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Autism traits and gender diversity in adults from the general population: Examining the role of restricted and repetitive behaviours and interests

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ABSTRACT

Background: Autism is diagnosed on the basis of persistent social-communication difficulties and restricted, repetitive patterns of behaviour and interests (RRBIs). Increasing evidence indicates that autism frequently co-occurs with gender diversity, yet the nature of this intersection remains unclear. The current study aimed to address this insufficiently understood intersection by examining the predictive role of RRBIs in gender dysphoric traits and gender diversity experiences, adopting an individual differences approach.

Method: Two hundred and thirty-eight adults from the general population, predominantly undergraduate students, completed self-report measures of autism traits (Autism-Spectrum Quotient), RRBIs (Repetitive Behaviours Questionnaire-3), gender dysphoria (Utrecht Gender Dysphoria Scale–Gender Spectrum) and gender diversity (Gender Self-Report).

Results: Correlational analyses showed that both social-communication difficulties and RRBIs were positively associated with gender dysphoric traits, as well as binary and nonbinary gender diversity experiences. Hierarchical regressions, however, revealed that only RRBIs, and not social-communication difficulties, were uniquely associated with the gender-related variables in the general population.

Conclusions: These findings suggest that the dimensional relationship between autism traits and gender diversity may be largely attributable to specific autism traits (i.e., RRBIs). This raises further questions about the nature of this association in the general population and highlights the need for future research to examine the role of RRBIs in the intersection of autism and gender diversity.

Introduction

Autism is a neurodevelopmental condition diagnosed based on a dyad of core features, namely difficulties in social communication and restricted, repetitive patterns of behaviour and interests (RRBIs) (American Psychiatric Association, 2022). Research indicates a common intersection of autism and gender diversity (Bungert et al., 2024; Kallitsounaki & Williams, 2023). Gender diversity (GD) describes experiences and expressions of gender that differ from the societal and cultural norms typically associated with one's sex assigned at birth. This may involve feelings of emotional discomfort or distress (i.e., gender dysphoria), identifying as a binary gender different from one's sex assigned at birth (i.e., transgender), or formulating a gender identity or expression that falls outside of conventional binary categories (i.e., nonbinary) (Coleman et al., 2022). Nonetheless, gender-related experiences show substantial variation even within cisgender populations and overlap with experiences observed in transgender and nonbinary populations (Jacobson & Joel, 2019; Sandfort et al., 2021; Tabler et al., 2021).

Indeed, a considerable proportion of the evidence supporting an intersection of autism and gender diversity has derived from individual-differences studies either in exclusively cisgender samples or in general-population samples, the latter of which may include autistic and/or gender diverse individuals (e.g., George & Stokes, 2018; Kallitsounaki et al., 2020; Kallitsounaki & Williams, 2020). This dimensional approach is based on the assumption that both autism and gender exist along continua (Abed et al., 2019; Constantino & Todd, 2003; De Groot & Van Strien, 2017). Accordingly, both constructs can be operationalised dimensionally by measuring autism- and gender-related traits on continuous scales. Studies adopting this methodology in the adult general population (used to describe samples *not* recruited from clinical settings) have almost exclusively relied on the Gender

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Identity/Dysphoria Questionnaire (GIDYQ) (Deogracias et al., 2007) to index gender diversity. Across these studies, increased numbers of autism traits have consistently been associated with elevated gender dysphoric traits (George & Stokes, 2018; Kallitsounaki et al., 2020; Kallitsounaki & Williams, 2020, 2022; Kallitsounaki et al., 2026; Mears et al., 2025).

However, the GIDYQ is a self-report measure that adopts a binary conceptualisation of gender and therefore does not capture feelings and experiences that fall outside of binary categories. It also operationalises gender diversity through the presence of gender dysphoric traits, despite evidence that not all gender diverse people experience discomfort due to an incongruence between their experienced gender and sex assigned at birth (Perzanowski et al., 2020). To our knowledge, only two studies have employed an alternative measure of dimensional gender diversity (Kallitsounaki et al., 2026; Thomas et al., 2025), namely the Gender Self-Report (GSR) (Strang et al., 2023). The GSR captures experiences of both binary and nonbinary gender diversity, and unlike the GIDYQ, it emphasises gender-related characteristics, experiences, and goals that are positive and affirming. Consistent with previous findings, both studies reported a positive and significant relationship between autism traits and both binary and nonbinary experiences of gender diversity in a general population sample. In combination, research evidence indicates a well-established link between dimensional autism traits and dimensional gender diversity. However, the nature of this relationship remains poorly understood.

The literature on the autism-gender diversity intersection suggests several potential contributing factors (for a review, see Wattel et al., 2024), one of which is RRBIs (Mukaddes, 2002; Tateno et al., 2008; Williams et al., 1996). Specifically, it has been argued that autistic individuals who show a strong preoccupation with activities and items typically associated with a different gender may be more likely to develop gender diversity traits (van Vlerken et al., 2020; VanderLaan et al., 2015; Zucker et al., 2017).

To date, only a small number of studies have examined this theory, with mixed results. Using items 9 and 66 of the Child Behaviour Checklist (Achenbach & Ruffle, 1991), Zucker et al. (2017) and VanderLaan et al. (2015) found that children and young people referred for gender dysphoria showed increased obsessions and compulsions compared to control groups, although their level of compulsions was not higher than that of a clinically referred group. A more recent study showed that obsessional thoughts, as measured with the Obsessional Thoughts subscale of the Obsessive-Compulsive Inventory-Revised (Foa et al., 2002), and autism traits, were each uniquely associated with features of gender dysphoria in both clinical and nonclinical adult samples (Mears et al., 2025). Together these findings suggest that some dimensions of RRBIs (i.e., obsessions and compulsions) may be related to gender diversity.

In contrast, studies using autism screening tools have shown elevated autism traits among gender diverse children and adults across multiple subscales, leading the original authors to conclude that the absence of selective elevations in subscales specifically related to RRBIs (e.g., stereotyped behaviours) provides evidence against the RRBIs hypothesis (Van der Miesen et al., 2018; Walsh et al., 2018). However, caution is required when interpreting these findings, as none of the of the aforementioned studies employed a comprehensive measure that taps RRBIs in their entirety, including motor behaviours, routines, sensory responses, focused interests, and preference for sameness.

Adopting an individual differences approach, we accordingly aimed to refine our understanding of the relationship between autism traits and dimensional gender diversity in the general population by examining, for the first time, the unique contributions of RRBIs and social-communication difficulties in predicting gender diversity traits. As existing autism screening measures do not include a dedicated subscale capturing RRBIs as a whole, we used the Repetitive Behaviours Questionnaire−3 (RBQ−3; Jones et al., 2024). To measure social-communication difficulties, which is the other core domain of autism (American Psychiatric Association, 2022), we created a composite score from the Social Skills and Communication subscales of the Autism-Spectrum Quotient−50 (AQ−50) (Baron-Cohen et al., 2001), which forms the most consistent and reliable factor structure in the AQ−50 (Hoekstra et al., 2008). To tap two distinct dimensions of gender diversity (i.e., gender dysphoric traits, and binary and nonbinary experiences of gender diversity) we used the Utrecht Gender Dysphoria Scale-Gender Spectrum (UGDS-GS; McGuire et al., 2020) and the GSR (Strang et al., 2023).

We predicted that the total number of self-reported autism traits, as well as the two autism domains separately (i.e., RRBIs and social-communication difficulties) would be positively and significantly associated with feelings and experiences of gender diversity (more autism traits = greater gender diversity). Based on the theory that RRBIs play a unique role in the intersection of autism and gender diversity, we also expected this domain to be a stronger predictor of gender diversity than the social-communication difficulties domain.

Method

Participants

Two hundred and seventy-one adults participated in this study. Participants with missing data ($n = 13$), those who failed the attention checks ($n = 19$), and participants who chose not to disclose their gender identity ($n = 1$) were excluded from the sample. This resulted in a final sample of 238 participants (87% assigned female at birth). The mean age of the sample was 19.91 ($SD = 4.36$; range = 18–60). In terms of gender identity, 82.77% of participants identified as female, 13.87% as male, and 3.36% as nonbinary. Participants whose sex assigned at birth matched their expressed gender were categorised as cisgender (94.96%), whereas participants whose sex assigned at birth did not match their gender identity were categorised as gender diverse (5.04%). Twenty participants reported a formal diagnosis of autism. Excluding gender diverse participants and those with a formal diagnosis of autism did not change the results (see Supplementary Information), so all participants were retained in the main analyses. In terms of ethnicity, 63.03% were White, 13.87% Black, 13.45% Asian, 7.14% Mixed, and 2.52% were from other ethnic backgrounds.

Most participants were recruited through a Research Participation Scheme (RPS) for undergraduate students, with two participants recruited from the broader community. Individuals recruited through the RPS received course credits as partial fulfilment for their degree, whereas those recruited outside the RPS received no incentive or financial re-imbursement for participation. All participants took part after they gave digital written consent. The study was approved by the University of Kent Psychology Research Ethics Committee (ID: 202317018499528876).

Measures

Autism-spectrum quotient

The Autism-Spectrum Quotient (AQ−50) is a self-administered questionnaire used to measure autism traits in people aged 16 years and over (Baron-Cohen et al., 2001). The AQ presents participants with 50 self-referential statements (e.g., "I find it difficult to imagine what it would be like to be someone else"), and they are asked to decide the extent to which they agree with each statement. Responses are given on a four-point Likert scale, ranging from "definitely agree" to "definitely disagree". Sum scores range from 0 to 50 with higher scores indicating more autism traits. The AQ−50 contains five separate sub-scales (10 questions each), with each subscale assessing a specific domain: social skills, communication, attention switching, attention to detail, and imagination. In this study, the sum score of the Social Skills and Communication subscales was used as a composite score (AQ-SC) to tap social-communication difficulties. Test-retest reliability scores of the AQ

range from.70 to.95 (Baron-Cohen et al., 2001; Broadbent et al., 2013), and it has shown convergent validity with the Social Responsiveness Scale in clinical (Armstrong & Iarocci, 2013) and nonclinical samples (Ingersoll et al., 2011).

Repetitive behaviours questionnaire−3

The Repetitive Behaviours Questionnaire−3 (RBQ−3) is a 20-item self-report measure of restricted and repetitive behaviours and interests (Jones et al., 2024). It is based on the RBQ−2 (Leekam et al., 2007) and the RBQ−2A (Barrett et al., 2015), and includes items that tap motor behaviours, routines, sensory responses, focused interests, and preference for sameness. All responses except one are given on a four-point scale, ranging from "never or rarely" to "30 times or more daily", "serious or extreme", and "serious or severe", depending on the item. Items are summed and divided by the number of items answered to give an RBQ−3 mean total score. The RBQ−3 has demonstrated good to excellent internal consistency (from.82 to.90), cross-informant reliability (r_s =.71), and convergent validity with the DISCO-Abbreviated RRB domain scores (r_s =.45–.54; Jones et al., 2024).

Gender self-report

The Gender Self-Report (GSR) is a 30-item multidimensional self-report measure of gender identity (Strang et al., 2023). GSR presents participants with self-referential statements (e.g., "I want people to see me as a male"), which participants are asked to rate on a 4-point scale, ranging from "never true" to "always true". The GSR comprises two scales: (a) the Female-Male Continuum (FMC), which taps binary experiences of femaleness and maleness; and (b) the Nonbinary Gender Diversity (NGD), which taps identification with neither, both, or another gender outside of binary categories. Higher scores on the FMC reflect greater femaleness and lower maleness, and higher scores on the NGD reflect stronger nonbinary identification. After summing items, FMC and BGD were rescaled to 0–1 (lowest possible = 0; highest = 1). Then, following Strang et al. (Strang et al., 2023), a Binary Gender Diversity (BGD) score was derived from the FMC to capture alignment with a gender different form one's sex assigned at birth. Hence, BGD equals 1 minus FMC for participants assigned female at birth, whereas BGD equals FMC for participants assigned male at birth. Thus, participants assigned male at birth with high BGD scores would have a high level of femaleness, and participants assigned female at birth with high BGD scores would have a high level of maleness. For the purposes of this study, only the BGD and NGD scale scores were used as the primary GSR variables. The GSR has been developed through participatory research involving autistic and nonautistic gender diverse youth (Strang et al., 2020). Early validation work has demonstrated good internal reliability (.73–.87), as well as construct, convergent, and ecological validity (Strang et al., 2023).

Utrecht gender dysphoria scale–gender spectrum

The Utrecht Gender Dysphoria Scale–Gender Spectrum (UGDS-GS) is an 18 item self-report questionnaire that measures gender dysphoric traits (McGuire et al., 2020). The questionnaire consists of self-referential questions regarding people's feelings towards their sex assigned at birth and experienced gender (e.g., "I feel unhappy when I have to behave like my assigned sex"). Participants are asked to respond to these questions using a five-point Likert scale that ranges from "disagree completely" to "agree completely". A mean score of all 18 items is calculated, with higher scores indicating more gender dysphoric traits. The UGDS-GS demonstrates strong construct validity and acceptable measurement invariance across binary transgender, nonbinary/genderqueer, and cisgender LGBQ groups (McGuire et al., 2020). Configural invariance was supported with model fit indices indicating acceptable fit (CFI =.914, RMSEA =.073, SRMR =.064), and UGDS-GS was found to reliably measure dysphoria and affirmation across gender groups (McGuire et al., 2020).

Statistical analysis

First, to examine the relationships among autism traits, social-communication skills, restricted and repetitive behaviours and interests, binary gender diversity, nonbinary gender diversity, and gender dysphoric traits, a series of zero-order correlations was conducted. The variables included in the analyses were the AQ−50 sum score, the AQ-SC composite sum score, the RBQ−3 mean score, the BGD score, the NGD score, and the UGDS-GS mean score, respectively. Pearson's *r* coefficients are reported as measures of effect size ($\geq$.10 = small effect, $\geq$.30 = moderate effect, $\geq$.50 = large effect; Cohen, 1988).

Next, to examine the effects of restricted and repetitive behaviours and interests (RBQ−3) on gender dysphoric traits (UGDS-GS), binary gender diversity (BGD), and nonbinary gender diversity (NGD), three separate hierarchical multiple regressions were conducted, one for each outcome variable. In each regression, age, sex assigned at birth, and gender identity were entered as predictors at Step 1, RBQ−3 was added as predictor at Step 2, and AQ-SC was added at Step 3.

For each analysis, we reported the proportion of explained variance (R^2), change in R^2 (ΔR^2), unstandardised (*B*) and standardised (β) regression, with standard errors and 95% confidence intervals. Standardised coefficients are interpreted as Pearson's *r* correlation coefficients (Cohen, 1988). All statistical analyses were performed with SPSS (v.27).

Bayesian analyses were also conducted to evaluate the strength of evidence for the alternative hypothesis relative to the null hypothesis (Dienes, 2014). Bayes factors (BF_{10} >1) indicate increasing support for the alternative hypothesis (BF_{10} > 1, > 3, > 10, > 30, > 100 represent anecdotal, substantial, strong, very strong, and decisive evidence for H1, respectively), whereas those < 1 provide increasing evidence for the null hypothesis (BF_{10} < 1, < 0.33, < 0.10, < 0.03, and < 0.01 represent anecdotal, substantial, strong, very strong, and decisive evidence for H0, respectively). All Bayesian analyses were performed using JASP 0.19.3.

Results

Correlation analyses

Table 1 shows descriptive statistics and correlations for the study variables. As predicted, AQ−50 was positively and significantly associated with UDGD-GS, indicating that higher self-reported autism traits were associated with greater gender dysphoric traits. AQ−50 was also positively and significantly associated with both BGD and NGD, suggesting that higher autism traits were linked to greater binary and nonbinary gender diversity experiences, respectively. Similarly, both AQ-SC and RBQ−3 were positively and significantly associated with UGDS-GS, BGD, and NGD. These results indicate that greater social-communication difficulties *and* restricted, repetitive behaviours and interests were associated with elevated gender dysphoria traits as well as higher level of binary and nonbinary gender diversity.

Hierarchical regression analyses

Gender dysphoric traits

The results of the hierarchical regression analysis predicting gender dysphoric traits are presented in Table 2. In Step 1, age, sex assigned at birth, and gender identity were entered into the model, accounting for 38% of the variance in UGDS-GS. Age did not significantly predict UGDS-GS, whereas both sex assigned at birth and gender identity were significant predictors. Specifically, being assigned female at birth and identifying as gender diverse were associated with increased gender dysphoric traits. In Step 2, adding RBQ−3 resulted in a significant increase of 3% in explained variance. Greater restricted and repetitive behaviours and interests were associated with more gender dysphoric traits. In Step 3, the inclusion of AQ-SC did not significantly increase explained variance. Whilst RBQ−3 remained a significant predictor of UGDS-GS, AQ-SC was not significant. This indicates that the association

Table 1
Descriptive statistics and correlations for study variables.

Measure	*M*	*SD*	1	2	3	4	5	6
1. AQ−50	23.40	8.69	-					
2. AQ-SC	8.20	4.97	.90***	-				
3. RBQ−3	1.94	0.52	.68***	.62***	-			
4. UGDS-GS	2.28	0.56	.27***	.27***	.30***	-		
5. BGD	0.11	0.16	.27***	.27***	.30***	.71***	-	
6. NGD	0.08	0.15	.39***	.37***	.38***	.52***	.60***	-

Note. $N = 238$. AQ−50 = Autism-Spectrum Quotient; AQ-SC = Autism-Spectrum Quotient social-communication subscale; RBQ−3 = Repetitive Behaviours Questionnaire−3; Utrecht Gender Dysphoria Scale – Gender Spectrum; BGD = Gender Self-Report – Binary Gender Diversity; NGD = Gender Self-Report – Nonbinary Gender Diversity. All BF_{10}s > 100.
***$p < .001$.

Table 2
Hierarchical Regression Results for Feelings of Gender Dysphoria.

Variable	*B*	95% CI for *B*		*SE B*	β	BF_{10}	R^2	ΔR^2
		LL	*UL*					
Step 1							.38	.38***
Constant	1.75***	1.32	2.19	0.22				
Gender Identity	1.52***	1.27	1.78	0.13	.60	>100		
Age	0.003	−0.01	0.02	0.01	.02	0.29		
Sex	0.21**	0.04	0.38	0.09	.13	2.19		
Model Summary	$F(3, 234) = 48.11$, $p < .001$							
Step 2							.41	.03***
Constant	1.34***	0.86	1.82	0.24				
Gender Identity	1.43***	1.17	1.69	0.13	.56	>100		
Age	0.01	−0.01	0.02	0.01	.04	0.57		
Sex	0.21**	0.05	0.37	0.08	.13	4.42		
RBQ−3	0.20***	0.09	0.31	0.06	.19	72.03		
Model Summary	$F(4, 233) = 41.15$, $p < .001$							
Step 3							.41	<.001
Constant	1.35***	0.86	1.83	0.25				
Gender Identity	1.42***	1.16	1.68	0.13	.56	>100		
Age	0.01	−0.01	0.02	0.01	.04	0.39		
Sex	0.21*	0.04	0.37	0.08	.13	3.03		
RBQ−3	0.18**	0.05	0.32	0.07	.17	20.57		
AQ-SC	0.003	−0.01	0.02	0.01	.03	0.38		
Model Summary	$F(5, 232) = 32.83$, $p < .001$							

Note. $N = 238$. All variance inflation factors (VIFs) < 2.5, indicating no multicollinearity concerns. CI = confidence interval; LL = lower limit; UL = upper limit; RBQ−3 = Repetitive Behaviours Questionnaire−3; AQ-SC = Autism-Spectrum Quotient – Social-Communication composite score; Gender Identity = cisgender (0) / gender diverse (1); Sex = assigned male at birth (0) / assigned female at birth (1).
*$p < .05$. **$p < .01$. ***$p < .001$.

between restricted, repetitive behaviours and interests and gender dysphoric traits remained significant even after accounting for social-communication difficulties.

Binary gender diversity

The results of the hierarchical regression analysis predicting binary gender diversity are presented in Table 3. In Step 1, age, sex assigned at birth, and gender identity were entered into the model, accounting for 53% of the variance in BGD. Neither age nor sex assigned at birth significantly predicted BGD, whereas gender identity was a significant predictor, with gender diverse identity associated with higher binary gender diversity. In Step 2, adding RBQ−3 resulted in a significant 2% increase in explained variance. Greater restricted and repetitive behaviours and interests were associated with increased binary gender diversity. In Step 3, the inclusion of AQ-SC did not significantly increase explained variance. Whilst RBQ−3 remained a significant predictor of BGD, AQ-SC was not significant. This indicates that the association between restricted, repetitive behaviours and interests and binary gender diversity experiences remained significant after accounting for social-communication difficulties.

Nonbinary gender diversity

The results of the hierarchical regression analysis predicting nonbinary gender diversity are presented in Table 4. In Step 1, age, sex assigned at birth, and gender identity were entered into the model, accounting for 31% of the variance in NGD. Neither age nor sex assigned at birth significantly predicted NGD, whereas gender identity was a significant predictor, with gender diverse identity associated with higher nonbinary gender diversity. In Step 2, adding RBQ−3 resulted in a significant 7% increase in explained variance. Greater restricted and repetitive behaviours and interests were associated with increased nonbinary gender diversity. In Step 3, the inclusion of AQ-SC did not significantly increase explained variance. Whist RBQ−3 remained a significant predictor of NGD, AQ-SC was not significant. This indicates that the association between restricted repetitive behaviours and interests and nonbinary gender diversity experiences remained significant after accounting for social-communication difficulties.

Discussion

The first aim of the current study was to replicate the relationship between autism traits and gender diversity traits in a general population sample. Consistent with our predictions, autism traits were positively associated with gender dysphoric traits, and both binary and nonbinary gender diversity. Specifically, we found that elevated autism traits were associated with greater gender dysphoric traits as well as more binary and nonbinary gender diversity experiences. This successfully replicates previous research showing an association between dimensional autism

Table 3
Hierarchical regression results for binary gender diversity.

Variable	*B*	95% CI for *B*		*SE B*	β	BF_{10}	R^2	ΔR^2
		LL	*UL*					
Step 1							.53	.53***
Constant	0.12*	0.01	0.23	0.06				
Gender Identity	0.55***	0.48	0.61	0.03	.73	>100		
Age	−0.001	−0.01	0.002	0.002	-.04	0.12		
Sex	−0.004	−0.05	0.04	0.02	-.01	0.09		
Model Summary	$F(3, 234) = 88.51, p < .001$							
Step 2							.56	.02***
Constant	0.01	−0.11	0.14	0.06				
Gender Identity	0.52***	0.46	0.59	0.03	.70	>100		
Age	−0.001	−0.004	0.002	0.002	-.02	0.19		
Sex	−0.01	−0.05	0.04	0.02	-.01	0.17		
RBQ−3	0.05***	0.02	0.08	0.01	.16	28.99		
Model Summary	$F(4, 233) = 72.75, p < .001$							
Step 3							.56	<.001
Constant	0.01	−0.11	0.14	0.06				
Gender Identity	0.52***	0.46	0.59	0.03	.70	>100		
Age	−0.001	−0.004	0.002	0.002	-.02	0.13		
Sex	−0.01	−0.05	0.04	0.02	-.01	0.12		
RBQ−3	0.05**	0.02	0.09	0.02	.16	16.21		
AQ-SC	< .001	- 0.004	0.004	0.002	-.001	0.13		
Model Summary	$F(5, 232) = 57.95, p < .001$							

Note. $N = 238$. All variance inflation factors (VIFs) < 2.5, indicating no multicollinearity concerns. CI = confidence interval; LL = lower limit; UL = upper limit; RBQ−3 = Repetitive Behaviours Questionnaire−3; AQ-SC = Autism-Spectrum Quotient – Social-Communication composite score; Gender Identity = cisgender (0) / gender diverse (1); Sex = assigned male at birth (0) / assigned female at birth (1).
*$p < .05$. ** $p < .01$. ***$p < .001$.

Table 4
Hierarchical regression results for nonbinary gender diversity.

Variable	*B*	95% CI for *B*		*SE B*	β	BF_{10}	R^2	ΔR^2
		LL	*UL*					
Step 1							.31	.31***
Constant	0.09	−0.04	0.22	0.06				
Gender Identity	0.39***	0.32	0.46	0.04	.56	>100		
Age	−0.001	−0.004	0.003	0.002	-.02	0.17		
Sex	−0.01	−0.06	0.04	0.03	-.02	0.17		
Model Summary	$F(3, 234) = 35.43, p < .001$							
Step 2							.39	.07***
Constant	−0.08	−0.22	0.06	0.07				
Gender Identity	0.35***	0.28	0.42	0.04	.50	>100		
Age	< .001	−0.004	0.004	0.002	<.001	0.25		
Sex	−0.01	−0.06	0.04	0.02	-.02	0.26		
RBQ−3	0.08***	0.05	0.11	0.02	.28	>100		
Model Summary	$F(4, 233) = 36.60, p < .001$							
Step 3							.40	.01
Constant	−0.07	−0.21	0.07	0.07				
Gender Identity	0.34***	0.27	0.41	0.04	.49	>100		
Age	< .001	−0.003	0.004	0.002	.01	0.25		
Sex	−0.01	−0.06	0.04	0.02	-.02	0.27		
RBQ−3	0.06**	0.02	0.10	0.02	.20	36.18		
AQ-SC	0.004	−0.0001	0.01	0.002	.13	1.04		
Model Summary	$F(5, 232) = 30.33, p < .001$							

Note. $N = 238$. All variance inflation factors (VIFs) < 2.5, indicating no multicollinearity concerns. CI = confidence interval; LL = lower limit; UL = upper limit; RBQ−3 = Repetitive Behaviours Questionnaire−3. AQ-SC = Autism-Spectrum Quotient – Social-Communication composite score; Gender Identity = cisgender (0) / gender diverse (1); Sex = assigned male at birth (0) / assigned female at birth (1).
**$p < .01$. ***$p < .001$.

traits and gender dysphoric traits (George & Stokes, 2018; Kallitsounaki et al., 2020; Kallitsounaki & Williams, 2020, 2022; Kallitsounaki et al., 2026; Mears et al., 2025). It strengthens the evidence that this link extends beyond negative feelings or discomfort about one's own sex assigned at birth or gender and goes beyond a binary conceptualisation of gender, capturing identities and gender experiences that are often overlooked in autism–gender diversity research (Thomas et al., 2025).

The second aim of the current study was to refine our understanding of the relationship between autism traits and gender diversity traits by examining the unique contributions of the two core autism dimensions (i.e., RRBIs and social communication difficulties). As predicted, both RRBIs and social-communication difficulties were positively associated with gender dysphoric traits and binary and nonbinary gender diversity. Interestingly, however, regression analyses showed that, compared to social-communication difficulties, RRBIs were a stronger predictor of the gender-related variables. Specifically, RRBIs significantly predicted gender dysphoric traits and both binary and nonbinary gender diversity, even after accounting for social-communication difficulties. In contrast, although social-communication difficulties were significantly related to all gender-related variables, when they were included in the regression model alongside RRBIs, they were no longer significantly associated with any of the gender-related variables.

We found that RRBIs were the primary predictor of variation is gender diversity traits; but what can this tell us about the nature of the relationship between dimensional autism traits and dimensional gender diversity? We suggest a plausible interpretation is that the well-established relationship between autism traits and gender diversity in the general population may be accounted for by a specific dimension of autism traits, namely RRBIs, rather than by the full autism trait phenotype. This supports the hypothesis that RRBIs play a unique and important role in gender diversity, suggesting that people with restricted repetitive behaviours and interests may be more likely to express increased feelings of gender diversity, irrespective of social-communication difficulties. Our findings are in keeping with previous studies showing that children referred to gender services for gender dysphoria showed increased obsessions and compulsions, facets of RRBIs, compared to nonclinical control groups (VanderLaan et al., 2015; Zucker et al., 2017). Our findings also corroborate recent work by Mears et al. (2025), who found that obsessional thinking, and overall autism traits (that contain the dimension of RRBIs), were each uniquely associated with increased gender dysphoric traits in clinical and nonclinical adult samples.

From a theoretical perspective, our findings are consistent with the hypothesis that RRBIs may be associated with the autism–gender diversity relationship. It is possible that the cognitive behavioural rigidity and narrow interests often heightened in autism may predispose individuals to intensely explore or fixate on gender-related issues and gender diverse identities (Zucker et al., 2017). However, to date no studies have examined systematically the content of special interests in autistic people and whether there is a selective influence of those on gender identity. It is important to highlight that even if this the case, it cannot be argued that gender identity as a by-product of autistic experience is not a valid dimension of identity in its own right. Indeed, research has shown that gender identity profiles do not differ qualitatively or quantitatively between autistic and nonautistic gender diverse people (Fysh et al., 2026; Kallitsounaki et al., 2025; Kallitsounaki & Williams, 2022).

Particular care should be taken not to assume that findings on variation in autism traits in the general population can necessarily be generalised to autistic populations, nor that findings on dimensional gender diversity within predominantly cisgender samples can be generalised to transgender and/or nonbinary populations. To assess generalisability across these groups specifically, future research should seek to replicate the present findings in samples containing exclusively autistic and gender diverse participants. Future studies might also examine whether the observed patterns of results can be replicated in autistic populations by investigating the unique contributions of RRBIs and social-communication difficulties, measured with diagnostic tools such as the Autism Diagnostic Observation Schedule (ADOS) (Lord et al., 2000)), to experiences of gender diversity.

It is also important to note that our sample was predominantly composed of young university students and individuals assigned female at birth. It is therefore unclear whether the same results would be observed in older adults, non-university student populations, or individuals assigned male at birth.

Furthermore, whilst the use of the RBQ−3 captures RRBIs as a broad diagnostic domain, the study did not assess the *content* of restricted and repetitive interests. As such, it remains unclear whether the association between RRBIs and gender diversity reflects a general propensity toward repetitive and focused interests, or whether gender-related content within special interests plays a more pronounced putative role.

Future research should systematically examine the thematic content of special interests in autistic individuals and assess whether gender-focused interests are selectively associated with increased gender diversity. This could be achieved through nested qualitative analysis or using established diagnostic instruments such as the Autism Diagnostic Interview-Revised (ADI-R (Lord et al., 1994)), alongside comprehensive RRBI measures. It is also important to note that RRBIs are associated with internalising difficulties, such as anxiety and depression in the general population (Wu et al., 2025), which in turn are associated with gender diversity (Bista et al., 2025). It is therefore possible that the observed association between RRBIs and gender diversity traits in the general population reflects shared variance with internalising difficulties. Future research might usefully attempt to replicate the current findings after accounting for the potential effects of internalising difficulties (see Kallitsounaki et al., 2026).

To summarise, the present study demonstrates that autism traits (i.e., both RRBIs and social-communication difficulties) are positively associated with gender dysphoric traits as well as binary and nonbinary gender diversity in a general population sample. Importantly, only RRBIs accounted for unique variance across all gender-related outcomes beyond demographic factors and social-communication difficulties. These findings suggest that associations between autism traits and gender diversity in the general population are particularly influenced by a specific component of the autism phenotype, namely RRBIs. This raises further questions about the nature of this association and highlights the need for future research to explore the role of RRBIs in the intersection of autism and gender diversity.

CRediT authorship contribution statement

Aimilia Kallitsounaki: Writing – review & editing, Writing – original draft, Supervision, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **O'Neill Adam:** Writing – review & editing, Writing – original draft, Validation, Methodology, Conceptualization.

Ethics statement

In accordance with the Declaration of Helsinki, all participants were required to provide informed consent ahead of research activity. The study was approved by the University of Kent Psychology Research Ethics Committee (ID: 202317018499528876).

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.rin.2026.100055.

Data availability

Anonymised data are available from the authors upon reasonable

request.

References

Abed, E. C., Schudson, Z. C., Gunther, O. D., Beischel, W. J., & van Anders, S. M. (2019). Sexual and gender diversity among sexual and gender/sex majorities: insights via sexual configurations theory. *Archives of Sexual Behavior, 48*, 1423–1441. https://doi.org/10.1007/s10508-018-1340-2

Achenbach, T. M., & Ruffle, T. M. (1991). Child behavior checklist. *Burlington (Vt), 7*, 371–392. https://doi.org/10.1542/pir.21-8-265

American Psychiatric Association. (2022). Autism Spectrum Disorder. *Diagnostic and statistical manual of mental disorders* (5th ed., pp. 50–59). https://doi.org/10.1176/appi.books.9780890425787

Armstrong, K., & Iarocci, G. (2013). Brief report: The autism spectrum quotient has convergent validity with the social responsiveness scale in a high-functioning sample. *Journal of Autism and Developmental Disorders, 43*, 2228–2232. https://doi.org/10.1007/s10803-013-1769-z

Baron-Cohen, S., Wheelwright, S., Skinner, R., Martin, J., & Clubley, E. (2001). The autism-spectrum quotient (AQ): Evidence from asperger syndrome/high-functioning autism, males and females, scientists and mathematicians. *Journal of Autism and Developmental Disorders, 31*, 5–17. https://doi.org/10.1023/A:1005653411471

Barrett, S. L., Uljarević, M., Baker, E. K., Richdale, A. L., Jones, C. R., & Leekam, S. R. (2015). The Adult Repetitive Behaviours Questionnaire-2 (RBQ-2A): a self-report measure of restricted and repetitive behaviours. *Journal of Autism and Developmental Disorders, 45*, 3680–3692. https://doi.org/10.1007/s10803-015-2514-6

Bista, S., Werner-Seidler, A., Maston, K., Lin, A., Perry, Y., Davies, C., & Skinner, S. R. (2025). Depression and anxiety among young gender-and sexuality-diverse adolescents. *JAMA Network Open, 8*(12), Article e2551570. https://doi.org/10.1001/jamanetworkopen.2025.51570

Broadbent, J., Galic, I., & Stokes, M. (2013). Validation of autism spectrum quotient adult version in an Australian sample. *Autism Research and Treatment, 2013*(1), Article 984205. https://doi.org/10.1155/2013/984205

Bungert, L., Li, C. E., Cardinaux, A. L., O'Brien, A. M., Cannon, J., Shkolnik, V., Gabrieli, J. D. E., Strang, J. F., & Sinha, P. (2024). Proportional overrepresentation of gender-diverse identities in two US-based autistic adult samples from the SPARK database. *Autism in Adulthood, 7*(6), 685–697. https://doi.org/10.1089/AUT.2023.0121

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Ed.). Routledge. https://doi.org/10.4324/9780203771587

Coleman, E., Radix, A. E., Bouman, W. P., Brown, G. R., De Vries, A. L., Deutsch, M. B., & Arcelus, J. (2022). Standards of care for the health of transgender and gender diverse people, version 8. *International Journal of Transgender Health, 23*(sup1), S1–S259. https://doi.org/10.1080/26895269.2022.2100644

Constantino, J. N., & Todd, R. D. (2003). Autistic traits in the general population: A twin study. *Archives of General Psychiatry, 60*(5), 524–530. https://doi.org/10.1001/ARCHPSYC.60.5.524

De Groot, K., & Van Strien, J. W. (2017). Evidence for a broad autism phenotype. *Advances in Neurodevelopmental Disorders, 1*, 129–140. https://doi.org/10.1007/s41252-017-0021-9

Deogracias, J. J., Johnson, L. L., Meyer-Bahlburg, H. F., Kessler, S. J., Schober, J. M., & Zucker, K. J. (2007). The gender identity/gender dysphoria questionnaire for adolescents and adults. *Journal of Sex Research, 44*(4), 370–379. https://doi.org/10.1080/00224490701586730

Dienes, Z. (2014). Using Bayes to get the most out of nonsignificant results. *Frontiers in Psychology, 5*, 781. https://doi.org/10.3389/fpsyg.2014.00781

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P. M. (2002). The obsessive-compulsive inventory: Development and validation of a short version. *Psychological Assessment, 14*(4), 485. https://doi.org/10.1037/1040-3590.14.4.485

Fysh, M. C., Kallitsounaki, A., Williams, D. M., Kennedy, E., & Spinner, L. (2026). Gender identity profiles in autistic and non-autistic cisgender and gender diverse youth, and their caregivers. *Autism Research, 19*(1), Article e70142. https://doi.org/10.1002/AUR.70142

George, R., & Stokes, M. A. (2018). Gender identity and sexual orientation in autism spectrum disorder. *Autism, 22*(8), 970–982. https://doi.org/10.1177/1362361317714587

Hoekstra, R. A., Bartels, M., Cath, D. C., & Boomsma, D. I. (2008). Factor structure, reliability and criterion validity of the Autism-Spectrum Quotient (AQ): A study in Dutch population and patient groups. *Journal of Autism and Developmental Disorders, 38*(8), 1555–1566. https://doi.org/10.1007/s10803-008-0538-x

Ingersoll, B., Hopwood, C. J., Wainer, A., & Brent Donnellan, M. (2011). A comparison of three self-report measures of the broader autism phenotype in a non-clinical sample. *Journal of Autism and Developmental Disorders, 41*, 1646–1657. https://doi.org/10.1007/s10803-011-1192-2

Jacobson, R., & Joel, D. (2019). Self-reported gender identity and sexuality in an online sample of cisgender, transgender, and gender-diverse individuals: An exploratory study. *The Journal of Sex Research, 56*(2), 249–263. https://doi.org/10.1080/00224499.2018.1523998

Jones, C. R., Livingston, L. A., Fretwell, C., Uljarević, M., Carrington, S. J., Shah, P., & Leekam, S. R. (2024). Measuring self and informant perspectives of Restricted and Repetitive Behaviours (RRBs): Psychometric evaluation of the Repetitive Behaviours Questionnaire-3 (RBQ-3) in adult clinical practice and research settings. *Molecular Autism, 15*. https://doi.org/10.1186/s13229-024-00603-7

Kallitsounaki, A., Fysh, M. C., Williams, D. M., Spinner, L., & Kennedy, E. (2025). Implicit and explicit gender identification in autistic and nonautistic gender clinic-referred youth, and their caregivers. *European Child & Adolescent Psychiatry*. https://doi.org/10.1007/s00787-025-02869-5

Kallitsounaki, A., & Williams, D. (2020). A relation between autism traits and gender self-concept: Evidence from explicit and implicit measures. *Journal of Autism and Developmental Disorders, 50*(2), 429–439. https://doi.org/10.1007/s10803-019-04262-z

Kallitsounaki, A., & Williams, D. M. (2022). Implicit and explicit gender-related cognition, gender dysphoria, autistic-like traits, and mentalizing: Differences between autistic and non-autistic cisgender and transgender adults. *Archives of Sexual Behavior, 51*(7), 3583–3600. https://doi.org/10.1007/s10508-022-02386-5

Kallitsounaki, A., & Williams, D. M. (2023). Autism spectrum disorder and gender dysphoria/incongruence. A systematic literature review and meta-analysis. *Journal of Autism and Developmental Disorders, 53*(8), 3103–3117. https://doi.org/10.1007/s10803-022-05517-y

Kallitsounaki, A., Williams, D. M., & Fysh, M. C. (2026). Links between gender diversity and autism traits in non-autistic cisgender and transgender adults: Contributions of negative affect and alexithymia. *International Journal of Transgender Health*. https://doi.org/10.1080/26895269.2026.2658857

Kallitsounaki, A., Williams, D. M., & Lind, S. E. (2020). Links between autistic traits, feelings of gender dysphoria, and mentalising ability: Replication and extension of previous findings from the general population. *Journal of Autism and Developmental Disorders, 51*(5), 1458–1465. https://doi.org/10.1007/S10803-020-04626-W

Leekam, S., Tandos, J., McConachie, H., Meins, E., Parkinson, K., Wright, C., & Couteur, A. L. (2007). Repetitive behaviours in typically developing 2-year-olds. *Journal of Child Psychology and Psychiatry, 48*(11), 1131–1138. https://doi.org/10.1111/j.1469-7610.2007.01778.x

Lord, C., Risi, S., Lambrecht, L., Cook, E. H., Jr, Leventhal, B. L., DiLavore, P. C., & Rutter, M. (2000). The autism diagnostic observation schedule—generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders, 30*(3), 205–223. https://doi.org/10.1023/A:1005592401947

Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism Diagnostic Interview—Revised: A revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders, 24*(5), 659–685. https://doi.org/10.1007/BF02172145

McGuire, J. K., Berg, D., Catalpa, J. M., Morrow, Q. J., Fish, J. N., Nic Rider, G., & Spencer, K. (2020). Utrecht Gender Dysphoria Scale-Gender Spectrum (UGDS-GS): Construct validity among transgender, nonbinary, and LGBQ samples. *International Journal of Transgender Health, 21*(2), 194–208. https://doi.org/10.1080/26895269.2020.1723460

Mears, K., Rai, D., Shah, P., & Ashwin, C. (2025). Obsessional thinking and autistic traits are each uniquely associated with greater traits of gender dysphoria in clinical and nonclinical adult samples. *Molecular Autism, 16*(1), 1–13. https://doi.org/10.1186/s13229-025-00649-1

Mukaddes, N. M. (2002). Gender identity problems in autistic children. *Child Care Health and Development, 28*(6), 529–532. https://doi.org/10.1046/j.1365-2214.2002.00301.x

Perzanowski, E. S., Ferraiolo, T., & Keuroghlian, A. S. (2020). Overview and Terminology. In M. Forcier, G. VanSchalkwyk, & J. L. Turban (Eds.), *Paediatric Gender Identity: Gender-affirming Care for Transgender & Gender Diverse Youth* (pp. 1–13). Springer Nature. https://doi.org/10.1007/978-3-030-38909-3_1.

Sandfort, T. G., Bos, H. M., Fu, T. C., Herbenick, D., & Dodge, B. (2021). Gender expression and its correlates in a nationally representative sample of the US adult population: Findings from the National Survey of Sexual Health and Behavior. *The Journal of Sex Research, 58*(1), 51–63. https://doi.org/10.1080/00224499.2020.1818178

Strang, J. F., van der Miesen, A. I. R., Caplan, R., Hughes, C., DaVanport, S., & Lai, M. C. (2020). Both sex- and gender-related factors should be considered in autism research and clinical practice. *Autism, 24*(3), 539–543. https://doi.org/10.1177/1362361320913192

Strang, J. F., Wallace, G. L., Michaelson, J. J., Fischbach, A. L., Thomas, T. R., Jack, A., & Yang, J. S. (2023). The Gender Self-Report: A multidimensional gender characterization tool for gender-diverse and cisgender youth and adults. *American Psychologist, 78*(7), 886–900. https://doi.org/10.1037/amp0001117

Tabler, J., Schmitz, R. M., Nagata, J. M., & Geist, C. (2021). Self-perceived gender expression, discrimination, and mental health disparities in adulthood. *SSM-Mental Health, 1*, Article 100020. https://doi.org/10.1016/j.ssmmh.2021.100020

Tateno, M., Tateno, Y., & Saito, T. (2008). Comorbid childhood gender identity disorder in a boy with Asperger syndrome. *Psychiatry and Clinical Neurosciences, 62*(2), 238. https://doi.org/10.1111/j.1440-1819.2008.01761.x

Thomas, K. S., Cooper, K., & Jones, C. R. (2025). The intersection of autistic traits, ADHD traits, and gender diversity in disordered eating and drive for muscularity within the general population. *Neurodiversity, 3*. https://doi.org/10.1177/27546330241308649

Van der Miesen, A. I., Hurley, H., & De Vries, A. L. (2018). Gender dysphoria and autism spectrum disorder: A narrative review. In W. Bouman, A. de Vries, & G. T'Sjoen (Eds.), *Gender Dysphoria and Gender Incongruence* (pp. 82–92). Routledge. https://doi.org/10.4324/9781315446806.

van Vlerken, R. H., Fuchs, C. E., & van der Miesen, A. I. (2020). Caring for transgender and gender diverse youth with co-occurring neurodiversity. In M. Forcier, G. van Schalkwyk, & J. Turban (Eds.), *Pediatric Gender Identity: Gender-affirming Care for Transgender & Gender Diverse Youth* (pp. 137–148). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-38909-3_10.

VanderLaan, D. P., Postema, L., Wood, H., Singh, D., Fantus, S., Hyun, J., & Zucker, K. J. (2015). Do children with gender dysphoria have intense/obsessional interests? *The*

Journal of Sex Research, 52(2), 213–219. https://doi.org/10.1080/00224499.2013.860073

Walsh, R. J., Krabbendam, L., Dewinter, J., & Begeer, S. (2018). Brief report: Gender identity differences in autistic adults: Associations with perceptual and socio-cognitive profiles. *Journal of Autism and Developmental Disorders, 48*(12), 4070–4078. https://doi.org/10.1007/s10803-018-3702-y

Wattel, L. L., Walsh, R. J., & Krabbendam, L. (2024). Theories on the link between autism spectrum conditions and trans gender modality: A systematic review. *Journal of Autism and Developmental Disorders, 11*(2), 275–295. https://doi.org/10.1007/S40489-022-00338-2

Williams, P. G., Allard, A. M., & Sears, L. (1996). Case study: Cross-gender preoccupations in two male children with autism. *Journal of Autism and Developmental Disorders, 26*(6), 635–642. https://doi.org/10.1007/BF02172352

Wu, Q., Hong, Q., Kim, N. Y., Adolphs, R., Paul, L. K., & Charpentier, C. J. (2025). Variability and stability of autistic traits in the general population: A systematic comparison between online and in-lab samples. *Personality Neuroscience, 8*, Article e5. https://doi.org/10.1017/pen.2025.10001

Zucker, K. J., Nabbijohn, A. N., Santarossa, A., Wood, H., Bradley, S. J., Matthews, J., & VanderLaan, D. P. (2017). Intense/obsessional interests in children with gender dysphoria: A cross-validation study using the Teacher's Report Form. *Child and Adolescent Psychiatry and Mental Health, 11*(1), 51. https://doi.org/10.1186/s13034-017-0189-9