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What is the Impact of Social Difficulties on Social Camouflaging?: A Transdiagnostic Exploration of Adolescent Experiences

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Abstract

Background

Depressive symptoms and social isolation in adolescents can be mitigated through social connections. To build social connections and "fit in", adolescents may utilize impression management strategies like social camouflaging. While camouflaging has been studied extensively in autism, less is known about camouflaging in non-autistic adolescents with another neurodevelopmental or psychiatric diagnoses.

Methods

Four-hundred and one adolescents (12–18 years; 187F) with autism (AUT; n = 113, 35F), other neurodevelopmental or psychiatric diagnoses (PSY; n = 204; 112F), or typical development (TD; n = 84; 40F) completed the Camouflaging Autistic Traits Questionnaire. Parents reported their child's social phenotype. A generalized linear regression model assessed effects of age, sex, diagnosis, and social phenotype on social camouflaging.

Results

Diagnostic group, sex, age, and social phenotype were significantly associated with camouflaging. Autistic and adolescents with another neurodevelopmental diagnosis reported significantly greater camouflaging than typically developing adolescents. Girls reported higher rates of camouflaging than boys. Rates of camouflaging increased with age for autistic and adolescents with another neurodevelopmental diagnosis, except for PSY girls who demonstrated high rates of camouflaging as early as 12 years old. Social difficulties and camouflaging scores were positively correlated in the full sample, but this effect was driven primarily by the PSY subgroup. Some youth exhibited a unique pattern of more social difficulties→less camouflaging.

Conclusions

This transdiagnostic exploration revealed both universality and heterogeneity in camouflaging during adolescence. The findings also suggest that people with the greatest social difficulties may not *always* camouflage the most; rather, there may be *a threshold of social difficulties over which camouflaging ceases to be a priority*. The social challenges, driving forces, and long-term outcomes of camouflaging remain minimally understood; future research examining these factors is necessary to help support adolescents as they navigate social situations and build social connections.

Introduction

Adolescents in the United States report high rates of depression, anxiety, and loneliness (Office of the Surgeon General, 2023; McGorry et al., 2025). However, social connectedness – a combination of constructs spanning social support, networks, and absence of perceived social isolation (Wickramaratne et al., 2022) – can help mitigate these symptoms. When seeking out social connections, adolescents across all neurotypes (i.e. categorical definitions of one's cognitive profile) may actively adjust their self-presentation to help build and maintain relationships (Schlenker, 2003) using strategies such as *social camouflaging* or *impression management* (IM).

Social camouflaging. Social camouflaging is a set of strategies used to appear "normal" or "neurotypical" in social settings (Lai et al. 2011). Camouflaging has most frequently been studied in autistic people (APA, 2015) and has three main components: masking, compensation, and assimilation (Hull et al., 2017) with different strategies associated with each (Locke et al., 2016). An example of *compensation* could be to mimic the body language or facial expressions of others in social interactions. Common *masking* strategies could include purposefully maintaining eye contact with others or avoiding engaging in repetitive behaviors in public. Lastly, assimilation could include behaving in ways that help a person "blend in" when socializing. Camouflaging is a growing area of research, particularly in the autism literature. Interest in camouflaging has been heightened in part by community feedback, as autistic individuals report frequently engaging in masking and/or dampening non-neurotypical behaviors in order to fit in with neurotypical peers (Cage & Troxell-Whitman, 2019; Bernardin et al., 2021b).

Impression management (IM). Camouflaging may be conceptualized as a form of IM (Ai et al., 2022). Both strategies are deployed for the purpose of making and maintaining social relationships, and many children, teens, and adults engage in IM regardless of whether they identify as neurodivergent (Bolino et al., 2008). Impression management has two parts: how a person presents themselves initially, and how they continue to manage the impressions others form about them over time (Leary & Kowalski; 1990).

Camouflaging and impression management have been well documented and studied in prior literature with autistic and non-autistic adults and adolescents (Libsack et al., 2021). Some research also suggests that autistic individuals may curate a 'less autistic' or neurotypical persona to avoid negative social repercussions due to being perceived as autistic by another party (Baer et al., 2025). However, there is still a gap in the literature when addressing the social motivations and difficulties behind camouflaging and camouflaging strategies in non-autistic adolescents who have a diagnosis of another neurodevelopmental or psychiatric condition. We aim to address this gap by examining the relationship between quantitative parent reports of social difficulties and quantitative self-reports of camouflaging behaviors in autistic, neurotypical, and adolescents who have a neurodevelopmental or psychiatric diagnosis of anxiety, depression, ADHD, or combination of other diagnoses, henceforth referred to as PSY.

Motivation to Camouflage in Autistic Youth. Autistic adolescents who experience social challenges like bullying or social isolation (Libster et al., 2022; Libster et al., 2023) might be especially motivated to camouflage their autistic traits to achieve social goals like fitting in and having friends. On the other

hand, reduced social motivation to achieve social goals might lead to fewer attempts to camouflage social challenges. In the autism literature, research suggests that social motivation is highly heterogeneous (Chevallier et al., 2012; Calder et al., 2013; Waite et al., 2025) as are the underlying reasons to engage in social camouflaging strategies (Cook et al., 2021; Jones et al., 2025). For some autistic adolescents, self-reports show that their camouflaging behaviors are motivated by a desire to avoid negative social experiences (Bernardin et al. 2021b). Specifically, camouflaging in autistic girls is motivated by a desire to avoid negative perceptions and peer bullying, while autistic boys and neurotypical girls are motivated by peer acceptance. Neurotypical boys report their motivations to camouflage as being a need to socially adapt (Bernardin et al. 2021b).

An examination of teacher reports of social motivation and social difficulties by Sedgewick et al., (2016) showed that autistic boys experience more social difficulties than autistic girls; however, boys themselves expressed fewer concerns about making and maintaining friendships and more interest in avoiding social interactions. Self-reports of social motivation in the same study also found that autistic boys reported lower social motivation compared to both autistic girls and neurotypical adolescents.

Though these previous findings revealed that autistic boys may have less interest in making and maintaining friendships compared to other groups, autistic and neurodiverse adolescents are still socially motivated. As a result, they may choose to engage in camouflaging or IM strategies to enhance social success or avoid negative social repercussions from their peers (Bernardin et al., 2021b; Chapman et al., 2022). Many studies covering a broad range of camouflaging strategies in autistic adults (Cage & Troxell-Whitman, 2019) and adolescents (Bernardin et al., 2021b) have documented that autistic individuals of all ages report engaging in camouflaging behaviors at higher rates than their neurotypical peers (Hull et al., 2019; Robinson et al., 2020; Jorgenson et al., 2020).

Social Camouflaging in Non-autistic Adults and Implications for Youth. Studies of camouflaging and impression management in non-autistic, neurodiverse individuals are few, and report mixed results. For example, prior research shows that adults with greater ADHD traits report camouflaging at similar rates to adults with greater autism traits, but the ADHD subgroup reported better mental health outcomes than the subgroup with autism traits (Ai et al. 2024). Conversely, other research shows that adults with a clinical diagnosis of ADHD engage in camouflaging behaviors at a lower rate than adults with a clinical diagnosis of autism, but at a higher rate than neurotypical adults (Van Der Putten et al. 2024).

In a general population study examining camouflaging and anxiety, Lorenz & Hull (2024) found that adults with higher social anxiety traits had higher camouflaging scores. The authors also reported a weaker, but still positive correlation between camouflaging and generalized anxiety scores. An adolescent study comparing how autistic traits and social anxiety traits are related to camouflaging and IM found masking and IM behaviors to be more strongly associated with social anxiety traits. Conversely, autistic traits were more strongly associated with compensation, assimilation, and avoidance behaviors (Lei et al., 2023).

Within major depression, adults with major depressive symptoms camouflage at a higher rate than adults without. Depressive symptoms were predicted by autistic traits, but the relationship between depressive symptoms and autistic traits was mediated by camouflaging (Lu et al., 2023).

Sex Differences in Social Camouflaging. Across pediatric and adult literatures, autistic and neurotypical women and girls report engaging in camouflaging behaviors at higher rates than men and boys respectively, and non-binary adults also camouflage at a higher rate than men (Jorgenson et al. 2020; Hull et al. 2020). This gender difference is also found within diagnostic groups as autistic women and non-binary adults report camouflaging at higher rates than autistic men (Hull et al. 2020). Across diagnostic groups, autistic adults typically camouflage at higher rates than neurotypical adults (Schuck et al., 2019).

As prior research and literature have observed, engaging in camouflaging strategies is common in people with multiple neurotypes, though to date, no study has looked at how the rates at which camouflaging strategies are deployed may differ transdiagnostically during adolescence. In this study, we aim to address this gap by examining rates of self-reported camouflaging behaviors in three different adolescent groups and testing whether camouflaging behaviors are related to parent reported social phenotype. Based upon prior research, we hypothesize: (1) Autistic and PSY adolescents will report engaging in more camouflaging behaviors compared to their typically developing peers, and (2) Girls in each group will report more camouflaging behaviors compared to their male peers. We anticipate parents of autistic adolescents to report more social difficulties compared to parents of PSY adolescents and typically developing adolescents. The findings of this study will inform future camouflaging research by presenting an analysis of the roles of sex, neurotype, and social phenotype all play in adolescent development of camouflaging behaviors.

Methods

Participants. Four-hundred and one adolescents aged 12–18 (Table 1) were recruited through an autism research center in a large metropolitan children's hospital in the northeast US. Participants and their parents completed a series of questionnaires, a parent and child clinical evaluation, and one in-person study visit.

Table 1

	AUT			PSY			TD			Overall		
	Girls (N = 35)	Boys (N = 78)	p-values (AUT girls vs AUT boys)	Girls (N = 112)	Boys (N = 92)	p-values (PSY girls vs PSY boys)	Girls (N = 40)	Boys (N = 44)	p-values (TD girls vs TD boys)	Girls (N = 187)	Boys (N = 214)	p-values (al group comparison
Age (SD)	15.3 (1.70)	15.1 (1.60)	0.48	14.9 (1.82)	14.1 (1.63)	< 0.001	14.4 (1.72)	14.4 (1.89)	0.863	14.9 (1.80)	14.5 (1.72)	0.034*
Race			0.906			0.447			0.285			0.397
American Indian/Alaska Native	0 (0%)	1 (1.3%)		0 (0%)	0 (0%)		0 (0%)	0 (0%)		0 (0%)	1 (0.5%)	
Asian	1 (2.9%)	3 (3.8%)		2 (1.8%)	3 (3.3%)		1 (2.5%)	1 (2.3%)		4 (2.1%)	7 (3.3%)	
Black	7 (20.0%)	7 (9.0%)		12 (10.7%)	8 (8.7%)		10 (25.0%)	7 (15.9%)		29 (15.5%)	22 (10.3%)	
Multiracial/Other	3 (8.6%)	3 (3.8%)		4 (3.6%)	9 (9.8%)		5 (12.5%)	8 (18.2%)		12 (6.4%)	20 (9.3%)	
White	22 (62.9%)	64 (82.1%)		91 (81.3%)	71 (77.2%)		22 (55.0%)	28 (63.6%)		135 (72.2%)	163 (76.2%)	
Missing	2 (5.8%)	0 (0%)		3 (2.7%)	1 (1.1%)		2 (5.0%)	0 (0%)		7 (3.7%)	1 (0.5%)	
Ethnicity			0.182			0.794			0.359			0.278
Hispanic or Latino	1 (2.9%)	8 (10.3%)		7 (6.3%)	5 (5.4%)		1 (2.5%)	3 (6.8%)		9 (4.8%)	16 (7.5%)	
Not Hispanic or Latino	34 (97.1%)	70 (89.7%)		104 (92.9%)	87 (94.6%)		39 (97.5%)	41 (93.2%)		177 (94.7%)	198 (92.5%)	
Missing	0 (0%)	0 (0%)		1 (0.9%)	0 (0%)		0 (0%)	0 (0%)		1 (0.5%)	0 (0%)	
Total Household Income			0.362			0.383			0.907			0.624
$50,000 or less	0 (0%)	2 (2.6%)		2 (1.8%)	2 (2.2%)		0 (0%)	1 (2.3%)		2 (1.1%)	5 (2.3%)	
Between $50,000 to $100,000	11 (31.4%)	13 (16.7%)		14 (12.5%)	15 (16.3%)		6 (15.0%)	5 (11.4%)		31 (16.6%)	33 (15.4%)	
$100,000 or more	18 (51.4%)	47 (60.3%)		78 (71.5%)	59 (64.1%)		26 (65.0%)	29 (65.9%)		123 (65.8%)	135 (63.1%)	
Missing	6 (17.1%)	16 (20.5%)		16 (14.3%)	16 (17.4%)		8 (20.0%)	9 (20.5%)		30 (16.0%)	41 (19.2%)	
Highest Parent Education			0.926			0.559			0.653			0.898
High school graduate – Or equivalent	0 (0%)	3 (3.8%)		3 (2.7%)	4 (4.3%)		2 (5.0%)	3 (6.8%)		5 (2.7%)	10 (4.7%)	
Trade school/Associate's degree	1 (2.9%)	3 (3.8%)		9 (8.0%)	6 (6.5%)		5 (12.5%)	1 (2.3%)		15 (8.0%)	10 (4.7%)	
Partial college (at least one year)	3 (8.6%)	5 (6.4%)		5 (4.5%)	7 (7.6%)		1 (2.5%)	2 (4.5%)		9 (4.8%)	14 (6.5%)	
Bachelor's degree	13 (37.1%)	15 (19.2%)		26 (23.2%)	17 (18.5%)		6 (15.0%)	8 (18.2%)		45 (24.1%)	40 (18.7%)	
Master's degree	12 (34.3%)	40 (51.3%)		39 (34.8%)	41 (44.6%)		16 (40.0%)	20 (45.5%)		67 (35.8%)	101 (47.2%)	
Doctoral degree	6 (17.1%)	12 (15.4%)		29 (25.9%)	17 (18.5%)		10 (25.0%)	10 (22.7%)		45 (24.1%)	39 (18.2%)	
Missing	0 (0%)	0 (0%)		1 (0.9%)	0 (0%)		0 (0%)	0 (0%)		1 (0.5%)	0 (0%)	

Demographic information for participan

	AUT			PSY			TD			Overall		
	Girls (N = 35)	Boys (N = 78)	p-values (AUT girls vs AUT boys)	Girls (N = 112)	Boys (N = 92)	p-values (PSY girls vs PSY boys)	Girls (N = 40)	Boys (N = 44)	p-values (TD girls vs TD boys)	Girls (N = 187)	Boys (N = 214)	p-values (al group comparison
CAT-Q Total Score (SD)	108.0 (24.4)	93.8 (24.4)	0.005**	107.0 (26.6)	91.3 (24.2)	< 0.001***	88.6 (21.3)	80.5 (20.4)	0.081	103.0 (26.1)	90.0 (24.0)	< 0.001***
Median [Min, Max]	110.0 [39.0, 147.0]	93.5 [40.0, 151.0]		109 [40.0, 167.0]	91.0 [42.0, 153.0]		92.0 [45.0, 141]	82.0 [28.0, 133.0]		103.0 [39.0, 167.0]	90.0 [28.0, 153.0]	
SRS-2 SCI Total Score (SD)	74.0 (10.5)	69.3 (11.8)	0.0503	57.6 (13.3)	56.6 (13.2)	0.62	44.0 (5.07)	45.7 (9.16)	0.305	57.9 (14.9)	59.2 (14.8)	0.371
Median [Min, Max]	74.0 [49.0, 99]	68.0 [44.0, 97.0]		57.0 [37.0, 96.0]	52.5 [37.0, 87.0]		43.0 [37.0, 60.0]	43.0 [37.0, 74.0]		57.0 [37.0, 99.0]	58.0 [37.0, 97.0]	
Missing	1 (2.9%)	0 (0%)		1 (0.9%)	0 (0%)		3 (7.5%)	3 (6.8%)		5 (2.7%)	3 (1.4%)	

Demographic information for participan

Parents who previously participated in a research study and provided consent to be recontacted for future research were contacted via email or telephone. Other families were recruited via weekly email blasts and posts in the hospital's newsletter. Prior to the clinical evaluation and in-person visit, parents were asked to provide information about their child's mental health and any prior formal diagnosis received (e.g., autism, ADHD, anxiety, depression). During the clinical evaluation, which included parent interviews and child observations, clinicians administered the Kiddie-Schedule for Affective Disorders and Schizophrenia (K-SADS; Kaufman, et al. (1997)) online via teleconference call. Using all available information, PhD-level clinicians either provided a diagnosis for the child or confirmed a prior diagnosis according to clinical best estimate and DSM-V criteria (American Psychiatric Association, 2022). After the evaluation, participants were assigned to one of three groups: autism (AUT), typical development (TD), or other clinical diagnosis (PSY). Participants in the PSY group did not meet diagnostic criteria for autism, but had one or more DSM-V diagnoses (i.e., ADHD, anxiety, or depression). Parents and their children were eligible to take part in this study if their child was between the ages of 12–18, had language on par with their chronological age, had no history of a tic disorder, and had a gestational age above 32 weeks when they were born. Additional criteria included the adolescent not having a sibling with an autism diagnosis (for the TD and PSY groups), an IQ estimate above 85 determined by the Wechsler Abbreviated Scale of Intelligence Second Edition (WASI-II; Wechsler, 2011), English as both the child and parent's primary language, and no history of motor behavior changes due to medication or medical history. This study was approved and overseen by the Institutional Review Board at [redacted for peer review].

Measurements. After the initial intake procedure, adolescents and their parents were asked to complete a series of online questionnaires. Among these were a demographic information questionnaire, the Camouflaging Autistic Traits Questionnaire (CAT-Q; Hull et al., 2019) and Social Responsiveness Scale version 2 (SRS-2; Constantino et al., 2013). The CAT-Q was completed by the adolescent while the SRS-2 and demographic forms were completed by the parent.

Adolescent self-reported CAT-Q responses were summed for subscale and total scores with a possible range of 25–175 for total scores. While the SRS-2 typically measures autism-related social difficulties that include repetitive behaviors and sensory challenges, it also has a DSM-V comparable subscale score which measures communication difficulties specifically: the Social Communication and Interaction (SCI) subscale (Frazier et al., 2012). SCI scores were summed and T-scores calculated. All analyses in this study were conducted using the full scale for self-reported CAT-Q total scores (range: 25–175, higher = more camouflaging) and parent-reported SCI T-scores (range: 30- ≥90, higher = greater social communication and interaction challenges).

Statistical Considerations. To examine the relationship between demographic and clinical characteristics and self-reports of camouflaging, a Poisson generalized linear regression (GLM; Marschner, I. 2011) model was conducted using R Statistical Software version 2026.01.1 using the R Stats package version 3.6.2 (R Core Team, 2024). Each model included age, sex, and diagnostic group as predictors. Initially IQ estimates were used in the model, however, because groups were matched on IQ estimates, some participants had missing scores (n = 37), and IQ not exerting a significant main effect or interaction on CAT-Q scores in preliminary analyses, this variable was dropped. The TD group was modeled as the referent diagnostic group and rotated to test differences between the AUT and PSY groups, and girls modeled as the referent sex. The model included diagnostic group, sex, age, and SCI scores as predictors of CAT-Q total scores. In this model, diagnostic group and sex were tested for an interaction effect; however, the result was nonsignificant; thus, the model presented in the results below are *conditional main effects* of diagnostic group, sex, age, and SCI scores. Estimated marginal means were calculated using the emmeans package in R (Lenth, R. & Piaskowski, J. 2025). Tukey pairwise comparisons of CAT-Q total scores by sex and diagnostic group were also calculated. Lastly, Spearman correlations between CAT-Q total scores and SCI scores within each diagnostic group calculated and figures generated using the ggplot2 package (Wickham H. 2016) as well as box plots visualizing the relationship between CAT-Q total scores and diagnostic group.

Results

A GLM with age, sex, diagnostic group, and SCI scores as predictors of self-reported camouflaging behaviors revealed significant conditional main effects of age (older age associated with higher CAT-Q scores), sex (F > M), diagnostic group, and SCI scores (higher SCI associated with higher CAT-Q scores; Table 2).

Rotating the reference group revealed that all diagnostic groups differed significantly from one another (PSY > AUT > TD). Below, we discuss each conditional main effect in turn.

Table 2

Effect	Estimate	SE	95% CI		*p*
			LL	UL	
Fixed Effects					
Intercept	3.954	0.051	3.855	4.053	< .001
Age	0.028	0.003	0.022	0.034	< .001
Sex (Male)	-0.119	0.011	-0.140	-0.098	< .001
SCI Total	0.003	0.000	0.002	0.003	< .001
Dx (AUT)	0.076	0.196	0.037	0.114	< .001
Dx (PSY)	0.118	0.015	0.037	0.148	< .001
Dx (TD)	-0.076	0.019	-0.114	-0.037	< .001

Regression results predicting CAT-Q scores (LL = lower limit, UL = upper limit). Results of the TD diagnostic group are using the rotated model with AUT as the referent.

Effect of Diagnostic Group on Camouflaging. Table 3 summarizes results of pairwise comparisons of Tukey-corrected estimated marginal means by sex and diagnosis (controlling for age and SCI scores). Tukey-corrected pairwise comparisons revealed that CAT-Q scores differed significantly by diagnostic group, with adolescents in the AUT and PSY groups engaging in camouflaging behaviors at significantly greater rates than their TD peers, but not significantly more or less than each other (Table 3).

Table 3

Contrast	Estimate	SE	p-value
TD Girls - TD Boys	0.119	0.010	< .0001
TD Girls - AUT Girls	-0.076	0.019	< .01
TD Girls - AUT Boys	0.044	0.021	n.s (.291)
TD Girls - PSY Girls	-0.119	0.015	< .0001
TD Girls - PSY Boys	0.001	0.019	n.s (1.00)
TD Boys - AUT Girls	-0.195	0.023	< .0001
TD Boys - AUT Boys	-0.076	0.019	< .01
TD Boys - PSY Girls	-0.238	0.018	< .0001
TD Boys - PSY Boys	-0.119	0.015	< .0001
AUT Girls - AUT Boys	0.119	0.011	< .0001
AUT Girls - PSY Girls	-0.043	0.014	< .05
AUT Girls - PSY Boys	0.076	0.019	< .01
AUT Boys - PSY Girls	-0.162	0.015	< .0001
AUT Boys - PSY Boys	-0.043	0.014	< .05
PSY Girls - PSY Boys	0.119	0.011	< .0001

Pairwise estimated marginal mean comparisons of CAT-Q scores by sex and diagnosis after controlling for SCI scores and age (Rpackage: emmeans, Lenth, R., 2024).

Effect of Sex on Camouflaging. There was a conditional main effect of sex on camouflaging after controlling for age, social phenotype, and diagnosis, such that girls reported more camouflaging behaviors than boys (Table 3). The largest sex differences in self-reported camouflaging behaviors were found in the AUT and PSY groups. Girls in the PSY group reported the highest average rate and widest range of self-reported camouflaging behaviors, but AUT and PSY girls did not statistically differ from one another. Self-reported camouflaging rates of boys in the AUT and PSY groups are more closely aligned with those of girls in the TD group (**Fig. 1**). Boys in the TD group reported engaging in the lowest rate of camouflaging behaviors.

Figure 1

Tukey-corrected estimated marginal mean CAT-Q total scores by sex and diagnostic group after controlling for SRS-2 SCI scores and age. Standard error represented by error bars.

Effect of Age on Camouflaging. Age exerted a significant conditional main effect on self-reported CAT-Q scores, such that across the full sample, self-reports of camouflaging behaviors increased with age. Examined within each diagnostic group separately, we found that girls and boys in the AUT (Spearman r = 0.322, $p = 0.0005$) and PSY (Spearman r = 0.243, $p = 0.0004$) groups both showed a trend toward increasing self-reported camouflaging behaviors with age, whereas neither boys nor girls in the TD group showed a relationship between age and camouflaging (Spearman r = 0.036, $p = 0.742$; **Fig. 2**).

Figure 2

Scatterplots of raw CAT-Q scores and age split by sex and diagnostic group.

Effect of Social Communication and Interaction (SCI) on Camouflaging. As expected, SCI scores differed significantly by diagnostic group. Parents of adolescents in the AUT group reported significantly greater rates of perceived social difficulties than parents of both the PSY and TD groups (**Fig. 3**). Diagnostic group differences were also found between the PSY and TD groups with parents of adolescents in the PSY group reporting significantly greater rates of social difficulties than the TD group. Girls in the AUT and PSY groups received higher social difficulty ratings than boys in the respective groups with no difference in the TD group (**Fig. 3**).

Figure 3

Raw SCI total scores split by sex and diagnostic group.

SCI scores were a significant predictor of CAT-Q scores in the overall model. Spearman correlations between SCI scores and CAT-Q scores in the full sample showed that the two measures were highly and significantly correlated (Spearman r = 0.224, $p < 0.001$) (**Fig. 4**).

Figure 4

Spearman correlations of raw CAT-Q total scores and raw SCI total scores of the TD group (a), AUT group (b), PSY group (c), and full diagnostic sample (d).

Within both genders (collapsed across diagnostic groups), girls showed a slightly stronger positive correlation between camouflaging behaviors and social difficulties (Spearman r = 0.302, $p < 0.001$) compared to boys (Spearman r = 0.195, $p < 0.01$). Thus, adolescents who are perceived to have more social difficulties by their parents also engage in more self-reported camouflaging behaviors. However, when examined within each diagnostic group separately, only the PSY group demonstrated a significant correlation between SCI and CAT-Q scores (Spearman r = 0.206, $p = 0.003$). Within sex, only girls in the PSY group had a significant correlation (Spearman r = 0.222, $p = 0.019$) (**Fig. 4**). Of note, all correlations were positive *except* in AUT boys and TD girls, suggesting between-group heterogeneity in the relationship between social difficulties and camouflaging.

Discussion

In this cross-sectional analysis of camouflaging behaviors across adolescence, we found that diagnostic group, age, sex, and parent-reported social difficulties were all significant predictors of self-reported camouflaging. Overall, our pattern of results suggests that social strategies like camouflaging and impression management are used more often by: (1) neurodiverse adolescents with social difficulties vs typically developing peers with fewer social challenges, and (2) girls and older teens as compared to boys and younger teens.

Diagnostic group differences in camouflaging. Consistent with prior research, the results of this study showed that autistic teens and teens with non-autism psychiatric or neurodevelopmental diagnoses report engaging in social camouflage at higher rates than typically developing peers (Jorgenson et al., 2020). After controlling for parent-reported social difficulties and chronological age, however, the likelihood of self-reporting camouflaging behavior varied by diagnostic group. In a novel contribution to the literature, our analyses revealed that non-autistic adolescents with other psychiatric or neurodevelopmental diagnoses engaged in *even more* camouflaging than autistic adolescents. Thus, the experience of being neurodivergent may be a key factor that underlies camouflaging behaviors. Despite relatively greater camouflaging in the PSY group vs. the AUT group, however, it is likely that the motivations, methods, and outcomes of camouflaging differ by group; this is a promising avenue for future research.

Age-related changes in camouflaging. This study was cross-sectional, but we found preliminary evidence for age-related differences in camouflaging. There was a significant main effect of age on camouflaging across groups in the overall model, but follow-up analyses revealed that adolescents in our TD subgroup reported relatively stable rates of camouflaging across all ages. In contrast, older adolescents in our AUT and PSY subgroups reported engaging in more camouflaging strategies compared to younger adolescents. Considering the increased complexity of social interactions as adolescents grow older and prepare to transition to adulthood, this increase in camouflaging strategies in the AUT and PSY adolescents may reflect internal and external pressure to adapt to social expectations, increased awareness of engaging in camouflaging behaviors, as well as variations in social learning. There is also the fact that camouflaging is, inherently, a complex process to learn at a younger age, especially considering that one needs to understand that there is a “typical” consistent behavior others are engaging in, that they are behaving differently from that norm, and then modify their behavior to fit the norm. This learning process may then interact with age-related sex and diagnostic group differences, as boys in the PSY and AUT groups and girls in the AUT group showed steep increases in camouflaging behaviors from younger to older adolescence. Girls in the PSY group, however, demonstrated more moderate increases in camouflaging behaviors from younger to older adolescence. This finding is likely explained by higher rates of camouflaging at earlier ages in PSY girls compared to every other diagnostic group (i.e., ceiling effects). Longitudinal research on camouflaging in PSY populations at even younger ages is necessary to understand developmental sex differences in camouflaging (McNaughton et al., 2026).

Sex differences in camouflaging. This study adds to a growing literature showing that autistic girls and women engage in camouflaging strategies at higher rates than autistic boys and men (Jorgenson et al. 2020). We extend this research by showing that TD and PSY girls *also* report greater camouflaging compared to boys, after controlling for age and social phenotype, just like autistic girls. Thus, sex differences in camouflaging are *transdiagnostic* and may be a function of multiple factors, such as the social pressures faced by girls or enhanced motivation to connect with others (Sedgewick et al., 2016). Given that sex differences in camouflaging are robust and transdiagnostic, they could be argued to reflect powerful forces of early female gender socialization and sex-specific "display rules" (Ekman & Friesen, 1969). These "display rules" include behaviors like smiling and engaging socially (Zampella et al., 2025), which overlap with common behaviors deployed during social camouflage and masking (Hull et al., 2019).

The relationship between social difficulties and camouflaging. Greater parent-reported social difficulties were significantly associated with more camouflaging behaviors in the overall sample. As expected, parents of adolescents in the AUT group reported the highest rate of social difficulties, followed by the PSY group and the TD group. Of note, all sex/diagnosis subgroups in our sample showed positive correlations between camouflaging and social difficulties, except for autistic boys and typically developing girls. Adolescents in these two subgroups showed a nonsignificant *negative* correlation between social difficulties and camouflaging scores. This unusual pattern suggests that in autistic boys, greater social difficulties might associate with a lack of motivation to camouflage that could be due to poor awareness of their social difficulties. It may also be possible that the increased social difficulties may be a result of their lack of camouflaging. Conversely, typically developing girls may feel a greater motivation to camouflage to maintain outward perceptions of low social difficulties or maintain social connections. When considering these two groups and this negative correlation, these results show that there may be a threshold of social difficulties at which camouflaging no longer feels to be a necessary behavior and, simultaneously, that there is a point at which social difficulties may not be a motivation to camouflage. This relationship between the social difficulty threshold and sex/diagnostic group should be more thoroughly investigated in future research in order to build a more holistic understanding of social difficulties and camouflaging across the lifespan.

Implications of camouflaging. High rates of camouflaging in autistic adolescents and adults have been shown to correlate with increased rates of depression, anxiety and self-regulation fatigue (Bernardin et al., 2021a; Ai et al., 2024). However, camouflaging and IM strategies can also be instrumental for making and maintaining friendships and other interpersonal relationships (Ai et al., 2025). These relationships, in turn, are key for mitigating symptoms of depression, social isolation, and poor mental health (Birrell et al., 2025). Improved understanding of the social motivations, difficulties, and driving forces of camouflaging and IM in adolescence (including cost/benefit thresholds) can help parents better understand their children, and inform clinicians as they strive to provide effective support during this sensitive developmental period.

Study Limitations and Future Directions. This study should be interpreted in the context of its limitations. First, the current sample is not racially diverse (73.5% white) and primarily consists of adolescents from higher-income households with at least one parent that holds an advanced degree. Thus, the findings presented here may not generalize to the full diverse spectrum of autistic youth, typically developing youth or adolescents with other neurodevelopmental or psychiatric conditions with different demographic characteristics. It is especially important to acknowledge the ways that camouflaging and IM may function differently in racially and ethnically diverse groups who, due to a myriad of intense social pressures, may have to balance their neurodivergent identities alongside their racial or ethnic identities. Deeply diverse research samples and well-powered approaches are imperative to create a more holistic picture of camouflaging and impression management across the spectrum of humanity.

Second, many autistic adolescents in our sample were very aware of their autism diagnosis, their symptoms, and their camouflaging behaviors. For example, some participants mentioned learning about autism and camouflaging from online sources such as TikTok, YouTube, and other social media platforms. Overt familiarity with camouflaging at younger ages may lead to differences in self-perception and presentation compared to autistic adolescents with more limited access to such information and platforms, or autistic adolescents from 10 years ago.

Third, future research should aim to maximize the number of autistic and typically developing adolescents to match diagnostic group sample sizes in all diagnostic groups. This would allow us to split samples of adolescents with a non-autistic neurodevelopmental diagnosis into individual diagnostic groups (ADHD, anxiety, depression, etc.) to better examine individual differences associated with camouflaging and social difficulties. Finally, this study was cross-sectional, which limits the interpretability of age as it relates to camouflaging. While age and sex differences were significant in our sample, future research should examine this relationship longitudinally in young adolescents as they transition into adulthood.

Conclusion

This transdiagnostic exploration of camouflaging behaviors in adolescents revealed that autistic adolescents and adolescents with other neurodevelopmental diagnoses engage in camouflaging behaviors at significantly higher rates than their typically developing peers. Consistent with prior research, girls camouflaged more than boys across diagnostic groups, lending further evidence to support a population-level sex difference. Younger teens reported camouflaging less than older teens, except in the case of girls with non-autistic psychiatric or neurodevelopmental conditions who demonstrated high rates of camouflaging as early as 12 years old. As predicted, we found that parent reports of greater social difficulties were associated with more camouflaging across the entire sample; however, the strongest relationship appeared in the PSY group and was largely driven by girls. All correlations between social difficulties and camouflaging were positive (i.e., more social difficulties -> more camouflaging) except for autistic boys and neurotypical girls, who exhibited a pattern of more social difficulties -> less camouflaging. This suggests that people with the greatest social difficulties may not *always* camouflage the most; rather, there may be *a threshold of social difficulties over which camouflaging ceases to be a priority* or *a point at which social difficulties are not a motivation to camouflage*. Future research is needed to identify these thresholds and develop personalized interventions to support the social goals of people above and below this cutoff.

Abbreviations

IM
Impression management
ADHD
Attention Deficit Hyperactivity Disorder
PSY
Mixed-Psychological Diagnosis
K-SADS
Kiddie-Schedule for Affective Disorders and Schizophrenia
DSM-V
Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
AUT
Autism/Autistic
TD
Typically Developing
IQ
Intelligence Quotient
WASI-II
Wechsler Abbreviated Scale of Intelligence, Second Edition
CAT-Q
Camouflaging Autistic Traits Questionnaire
SRS-2
Social Responsiveness Scale, Second Edition
SCI
Social Communication and Interaction
GLM
Generalized Linear Regression

Declarations

Ethics approval and consent to participate. Participating parents provided informed consent for themselves and their children. Children also provided informed assent for themselves. Study procedures were approved by the Institutional Review Board of the Children's Hospital of Philadelphia (IRB 15-011840). The authors assert that all procedures contributing to this work are in compliance with the ethical standards of the relevant national and international committees on human subjects research.

Consent for publication. Not applicable.

Availability of data and materials. The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests. 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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Authors' contributions. MPJ, STR, PJ, and LM oversaw data collection. Clinical diagnostic assessments were administered by YL, ZC, and PJ. Data was compiled by LM, FL, HN, FH, and MA. KA, MPJ, and CM were responsible for data analysis. KA, CM, FYA, MPJ were major contributors in writing the manuscript with SC and HM providing major edits to the manuscript. All authors read and approved the final manuscript.

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Clinical trial number. Not applicable.

References

1. Ai W, Cunningham WA, Lai M-C. Reconsidering autistic 'camouflaging' as transactional impression management. Trends Cogn Sci. 2022;26(8):631–45. https://doi.org/10.1016/j.tics.2022.05.002.
2. Ai W, Cunningham WA, Lai M-C. Camouflaging, internalized stigma, and mental health in the general population. Int J Soc Psychiatry. 2024;70(7):1239–53. https://doi.org/10.1177/00207640241260020.
3. Ai W, Wang YA, Cunningham WA, Lai M-C. Intentional use and self-efficacy as distinct facets of impression management and their relationships with socio-motivational, cognitive, and mental health factors. Sci Rep. 2025;15(1):41050. https://doi.org/10.1038/s41598-025-24899-4.
4. American Psychiatric Association. (2022). *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5-TR). American Psychiatric Association Publishing. https://doi.org/10.1176/appi.books.9780890425787

5. Baer M, Cola M, Knox A, Lyons M, Schillinger S, Lee A, Worth BF, Parish-Morris J, Grossman RB. Social first impressions and perceived gender in autistic and non-autistic youth. Sci Rep. 2025;15(1):5240. https://doi.org/10.1038/s41598-025-89083-0.
6. Bernardin CJ, Lewis T, Bell D, Kanne S. Associations between social camouflaging and internalizing symptoms in autistic and non-autistic adolescents. Autism. 2021a;25(6):1580–91. https://doi.org/10.1177/1362361321997284.
7. Bernardin CJ, Mason E, Lewis T, Kanne S. You Must Become a Chameleon to Survive: Adolescent Experiences of Camouflaging. J Autism Dev Disord. 2021b;51(12):4422–35. https://doi.org/10.1007/s10803-021-04912-1.
8. Birrell L, Werner-Seidler A, Davidson L, Andrews JL, Slade T. Social connection as a key target for youth mental health. Mental Health Prev. 2025;37:200395. https://doi.org/10.1016/j.mhp.2025.200395.
9. Bolino MC, Kacmar KM, Turnley WH, Gilstrap JB. A Multi-Level Review of Impression Management Motives and Behaviors. J Manag. 2008;34(6):1080–109. https://doi.org/10.1177/0149206308324325.
10. Cage E, Troxell-Whitman Z. Understanding the Reasons, Contexts and Costs of Camouflaging for Autistic Adults. J Autism Dev Disord. 2019;49(5):1899–911. https://doi.org/10.1007/s10803-018-03878-x.
11. Calder L, Hill V, Pellicano E. Sometimes I want to play by myself': Understanding what friendship means to children with autism in mainstream primary schools. Autism. 2013;17(3):296–316. https://doi.org/10.1177/1362361312467866.
12. Chapman L, Rose K, Hull L, Mandy W. I want to fit in… but I don't want to change myself fundamentally: A qualitative exploration of the relationship between masking and mental health for autistic teenagers. Res Autism Spectr Disorders. 2022;99:102069. https://doi.org/10.1016/j.rasd.2022.102069.
13. Chevallier C, Kohls G, Troiani V, Brodkin ES, Schultz RT. The social motivation theory of autism. Trends Cogn Sci. 2012;16(4):231–9. https://doi.org/10.1016/j.tics.2012.02.007.
14. Constantino JN. The social responsiveness scale. Encyclopedia of Auttonic spectrum disorders. New York, NY: Springer; 2013. pp. 2919–29.
15. Cook J, Crane L, Bourne L, Hull L, Mandy W. Camouflaging in an everyday social context: An interpersonal recall study. Autism. 2021;25(5):1444–56. https://doi.org/10.1177/1362361321992641.
16. Ekman P, Friesen WV. The Repertoire of Nonverbal Behavior: Categories, Origins, Usage, and Coding. Semiotica. 1969;1(1):49–98. https://doi.org/10.1515/semi.1969.1.1.49.
17. Frazier TW, Youngstrom EA, Speer L, Embacher R, Law P, Constantino J, Findling RL, Hardan AY, Eng C. Validation of Proposed DSM-5 Criteria for Autism Spectrum Disorder. J Am Acad Child Adolesc Psychiatry. 2012;51(1):28–e403. https://doi.org/10.1016/j.jaac.2011.09.021.
18. Hull L, Lai M-C, Baron-Cohen S, Allison C, Smith P, Petrides K, Mandy W. Gender differences in self-reported camouflaging in autistic and non-autistic adults. Autism. 2020;24(2):352–63. https://doi.org/10.1177/1362361319864804.
19. Hull L, Mandy W, Lai M-C, Baron-Cohen S, Allison C, Smith P, Petrides KV. Development and Validation of the Camouflaging Autistic Traits Questionnaire (CAT-Q). J Autism Dev Disord. 2019;49(3):819–33. https://doi.org/10.1007/s10803-018-3792-6.
20. Hull L, Petrides KV, Allison C, Smith P, Baron-Cohen S, Lai M-C, Mandy W. Putting on My Best Normal: Social Camouflaging in Adults with Autism Spectrum Conditions. J Autism Dev Disord. 2017;47(8):2519–34. https://doi.org/10.1007/s10803-017-3166-5.
21. Jones S, Sharpe BT, King R, Waldeck D, Tyndall I. Putting on a disguise to fit in: A mixed methods study of experiences in autistic camouflaging. Res Neurodiversity. 2025;1:100004. https://doi.org/10.1016/j.rin.2025.100004.
22. Jorgenson C, Lewis T, Rose C, Kanne S. Social Camouflaging in Autistic and Neurotypical Adolescents: A Pilot Study of Differences by Sex and Diagnosis. J Autism Dev Disord. 2020;50(12):4344–55. https://doi.org/10.1007/s10803-020-04491-7.
23. Kaufman J, Birmaher B, Brent D, Rao UMA, Flynn C, Moreci P, Ryan N. Schedule for affective disorders and schizophrenia for school-age children-present and lifetime version (K-SADS-PL): initial reliability and validity data. J Am Acad Child Adolesc Psychiatry. 1997;36(7):980–8.
24. Lai M-C, Lombardo MV, Pasco G, Ruigrok ANV, Wheelwright SJ, Sadek SA, Chakrabarti B, MRC AIMS Consortium, Baron-Cohen S. A Behavioral Comparison of Male and Female Adults with High Functioning Autism Spectrum Conditions. PLoS ONE. 2011;6(6):e20835. https://doi.org/10.1371/journal.pone.0020835.
25. Leary MR, Kowalski RM. Impression management: A literature review and two-component model. Psychol Bull. 1990;107(1):34–47. https://doi.org/10.1037/0033-2909.107.1.34.
26. Lei J, Leigh E, Charman T, Russell A, Hollocks MJ. Understanding the relationship between social camouflaging in autism and safety behaviours in social anxiety in autistic and non-autistic adolescents. J Child Psychol Psychiatry. 2024;65(3):285–97. https://doi.org/10.1111/jcpp.13884.
27. Lenth R, Piaskowski J. (2025). emmeans: Estimated Marginal Means, aka Least-Squares Means. R package version 2.0.1. https://rvlenth.github.io/emmeans/
28. Libsack EJ, Keenan EG, Freden CE, Mirmina J, Iskhakov N, Krishnathasan D, Lerner MD. A Systematic Review of Passing as Non-autistic in Autism Spectrum Disorder. Clin Child Fam Psychol Rev. 2021;24(4):783–812. https://doi.org/10.1007/s10567-021-00365-1.
29. Libster N, Knox A, Engin S, Geschwind D, Parish-Morris J, Kasari C. Personal victimization experiences of autistic and non-autistic children. Mol Autism. 2022;13(1):51. https://doi.org/10.1186/s13229-022-00531-4.
30. Libster N, Knox A, Engin S, Geschwind D, Parish-Morris J, Kasari C. Sex differences in friendships and loneliness in autistic and non-autistic children across development. Mol Autism. 2023;14(1):9. https://doi.org/10.1186/s13229-023-00542-9.
31. Locke J, Shih W, Kretzmann M, Kasari C. Examining playground engagement between elementary school children with and without autism spectrum disorder. Autism. 2016;20(6):653–62. https://doi.org/10.1177/1362361315599468.
32. Lorenz S, Hull L. Do All of Us Camouflage? Exploring Levels of Camouflaging and Mental Health Well-Being in the General Population. Trends Psychol. 2024. https://doi.org/10.1007/s43076-024-00357-4.

33. Lu M, Pang F, Peng T, Liu Y, Wang R. Struggling to appear normal': A moderated mediational analysis of empathy and camouflaging in the association between autistic traits and depressive symptoms. Int J Dev Disabil. 2023;1–11. https://doi.org/10.1080/20473869.2023.2181273.
34. Marschner I. (2011), glm2: Fitting Generalized Linear Models with Convergence Problems. R J.
35. McGorry P, Gunasiri H, Mei C, Rice S, Gao CX. The youth mental health crisis: Analysis and solutions. Front Psychiatry. 2025;15:1517533. https://doi.org/10.3389/fpsyt.2024.1517533.
36. McNaughton KA, Russell AS, Lyons M, Parish-Morris J, Harrop C, the SAGA Network*. Development is key to understanding autism: How longitudinal approaches shape our understanding of autism. Autism. 2026;30(3):555–60. https://doi.org/10.1177/13623613261425302.
37. Office of the Surgeon General (OSG). Our Epidemic of Loneliness and Isolation: The U.S. Surgeon General's Advisory on the Healing Effects of Social Connection and Community. US Department of Health and Human Services; 2023. http://www.ncbi.nlm.nih.gov/books/NBK595227/.
38. R Core Team. (2024). _R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/
39. Robinson E, Hull L, Petrides KV. Big Five model and trait emotional intelligence in camouflaging behaviours in autism. Pers Indiv Differ. 2020;152:109565. https://doi.org/10.1016/j.paid.2019.109565.
40. Schlenker BR. Self-presentation. Handbook of self and identity. The Guilford Press; 2003. pp. 492–518.
41. Schuck RK, Flores RE, Fung LK. Brief Report: Sex/Gender Differences in Symptomology and Camouflaging in Adults with Autism Spectrum Disorder. J Autism Dev Disord. 2019;49(6):2597–604. https://doi.org/10.1007/s10803-019-03998-y.
42. Sedgewick F, Hill V, Yates R, Pickering L, Pellicano E. Gender Differences in the Social Motivation and Friendship Experiences of Autistic and Non-autistic Adolescents. J Autism Dev Disord. 2016;46(4):1297–306. https://doi.org/10.1007/s10803-015-2669-1.
43. Van Der Putten WJ, Mol AJJ, Groenman AP, Radhoe TA, Torenvliet C, Van Rentergem JAA, Geurts HM. Is camouflaging unique for autism? A comparison of camouflaging between adults with autism and ADHD. Autism Res. 2024;17(4):812–23. https://doi.org/10.1002/aur.3099.
44. Waite M, Fouladi RT, Iarocci G. Autistic Girls but Not Boys Show a Strong Association Between Internalizing Symptoms and Social Motivation. J Autism Dev Disord. 2025. https://doi.org/10.1007/s10803-024-06707-6.
45. Wechsler D. (2011). *Wechsler Abbreviated Scale of Intelligence–Second Edition (WASI-II)* [Database record]. APA PsycTests. https://doi.org/10.1037/t15171-000
46. Wickham H. ggplot2: Elegant Graphics for Data Analysis. New York: Springer-; 2016.
47. Wickramaratne PJ, Yangchen T, Lepow L, Patra BG, Glicksburg B, Talati A, Adekkanattu P, Ryu E, Biernacka JM, Charney A, Mann JJ, Pathak J, Olfson M, Weissman MM. Social connectedness as a determinant of mental health: A scoping review. PLoS ONE. 2022;17(10):e0275004. https://doi.org/10.1371/journal.pone.0275004.
48. Zampella CJ, Parish-Morris J, Foy J, Cola M, Schultz RT, Herrington JD. You should smile more: Population-level sex differences in smiling also exist in autistic people. Autism. 2025;29(5):1236–45. https://doi.org/10.1177/13623613241301113.

Footnotes

[1] Examples of items from the CAT-Q include: "I don't feel the need to make eye contact with other people if I don't want to" and "I have to force myself to interact with people when I am in social situations"

Figures

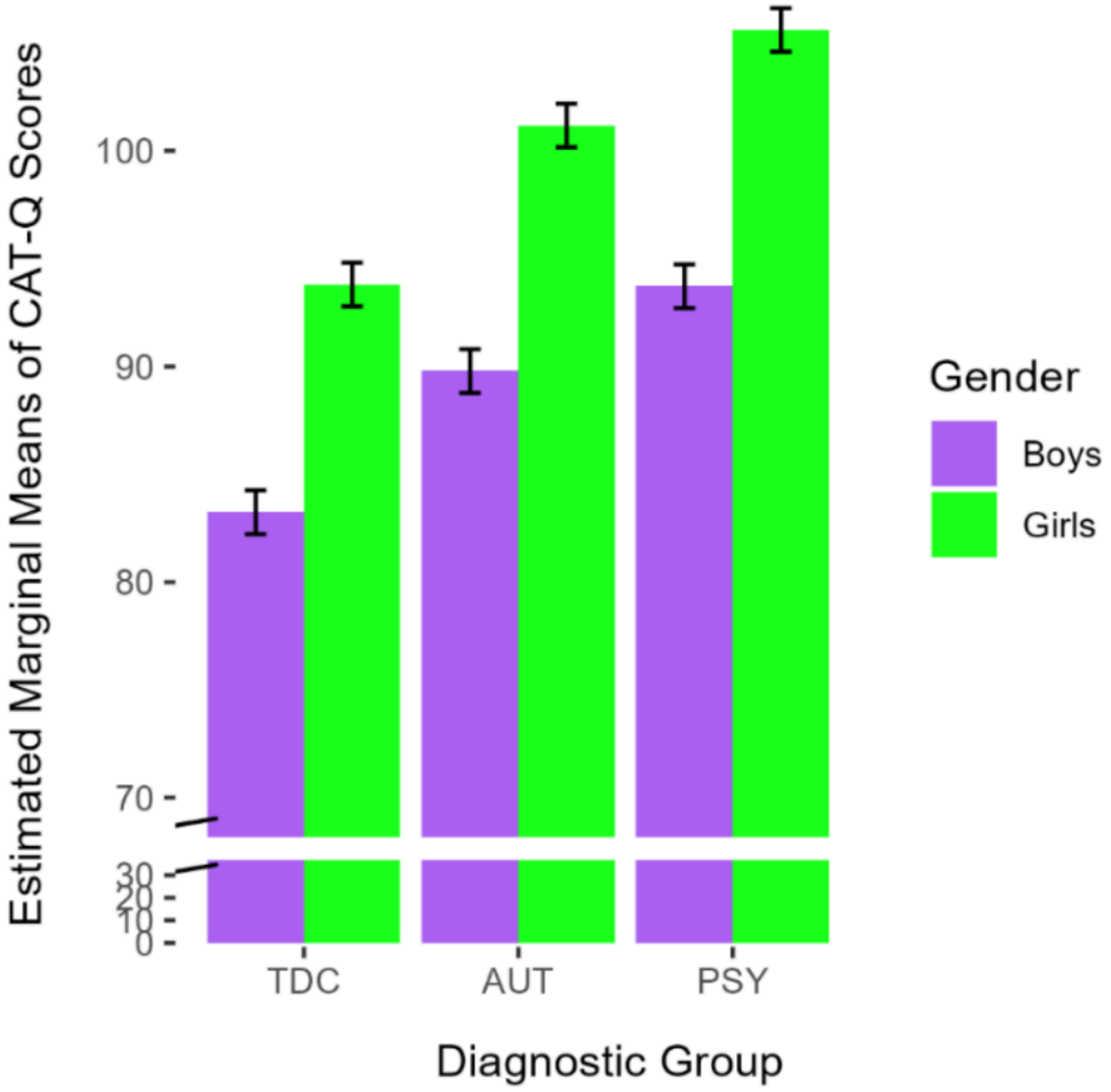

Figure 1

Tukey-corrected estimated marginal mean CAT-Q total scores by sex and diagnostic group after controlling for SRS-2 SCI scores and age. Standard error represented by error bars.

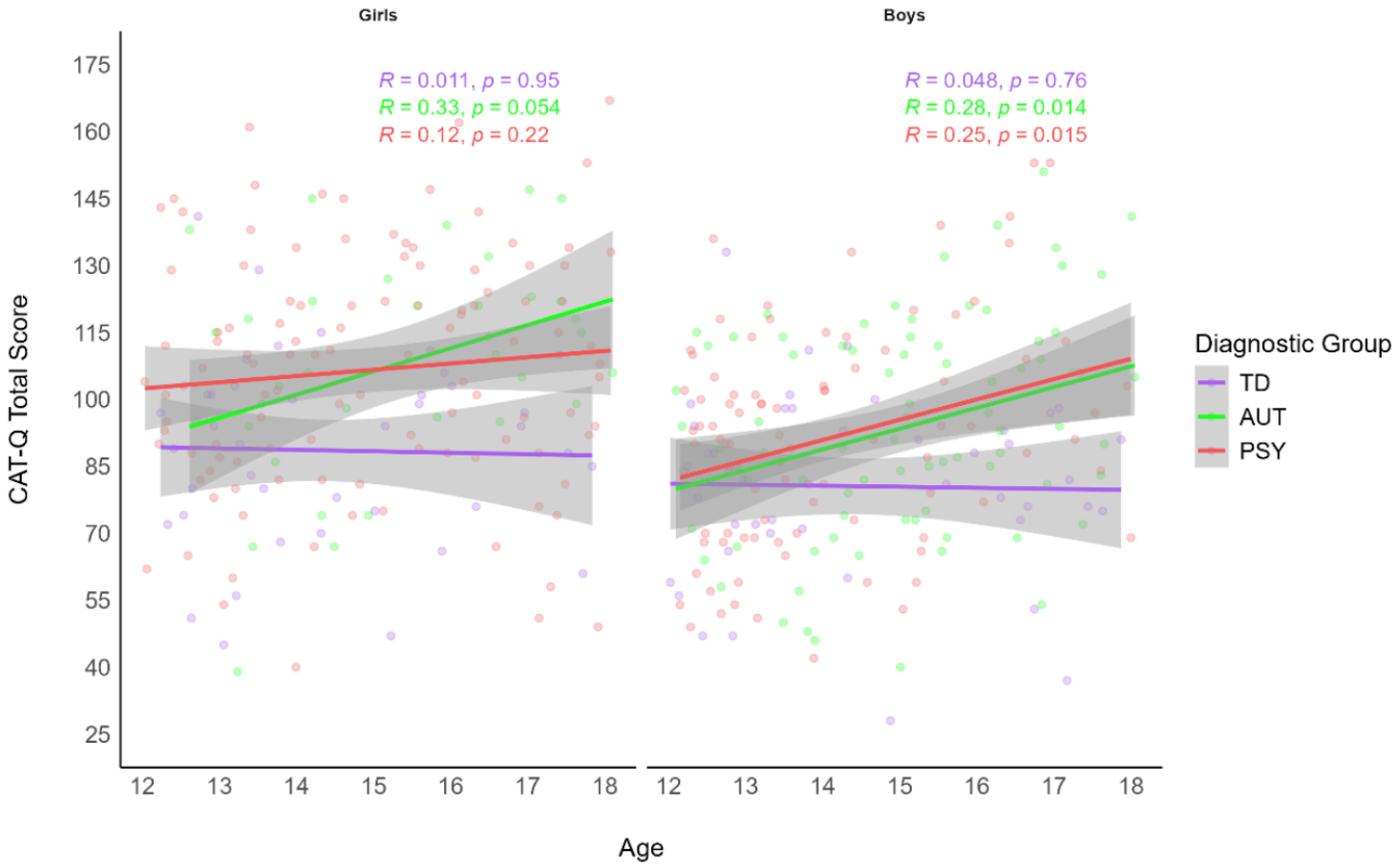

Figure 2

Scatterplots of raw CAT-Q scores and age split by sex and diagnostic group.

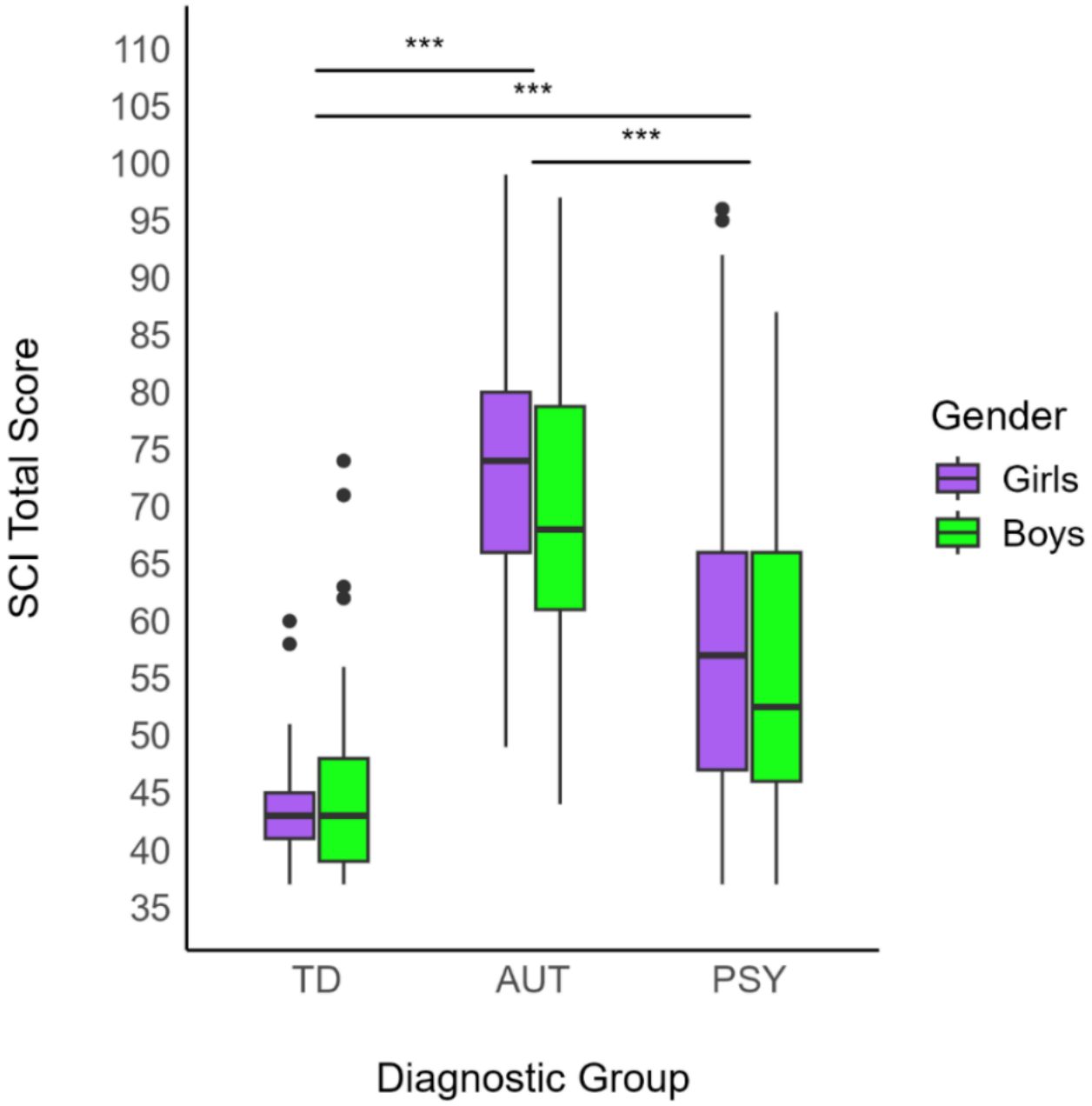

Figure 3

Raw SCI total scores split by sex and diagnostic group.

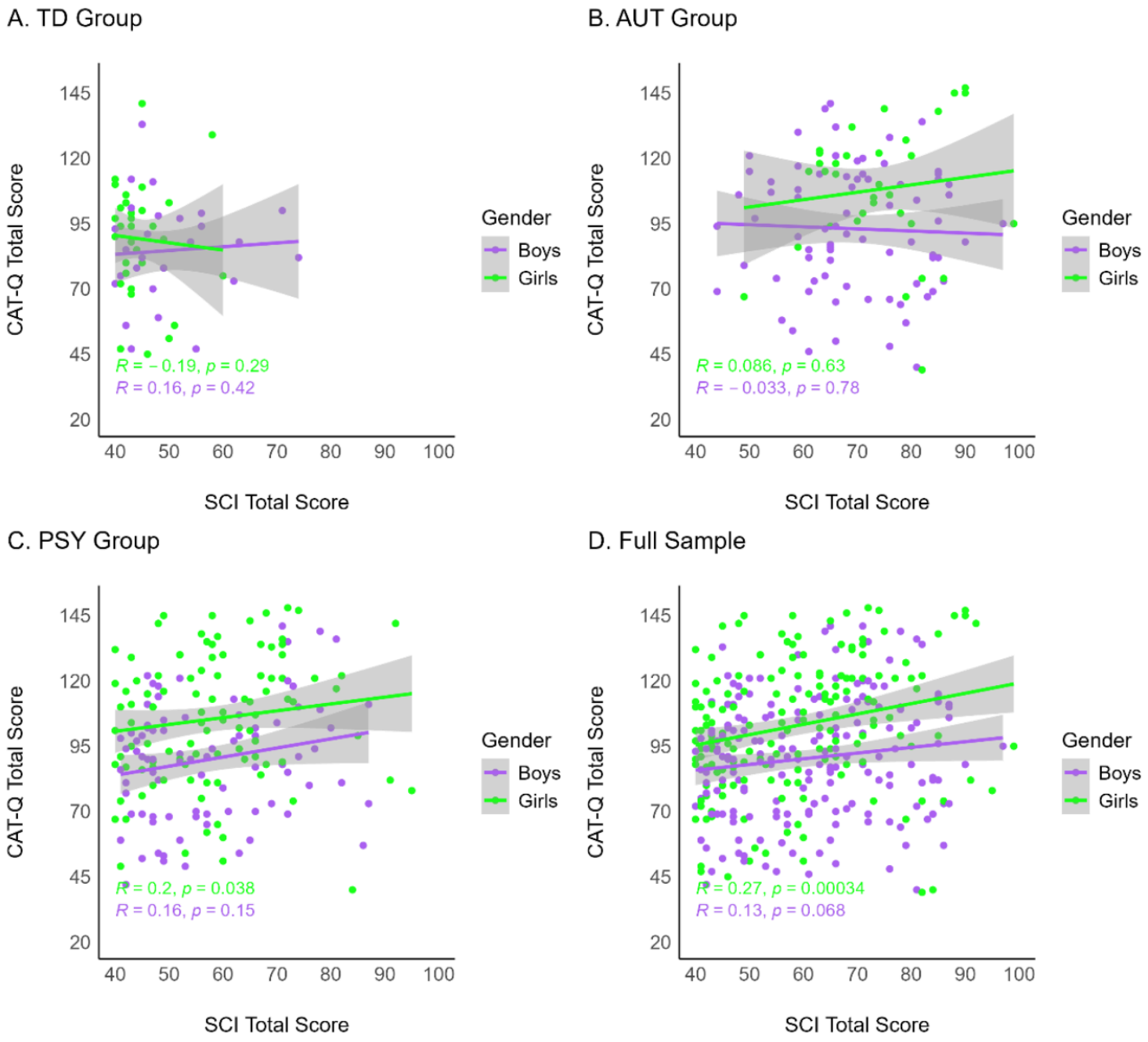

Figure 4

Spearman correlations of raw CAT-Q total scores and raw SCI total scores of the TD group (a), AUT group (b), PSY group (c), and full diagnostic sample (d).