A comparison of gender diversity in transgender young people with and without autistic traits from the Trans 20 cohort study

Michelle A. Tollit,[a] Tiba Maloof,[b] Monsurul Hoq,[c] Kristina Haebich,[d] Carmen C. Pace,[e] Zamantha Munoz Rodriguez,[f] Muhammad Sial,[g] Jonathan M. Payne,[h] and Ken Pang[i,]*

[a]Murdoch Children's Research Institute, The Royal Children's Hospital, Department of Paediatrics, The University of Melbourne, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[b]The Royal Children's Hospital, The University of Melbourne, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[c]Murdoch Children's Research Institute, The University of Melbourne, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[d]Murdoch Children's Research Institute, Department of Paediatrics, The University of Melbourne, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[e]The Royal Children's Hospital, Murdoch Children's Research Institute, The University of Melbourne, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[f]Murdoch Children's Research Institute, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[g]The Royal Children's Hospital, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[h]The Royal Children's Hospital, Murdoch Children's Research Institute, Department of Paediatrics, The University of Melbourne, 50 Flemington Rd, Parkville, VIC, 3052, Australia
[i]The Royal Children's Hospital, Murdoch Children's Research Institute, The University of Melbourne, 50 Flemington Rd, Parkville, VIC, 3052, Australia

Summary

Background There is an elevated co-occurrence of autism in trans individuals, with recent meta-analyses suggesting that 11% of trans individuals are autistic. The presence of autism in trans young people can create clinical challenges by adding complexity to the presentation, assessment and management of those presenting to gender clinics. Although many trans young people display traits of autism, how these traits relate to the nature of their gender diversity is unclear.

Methods This study compared gender identity, gender expression and gender dysphoria (GD) in trans young people with and without autistic traits. Baseline data from a cohort study of trans children and adolescents who first attended the Royal Children's Hospital Gender Service (Victoria, Australia) between February 2017 and January 2020 were analysed cross-sectionally. Autistic traits were assessed via the Social Responsiveness Scale-2. Gender was assessed using tools that measure gender identity, social transition, GD, body dissatisfaction, voice dysphoria, and chest dysphoria.

Findings 522 participants were included, of whom 239 (45.8%) exhibited autistic traits (SRS total T-score $\geq$60). Those with and without autistic traits were similar in their age (mean (SD) age 14.0 (2.9) and 13.1 (3.6) years respectively) and gender identity: the majority (73.7% (n = 174) and 70.5% (n = 198) respectively) identified in a binary way. Higher rates of social transition (specifically, changing pronouns) were noted in those with autistic traits (Difference in proportion 11.7, 95% confidence interval [CI] 2.4–21.1, $p = 0.014$). GD was high in both groups with ~95% displaying clinically relevant levels of GD. Chest dysphoria was similar between groups, while voice dysphoria was higher in those with autistic traits (standardised mean difference [SMD] = 0.3, 95% confidence interval [CI]: 0.1–0.5 $p = 0.00087$). Dissatisfaction with secondary gendered characteristics (SMD = 0.3, CI: 0.1–0.5 $p = 0.0011$) and hormonally unresponsive body characteristics (SMD = 0.2, CI: 0.1–0.4 $p = 0.016$) was higher in trans young people with autistic traits.

Interpretation The similarly high severity of GD in those with and without autistic traits reinforces the importance of trans young people with and without autistic traits being availed the same opportunities to access gender-affirming care. Subtle differences identified between the groups in other areas of gender diversity suggest trans young people with autistic traits may have distinct needs and that gender-affirming care may need to be tailored accordingly.

*Corresponding author. Murdoch Children's Research Institute, 50 Flemington Rd, Parkville, VIC, 3052, Australia.
E-mail address: ken.pang@mcri.edu.au (K. Pang).

Research in context

Evidence before this study

Many existing studies identify an elevated co-occurrence of autism in trans individuals, yet this link has been debated with the authenticity of this group questioned. The presence of autistic traits in trans young people can create clinical complexity and while existing clinical guidelines emphasise the importance of tailoring care to meet the unique needs of this group, there is limited research exploring how autistic traits affect the clinical presentation of gender diversity to inform care. To better understand evidence on the topic of autism and gender diversity in transgender children and adolescents, we searched literature in PubMed until 30/6/23 using terms relating to being transgender (eg "transgender" OR "gender dysphoria") AND autism (eg "autism" OR "autistic" OR "ASD") AND children/adolescents (eg "child" OR "adolescent" OR "adolescence") in titles/abstracts. The search revealed studies that primarily focussed on presenting the prevalence in overlap between autism and gender diversity. Although existing studies commonly report an overrepresentation of autism in trans populations–with a recent meta-analysis revealing that the rate of autism in trans individuals is around 11%–rarely do these studies unpack the relationship beyond this.

Added value of this study

We took a multifaceted approach to exploring gender diversity in trans young people by measuring different aspects of individuals' gender-related experiences such as their gender identity, gender expression and gender dysphoria, to better understand whether gender diversity differs between those with and without autistic traits. To our knowledge, measuring gender in such a detailed manner, including both internal thoughts about one's gender and related dysphoria as well as one's gender expression in those with and without autistic traits is unique to this study and is important for gaining a holistic account of the gender-related experiences of trans young people. Few differences in gender identity, gender expression and gender dysphoria were found in those with and without autistic traits; we also found that both groups experienced high levels of gender dysphoria. Taken together, these findings suggest that gender diversity appears similar in trans young people with and without autistic traits, but some subtle differences were observed including higher rates of social transition and body dissatisfaction in those with autistic traits.

Implications of all the available evidence

Trans young people with and without autistic traits report high levels of gender dysphoria reinforcing the need for gender-related clinical support for this marginalised group. Although autistic traits do not affect the nature of gender diversity in trans young people across many facets of gender including gender identity, gender diverse behaviours, overall social transition, gender dysphoria, dissatisfaction with primary gendered body characteristics and chest dysphoria, those with autistic traits displayed some subtle differences with regards to changing pronouns (a form of social transition) and dissatisfaction with secondary gendered and neutral body characteristics as well as voice dysphoria, suggesting that they may have distinct needs worthy of consideration in clinical care.

Introduction

Trans and gender diverse (hereafter referred to as *trans*) children and adolescents are presenting to specialist gender clinics around the world at increased rates.[1–4] Paediatric gender clinics provide assessment and management of gender dysphoria (GD), which is the distress experienced when an individual's birth assigned gender does not align with their gender identity.[5] Trans children and adolescents attending specialist gender clinics display a range of clinical presentations. This heterogeneity can exist in relation to various aspects of their gender-specific experiences, including gender identity, gender expression and GD. For example, some young people identify in a binary way (e.g., transmasculine or transfeminine) while others identify as non-binary (e.g., not exclusively male or female).[6] Variation also exists in gender expression; some young people choose to affirm their gender via social transition (i.e., changing the way they present themselves), and this can vary in terms of methods (e.g., through dress, name, pronouns) and environments in which this occurs (e.g., home, school, online).[7] GD can also vary in trans young people–not all will experience GD, but for those who do the intensity of dysphoria can range from mild to severe.[8]

There is considerable heterogeneity in the broader clinical presentation of trans children and young people.

Many experience mental health difficulties, including mood and anxiety disorders,[6,9] which are believed to be in part driven by the discrimination, bullying and abuse faced by these young people.[10] Relatedly, among trans individuals there is an elevated co-occurrence of autism spectrum disorder (ASD; a neurodevelopmental condition characterised by differences, and at times difficulties, in social communication, and restricted and repetitive behaviours[5]) and autistic traits compared with cisgender populations (i.e., those whose gender identity matches their birth assigned gender).[11,12] Moreover, a recent review revealed a pooled prevalence estimate of ASD diagnoses of 11% among trans people,[13] and even higher "positive rates for ASD caseness" (up to 68%) based on thresholds on ASD screening questionnaires, as well as increased prevalence of ASD traits in trans individuals.[13] Please note that we use both identity-first language (autistic person) and person-first language (person with autism) throughout this paper to reflect variability in the language preferences of the autism community.

The presence of autistic traits in trans individuals can create clinical challenges by adding complexity to the presentation, assessment, and management of those presenting to gender clinics. For example, ASD is associated with difficulties in social interaction and communication,[5] which may make it challenging for individuals to describe their internal sense of gender and gender needs.[14] As inflexible thinking patterns (e.g., 'black and white' thinking) are frequently seen in some autistic individuals,[5] one might also expect trans individuals with autistic traits to more frequently express a gender identity that conforms to a stereotypical binary view of either male or female. Furthermore, this rigidity could theoretically impact how trans individuals seek to make a social transition, since some may prefer to delay this transition until medical gender-affirmation has enabled their bodies to be better aligned with any social changes. However, there is currently no empirical evidence to support these hypotheses. What is better evidenced is that autistic individuals are more susceptible to various neurodevelopmental and psychiatric conditions,[15] which can add further complexity to the clinical picture.

To help manage such complexity, initial clinical guidelines were developed to help guide care for those presenting with both ASD and GD.[16] Implicit within these guidelines is the importance of tailoring clinical care to meet the unique needs of trans individuals who are autistic. However, significant knowledge gaps remain in the understanding of the autism and gender diversity intersection.[17] Indeed, beyond a qualitative study of autistic trans youth which examined their gender trajectories over time and thematically identified challenges arising from the co-occurrence of neurodiversity and gender diversity (in the absence of a non-autistic control group),[14] we have minimal empirical data regarding how the presence of autistic traits is related to the clinical presentation of gender diversity in trans children and adolescents. Improving our understanding in this area will be critical to developing more tailored approaches for supporting trans young people with autistic traits, who may be considered especially vulnerable given the compounded effects of discrimination and stigmatisation resulting from the intersectionality of these identities.[11,18]

The objective of this study was therefore to describe the clinical presentation of trans children and adolescents with autistic traits and to compare their profile with those who do not have such traits. To begin, we examined the general mental health profile of both groups, before comparing different aspects of their gender diversity, including gender identity, gender expression, and GD at the time of their first attendance at a specialised gender clinic.

Methods
Study design and population
Baseline data were drawn from the Trans 20 study, a single-site cohort study of trans children and adolescents, whose detailed protocol has previously been reported.[19] Participants were eligible for inclusion in the current study if they were trans patients who attended their first appointment during the study period (between February 2017 and January 2020) and had completed the autistic trait instrument used in this study.

The Trans 20 study was approved by the Royal Children's Hospital Human Research Ethics Committee (#36323). Data were collected as standard clinical care; participant consent was therefore not required.

Measures
A list of all measures used in Trans 20, including age applicability of measures and sources of data can be viewed in Tollit et al.[19]

Autistic traits
Parents completed the Social Responsiveness Scale-2 School-Age form (SRS-2),[20] a 65-item questionnaire measuring the presence and severity of social impairments that characterise ASD; higher scores reflect greater social deficits associated with ASD. Clinically significant ASD traits are indicated by an SRS-2 total T-score ≥ 60 (autistic trait group); scores <60 provide little evidence of social deficits indicative of ASD (non-autistic trait group).[20]

Mental health
The Child Behaviour Checklist (CBCL/6-18) and the Youth Self Report (YSR) were used to measure parent- and child-reported internalising and externalising psychopathology.[21] Elevated T-scores (≥ 70) indicated scores in the clinical range on the DSM-Oriented Scales.

Recent suicidal ideation and lifetime suicide behaviours were assessed in young people aged 12 years and older using 6 items from the Columbia-Suicide Severity Rating Scale (CSSR).[22] Responses were categorised into high risk vs not high risk.

Gender diversity

We examined gender diversity by evaluating gender identity, gender expression, and distress experienced in relation to gender (see eTable 1 in the Supplement for further details).

Gender identity. Gender identity: Measured categorically using the single item: *how do you describe your current gender identity?* Responses were collapsed into: binary gender identities, non-binary, unsure and prefer not to answer.[23] Gender identity was also measured on a continuum using The Gender Slider, where respondents indicate on two separate scales the degree to which they feel female and male from *not at all (0)* to *completely (100)*.

Gender expression. Gender diverse behaviour: The Gender Identity Questionnaire (GIQ) for children was used to measure children's engagement in traditional gender role behaviours.[24] A lower score reflects greater gender diverse behaviour and expression relative to their assigned gender.

Social transition: The Social Transition Questionnaire measures the extent to which a person has socially transitioned in different domains (i.e., name, pronouns, appearance) and settings (i.e., home, school, online).

Gender and body dysphoria. GD: assessed by the Gender Preoccupation and Stability Questionnaire.[25] Total scores range from 14 to 70 with higher scores indicating greater gender dysphoria–a score of ≥ 28 can be used as a threshold to identify those who "are likely to have clinically high levels of gender dysphoria".[25(p139)]

Body dissatisfaction: examined using the Body Image Scale[26] (BIS) for which respondents indicate level of satisfaction with 30 body parts from *very satisfied* to *very dissatisfied*. An overall body satisfaction score is derived as are summary scores relating to 'primary genderal' characteristics, a term described by the original developers of the BIS but hereafter referred to as 'primary gendered' characteristics (e.g., vagina, penis), 'secondary genderal' characteristics as termed by the original developers of the BIS but hereafter referred to as 'secondary gendered' characteristics (e.g., hips, arms) and 'hormonally unresponsive (neutral)' characteristics (e.g., nose, feet), with higher scores representing greater dissatisfaction. Each body part is grouped according to its "relative importance as a gender-defining body feature".[26(p642)]

Voice dysphoria: frequency of voice dysphoria was measured using six items adapted from the Transsexual Voice Questionnaire.[27,28] Higher scores indicate greater frequency of distressing thoughts or feelings about voice.

Chest dysphoria: Examined in assigned females via the adapted 16-item Chest Dysphoria Scale.[29] Respondents indicate frequency of dysphoria related to chest; higher scores correspond to greater distress.

Statistical analyses

Categorical variables were summarised using frequencies and proportions. For most of the continuous variables, distributions were skewed (eFigs. 7–12 in the Supplement). Hence, all continuous variables were summarised using median and inter quartile range. However, to allow comparison with the published literature, the continuous variables were also summarised using mean and standard deviation and are reported in the eTable 2 in the Supplement. To allow comparison across continuous outcomes, standardised scores were calculated by subtracting from the mean and dividing by standard deviation. We used binary logistic regression for binary outcome variables and simple linear regression for continuous outcome variables to assess the association between mental health and gender outcomes and the autistic trait (yes/no) as exposure adjusting for the effect of age and assigned gender at birth (except for sex-specific outcomes e.g., male slider for male at birth etc). Differences (i.e., marginal effects) in mental health and gender outcomes by the autistic and non-autistic trait group status were estimated as differences in proportions for categorical outcomes and as differences in standardised mean scores for continuous outcomes using the fitted models. Data were analysed in Stata/IC–version 16.

Role of the funding source

Results

Sample characteristics

Among the 570 patients who completed the online survey, 18 identified as cisgender and 30 did not complete the autistic traits questionnaire (i.e., SRS-2)[20] and were excluded from analyses. The final sample comprised 522 participants; the majority were born in Australia and predominantly spoke English at home (Table 1). In total, 45.8% (n = 239) exhibited elevated autistic traits. There was a predominance of assigned females in both the autistic and non-autistic trait groups. Mean age was similar between the groups.

	Non-autistic traits	Autistic traits	Total
	N = 283	N = 239	N = 522
SRS-2 Total T-score (mean, SD)	50.1 (5.2)	71.6 (9.0)	59.9 (12.9)
Birth assigned gender (n, %)			
Male	102 (36.0)	61 (25.5)	163 (31.2)
Female	181 (64.0)	178 (74.5)	359 (68.8)
Age (mean, SD)	13.1 (3.6)	14.0 (2.9)	13.5 (3.3)
Country of origin (n, %)			
Australia	264 (93.3)	221 (92.5)	485 (92.9)
Other	19 (6.7)	18 (7.5)	37 (7.1)
Main language at home (n, %)			
English	279 (98.6)	236 (98.7)	515 (98.7)
Other	4 (1.4)	3 (1.3)	7 (1.3)
School attendance[a], % of days (median, IQR)	95.0 (83.6–100.0)	86.0 (60.0–100.0)	93.9 (75.0–100.0)

[a]School attendance was parent reported and was calculated as a % of days the patient attended the school among the expected days of attendance in the past four weeks from the day survey completion. The distribution is skewed.

Table 1: Demographic characteristics of the participants.

School attendance was slightly lower in the autistic trait group.

Mental health

Table 2 presents the mental health profile of each group. Overall, the autistic trait group displayed poorer mental health than the non-autistic trait group on the DSM-oriented scales according to the CBCL/6-18 and YSR. For example, 58.2% of the autistic trait group reported depressive problems in the clinical range using the YSR compared to 34.7% in the non-autistic trait group (adjusted model diff = 23.0, 95% CI: 13.7–32.3 $p < 0.0001$). Similarly, higher rates of anxiety problems were reported by youth in the autistic trait group (48.8%) compared with the non-autistic trait group (27.2%) (adjusted model diff = 21.1, 95% CI: 12.0–30.3 $p < 0.0001$). Rates of other internalising and externalising mental health difficulties (and differences between the groups) are reported in Table 2. There was also evidence of a difference in the rates of high suicide risk, with the autistic trait group presenting with greater risk compared to the non-autistic trait group (17.1% vs 7.8%, diff = 8.8, 95% CI: 2.2–15.5 $p = 0.0091$).

Gender diversity

Differences in gender diversity, gender dysphoria and body dissatisfaction between those with and without autistic traits are presented in Tables 3 and 4 for continuous and categorical variables respectively. Effect sizes are reported in the tables as differences in proportions or SMDs.

Gender identity

The distributions of gender identities were similar between those with and without autistic traits using both categorical and continuous approaches to measuring this construct (Tables 3 and 4). Most of those in the non-autistic trait and autistic trait groups reported a binary gender identity (70.5% vs 73.7% respectively). Proportions of those who identified as non-binary were also similar (non-autistic trait 14.2% and autistic trait 14.0%), as were proportions of being unsure (non-autistic trait 15.3% vs autistic trait 12.3%). The Gender Slider revealed that the degree of congruence on the male and female sliders (in relation to assigned gender) was similar for those with and without autistic traits, with distribution of scores on both sliders comparable between groups and most scoring closer to the extreme ends of the sliders (see eFig. 1a and b in the Supplement).

Gender expression

According to the GIQ, parents of children (≤12 years) reported similar levels (standardised mean difference [SMD] = 0.2, 95% CI: –0.2 to 0.5 $p = 0.32$) of gender diverse behaviour in the autistic trait (median 2.5, Inter quartile range (IQR) 2.1–2.9) and non-autistic trait group (median 2.1, IQR 1.9–2.7), see eFig. 2 in the Supplement. With regards to social transition (Table 4), more young people with autistic traits reported changing pronouns compared with the non-autistic trait group (56.3% vs 42.5%, diff = 11.7, 95% CI: 2.4–21.1 $p = 0.014$). Similarly, we observed higher rates of other facets of social transition in the autistic trait group compared to the non-autistic trait group, for example, overall social transition (46.4% vs 35.4%), changing name (54.7% and 45.2%) and social transition at school (59.1% vs 46.7%), although the evidence in support of these differences were weak.

GD and body dysphoria

Based on the GPSQ (Table 3), high levels of GD were reported in the autistic trait (median 41.0, IQR 37.0 to 45.0) and the non-autistic trait group (median 39.5, IQR

	Non-autistic traits		Autistic traits		Difference in proportion[a] (age and assigned gender adjusted)			
	N	% (n)	N	% (n)	N	Diff	95% CI	p value
Mental Health–parent report (CBCL/6-18)								
Depressive problems	262	26.0 (68)	234	72.6 (170)	496	44.9	37.0–52.9	<0.0001
Anxiety problems	262	17.2 (45)	234	64.5 (151)	496	47.1	39.4–54.8	<0.0001
Somatic problems	262	13.4 (35)	234	33.3 (78)	496	19.1	11.8–26.5	<0.0001
Attention deficit/hyperactivity problems	262	1.1 (3)	234	21.4 (50)	496	20.4	14.9–25.8	<0.0001
Oppositional defiant problems	262	5.0 (13)	234	20.1 (47)	496	16.5	10.7–22.2	<0.0001
Conduct problems	262	2.3 (6)	234	17.5 (41)	496	15.7	10.6–20.9	<0.0001
Mental Health–youth report (YSR)								
Depressive problems	213	34.7 (74)	201	58.2 (117)	414	23.0	13.7–32.3	<0.0001
Anxiety problems	213	27.2 (58)	201	48.8 (98)	414	21.1	12.0–30.3	<0.0001
Somatic problems	213	3.8 (8)	201	11.4 (23)	414	7.6	2.5–12.7	0.0035
Attention deficit/hyperactivity problems	213	8.5 (18)	201	22.9 (46)	414	14.1	7.2–21.0	<0.0001
Oppositional defiant problems	213	4.2 (9)	201	10.0 (20)	414	5.9	0.9–10.9	0.020
Conduct problems	213	4.2 (9)	201	14.9 (30)	414	10.2	4.7–15.8	<0.0001
Suicidality (CSSR)								
High risk	192	7.8 (15)	181	17.1 (31)	373	8.8	2.2–15.5	0.0091

Note: CBCL/6–18: Child Behavior Checklist; YSR: Youth Self Report; CSSR: Columbia Suicide Severity Rating Scale. Percentages reported for the CBCL/6–18 and YSR reflect % in the *clinical* range i.e., T-score ≥70 on each scale. Questionnaires were administered according to age applicability, hence, the total numbers do not always equal 522. [a]Binary logistic regression used to assess the association between mental health and the autistic trait (yes/no) adjusting for the effect of age and assigned gender at birth. Marginal effects as difference in proportion was estimated using the fitted models.

Table 2: Differences in internalising and externalising mental health difficulties in those with and without autistic traits.

	Non-autistic traits		Autistic traits		Difference in standardised mean[a]			
	N	Median (IQR)	N	Median (IQR)	N	Diff	95% CI	p value
Gender Identity[b]								
Gender identity—Slider (Continuum)								
Male slider—birth-assigned male (congruence)	89	15.0 (5.0–31.0)	57	10.0 (1.0–31.0)	146	−0.1	−0.4 to 0.3	0.69
Female slider—birth-assigned male (incongruence)	94	75.0 (61.0–95.0)	57	81.0 (56.0–95.0)	151	0.0	−0.3 to 0.3	0.92
Male slider—birth-assigned female (incongruence)	167	86.0 (71.0–96.0)	164	85.0 (66.0–96.0)	331	−0.1	−0.4 to 0.1	0.19
Female slider—birth-assigned female (congruence)	169	6.0 (1.0–21.0)	160	6.0 (1.0–16.0)	329	−0.1	−0.3 to 0.1	0.31
Gender Expression[c]								
Gender diverse behaviour								
Gender diverse behaviour (GIQ -14 item)	98	2.1 (1.9–2.7)	55	2.5 (2.1–2.9)	153	0.2	−0.2 to 0.5	0.32
Gender Dysphoria[c]								
Gender preoccupation and stability								
GPSQ Total score	214	39.5 (35.0–45.0)	205	41.0 (37.0–45.0)	419	0.1	−0.1 to 0.3	0.20
Body Dysphoria								
Body dissatisfaction: Body Image (BIS)[c]								
Overall body	192	3.5 (3.2–3.8)	188	3.7 (3.3–4.0)	380	0.3	0.1–0.5	0.0043
Primary characteristics	191	4.4 (4.0–4.8)	187	4.6 (4.1–4.8)	378	0.1	−0.1 to 0.3	0.53
Secondary characteristics	192	3.4 (3.0–3.8)	188	3.7 (3.2–4.1)	380	0.3	0.1–0.5	0.0011
Hormonally unresponsive body characteristics	192	3.0 (2.6–3.4)	188	3.2 (2.8–3.5)	380	0.2	0.0–0.4	0.016
Voice dysphoria[c]								
Frequency of distress about voice (min 6; max 24)	194	13.5 (10.0–18.0)	190	16.0 (12.0–20.0)	384	0.3	0.1–0.5	0.00087
Chest dysphoria[c]								
Overall chest dysphoria (min 0; max 48)	57	26.0 (19.0–32.0)	78	27.0 (22.0–34.0)	135	0.2	−0.1 to 0.5	0.26

[a]Simple linear regression was used to assess the association between gender diversity and the autistic trait (yes/no) adjusting for the effect of age and assigned gender at birth (except for sex-specific outcomes). Marginal effects as difference in standardise mean was estimated using the fitted models. [b]Difference in standardised mean is adjusted for age. [c]Difference in standardised mean is adjusted for age and assigned gender at birth.

Table 3: Standardised mean differences in gender identity, gender expression and gender (and body) dysphoria in those with and without autistic traits.

	Non-autistic traits		Autistic traits		Difference in proportion[a] (age and assigned gender adjusted)			
	N	% (n)	N	% (n)	N	Diff	95% CI	p values
Gender identity								
Gender identity (categorical)								
Binary	281	70.5 (198)	236	73.7 (174)	517	2.4	–5.4 to 10.3	0.54
Non-binary	281	14.2 (40)	236	14.0 (33)	517	–1.0	–7.1 to 5.0	0.74
Unsure	281	15.3 (43)	236	12.3 (29)	517	–1.4	–7.5 to 4.6	0.64
Gender expression								
Social transition								
Overall	223	35.4 (79)	207	46.4 (96)	430	8.0	–1.1 to 17.0	0.084
Name	199	45.2 (90)	201	54.7 (110)	400	7.4	–2.2 to 17.1	0.13
Pronoun	221	42.5 (94)	206	56.3 (116)	427	11.7	2.4–21.1	0.014
Look	229	72.1 (165)	205	78.0 (160)	434	–0.9	–7.5 to 5.7	0.79
Home	238	54.2 (129)	213	59.2 (126)	451	0.9	–7.9 to 9.7	0.84
School	229	46.7 (107)	203	59.1 (120)	432	8.7	–0.5 to 18.0	0.062
Online	184	76.6 (141)	177	84.2 (149)	361	5.9	–1.9 to 13.7	0.14
Gender dysphoria								
Gender preoccupation and stability (clinically high levels of GD)								
GPSQ Total score ≥28	214	95.8 (205)	205	95.1 (195)	419	–1.2	–5.2 to 2.8	0.56

Note: Questionnaires were administered according to age applicability and in some instances also according to assigned gender, hence, the total numbers do not always equal 522. [a]Binary logistic regression used to assess the association between gender outcomes and the autistic trait (yes/no) adjusting for the effect of age and assigned gender at birth. Marginal effects as difference in proportion was estimated using the fitted models.

Table 4: Proportion differences in gender identity, gender expression and gender dysphoria in those with and without autistic traits.

35.0–45.0; SMD = 0.1, 95% CI: –0.1 to 0.3 $p = 0.20$, also see eFig. 3 in the Supplement) and 95.8% of the non-autistic trait group and 95.1% of the autistic trait group presented with clinically high levels of GD (≥ 28 on the GPSQ) (Table 4).

Regarding body image (BIS), both groups expressed greatest dissatisfaction with primary gendered characteristics relative to secondary gendered characteristics and hormonally unresponsive body parts. Compared to those without autistic traits, those with autistic traits expressed greater dissatisfaction with their body overall (SMD = 0.3, 95% CI: 0.1–0.5 $p = 0.0043$) as well as with secondary characteristics (SMD = 0.3, 95% CI: 0.1–0.5 $p = 0.0011$) and neutral body characteristics (SMD = 0.2, 95% CI: 0.0–0.4 $p = 0.016$). See eFig. 4a–d in the Supplement.

The extent of chest dysphoria was similar in the two groups (SMD = 0.2, 95% CI: –0.1 to 0.5 $p = 0.26$), while frequency of voice dysphoria was higher in the autistic trait group (SMD = 0.3, 95% CI: 0.1–0.5 $p = 0.00087$). See eFigs. 5 and 6 in the Supplement.

Discussion

In our study, almost half of the trans children and adolescents seeking clinical care exhibited autistic traits. Notably, these young people reported high rates of mental health difficulties and substantial suicide risk, which may be driven in part as sequelae of autism. The overall rates of mental health difficulties among the autistic trait group reported in this study are in keeping with the high rates of mental health difficulties commonly reported by those with ASD in non-trans specific populations in other clinical and community settings.[15] However, in our study, rates of depressive and anxiety problems (in the clinical range) in the autistic trait group were as high as 73% and 65% respectively, which is even higher than the prevalence rates of depressive disorders (2.5%–47.1%) and anxiety disorders (1.5%–54%) reported in other studies involving non-trans autistic populations.[15] These findings point to the increased vulnerability of those with an intersectionality between autism and GD, and are consistent with studies, albeit based on smaller samples, that have reported poor mental health among trans young people with ASD or autistic traits.[30]

A primary aim of our study was to better understand if and how the presence of autistic traits affects the clinical presentation of gender diversity in trans children and adolescents. We subsequently found many features of gender diversity, including aspects of gender identity, expression and dysphoria, to be similar in trans young people with and without autistic traits which is consistent with others who have reported generally similar gender-related experiences in autistic and non-autistic young people.[14,31] Regarding gender identity, binary gender identities occurred at a similar rate in both groups—therefore, the hypothesis that inflexible

thinking patterns (which are frequently seen in some autistic individuals) would increase the likelihood of those with autistic traits endorsing a binary gender identity (compared to those without autistic traits) was not supported. Relatedly, the hypothesis that lower rates of non-binary gender identities would be observed in those with autistic traits due to cognitive rigidity and related discomfort with ambiguity[32] was also not supported by our results. Perhaps this is not surprising as cognitive rigidity and inflexible thinking styles, although common, are not universally observed in autistic individuals. Moreover, our finding of comparably high levels of GD across the two groups is important. Although the link between ASD and GD has been debated,[13,33,34] and the authenticity of GD in autistic individuals questioned by some who have interpreted gender diversity in this group as "'symptoms' of autism",[18(p2644)] the significant levels of GD reported in this study reinforce the need for gender-related clinical support for trans children and adolescents with autistic characteristics. In this way, the presence of autistic traits should not prohibit someone from receiving the gender affirming care that is afforded to people without autistic traits.[16,33]

In our study, some subtle differences in the clinical presentation of gender diversity were nonetheless identified, suggesting that young people with autistic traits and GD may have specific needs and that their clinical management may need to be tailored accordingly. For example, although both groups reported greatest body dissatisfaction with primary characteristics, those with autistic traits reported more dissatisfaction with secondary characteristics and hormonally unresponsive body characteristics than those without autistic traits as well as a significantly higher frequency of voice distress. These body features tend to be more overtly visible to self and others and our findings suggest that those with autistic traits may experience increased difficulty coping with the incongruence between their external body appearance and gender identity. This may also reflect a more rigid thinking style (experienced by some, but not all, autistic individuals) with distress ensuing when body appearance does not match gender identity. Coleman-Smith and colleagues also found that trans individuals with ASD experience conflict with body.[18] Helping young people navigate this conflict may be especially important when working with trans young people with autistic traits.

This study's findings should be interpreted with the study limitations in mind. First, although a widely-used ASD screening tool, the SRS-2 is not a formal diagnostic tool[20] and may be limited in its specificity in identifying ASD when used with the trans population.[33] Whether elevated scores on the SRS-2 reflect underlying ASD, broader autism phenotype, some other neurodevelopmental condition, or alternatively social anxiety (potentially related to discrimination and transphobia)

among trans young people remains unknown, since screening tools of this nature may detect social impairment not specifically related to ASD.[33] Relatedly, it is important to note that some of the measures used in this study were not designed specifically for use with autistic samples. Secondly, our sample was a clinical sample comprising individuals attending a tertiary service and consisted predominantly of assigned females as well as young people who were supported by their parents; the findings may therefore not be generalisable to the broader trans population within the community where the assigned sex ratio is around 1:1,[35] and where many young people lack familial support.[10] Finally, our study does not allow us to assess for the effects of autistic traits on gender diversity in the broader population including among cisgender young people.

Despite these limitations, the current study provides a detailed and nuanced account of the gender-related presentation of trans young people with autistic traits who present for clinical care. The current study indicated that gender diversity in trans children and adolescents with autistic traits did not significantly differ from trans young people without autistic traits and that both groups experience high levels of body dissatisfaction and GD which provides further evidence of the health care needs of this group. The sizeable proportion of trans young people with autistic traits in the current study emphasises the importance of having gender services that are well-versed in autism and have links to autism services to guide care. The findings of this study also highlight the increased vulnerability of this group, and as such, continuing to improve knowledge of optimal support options is needed, while future research may best be directed toward better understanding the broader autism profile of this population using well-established ASD diagnostic tools.

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