the Social Communication Questionnaire (SCQ; Rutter et al., 2003).

At T7, all 132 parents from the LASA younger cohort were invited to complete an online survey in Term 2 or Term 3 of the 2023 academic school year. A total of 81 parents began the survey; 77 provided sufficient data (i.e., completion of the school attendance measures and at least half of the predictor measures) to be included in the analysis. Demographics are provided in Table 1 (children) and Table 2 (parents/caregivers). Caregivers were asked to describe their relationship to the child using their own words; 70 (91%) described themselves as a mother, four (5.2%) as a father, two (2.6%) as a parent, and one (1.3%) as a grandparent (who lives with the child full-time). The sample of children being reported on consisted of 68 boys (83%), 12 girls (16%), and one child who identified as non-binary (1.2%). Children were aged between 11.92 and 14.42 years ($M=13.00$, $SD=0.62$), and 48 (62.3%) attended mainstream school. For reference, the education system differs slightly between each state and territory of Australia, but broadly, special or specialist educational schools are available alongside mainstream schooling options. For a comprehensive review of Australian federal, state and territory inclusive education policies see Carington et al. (2024).

Children's co-occurring conditions are reported in Table 1; over 50% had received a diagnosis of ADHD/ADD, over 40% a diagnosis of anxiety, and almost 40% a diagnosis of intellectual disability. Of the 77 participants who completed the T7 survey, 61 (79.2%) had data from all six time points of the LASA, 10 (13%) from five time points, five (6.5%) from four time points, and one participant (1.3%) from three time points.

Table 1 Child demographics (as reported by parents at T7, N = 77)

Demographic		N (%)
Gender	Boy	64 (83.1%)
	Girl	12 (15.6%)
	Non-binary	1 (1.3%)
School type	Mainstream	48 (62.3%)
	Alternative setting (special, specialist or autism-specific school)	29 (37.7%)
Co-occurring conditions		
Attention deficit hyperactivity disorder (ADHD)	Formally diagnosed	39 (50.6%)
	Suspected/mentioned	6 (7.8%)
Anxiety	Formally diagnosed	32 (41.6%)
	Suspected/mentioned	18 (23.4%)
Depression	Formally diagnosed	7 (9.1%)
	Suspected/mentioned	2 (2.6%)
Intellectual disability	Formally diagnosed	29 (37.7%)
	Suspected/mentioned	2 (2.6%)
Dyspraxia/Developmental coordination disorder	Formally diagnosed	9 (11.7%)
	Suspected/mentioned	16 (20.8%)
Physical health issues (any)	Formally diagnosed	24 (31.2%)
Current medications	Stimulant medication	26 (33.8%)
	Melatonin	26 (33.8%)
	SSRI	16 (20.8%)
	Risperidone	13 (16.9%)

Table 2 Parent/caregiver participant demographics (T7, N = 77)

Demographic		N (%)
Relationship to child (as described by caregiver)	Mother	70 (91%)
	Father	4 (5.2%)
	Parent	2 (2.6%)
	Grandparent	1 (1.3%)
Age (years)	31–40	10 (13%)
	41–50	55 (71.4%)
	51–60	11 (14.3%)
	61+	1 (1.3%)
Highest educational level completed	Secondary school	11 (14.3%)
	Tertiary education/University	66 (85.7%)
Self-described financial situation	Poor	3 (3.9%)
	Just getting along	15 (19.5%)
	Reasonably comfortable	43 (55.8%)
	Very comfortable	14 (8.2%)
	Prosperous	2 (2.6%)

Measures

To reduce participant burden and to facilitate participant retention in the LASA study, not all measures were administered at every time point (an abbreviated survey was used in T2 and T4; see Table 3 for an overview of the measures of interest to this study included in the full and abbreviated

survey). For consistency, the longitudinal predictors for this study are taken from time points where all predictors are available (T3, T5, and T6). Of note, T6 data were collected in 2020 but collected at least 4 weeks after any periods of lockdown due to COVID-19. Parents were also asked not to complete the questionnaire during or immediately after any period of quarantine for COVID-19 due to the impact this may have on their responses. As well as showing which measures were collected at which timepoint, Table 3 also indicates the measures that were specifically added for the follow-up data collection point (T7) for this study.

Outcome Measure (Dependent Variable: T7)

The School Non-attendance ChecKlist (SNACK; Heyne et al., 2019) asks parents to indicate the number of school days missed in the past month (20 school days). Parents then indicate the reason for each day of non-attendance by selecting one of 15 response options. One additional reason for absence (COVID) was added for this study. Parents could also add in any other reasons for absence under the “other” category but this was not used by any parents in this study.

Predictor (Independent) Variables

Measures were selected based on the KiTeS bioecological conceptual framework of school non-attendance, guided by established predictors from the general student population literature and the limited research exploring non-attendance in autistic children (see reviews by Gubbels et al., 2019 and Sasso & Sansour, 2024). Included measures assessed factors related to school, family, and the child; these are summarised in Table 3.

Data Analysis

Missing data were handled as per the manual for each measure. Where data could not be imputed as per the manual, the data was coded as missing. The number of participants with complete data at T7 is noted in Table 5, the number of participants with complete data for each longitudinal model is noted in Table 7.

The total number of days of school missed, and the number of days missed due to each type of school non-attendance, were checked for distribution and normality. To answer the first research question (RQ: “What is the frequency of school non-attendance in 11–14-year-old autistic children?”), the frequency of days missed (overall and for specific types) is reported using descriptive statistics.

To answer the second research question (“Which (if any) child, family, or school factors are concurrently associated

Table 3 Study measures and administration time points

		Measure and Subscales reported in this study	T3 (6 years prior to T7)	T5 (4 years prior to T7)	T6 (3 years prior to T7)	T7	Cron- bach's alpha (T7)
School	Demographics	School placement (i.e., mainstream, specialist)	x	x	x	x	–
		Number of children enrolled at child's school, distance (km) from home to school				x	–
	Bullying	Three items from National Longitudinal Transition Study-2 (NLTS2 [National Center for Special Education Research, n.d.])	x	x	x	x	–
	School climate	Parent and Caregiver Survey (PaCS; Aldridge & McChesney, 2020). 29 items, six subscales; Teacher support, Student behaviour expectations, Affirming diversity, Welcoming school, Communication, and Assessment				x	.91–.94
Parent and family	Demographics	Family income, parent education, and number of siblings	x	x	x	x	–
	Parenting stress	Parent Stress Inventory (PSI-4 SF; Abidin, 1995). 36 items, two subscales reported: Parental Distress (PD), Parent–Child Interaction (PCI)	x	x	x	x	.86–.91
	Parent mental health	Depression, Anxiety and Stress Scales (DASS; Lovibond & Lovibond, 1995)				x	.90–.96
Child	Demographics	Child age, gender	x	x	x	x	–
	Anxiety (ASC-ASD)	Anxiety Scale for Children–Autism Spectrum Disorder (ASC-ASD; Rodgers et al., 2016) parent version. 24 items, four subscales (Anxious Arousal, Separation Anxiety, Uncertainty, Performance Anxiety)	x	x	x	x	.86–.89
	Behavioural and emotional presentation	Developmental Behaviour Checklist Primary Carer Version (DBC-P; Einfeld & Tonge, 2009). 96 items. Total behaviour problem score (TBPS) and four subscales reported: Disruptive Behaviour, Self-Absorbed, Communication Disturbance (hereafter called communication differences), Social Relating	x	x	x	x	.71–.91
	Sensory	Short Sensory Profile – 2 (SSP-2; Dunn, 2014) Four subscales: Seeking, Avoiding, Sensitivity, and Registration	x	x	x	x	.72–.80
	Repetitive behaviour (RBS)	Repetitive Behaviour Scale-Revised (RBS-R; Bodfish et al., 2000), 43 items, six subscales: Stereotyped Behaviour, Self-injurious Behaviour, Compulsive Behaviour, Routine Behaviour, Sameness Behaviour, and Restricted Behaviour				x	.76–.88
	Autism characteristics (SRS)	Social Responsiveness Scale 2nd Edition (SRS-2; Constantino & Gruber, 2012). 65 items, total score only used				x	.87

with the frequency of school non-attendance in 11–14-year-old autistic children?”), we correlated the frequency of non-attendance (total number of days) and child, family, and school factors (ordinal or continuous) collected at the same time point (T7). Correlational coefficients were also calculated between the number of days missed for specific reasons (where such absences were reported by > 10% of participants) and child, family, and school factors (ordinal or continuous) collected at the same time point (T7). Pearson's correlations, with α of .01 (selected based on number of comparisons to control family-wise error), were used as these remain robust even in the presence of zero-clustered data (Huson, 2007). To answer this research question and compare the number of days of school missed (dependent variable) based on categorical independent variables (e.g., child gender), Mann–Whitney U was used.

To further answer the second research question and identify the statistical predictors of the number of days of school missed, regression models were undertaken for specific absence types that were reported by > 10% of participants.

This cut-off was selected to ensure sufficient sample size for meaningful analysis. For all models, the dependent variable was the number of days missed and the independent (predictor) variables were the child or family factors described in the measures section above. As the regression models within this study represent a novel exploration into child, family and school factors influencing non-attendance, and is aimed at highlighting areas for in-depth investigation in future research, increased risk of Type 1 errors was considered less of a concern than Type 2 errors. Therefore, for the group comparisons and regression models, the decision was made a priori to retain an alpha-value of .05. As the dependent variable comprise count data with uneven and over dispersed variance, multivariate negative binomial regression models with loglink were used. Model fit was assessed using Chi-Square goodness of fit tests alongside plots of standardised deviance residuals.

Given that multiple types of school non-attendance outcomes are being explored, and that the sample is of moderate size, as per Stringer et al. (2020) the a priori defined

strategy was to select the most methodologically robust predictors based upon strength of correlation between the independent (predictor) and dependent variable. Where multiple predictors from a single measure correlated with the dependent variable, these were checked for collinearity using Pearson's correlations. If subscales within a single measure had high collinearity ($r > .7$), the total score for that measure was entered (i.e., for ASC-ASD and DASS). Where the number of predictor variables exceeded one variable for each participant, predictors with the highest correlation coefficients were selected. Aligning with common practice for binomial regression and in concordance with the previous study reporting upon the SNACK in autistic students (e.g., Adams, 2022; Totsika et al., 2020), exponential estimates are interpreted as relative risks (RRs). RRs are reported with 95% confidence intervals; RRs that do not cross 1 indicate a statistically significant RR ($\alpha = .05$). As noted in Totsika et al. (2020), RRs indicate the magnitude of the association (i.e., the effect size) rather than the magnitude of risk. As the regressions used are multivariate, the

RRs reported are in the context of accounting for the effect of the other potential covariates.

The final stage of the analysis answers the third research question ("Are child or family factors measured in earlier childhood associated with the frequency of school non-attendance in 11–14-year-old autistic children?"). Here the independent variables (predictors) were school, family, or child factors measured during primary school at T6 (3 years prior), T5 (4 years prior), or T3 (6 years prior) and the dependent variable was non-attendance in secondary school (T7). Aligning with Stringer et al's (2020) process for selecting methodologically robust predictors within samples with a modest size, the predictors included in these models were selected based on (a) the results of the concurrent correlation analyses reported in Table 4, and (b) longitudinal data availability (i.e., some measures that correlated concurrently were not included in the LASA. For the same reasons as noted above (i.e. uneven and over dispersed variance and count data), multivariate negative binomial regression models with loglink were calculated to elucidate the strength and significance of each predictor variable at each timepoint, following the processes described above.

Table 4 Number of children with one or more absences, the median (range) and percentage of days missed for each SNACK reason and the SNACK subscales across 20 school days

SNACK reason for absence	Number (%) of children with 1+ occurrence	Median (Min–Max) occurrences	% of all absences reported
1. Healthcare appointment	14 (18.18%)	0 0–10	14.58
2. Child unwell	30 (38.9%)	0 0–10	40.10
3. School refusal/EBSA	11 (14.29%)	0 0–10	19.57
4. Truancy	0	0	0
5. Parent gave child day off	3 (3.9%)	0 0–2	1.60
6. Parent kept child at home	0	0	0
7. Parent arranged extra holidays	3 (3.9%)	0 0–5	3.20
8. Family urgent situation	0	0	0
9. Family difficulties	0	0	0
10. Religious/cultural observance	0	0	0
11. School was closed	4 (5.2%)	0 0–2	1.92
12. School sent child home (including suspension, exclusion)	2 (2.6%)	0 0–4	1.92
13. School asked child to stay home	1 (1.3%)	0 0–2	0.96
14. Weather	0	0	0
15. Covid	1 (1.3%)	0 0–3	1.28
16. Other	0	0	0

Results

Frequency of School Non-attendance (RQ1)

For results, see Table 4. Over two thirds ($n = 53$, 68.8%) of children had missed one day or more in the previous 20 school days. The mean average of days of school missed was 3.11 (SD 4.3) within the 20-day period, equivalent to an average attendance rate of 84%. Persistent absence (10% or more days missed, for any reason) was present in 31 (40.3%) children. Table 4 documents the number of days on average for which the children were absent from school in a 4 week (20-school-day) period for type of absence in the SNACK. EBSA, resulting in at least one day's absence during the 20-school-day period, was reported in 11 (14.3%) children. The most frequently reported reasons for absence included the child being unwell, EBSA, and healthcare appointments. These resulted in 40.10%, 19.58%, and 14.58% of all absences, respectively. Graphs showing the distribution of the number of days missed across the sample for each of these three most common reasons for non-attendance are in the Supplementary Material.

Concurrent Correlates of School Non-attendance (RQ2)

The factors concurrently associated (i.e. significantly and positively correlated) with the total numbers of days of

school non-attendance in 11–14 year-old autistic children (RQ2) were T7 child anxiety, sensory sensitivity, sensory avoidance, repetitive behaviours linked to sameness, and parental mental health challenges (stress, anxiety, and depression) (see Table 5). T7 scores on the measure of autism characteristics (SRS), child behavioural and emotional challenges, family SES, and school variables (e.g.,

size, type, connection) were not correlated with the number of days of school non-attendance.

Three specific absence types (healthcare appointments, child illness, and EBSA) were reported by >10% of the sample. As shown in Table 5, the factors concurrently associated (i.e. significantly and positively correlated) with the dependent variable of number of days missed for healthcare appointments were level of T7 child anxiety (anxious

Table 5 T7 child, family, and school factors: mean (SD) and correlation coefficients with T7 SNACK school absence

Number of absences due to		Measure	Subscale	n	Mean (SD)	Any reasons	Healthcare appointment	Child being unwell	School refusal/EBSA
Child predictors	Anxiety (ASC-ASD-P)	Performance		76	6.37 (4.06)	.29	.00	-.04	.35
		Anxious arousal		76	3.89 (3.60)	.48**	.34*	-.03	.45**
		Separation		76	4.71 (3.99)	.33*	.37**	.02	.21
		Uncertainty		76	11.18 (6.18)	.42**	.38**	.08	.32*
		Total		76	26.13 (14.44)	.42**	.35*	.02	.41**
	Behavioural and emotional presentation (DBC-2)	Disruptive behaviour		76	15.42 (9.83)	.25	.28	-.12	.25
		Communication differences		76	8.68 (4.49)	.14	.30*	.15	.11
		Social relating		76	6.57 (3.24)	.27	.30*	.03	.28
		Total score		76	57.89 (28.79)	.23	.35*	.02	.20
	Sensory (SSP-2)	Sensor		72	28.18 (8.45)	.35*	.36*	.20	.29
		Seeker		72	17.11 (7.06)	.12	.21	.12	.09
		Registration		72	17.28 (6.26)	.28	.26	.22	.32*
		Avoider		72	25.90 (8.28)	.39**	.25	.08	.29
		Total		72	35.44 (23.79)	.32*	.37**	.18	.19
	Repetitive behaviour (RBS)	Stereotypy		72	6.59 (5.95)	-.02	.15	.17	-.01
		SIB		72	4.19 (5.51)	.22	.36*	.13	-.08
		Compulsive		72	3.79 (3.66)	-.02	.06	-.11	.13
		Ritual/Sameness		72	11.44 (8.15)	.35*	.37*	.19	.38**
		Total		72	3.81 (2.53)	.30	.34*	.18	.16
	Autism characteristics (SRS)	Total		75	63.33 (15.00)	.05	.21	.06	.13
Demographics		Distance to school (km)				9.02 (11.01)	.08	-.01	-.02
School predictors	Demographics	Number of children in school				762.94 (631.73)	-.04	-.10	.15
		School climate (PACS)	Teacher support	75	21.05 (3.60)	-.02	-.05	.05	-.30
	School climate (PACS)	Student behaviour	75	20.59 (3.74)	.01	-.09	.01	-.15	
		Affirming diversity	75	21.96 (3.60)	.06	.04	.04	-.21	
		Welcoming school	75	18.00 (2.73)	.08	-.01	.12	-.25	
		Communication with school	75	21.27 (4.30)	-.05	-.20	.08	-.25	
Parent and family predictors	Parent well-being (DASS)	Assessment criteria	75	19.19 (4.87)	-.07	-.31*	.01	-.17	
		Depression	72	10.00 (9.56)	.44**	.27	.21	.30*	
		Anxiety	72	7.69 (9.41)	.65**	.26	.37**	.45**	
		Stress	72	17.25 (10.37)	.41**	.17	.21	.31*	
	Parent well-being (PSI-4)	Total	72	34.94 (26.90)	.54**	.25	.29	.38**	
		Parental distress	72	34.83 (11.07)	-.30*	-.23	-.11	-.20	
		Parent child interaction	72	35.89 (7.08)	-.49**	-.37**	-.25	-.30*	
Family situation (SES; all ordinal variables)	Total	72	105.31 (10.79)	-.31*	-.20	-.27	-.10		
	Amount (\$)	74	N/A	-.25	-.35*	-.07	.10		
	Perceived financial comfort	77		.14	.05	-.07	.01		
	Parent education	77		.01	.08	-.01	-.13		

* $p < .01$, ** $p < .001$

¹All data are interval or ratio data unless note

arousal, separation anxiety, and anxiety around uncertainty), communication differences, social relating differences, sensory sensitivities, repetitive behaviours which link to sameness, and parenting stress. Similarly, the factors concurrently associated (i.e. significantly and positively correlated) with the dependent variable of number of days missed due to EBSA were T7 level of child anxiety (anxious arousal, challenges with uncertainty, and total score), sensory registration challenges (i.e., the degree to which a child misses sensory input), repetitive behaviours linked to

sameness, and parental depression, anxiety, and stress. The dependent variable of absence due to child illness was significantly, positively correlated with the independent variables of T7 parent anxiety only.

Concurrent Categorical Differences in School Non-attendance (RQ2)

Mann–Whitney U tests were used to compare the frequency of school non-attendance across T7 categorical variables. There were no significant differences (i.e., $p > .05$) in the frequency of school non-attendance between those in mainstream school or other school types; between those who have/have not reported to have been teased, been bullied, or been a bully; and those who do/do not receive support in school. We also found no significant difference in days of school non-attendance between boys and girls; with only one non-binary child participant, further analyses were precluded by sample size. Children whose parents were not employed at T7 missed significantly more school ($Z = -2.90$, $p = .004$) due to healthcare appointments ($M = 1.38$, $n = 13$) compared to those whose parents were employed at T7 ($M = 0.27$, $n = 64$).

Concurrent Predictors of School Non-attendance (RQ2)

The results of the multivariate negative binomial regression models for days of non-attendance are summarised in Table 6. Predictors from T7 entered for each model were based on the results reported above. There was only one significant T7 covariate (child anxiety ASC-ASD total score) for the number of days absent (any reason), absences due to healthcare appointments, and number of days missed due to EBSA. T7 child sensory profile and child behaviour and/or emotional challenges were not significant covariates within the model. This suggests that children with higher anxiety miss more days of school in total, miss more days of school due to healthcare appointments and miss more days of school due to EBSA.

Longitudinal Predictors of School Non-attendance (RQ3)

The results of the multivariate negative binomial regression models using concurrent and then longitudinal predictors of days of non-attendance are summarised in Table 7. As noted in the data analysis section, variables for each model were included if the outcome variable was either significantly correlated or was significantly different based on the variable, and the variable was available longitudinally from the LASA data.

Table 6 Relative risks (95% CI) of concurrent predictors from the multivariate negative binomial regression models for the number of days absent for any reason, as well as days absent due to healthcare appointments and days due to school refusal/EBSA (N=77)

		Number of days absent (all reasons)	Healthcare appointments	School refusal/EBSA
Model statistic		$\chi^2(6)=25.24$, $p < .001$	$\chi^2(7)=44.36$, $p < .001$	$\chi^2(5)=44.45$, $p < .001$
Child anxiety (ASC-ASD)	Total score	1.03* (1.00–1.06)	1.05* (1.01–1.10)	1.06* (1.01–1.11)
	Sensory sensitivities profile (SSP-2)	0.98 (0.93–1.03)	1.02 (0.92–1.13)	–
Child behaviour and/or emotional challenges	Sensory avoider	1.00 (0.94–1.06)	–	–
	Registration	–	–	1.06 (0.96–1.19)
	RBS-R total	1.00 (0.98–1.01)	1.02 (0.98–1.05)	–
Family situation (SES)	RBS-R Same-ness	–	–	1.05 (0.95–1.15)
	DBC Total	–	1.00 (0.97–1.03)	–
Parent mental health	Parent employment	–	3.20 (0.93–11.02)	–
	Family Income	–	0.65 (0.41–1.00)	–
Parent mental health	DASS Total	1.01 (.99–1.03)	–	1.00 (0.98–1.04)
	Parent stress (PSI total)	0.98 (.94–1.01)	1.00 (0.95–1.07)	1.02 (0.95–1.10)
	PSI	–	–	–
	Parent child interaction	–	–	–

* $p < 0.5$; ** $p < .01$; *** $p < .001$.

Bold text is used to note significant predictors

Table 7 Concurrent and longitudinal relative risks (95% CI) from multivariate negative binomial regression models for the number of days absent for any reason, absences due to healthcare appointments, and absences due to school refusal/EBSA (T7: concurrent, T6: 3 years prior, T5: 4 years prior, T3: 6 years prior)

Model statistic	Total number of days missed (any reason)							Days absent: healthcare appointments							Days absent: school refusal/EBSA						
	T7 N=77 $\chi^2(4)=25.24$ $p<.001$	T6 n=57 $\chi^2(4)=15.71$ $p=.003$	T5 n=63 $\chi^2(4)=9.82$ $p=.04$	T3 n=71 $\chi^2(4)=15.71$ $p=.003$	T7 N=77 $\chi^2(4)=35.10$ $p<.001$	T6 n=59 $\chi^2(4)=17.00$ $p=.002$	T5 n=64 $\chi^2(4)=10.71$ $p=.03$	T3 n=71 $\chi^2(4)=21.02$ $p<.001$	T7 N=77 $\chi^2(3)=44.45$ $p<.001$	T6 n=60 $\chi^2(3)=18.23$ $p<.001$	T5 n=63 $\chi^2(3)=42.16$ $p<.001$	T3 n=71 $\chi^2(3)=42.16$ $p<.001$	T7 N=77 $\chi^2(3)=44.45$ $p<.001$	T6 n=60 $\chi^2(3)=18.23$ $p<.001$	T5 n=63 $\chi^2(3)=42.16$ $p<.001$	T3 n=71 $\chi^2(3)=42.16$ $p<.001$					
Child anxiety score	1.03* (1.00-1.06)	1.04** (1.01-1.06)	1.03* (1.00-1.06)	1.04* (1.01-1.07)*	1.05** (1.01-1.09)	1.01 (0.98-1.06)	1.02 (0.98-1.05)	1.08** (1.02-1.14)	1.07** (1.02-1.12)	1.05** (1.01-1.09)	1.14** (1.09-1.20)	1.05** (1.01-1.09)	1.07** (1.02-1.12)	1.05** (1.01-1.09)	1.05** (1.01-1.09)	1.05** (1.01-1.09)					
Child sensory profile (SSP-2)	0.98 (0.93-1.03)	1.06* (1.01-1.12)	0.98 (0.93-1.03)	0.99 (0.91-1.03)	1.01 (0.92-1.12)	1.01 (0.92-1.12)	0.96 (0.87-1.05)	0.99 (0.98-1.01)	0.97 (0.88-1.06)	0.97 (0.91-1.03)	0.98 (0.78-0.96)	0.85 (0.89-1.02)	0.97 (0.88-1.06)	0.97 (0.91-1.03)	0.98 (0.95-1.01)	0.98 (0.95-1.01)					
Sensory avoider	1.00 (0.94-1.06)	0.97 (0.92-1.02)	1.01 (0.95-1.08)	0.97 (0.91-1.03)	-	-	-	-	-	-	-	-	-	-	-	-					
Registration	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-					
Child behaviour DBC total	-	-	-	-	1.03* (1.00-1.05)	-	-	0.99 (0.96-1.01)	-	-	-	-	-	-	-	-					
Parent mental health (PSI-4)	0.98 (0.94-1.01)	1.01 (0.99-1.03)	1.00 (0.99-1.02)	1.02* (1.00-1.03)	-	-	-	-	-	-	-	-	-	-	-	-					
Parent stress (total score)	-	-	-	-	1.01 (0.95-1.07)	1.03 (0.99-1.07)	0.98 (0.95-1.01)	1.02 (0.99-1.04)	1.04 (0.99-1.10)	0.99 (0.91-1.12)	0.98 (0.95-1.01)	1.03* (1.01-1.10)	1.04 (0.99-1.10)	0.99 (0.91-1.12)	0.98 (0.95-1.01)	1.03* (1.01-1.10)					

* $p < 0.5$; ** $p < 0.1$; *** $p < 0.001$
 Bold text is used to note significant predictors

In summary, child anxiety was the most consistent predictor of later non-attendance. The total number of days missed (any reason) and number of days missed due to EBSA is significantly predicted by the level of child anxiety (ASC-ASD total score) at T6 (3 years prior), T5 (4 years prior), and T3 (6 years prior). This suggests that children with higher anxiety at T6, T5, or T3 go on to miss more days of school in total, and more days of school due to EBSA at T7. The number of days missed due to healthcare appointments is also predicted by child anxiety at T3 (6 years prior), but not at any other time points.

The number of days (any reason) missed is significantly predicted by child sensory sensitivities at T6, and by parental stress at T3, with both statistics indicating that higher sensory sensitivity or parental stress scores predict more days of school missed. Absences due to EBSA are significantly predicted by the sensory registration score 4 years before; because the covariate is below 1.0, this suggests that lower scores on the sensory registration subscale predict higher EBSA at T7. Finally, increased absences due to healthcare appointments are predicted by higher scores on the measure of child behaviour at T5.

Discussion

This is the first study, to the authors' knowledge, to explore longitudinal predictors of school non-attendance in autistic children. The findings add to a small but rapidly growing research base in this area, with the potential to inform supports and thereby reduce the occurrence and impact of school non-attendance for autistic students. The multi-step analysis identified three key findings: (a) over two-thirds ($n = 53$, 68.6%) of children had missed one or more of the previous 20 school days. Using the number of days missed, the average attendance rate in this sample is 84%. The most frequently reported school non-attendance types were the child being unwell, EBSA, and healthcare appointments, which were the reasons for absence in 40.10%, 19.58%, and 14.58% of absences, respectively; (b) based on regression analyses, child anxiety was the only significant concurrent predictor of absences, specifically absences due to EBSA and healthcare appointments; and (c) child anxiety was the strongest and most consistent longitudinal predictor, with higher child anxiety significantly predicting more days of school non-attendance (specifically due to EBSA) 3, 4, and 6 years later.

Frequency of School Non-attendance

With an attendance rate of 84% and a persistent non-attendance rate (10% or more of days missed in the last 20 days)

of 40%, participants in this sample had lower attendance than reported in previous research with the broader student population (89–93%; Australian Curriculum, Assessment and Reporting Authority, 2023; Long & Roberts, 2024), but somewhat less attendance difficulties than reported in previous research with autistic students (Adams, 2022; Totsika et al., 2020). Unlike previous studies, though, our participants were not specifically recruited into a study on school non-attendance; they were instead drawn from a pre-existing cohort taking part in a broad, longitudinal study. The finding that our participants' non-attendance rates were comparably low for an autistic cohort, yet still exceeded national average and persistent non-attendance rates, highlights the scope of this challenge. There is, therefore, a clear need for research to identify the mechanisms that lead to and maintain school absenteeism in autistic children (Nordin et al., 2024).

The most frequently reported reason for school non-attendance was the child being unwell; 39% of children missed at least one day of school for this reason and it was the reason for 38.9% of absences from school. An additional 14.58% of days missed are due to healthcare appointments. For reference, data from the same academic year for students in Australia's state with the largest population (New South Wales) indicates that "sickness" (which combines days missed due to both illness and healthcare appointments) was responsible for 36.7% of all absences from school (NSW Government, 2024); the equivalent combined statistic from this dataset is 53.48%. This disparity between the general student population and autistic student absences for sickness and healthcare appointment reasons may reflect broader research findings that show autistic children are more likely to have both physical and mental healthcare needs which lead to an increased need for healthcare appointments (Boshoff et al., 2021). Many autistic children and their family members experience challenges or barriers to accessing these services (Brede et al., 2022) and find it challenging to transition back into school after a healthcare appointment. Whilst healthcare needs are a priority, healthcare appointments during the school day do result in missed lessons and learning opportunities, the cumulative effect of which may be problematic over time. Offering or allowing healthcare appointments in school premises reduces absences due to healthcare appointments (Foy & Hahn, 2009; Van Cura, 2010) as students do not have to leave school to attend appointments. School-based telemedicine clinics, which provide students with access to healthcare during the regular school day through private videoconferencing with a healthcare provider, have also been shown to reduce the number of days absent by 10% (Komisarow & Hemelt, 2024).

Almost one in five (19.58%) days missed from school were due to EBSA. EBSA was the reason for one or more

days absent for 14.29% of students. This is notably higher than the estimates of 1–4% of the general student population who are reported to experience EBSA (Elliott & Place, 2019). Given this marked difference in prevalence, and the suggestion that standard measures to understand factors leading to EBSA may not be appropriate for autistic young people (Adams et al., 2022), there is a clear need for further work to understand EBSA specifically in autistic young people.

Childhood Anxiety is a Concurrent and Longitudinal Predictor of School Non-attendance

Child anxiety was a consistent predictor of school non-attendance both cross-sectionally and longitudinally. Child anxiety was the only independent, significant predictor for total days missed, non-attendance due to healthcare appointments, and non-attendance due to EBSA. Further, child anxiety was a significant early predictor of later school non-attendance. A child's score on the autism-specific measure of anxiety (ASC-ASD), rated by parents, significantly predicts non-attendance, particularly non-attendance due to EBSA, 3, 4, and 6 years later. This delivers crucial new insights by confirming the longitudinal nature of the cross-sectional associations reported in five previous studies (Adams, 2022; Gray et al., 2023; Lassen et al., 2022; Munkhaugen et al., 2019; Truman et al., 2024). Anxiety is more strongly associated with school non-attendance than any of the other factors explored in this study, and anxiety is more strongly associated with absences due to EBSA than any other type of absence.

Anxiety is one of the most common co-occurring conditions for autistic young people, yet research in autistic children's anxiety and its impact on the school setting is very limited (see systematic reviews by Adams et al., 2019a, 2019b; Ambrose et al., 2021). Identifying anxiety as a potential early mechanism contributing to school non-attendance is a significant and notable finding. A recent randomised controlled trial has shown that anxiety is both preventable and treatable in young autistic children (Adams et al., 2024) and that school-based programs can be used to reduce anxiety in autistic school-aged children (Pickard et al., 2024). There is also preliminary evidence that children whose parents received a parent-mediated anxiety intervention for young autistic children experience less separation anxiety and EBSA when they transition to school (Adams et al., 2025). When combined with the current findings, this suggests that proactively providing these programs (in addition to identifying and reducing the drivers or causes of the anxiety) may not only help to prevent and reduce child anxiety and EBSA in the early years, but may also confer

the additional benefit of reducing school non-attendance in the later years.

Other Child, Family and School Factors and Their Association with School Non-attendance

Although child sensory profile and their score on a measure of behaviour and/or emotional challenges were concurrently correlated with days of school missed, when entered alongside anxiety, they were no longer predictive of school non-attendance. In the longitudinal regression models, child behaviour and/or emotional experiences were only correlated with absences due to healthcare appointments, and were identified as significant predictors of days missed due to healthcare appointments at two timepoints. Autistic children are at increased risk of health conditions and experience barriers to healthcare access (Weir, 2023). Many autistic people experience and express pain or discomfort in atypical ways, including through behaviours that some may perceive as challenging (Sala et al., 2020), and consequently face missed or misdiagnosis of health conditions, all of which may impact their frequency of healthcare appointments and ability to attend (see Donaghy et al., 2023 for a review of co-occurring physical health conditions in neurodivergent children, with a particular focus on the impact on attendance and academic outcomes). Further work is therefore needed to explore the relationship between behavioural presentation and school non-attendance (particularly related to absences due to healthcare appointments).

Some previously well-established predictors of non-attendance in autistic children, including bullying and school type (Totsika et al., 2020), were not associated with school non-attendance within this sample. This may have been due to how these variables were measured (i.e., using parent-report for bullying and school climate). It may also be due to cohort differences; in this sample, 34% were attending non-mainstream schools (e.g., special or specialist schools) whereas in previous studies which have evaluated the association between school type (mainstream/special), 15–19% of children were attending non-mainstream settings (Adams, 2022; Totsika et al., 2020). The review by Sasso and Sansour (2024) highlights that it may not be the educational setting (e.g., mainstream or special school) per se that is the predictor, but potentially universal factors (e.g., amount of support provided, the knowledge and attitudes towards autism, and sensory issues due to size and/or physical environment) which make the learning environment inaccessible for autistic students. Of course, each of the school factors may indeed impact upon each other, and upon child anxiety, to increase the risk or need for the child to not attend school.

Limitations and Future Research Directions

This study, as with all research, should be considered in the context of its limitations. First, the study would be strengthened by having data from schools and children themselves. Collecting data from children and schools on child and school factors would enable a deeper exploration of predictors. Second, as the work is exploratory it used in an alpha of .05 for group comparisons and regression models. It is important to acknowledge the limitations of this, and the relatively small sample for the analysis procedure. However, this work has identified the key variables for future studies with larger samples to focus upon. Third, while recruiting from an existing participant cohort and using the existing data to explore longitudinal predictors has significant advantages in reducing potential for expectancy effects or having only families experiencing school non-attendance volunteering to participate, potential biases in this sample are acknowledged. Namely, the sample represents parents of children who were diagnosed by the age of 5, which may mean that the sample may not be representative of children diagnosed later in their school years. Parents who participated in the sample tended to be well educated and to have family incomes above the mean for the Australia. They were also parents who had the time and capacity to commit to completing an annual questionnaire for 6 years. Finally, because the LASA was not originally established to explore predictors of school attendance, some of the variables introduced at T7 (e.g., school climate) were not included in T1–T6 data collection points.

Conclusion

This study adds to the growing literature highlighting school non-attendance as a substantial issue for autistic students. Autistic students are missing over three school days each calendar month and over 40% have persistent absence from school. Findings highlight that child anxiety is a critical factor that cross-sectionally and longitudinally predicts school non-attendance, particularly for EBSA and absences due to healthcare appointments. Given that anxiety is both preventable and treatable, this highlights a clear avenue for potential supports and solutions, tailored to meet the needs of autistic students and their families. Such supports or solutions could incorporate (ideally co-designed and co-delivered) professional development to increased teacher knowledge of anxiety in autistic students (see Adams et al., 2019a, 2019b).

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s10803-025-06976-9>.

Acknowledgments We are grateful to the autistic children and their families for giving their time to support this study. The authors also acknowledge the contributions of the broader LASA team to the original LASA study.

Author contributions Conceptualisation: Dawn Adams, Kylie Gray, Jac den Houting, Jessica Panter, Glenn Melvin, Kate Simpson Data curation: Dawn Adams, Kate Simpson Formal analysis: Dawn Adams Funding acquisition: Dawn Adams, Kylie Gray, Jac den Houting, Jessica Panter, Glenn Melvin, Kate Simpson Investigation: Dawn Adams, Methodology: Dawn Adams, Kylie Gray, Jac den Houting, Jessica Panter, Glenn Melvin, Kate Simpson Project administration: Dawn Adams Resources, software: Dawn Adams Supervision: Dawn Adams Writing: original draft: Dawn Adams Writing: review and editing: Dawn Adams, Kylie Gray, Jac den Houting, Jessica Panter, Glenn Melvin, Kate Simpson

Funding Open Access funding enabled and organized by CAUL and its Member Institutions. This study is funded by a Discovery grant, awarded by the Australian Research Council (Grant No.: DP230100701). The authors acknowledge the financial support of Autism CRC, which was established under the Australian Government's Cooperative Research Centres Program. Autism CRC facilitated the collection of longitudinal data utilised in this research. Neither of the funders, nor any of the employing Universities of the investigators, have influenced the study design, data collection, or influenced the decision to submit the final results for publication.

Declarations

Conflict of interest All authors declares that they have no competing interests with respect to this publication.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Abidin, R. (1995). *Parenting stress index short form* (4th ed.). Psychological Assessment Resources Inc.
- Adams, D. (2022). Child and parental mental health as correlates of school non-attendance and school refusal in children on the autism spectrum. *Journal of Autism and Developmental Disorders*, 52(8), 3353–3365. <https://doi.org/10.1007/s10803-021-05211-5>
- Adams, D., MacDonald, L., & Keen, D. (2019a). Teacher responses to anxiety-related behaviours in students on the autism spectrum. *Research in Developmental Disabilities*, 86, 11–19. <https://doi.org/10.1016/j.ridd.2018.12.009>
- Adams, D., Malone, S., Dargue, N., Rodgers, J., Simpson, K., Wicks, R., & Rapee, R. (2025). Brief report: School anxiety, school attendance and school refusal/distress following an autism-specific parent-mediated intervention for anxiety in preschoolers. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-025-06828-6>
- Adams, D., Malone, S., Dargue, N., Keen, D., Rodgers, J., Simpson, K., Wicks, R., Bullot, A., & Rapee, R. (2024). Prevention and reduction of anxiety in autistic preschoolers through an autism-specific parent-mediated intervention: A pilot randomised controlled trial evaluating short and longer term outcomes. *Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s10803-024-06570-5>
- Adams, D., MacDonald, L., & Keen, D. (2019). Teacher responses to anxiety-related behaviours in students on the autism spectrum. *Research in Developmental Disabilities*, 86, 11–19. <https://doi.org/10.1016/j.ridd.2018.12.009>
- Adams, D., McLucas, R., Mitchelson, H., Simpson, K., & Dargue, N. (2022). Form, function and feedback on the school refusal assessment scale-revised in children on the autism spectrum. *Journal of Autism and Developmental Disorders*, 52(5), 2156–2167. <https://doi.org/10.1007/s10803-021-05107-4>
- Adams, D., Young, K., & Keen, D. (2019b). Anxiety in children with autism at school: A systematic review. *Review Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s40489-019-00172-z>
- Aldridge, J. M., & McChesney, K. (2020). Parents' and caregivers' perceptions of the school climate: Development and validation of the parent and caregiver survey (PaCS). *Learning Environments Research*, 24, 23–41. <https://doi.org/10.1007/s10984-020-09308-z>
- Ambrose, K., Simpson, K., & Adams, D. (2021). The relationship between social and academic outcomes and anxiety for children and adolescents on the autism spectrum: A systematic review. *Clinical Psychology Review*. <https://doi.org/10.1016/j.cpr.2021.102086>
- Australian curriculum, assessment and reporting authority. (2023). *National report on schooling in Australia: Student attendance*. Retrieved from <https://www.acara.edu.au/reporting/national-report-on-schooling-in-australia/student-attendance>
- Bodfish, J., Symons, F., Parker, D., & Lewis, M. (2000). Varieties of repetitive behavior in autism: Comparisons to mental retardation. *Journal of Autism and Developmental Disorders*, 30(3), 237–243. <https://doi.org/10.1023/a:1005596502855>
- Boshoff, K., Bowen-Salter, H., Gibbs, D., Phillips, R. L., Porter, L., & Wiles, L. (2021). A meta-synthesis of how parents of children with autism describe their experience of accessing and using routine healthcare services for their children. *Health and Social Care in the Community*, 29(6), 1668–1682. <https://doi.org/10.1111/hsc.13369>
- Bowden, N., Anns, F., Vu, H., Dacombe, J., Muir, C., Russell, J., ... & Clendon, S. (2025). School Attendance Among Autistic Students in Aotearoa/New Zealand: A Population Cross-Sectional Study Using the Integrated Data Infrastructure. *Journal of paediatrics and child health*, 61(4), 609–616. <https://doi.org/10.1111/jpc.16795>
- Brede, J., Cage, E., Trott, J., Palmer, L., Smith, A., Serpell, L., Mandy, W., & Russell, A. (2022). “We have to try to find a way, a clinical bridge”—autistic adults' experience of accessing and receiving support for mental health difficulties: A systematic review and thematic meta-synthesis. *Clinical Psychology Review*, 93, Article 102131. <https://doi.org/10.1016/j.cpr.2022.102131>
- Carrington, S., Mavropoulou, S., Saggars, B., and Nepal, S. (2024). Inclusive education in australia policy review. Autism CRC. Retrieved from <https://www.autismcrc.com.au/knowledge-centre/reports/inclusive-education-australia-policy-review>
- Chen, C. C., Culhane, D. P., Metraux, S., Park, J. M., & Venable, J. C. (2016). The heterogeneity of truancy among urban middle school

- students: A latent class growth analysis. *Journal of Child and Family Studies*, 25(4), 1066–1075. <https://doi.org/10.1007/s10826-015-0295-3>
- Constantino, J. N., & Gruber, C. P. (2012). *Social responsiveness scale (SRS-2)*. Western Psychological Services.
- Donaghy, B., Moore, D., & Green, J. (2023). Co-occurring physical health challenges in neurodivergent children and young people: A topical review and recommendation. *Child Care in Practice*, 29(1), 3–21. <https://doi.org/10.1080/13575279.2022.2149471>
- Dunn, W. (2014). *Sensory profile 2 user's manual*. Pearson.
- Einfeld, S., & Tonge, B. (2009). *The developmental behaviour checklist (DBC)*. Western Psychological Services.
- Elliott, J. G., & Place, M. (2019). Practitioner review: School refusal: Developments in conceptualisation and treatment since 2000. *Journal of Child Psychology and Psychiatry*, 60(1), 4–15. <https://doi.org/10.1111/jcpp.12848>
- Foy, J. E., & Hahn, J. (2009). School-based health centers: A four year experience, with a focus on reducing student exclusion rates. *Osteopathic Medicine and Primary Care*, 3(1), 3.
- Gray, L., Hill, V., & Pellicano, E. (2023). “He’s shouting so loud but nobody’s hearing him”: A multi-informant study of autistic pupils’ experiences of school non-attendance and exclusion. *Autism and Developmental Language Impairments*, 8, 23969415231207816. <https://doi.org/10.1177/23969415231207816>
- Gubbels, J., van der Put, C. E., & Assink, M. (2019). Risk factors for school absenteeism and dropout: A meta-analytic review. *Journal of Youth and Adolescence*, 48(9), 1637–1667. <https://doi.org/10.1007/s10964-019-01072-5>
- Heyne, D., Gren-Landell, M., Melvin, G., & Gentle-Genitty, C. (2019). Differentiation between school attendance problems: Why and how? *Cognitive and Behavioral Practice*, 26(1), 8–34. <https://doi.org/10.1016/j.cbpra.2018.03.006>
- Huson, L. W. (2007). Performance of some correlation coefficients when applied to zero-clustered data. *Journal of Modern Applied Statistical Methods*, 6(2), 520–536. <https://doi.org/10.22237/jmasm/1193890560>
- John, A., Friedmann, Y., DelPozo-Banos, M., Frizzati, A., Ford, T., & Thapar, A. (2022). Association of school absence and exclusion with recorded neurodevelopmental disorders, mental disorders, or self-harm: A nationwide, retrospective, electronic cohort study of children and young people in Wales UK. *Lancet Psychiatry*, 9(1), 23–34. [https://doi.org/10.1016/S2215-0366\(21\)00367-9](https://doi.org/10.1016/S2215-0366(21)00367-9)
- Kearney, C., Benoit, L., Gonzalez, C., & Keppens, G. (2022). School attendance and school absenteeism: A primer for the past, present, and theory of change for the future. *Frontiers in Education*. <https://doi.org/10.3389/educ.2022.1044608>
- Komisarow, S., & Hemelt, S. W. (2024). School-based health care and absenteeism: Evidence from telemedicine. *Education Finance and Policy*, 19(2), 252–282. https://doi.org/10.1162/edfp_a_00398
- Lassen, J., Aggernaes, B., Foldager, M., Pedersen, J., Oranje, B., Kjær, T. W., Arnfred, S., & Vestergaard, M. (2022). Psychopathological symptoms associated with psychosocial functioning in children and adolescents with autism spectrum disorders and their typically developing peers. *Research in Autism Spectrum Disorders*, 98, Article 102040. <https://doi.org/10.1016/j.rasd.2022.102040>
- Long, R., & Roberts, N. (2024). *School attendance in England*. House of commons library. Retrieved from <https://researchbriefings.files.parliament.uk/documents/CBP-9710/CBP-9710.pdf>
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the beck depression and anxiety inventories. *Behaviour Research and Therapy*, 33, 335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-U](https://doi.org/10.1016/0005-7967(94)00075-U)
- Mattson, J. G., Bottini, S. B., Buchanan, K. A., Jarbou, M., & Won, D. (2022). Examination of school absenteeism among preschool and elementary school autistic students. *Advances in Neurodevelopmental Disorders*, 6(3), 331–339. <https://doi.org/10.1007/s41252-022-00263-9>
- Melvin, G. A., Freeman, M., Ashford, L. J., Hastings, R. P., Heyne, D., Tonge, B. J., Bailey, T., Totsika, V., & Gray, K. M. (2023). Types and correlates of school absenteeism among students with intellectual disability. *Journal of Intellectual Disability Research*, 67(4), 375–386. <https://doi.org/10.1111/jir.13011>
- Melvin, G. A., Heyne, D., Gray, K. M., Hastings, R. P., Totsika, V., Tonge, B. J., & Freeman, M. (2019). The Kids and teens at school (KiTeS) framework: An inclusive bioecological systems approach to understanding school absenteeism and school attendance problems [Conceptual Analysis]. *Frontiers in Education*, 4, 61. <https://doi.org/10.3389/educ.2019.00061>
- Munkhaugen, E. K., Torske, T., Gjevnik, E., Naerland, T., Pripp, A. H., & Diseth, T. H. (2019). Individual characteristics of students with autism spectrum disorders and school refusal behavior. *Autism*, 23(2), 413–423. <https://doi.org/10.1177/1362361317748619>
- National center for special education research. (n.d.). *Welcome to NLTS2 (National Longitudinal Transition Study-2)*. Retrieved from <http://www.nlts2.org/index.html>
- New South Wales Government (2024). 2023 Semester 1 student attendance fact sheet. Retrieved from <https://education.nsw.gov.au/about-us/education-data-and-research/cese/publications/statistics/attendance-bulletin/student-attendance-factsheet-2023>
- Nordin, V., Palmgren, M., Lindbladh, A., Bolte, S., & Jonsson, U. (2024). School absenteeism in autistic children and adolescents: A scoping review. *Autism*, 28(7), 1622–1637. <https://doi.org/10.1177/13623613231217409>
- Pickard, K., Maddox, B., Boles, R., & Reaven, J. (2024). A cluster randomized controlled trial comparing the effectiveness of two school-based interventions for autistic youth with anxiety. *BMC Psychiatry*, 24(1), 6. <https://doi.org/10.1186/s12888-023-05441-0>
- Roberts, J. M. A., Adams, D., Heussler, H., Keen, D., Paynter, J., Trembath, D., & Williams, K. (2018). Protocol for a prospective longitudinal study investigating the participation and educational trajectories of Australian students with autism. *British Medical Journal Open*, 8(1), e017082. <https://doi.org/10.1136/bmjopen-2017-017082>
- Rodgers, J., Wigham, S., McConachie, H., Freeston, M., Honey, E., & Parr, J. R. (2016). Development of the anxiety scale for children with autism spectrum disorder (ASC-ASD). *Autism Research*, 9(11), 1205–1215. <https://doi.org/10.1002/aur.1603>
- Rutter, M., Bailey, A., Berument, S., Lord, C., & Pickles, A. (2003). *Social communication questionnaire*. Western Psychological Services.
- Sala, R., Amet, L., Blagojevic-Stokic, N., Shattock, P., & Whiteley, P. (2020). Bridging the gap between physical health and autism spectrum disorder. *Neuropsychiatric Disease and Treatment*. <https://doi.org/10.2147/NDT.S251394>
- Sasso, I., & Sansour, T. (2024). Risk and influencing factors for school absenteeism among students on the autism spectrum-A systematic review. *Review Journal of Autism and Developmental Disorders*. <https://doi.org/10.1007/s40489-024-00474-x>
- Stringer, D., Kent, R., Briskman, J., Lukito, S., Charman, T., Baird, G., Lord, C., Pickles, A., & Simonoff, E. (2020). Trajectories of emotional and behavioral problems from childhood to early adult life. *Autism*, 24(4), 1011–1024. <https://doi.org/10.1177/1362361320908972>
- Tekin, I., & Aydin, S. (2022). School refusal and anxiety among children and adolescents: A systematic scoping review. *New Directions for Child and Adolescent Development*, 2022(185–186), 43–65. <https://doi.org/10.1002/cad.20484>
- Totsika, V., Hastings, R. P., Dutton, Y., Worsley, A., Melvin, G., Gray, K., Tonge, B., & Heyne, D. A. (2020). Types and correlates of school non-attendance in students with autism spectrum

disorders. *Autism*, 24(7), 1639–1649. <https://doi.org/10.1177/1362361320916967>

Truman, C., Crane, L., Howlin, P., & Pellicano, E. (2024). The educational experiences of autistic children with and without extreme demand avoidance behaviours. *International Journal of Inclusive Education*, 28(1), 57–77. <https://doi.org/10.1080/13603116.2021.1916108>

Van Cura, M. (2010). The relationship between school-based health centers, rates of early dismissal from school, and loss of seat time.

Journal of School Health, 80(8), 371–377. <https://doi.org/10.1111/j.1746-1561.2010.00516.x>

Weir, E. M. (2023). Autism, physical health conditions, and a need for reform. *JAMA Pediatrics*, 177(3), 229–230. <https://doi.org/10.1001/jamapediatrics.2022.5639>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.