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Friendship and Anxiety/Depression Symptoms in Boys with and without Autism
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Abstract:	Social interaction difficulties in individuals with autism spectrum disorder (ASD) can be very challenging, especially amidst the transition to adolescence. Adolescents with ASD have high rates of comorbid internalizing disorders, which can further contribute to social difficulties and impact friendship experiences. This study compared the relations among autism symptom severity, anxiety and depression symptoms, and friendship experiences in age-matched boys with and without ASD (with IQ > 75). More severe symptoms of ASD were not associated with poorer friendship experiences overall in this sample. Internalizing symptoms predicted quantity of close friendships in the ASD sample. It is possible that individuals with stronger social skills and greater self-awareness are more vulnerable to internalizing symptoms.



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**Friendship and Anxiety/Depression Symptoms in Boys with and without Autism
Spectrum Disorder**

1 **Introduction**

2 Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by
3 impairments in social communication and social interaction, and restricted, repetitive behaviors,
4 interests, or activities (American Psychiatric Association, 2013). The core social deficits
5 observed in ASD range from difficulties with fundamental aspects of social interaction, such as
6 eye contact and emotion perception, to more complex social processes like establishing,
7 maintaining, and understanding relationships and complicated social contexts (Cervantes et al.,
8 2013; Kjellmer et al., 2012; Matson, 2007). More severe symptoms of ASD may contribute to
9 social-cognitive difficulties and compound challenges communicating with and relating to peers,
10 and forming friendships. Additionally, many individuals with ASD experience symptoms of co-
11 occurring mental health conditions (Lai et al., 2019; Simonoff et al., 2008). Anxiety and
12 depression symptoms commonly emerge during the transition from childhood to adolescence in
13 ASD (Gotham et al., 2015; Schwartzman & Corbett, 2020) and may exacerbate social challenges
14 and friendship difficulties. The present study explored how ASD symptom severity and anxiety
15 and depression symptoms are related to friendship in boys with ASD as compared to boys
16 without autism or other developmental differences (i.e., neurotypical or NT peers).

17 **Social Difficulties in Autism Spectrum Disorder**

18 The majority of individuals with ASD experience significant difficulty forming and
19 maintaining friendships. Children with ASD have fewer friends, attend fewer social gatherings,
20 and have less stable friendships than their NT peers (Kasari et al., 2011; Kuo et al., 2013;
21 Rowley et al., 2012). Additionally, social communication challenges and difficulties
22 understanding and relating to peers can lead individuals with ASD to be rejected by peers and to
23 experience social isolation (Orsmond et al., 2013). While not true of all individuals with ASD,

1 many desire to have friends and demonstrate social motivation. Children and adolescents with
2 ASD without intellectual disability (ID) report greater loneliness and decreased friendship
3 satisfaction compared to NT peers, which suggests they desire friendship and social connection,
4 but may lack the skills and opportunities to do so (Bauminger & Kasari, 2000; Locke et al.,
5 2010). The social problems observed in ASD can impact individuals' understanding and
6 expectations surrounding friendships (Bauminger et al., 2010). The disconnect between what
7 they want and what they experience in relationships can contribute to difficulties maintaining
8 appropriate friendships and may result in negative friendship experiences.

9 The relationship difficulties experienced by individuals with ASD may be particularly
10 magnified during the transition from childhood to adolescence, as friendships gain increasing
11 importance and the social landscape becomes more complex. Schall and McDonough (2010)
12 noted that while individuals with ASD generally show improvements in basic communication
13 competencies as they progress into adolescence, they continue to exhibit distinct impairment in
14 social communication. Similarly, Seltzer et al. (2003) investigated a large sample of adolescents
15 and adults with ASD and found that friendship was among the areas of functioning showing the
16 least improvement with age. As individuals with ASD develop skills in other domains of
17 functioning, their social deficits may become increasingly frustrating to them and apparent to
18 their peers. This may be linked to internalizing symptoms and subsequent friendship experiences.

19 **Anxiety/Depression and Friendship**

20 It is well established that the absence of friendship and decreased friendship quality are
21 associated with anxiety and depression symptoms in NT individuals (Buhrmester, 1990; Nangle
22 et al., 2003). Models of internalizing symptoms and friendship outcomes among NT children and
23 adolescents highlight the role of anxiety in the avoidance of social interaction and subsequent

1 social skills deficits resulting from missed practice opportunities. Resulting skill deficits lead to
2 fewer positive peer interactions and the development of fewer friendships, which can worsen
3 anxiety symptoms and contribute to the development of depressive symptoms and further social
4 withdrawal (Seligman & Ollendick, 1998). There is a considerable body of research
5 demonstrating that anxiety and depression are associated with poorer social skills in non-clinical
6 and clinical populations of children (Chansky & Kendall, 1997; Coplan et al., 2004; Hamilton et
7 al., 1997; Schneider, 2009; Spence et al., 1999), as well as poorer quality friendships (De Matos
8 et al., 2003; Fordham & Stevenson-Hinde, 1999; Muris et al., 2001; Muris & Meesters, 2002).

9 The associations between internalizing symptoms and friendship are less understood
10 among individuals with autism. Symptoms of anxiety and depression are common in ASD and a
11 recent meta-analysis revealed that lifetime prevalence was 42% for anxiety disorders and 37%
12 for depressive disorders among individuals with ASD (Hollocks et al., 2019). It has been
13 proposed that the differences in arousal and sensory processing observed in individuals with
14 ASD, and the core deficits in theory of mind and emotion identification may predispose them to
15 problems with emotion regulation (Mazefsky & White, 2014). Disrupted emotion regulation has
16 been implicated as a mechanism underlying anxiety disorders (Cisler et al., 2010) and depressive
17 disorders (Rieffe et al., 2011; Siener & Kerns, 2012). As individuals with ASD often have
18 difficulty processing and integrating complex social information, the core social communication
19 deficits can lead to inattention to important social cues, misinterpretation of social information,
20 and trouble with turn-taking and reciprocity, which can contribute to frustration, anxiety, and
21 social disappointments (Mazefsky & White, 2014). Further, the difficulties in identifying and
22 understanding emotions in self and others may lead to trouble implementing successful emotion
23 regulation strategies to ameliorate unpleasant feelings. These challenges may be associated with

1 increased anxiety in social situations, fewer positive peer interactions, avoidance of social
2 encounters, and social withdrawal, which can all contribute to depressive symptoms (Seligman &
3 Ollendick, 1998).

4 Extensive research on anxiety has indicated that anxiety tends to developmentally
5 precede and increase the risk for depressive symptoms (Keenan et al., 2009). However, less
6 research has focused on the etiology of depression in autism. Smith and White (2020)
7 synthesized empirical findings over the last 20 years and proposed a model for the development
8 of depression in ASD. They highlighted the role of social motivation, which varies significantly
9 between individuals with ASD and over the course of development. They proposed that the
10 presence or absence of social motivation moderates the relationship between social
11 communication deficits and loneliness. Individuals with social deficits without strong social
12 motivation would be less likely to develop depression due to the limited discrepancy between
13 their social desires and ability to successfully navigate relationships (e.g., social desire and
14 ability are low). Thus, individuals with high social motivation would experience a greater
15 discrepancy between their social desires and their social communication abilities, which
16 contributes to loneliness (e.g., high social desire and low ability). Recent research has suggested
17 that girls with ASD without ID may demonstrate comparable social motivation to NT girls (Dean
18 et al., 2017; Sedgewick et al., 2016) and may be particularly vulnerable to anxiety and
19 depression and negative peer experiences (Greenlee et al., 2020; Zimmer-Gembeck, 2016).
20 Thus, there may be key differences among internalizing symptoms, social skills and motivation,
21 and friendship experience between boys and girls during this developmental period.

22 Internalizing symptoms have been found to be particularly prevalent in individuals with
23 ASD without intellectual disability (ID; Witwer & Lecavalier, 2010), who may be more aware of

1 their social deficits (Locke et al., 2010; Volkmar et al., 2012). They can become frustrated with
2 unsuccessful attempts to forge and maintain friendships (Klin et al., 2005), which can lead to
3 further internalizing symptoms (Kim et al., 2000). Higher levels of self-awareness are correlated
4 with higher levels of anxiety and depression and lower self-esteem among NT individuals (Chen
5 et al., 1998; Higgins, 1987; Wells, 1985) and increased self-awareness, and perhaps the
6 discrepancy between their social desires and abilities, has been found to be associated with both
7 anxiety and depression among individuals with ASD (Mazurek & Kanne, 2010; Sterling et al.,
8 2008; Sukhodolsky et al., 2008).

9 As high rates of anxiety and depression symptoms (Ghaziuddin et al., 2002), lower rates
10 of friendship (Mazurek & Kanne, 2010; Orsmond et al., 2004), and increased peer rejection and
11 social isolation (Orsmond et al., 2013) are common experiences for children with ASD, further
12 exploration of how social problems and anxiety/depression symptoms may impact friendship is
13 warranted. There is a particular need to understand how these factors are at play during a
14 developmental period marked by increasing social demands. The transition from childhood to
15 adolescence represents a particularly important time for both social and emotional development.

16 A qualitative study exploring the nature of anxiety in adolescent boys with ASD found
17 that desire to feel connected to others and self-criticism were among the main themes identified
18 related to participants' experience of anxiety (Acker et al., 2018). This suggests that self-
19 awareness of social deficits may lend internalizing symptoms to be interpreted in the context of
20 relationship desires and disappointments. This experience of internalizing symptoms may de-
21 motivate individuals to engage socially and pursue relationships, or may result in a hyper-
22 awareness of disappointments in relationships; both may be associated with fewer or poorer
23 friendship experiences.

1 Mazurek and Kanne (2010) found that children and adolescents with ASD with poor
2 quality friendships had more anxiety and depression symptoms than those with good quality
3 friendships or those with no friends. Additionally, Mazurek (2014) found that number of
4 friendships significantly predicted self-esteem and anxiety/depression symptoms beyond the
5 effects of loneliness and ASD symptom severity in an adult sample with ASD. These findings
6 suggest that there is a strong relationship between quantity and quality of friendships and
7 internalizing symptoms across children, adolescents, and adults with ASD. However, less
8 quantitative research has explored the relationship between internalizing symptoms, social
9 difficulties, and friendship amidst the transition from childhood to adolescence in youth with
10 ASD without ID, as compared to NT youth.

11 **The Present Study**

12 The present study sought to examine the relationships among autism symptom severity,
13 anxiety/depression symptoms, and friendship variables among boys with and without ASD. This
14 study focuses on a particular developmental stage and gender (boys), as boys are more
15 commonly diagnosed with ASD and recent literature suggests friendship patterns may differ
16 during this developmental period between boys and girls. The shift from childhood to
17 adolescence is a transitional period characterized by magnified social difficulty and the
18 emergence or worsening of anxiety and depression symptoms in individuals with ASD. Social
19 problems and internalizing symptoms may be associated with fewer friendship experiences
20 among this population. Knowledge of how these factors are related to friendship in this
21 population during the developmental transition may have important treatment implications.
22 Elevated anxiety and depression symptoms may be associated with fewer friendship experiences,
23 as these symptoms may heighten social challenges, particularly for individuals with pre-existing

1 social difficulties (i.e., ASD). The following hypotheses were tested: 1) that the ASD group
2 would have more ASD symptoms, greater anxiety/depression symptoms, and fewer friendship
3 experiences compared to the NT group, and 2) that among the ASD group, greater ASD
4 symptom severity and more anxiety/depression symptoms would be associated with fewer
5 friendship experiences.

6 **Methods**

7 **Participants and Procedures**

8 The sample included 80 boys ($n = 40$ with ASD and $n = 40$ NT peers) participating in a
9 larger study examining psychophysiological differences in social reward processing. All
10 participants were between the ages of 10 and 16 years ($M = 13.81$, $SD = 1.91$), and the ASD and
11 NT groups were matched on age. Potentially eligible participants in the ASD group were
12 identified from a pre-existing IRB-approved database at a university-based autism center. All
13 participants participated in a comprehensive clinical evaluation and received numerous measures
14 specific to autism as part of the diagnostic process. Participants were recruited by letter, email,
15 and/or phone. Eligibility criteria included previous diagnosis of ASD based on the center's
16 clinical care model, which included clinical evaluation by a psychologist and/or physician and a
17 comprehensive battery of standardized diagnostic and cognitive assessments, and a Full-Scale IQ
18 above 75. Age-matched participants in the NT group were recruited through word-of-mouth,
19 flyers, and online postings in the community. See Table 1 for sample characteristics.

20 [INSERT TABLE 1]

21 The study was approved by the Institutional Review Board at [BLINDED FOR
22 REVIEW]. Informed written consent was obtained from parents, and all children provided assent
23 to participate in the larger study. During the study visit, parents completed a packet of

1 questionnaires to provide information about their children’s social, behavioral, and emotional
2 functioning. Data from a subset of these measures were examined for the current analyses.

3 **Measures**

4 *Demographics*

5 Parents completed a brief demographic and background questionnaire developed for the
6 purposes of the larger study. Information included child age, gender, race, ethnicity, and
7 socioeconomic status.

8 *Friendship Status*

9 Parents also answered a series of questions developed for this study that specifically
10 focused on their child’s friendships. Friendship questions included: 1) “Does your child have a
11 best friend?” (yes/no); 2a) “Does your child have a close group of friends?” (yes/no), 2b) “If so,
12 how many?”; and 3) “How often does your child spend time with friends outside of school?”
13 (never, less than once per month, every few weeks, 1-2 days per week, 3-4 days per week, 5-6
14 days per week, every day).

15 *Autism Symptoms*

16 Autism symptoms were assessed using the Social Responsiveness Scale-Second Edition
17 (SRS-2; Constantino & Gruber, 2012). The SRS-2 is a 65-item rating scale that provides a
18 quantitative measure of symptoms associated with ASD, including reciprocal social behaviors,
19 social communication, and stereotyped mannerisms. All items are on a Likert scale ranging from
20 1 (i.e., not true) to 4 (i.e., always true). The SRS-2 was designed as a continuous assessment of
21 overall ASD traits, allowing for evaluation of a full spectrum of behaviors that range from
22 typical to clinical. *T*-scores ≥ 76 indicate severe deficits related to ASD that significantly
23 impact interactions with others. Scores 66-75 indicate moderate difficulties; scores 60-65

1 indicate mild difficulties; and scores of ≤ 59 suggest that the examinee does not demonstrate
2 impairment consistent with an ASD diagnosis. Internal consistency ($\alpha = .94 - .96$) and interrater
3 reliability ($k = .77$) are adequate (Bruni, 2014).

4 *Anxiety/depression Symptoms*

5 Anxiety and depression symptoms were assessed using the Anxious/Depressed syndrome
6 subscale of the Child Behavior Checklist, School-Age version (CBCL; Achenbach & Rescorla,
7 2001). The CBCL is a widely used, psychometrically sound parent-report measure that assesses a
8 broad range of children's behavioral and emotional problems. The CBCL/6-18 includes 113
9 items across eight subscales: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints,
10 Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and
11 Aggressive Behavior. Parents of participants completed the CBCL and rated items describing
12 their children on a scale of 0 (i.e., not true), 1 (i.e., somewhat or sometimes true), and 2 (i.e., very
13 true). Example Anxious/Depressed items are "Nervous, high-strung, or tense" and "Cries a lot."
14 The CBCL has been validated in youth with ASD, and the Anxious/Withdrawal subscale was
15 found to have good sensitivity to symptoms of anxiety and depression in youth with ASD
16 (Pandolfi et al., 2012), and good convergent validity with other measures of internal symptoms
17 (Pandolfi et al., 2014). Several studies have reported good internal consistency ($\alpha = .71-.84$)
18 among older children and adolescents with ASD without ID (Arias et al., 2021; Kuusikko et al.,
19 2008; Schwichtenberg et al., 2013). While the Anxious/Depressed subscale T-score may be
20 generated using gender and age norms, the present study used raw Anxious/Depressed scores in
21 order to reflect the absolute level of problems and in accordance with the guidance set forth by
22 the authors (Achenbach & Rescorla, 2001).

23 *Data Analytic Plan*

1 friends as compared to boys in the ASD group ($M = 1.47$, $SD = 1.91$, range = 0-6), $t(73) = -5.84$,
2 $p < .001$. Similarly, a chi-square test indicated that the frequency of spending time with friends at
3 least once per week (vs. less than once per week) was significantly higher in the NT group, $\chi^2(1)$
4 $= 10.75$, $p = .005$, $p = .001$.

5 T-tests were used to compare ASD and NT groups in SRS-2 T-score and CBCL
6 Anxious/Depressed subscale raw score. As expected, the ASD ($M = 76.33$, $SD = 9.67$) and NT
7 ($M = 43.26$, $SD = 3.7$) groups differed significantly on the SRS-2, $t(75) = 19.72$, $p < .001$. In
8 addition, the ASD ($M = 6.92$, $SD = 4.85$) and NT ($M = 1.95$, $SD = 2.28$) groups differed
9 significantly Anxious/Depressed subscale of the CBCL, $t(76) = 5.79$, $p < .001$.

10 [INSERT TABLE 2]

11 **Multiple group analysis**

12 ***Having a Best Friend***

13 A multiple group binary logistic regression model examined the influence of SRS T-score
14 and CBCL Anxious/Depressed raw score on the likelihood of having a best friend in the ASD
15 and NT groups covarying for child age and household family income. It was found that SRS T-
16 score and CBCL Anxious/Depressed raw score were not significantly associated with whether a
17 child had a best friend in either group. In addition, CBCL Anxious/Depressed raw score
18 coefficients did not significantly differ across groups ($\chi^2 = .26$, $p = .61$) (see Table 3). Pearson χ^2
19 goodness-of-fit test indicated acceptable model fit.

20 [INSERT TABLE 3]

21 ***Having a Group of Close Friends***

22 A multiple group binary logistic regression model examined the influence of SRS T-score
23 and CBCL Anxious/Depressed raw score on the likelihood of having a group of close friends in

1 the ASD and NT groups covarying for child age and household family income. It was found that
2 CBCL Anxious/Depressed raw score was significantly associated with having a group of close
3 friends in the ASD group only ($B = .26, p = .03$). Increased anxiety/depression was associated
4 with a higher likelihood of having a group of close friends; however, when CBCL
5 Anxious/Depressed raw score coefficients were compared across group models, they were not
6 significantly different ($\chi^2 = .34, p = .56$). Pearson χ^2 goodness-of-fit test indicated acceptable
7 model fit.

8 *Number of Close Friends*

9 A multiple group linear regression examined the association between SRS T-score and
10 CBCL Anxious/Depressed raw score and number of close friends in boys with and without ASD
11 covarying for youth age and family household income. In the ASD group, CBCL
12 Anxious/Depressed score ($B = .19, p = .007$) and SRS T-score ($B = -.08, p = .02$) were
13 significantly associated with number of close friends. Increased anxiety/depression was
14 associated with having more close friends. Increased autism symptom severity was associated
15 with having fewer close friends. In the NT group, neither CBCL Anxious/Depressed raw score
16 nor SRS T-score were significantly associated with number of close friends; however, when
17 CBCL Anxious/Depressed coefficients were compared across groups, no significant difference
18 was found ($\chi^2 = 1.19, p = .27$). Kurtosis and skewness of model residuals indicated a normal
19 distribution and that linear regression was appropriate.

20 *Time Spent with Friends*

21 A multiple group binary logistic regression model examined the influence of SRS T-score
22 and CBCL Anxious/Depressed raw score on the likelihood of seeing friends at least once per
23 week in the ASD and NT groups covarying for child age and household family income. It was

1 found that SRS T-score and CBCL Anxious/Depressed raw score were not significantly
2 associated with whether a child had weekly face-to-face contact with friends in either group. In
3 addition, CBCL Anxious/Depressed raw score coefficients did not significantly differ across
4 groups ($\chi^2 = .01, p = .92$). Pearson χ^2 goodness-of-fit test indicated acceptable model fit.

5 [INSERT TABLE 4]

6 **Discussion**

7 The results of this study add to the growing body of literature on friendship in boys with
8 ASD without co-occurring ID. This study specifically examined the associations between autism
9 symptom severity, symptoms of anxiety and depression, and friendship among boys with ASD as
10 compared to their NT peers using multiple group analysis. As expected, the NT group had more
11 friendships and more contact with friends, fewer autistic symptoms, and decreased
12 anxiety/depression symptoms compared to the ASD group. However, contrary to our predictions,
13 autism symptom severity was not significantly associated with three of the four friendship
14 variables. Surprisingly, having close friends was associated with greater symptoms of anxiety
15 and depression among boys with ASD.

16 Interestingly, ASD symptoms were not consistently associated with friendship
17 experiences among this sample of boys with ASD. The only friendship variable significantly
18 associated with ASD symptom severity was number of friends, indicating that the presence of
19 more severe symptoms is associated with having fewer close friends. This might suggest that
20 ASD symptoms differentially impact social processes involved in friendship. Maintaining
21 multiple close relationships may require greater executive functioning skills to juggle the social
22 task demands associated with each friendship. By contrast, ASD symptom severity did not
23 predict other friendship outcomes in the present study, including having a best friend or having

1 contact with friends. Thus, it is possible that greater symptoms are not necessarily associated
2 with fewer friendships or less frequent contact with friends in boys with ASD and solid cognitive
3 functioning. While this is perhaps a hopeful finding, further exploration and replication of this
4 finding among larger samples is warranted. Notably, a prior study found that ASD symptom
5 severity was strongly associated with some aspects of friendship in a larger sample of children
6 and adolescents with ASD across a wider range of IQ and age (Mazurek & Kanne, 2010). The
7 relationship between IQ and ASD symptom severity is well established (Eaves et al., 1994;
8 Matson & Shoemaker, 2009; Prior et al., 1998), as individuals with lower cognitive ability tend
9 to have more severe symptoms of ASD. Individuals with lower IQ and more severe ASD
10 symptoms tend to have both decreased anxiety/depression symptoms and poorer friendship
11 outcomes (Mazurek & Kanne, 2010). The present study was limited to boys with ASD without
12 co-occurring intellectual disability (IQ greater than 75). As such, further exploration of the
13 relations among friendship and internalizing symptoms is warranted among children with
14 cognitive limitations.

15 Counter to our predictions, greater symptoms of anxiety and depression were associated
16 with having more close friends in the ASD sample. This finding is in line with results from a
17 previous study by Mazurek (2014) that revealed quantity of friendships was associated with
18 increased anxiety and depression symptoms in adults with ASD. It is likely that individuals with
19 ASD who do not have co-occurring ID possess more social motivation and are able to better
20 navigate and maintain friendships. These individuals may in turn possess greater self-awareness
21 of their social difficulties, which may contribute to additional symptoms of anxiety and
22 depression. It is also possible that having more friends may not necessarily protect against
23 negative emotional symptoms, such as feelings of loneliness and desire for emotional

1 connection. Mazurek and Kanne (2010) found that quantity and quality of friendships were not
2 associated with decreased symptoms of anxiety and depression among youth with ASD. Thus, it
3 is possible that friendship may not be protective against internalizing symptoms in youth with
4 ASD, as it is in NT individuals (Bukowski et al., 2000; Ladd, 2006). Further exploration of the
5 relationship between friendship and emotional functioning is needed among larger, and more
6 diverse samples. Qualitative research may play an essential role in further examining the
7 relationship between friendship quantity and internalizing symptoms in individuals with ASD
8 across the lifespan.

9 **Limitations and Future Directions**

10 The present study is characterized by several limitations. First, the study is limited by a
11 small sample; as a result, the analysis was underpowered to demonstrate robust findings. It is
12 important to note that the ASD group was limited to boys without intellectual disability, and that
13 the sample was almost entirely Caucasian. It is possible that the relationships among the
14 variables investigated would appear quite different in racially and ethnically diverse populations
15 and among individuals with intellectual disability and physical or psychiatric comorbid
16 conditions. As this study focused exclusively on boys with ASD without ID, findings are not
17 generalizable to girls on the autism spectrum. Research has suggested that boys and girls with
18 autism without ID demonstrate differences in social and communication skills (see Tubío-
19 Fungueiriño et al., 2021 for review), social motivation (Dean et al., 2017; Head et al., 2014), and
20 friendship experiences (Calder et al., 2013; Sedgewick et al., 2016). Additionally, girls with
21 autism are more likely to mask social difficulties compared to boys (Hull et al., 2020), and this is
22 associated with higher rates of anxiety and depression (Bargiela et al., 2016; Cage & Troxell-
23 Whitman, 2019; Livingston et al., 2019). In light of these observed gender differences, future

1 studies should compare the relationships among social characteristics, internalizing symptoms,
2 and friendship experiences in boys and girls separately.

3 The present study may have been strengthened by inclusion of more comprehensive
4 measures of social functioning and social motivation, given the hypothesized relationship
5 between social skills, social motivation, internalizing symptoms, and friendship (Smith & White,
6 2020). This study also used parent-reported symptoms of anxiety and depression. As
7 internalizing symptoms are not always visible or effectively communicated to parents by
8 individuals with ASD, it is possible that parents over- or under-reported symptoms of
9 internalizing psychopathology. It may have been helpful to use both child and parent report to
10 capture these symptoms and evaluate concordance among reporters. Additionally, symptoms of
11 anxiety and depression were assessed using an empirically-derived syndrome scale from a
12 broadband measure of social, emotional, and behavioral problems. Future studies may consider
13 capturing internalizing symptoms with measures specifically designed to assess anxiety and
14 depression symptoms in order to assess these constructs more comprehensively.

15 This study also relied on parent-report of quantity of friendships and frequency of contact
16 with friends due to the difficulties that individuals with ASD demonstrate in understanding social
17 relationships and what defines a friend. Future studies on friendship among youth with ASD
18 should evaluate how youth with autism define friends. Concordance between youth- and parent-
19 reports of friendships should also be examined, as some research has indicated they may be
20 discrepant (Kuo et al., 2013). As the current study focused on quantity of friendships and
21 frequency of contact with friends, qualitative aspects of friendships, such as trust, intimacy,
22 reciprocity, and conflict were not assessed. Friendships may also vary based on context (e.g.,
23 group activities, school, online) and developmental period. The transition from childhood to

1 adolescence may be particularly isolating and challenging for individuals to maintain friendships.
2 This time often involves a transition between school placements, which may be associated with
3 increased challenges navigating social groups and establishing and maintain relationships in a
4 new environment. This transitional developmental period may be particularly difficulty for
5 individuals with autism, for whom transitions are already challenging. This is also a time when
6 individuals with and without autism may experience increased mental health concerns. Future
7 research should examine the relations among autism symptoms, internalizing symptoms, context,
8 and friendship variables during this key developmental period.

9 The online context for friendship was not explicitly investigated in the current study.

10 Qualitative information from many adolescents with ASD suggests that online video gaming and
11 social media platforms provide individuals with ASD increased social access. Mazurek (2013)
12 found that individuals with ASD who use social networking sites are significantly more likely to
13 have a close friend than those who do not. The present study did not assess friendship and
14 contact with friends through this medium and it is possible that including online gaming or social
15 media-based relationships may have impacted the findings of this study. Future research should
16 investigate how sociocultural and demographic variables, as well as media-based
17 communication, contribute to friendship outcomes in ASD among more diverse samples.

18 Despite these limitations, the present study extends the literature on friendship on ASD
19 by exploring how internalizing symptoms and severity of autism symptomology are related to
20 quantity of friendships and frequency of contact with friends during an important developmental
21 period, as compared to their NT peers. As much of the prior research in this area has been limited
22 to ASD samples without comparison to NT peers, or relied on adult samples, this study provides
23 an important contribution to research on friendship in autism amidst the transition to

1 adolescence. These results will help inform future research on friendship in ASD and inform
2 treatments for individuals with ASD without ID, such as social skills interventions. If future
3 research continues to demonstrate a relationship between internalizing symptoms and friendship
4 experiences, then social skills intervention programs should address the internalizing symptoms
5 associated with establishing/maintaining social relationships and perceived friendship quality. As
6 research continues to identify which factors influence friendship success in ASD, more
7 comprehensive treatments can be developed to target the specific skills that will result in
8 decreased symptoms of anxiety and depression related to social relationships.

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References

- 1
2 American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders*
3 (5th ed.). Arlington, VA: American Psychiatric Publishing.
- 4 Achenbach, T. M., & Rescorla, L. (2001). *ASEBA school-age forms & profiles*. Burlington, VT:
5 ASEBA.
- 6 Acker, L., Knight, M., & Knott, F. (2018). ‘Are they just gonna reject me?’ Male adolescents
7 with autism making sense of anxiety: An Interpretative Phenomenological Analysis.
8 *Research in Autism Spectrum Disorders, 56*(September), 9–20.
9 <https://doi.org/10.1016/j.rasd.2018.07.005>
- 10 Arias, A. A., Rea, M. M., Adler, E. J., Haendel, A. D., & Van Hecke, A. V. (2021). Utilizing the
11 Child Behavior Checklist (CBCL) as an Autism Spectrum Disorder Preliminary Screener
12 and Outcome Measure for the PEERS® Intervention for Autistic Adolescents. *Journal of*
13 *Autism and Developmental Disorders, 52*(5), 2061–2074. [https://doi.org/10.1007/S10803-](https://doi.org/10.1007/S10803-021-05103-8/TABLES/6)
14 [021-05103-8/TABLES/6](https://doi.org/10.1007/S10803-021-05103-8/TABLES/6)
- 15 Bargiela, S., Steward, R., & Mandy, W. (2016). The Experiences of Late-diagnosed Women with
16 Autism Spectrum Conditions: An Investigation of the Female Autism Phenotype. *Journal of*
17 *Autism and Developmental Disorders, 46*(10), 3281–3294. [https://doi.org/10.1007/s10803-](https://doi.org/10.1007/s10803-016-2872-8)
18 [016-2872-8](https://doi.org/10.1007/s10803-016-2872-8)
- 19 Bauminger, N., & Kasari, C. (2000). Loneliness and friendship in high-functioning children with
20 autism. *Child Development, 71*(2), 447–456.
21 <http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L3132589>
22 6
- 23 Bauminger, Nirit, Solomon, M., & Rogers, S. J. (2010). Predicting friendship quality in autism

- 1 spectrum disorders and typical development. *Journal of Autism and Developmental*
2 *Disorders*, 40(6), 751–761. <https://doi.org/10.1007/s10803-009-0928-8>
- 3 Buhrmester, D. (1990). Intimacy of friendship , interpersonal competence , and adjustment
4 during preadolescence and adolescence. *Child Development*, 61(4), 1101–1111.
- 5 Bukowski, W. M., Sippola, L. K., & Newcomb, A. F. (2000). Variations in patterns of attraction
6 to same- and other-sex peers during early adolescence. *Developmental Psychology*, 36(2),
7 147–154. <http://www.ncbi.nlm.nih.gov/pubmed/10749072>
- 8 Cage, E., & Troxell-Whitman, Z. (2019). Understanding the Reasons, Contexts and Costs of
9 Camouflaging for Autistic Adults. *Journal of Autism and Developmental Disorders*, 49(5),
10 1899–1911. <https://doi.org/10.1007/s10803-018-03878-x>
- 11 Calder, L., Hill, V., & Pellicano, E. (2013). “Sometimes i want to play by myself”:
12 Understanding what friendship means to children with autism in mainstream primary
13 schools. *Autism*, 17(3), 296–316. <https://doi.org/10.1177/1362361312467866>
- 14 Cervantes, P. E., Matson, J. L., Adams, H. L., Williams, L. W., Goldin, R. L., & Jang, J. (2013).
15 Comparing social skill profiles of children with autism spectrum disorders versus children
16 with attention deficit hyperactivity disorder: Where the deficits lie. *Research in Autism*
17 *Spectrum Disorders*, 7(9), 1104–1110. <https://doi.org/10.1016/j.rasd.2013.05.008>
- 18 Chansky, T. E., & Kendall, P. C. (1997). Social expectancies and self-perceptions in anxiety-
19 disordered children. *Journal of Anxiety Disorders*, 11(4), 347–363.
20 [https://doi.org/10.1016/S0887-6185\(97\)00015-7](https://doi.org/10.1016/S0887-6185(97)00015-7)
- 21 Chen, H., Mechanic, D., & Hansell, S. (1998). A longitudinal study of self-awareness and
22 depressed mood in adolescence. *Journal of Youth and Adolescence*, 27(6), 719–734.
23 <https://doi.org/10.1023/A:1022809815567>

- 1 Cisler, J. M., Olatunji, B. O., Feldner, M. T., & Forsyth, J. P. (2010). Emotion Regulation and
2 the Anxiety Disorders: An Integrative Review. *Journal of Psychopathology and Behavioral*
3 *Assessment*, 32(1), 68–82. <https://doi.org/10.1007/S10862-009-9161-1>
- 4 Coplan, R. J., Prakash, K., O’Neil, K., & Armer, M. (2004). Do You “Want” to Play?
5 Distinguishing Between Conflicted Shyness and Social Disinterest in Early Childhood.
6 *Developmental Psychology*, 40(2), 244–258. <https://doi.org/10.1037/0012-1649.40.2.244>
- 7 De Matos, M. G., Barrett, P., Dadds, M., & Shortt, A. (2003). Anxiety, depression, and peer
8 relationships during adolescence: Results from the Portuguese national health behaviour in
9 school-aged children survey. In *European Journal of Psychology of Education* (Vol. 18,
10 Issue 1, pp. 3–14). Instituto Superior de Psicologia Aplicada.
11 <https://doi.org/10.1007/BF03173600>
- 12 Dean, M., Harwood, R., & Kasari, C. (2017). The art of camouflage: Gender differences in the
13 social behaviors of girls and boys with autism spectrum disorder. *Autism*, 21(6), 678–689.
14 <https://doi.org/10.1177/1362361316671845>
- 15 Eaves, L. C., Ho, H. H., & Eaves, D. M. (1994). Subtypes of autism by cluster analysis. *Journal*
16 *of Autism and Developmental Disorders*, 24(1), 3–22. <https://doi.org/10.1007/BF02172209>
- 17 Fordham, K., & Stevenson-Hinde, J. (1999). Shyness, Friendship Quality, and Adjustment
18 During Middle Childhood. *Journal of Child Psychology and Psychiatry*, 40(5), 757–768.
19 <https://doi.org/10.1111/1469-7610.00491>
- 20 Ghaziuddin, M., Ghaziuddin, N., & Greden, J. (2002). Depression in persons with autism:
21 Implications for research and clinical care. *Journal of Autism and Developmental*
22 *Disorders*, 32(4), 299–306. <https://doi.org/10.1023/A:1016330802348>
- 23 Gotham, K., Brunwasser, S. M., & Lord, C. (2015). Depressive and anxiety symptom trajectories

- 1 from school age through young adulthood in samples with autism spectrum disorder and
2 developmental delay. *Journal of the American Academy of Child and Adolescent*
3 *Psychiatry*, 54(5), 369-376.e3. <https://doi.org/10.1016/j.jaac.2015.02.005>
- 4 Greenlee, J. L., Winter, M. A., & Marcovici, I. A. (2020). Brief Report: Gender Differences in
5 Experiences of Peer Victimization Among Adolescents with Autism Spectrum Disorder.
6 *Journal of Autism and Developmental Disorders*, 50(10), 3790–3799.
7 <https://doi.org/10.1007/s10803-020-04437-z>
- 8 Hamilton, E. B., Asarnow, J. R., & Tompson, M. C. (1997). Social, academic, and behavioral
9 competence of depressed children: Relationship to diagnostic status and family interaction
10 style. *Journal of Youth and Adolescence*, 26(1), 77–87.
11 <https://doi.org/10.1023/A:1024592213017>
- 12 Head, A. M., McGillivray, J. A., & Stokes, M. A. (2014). Gender differences in emotionality and
13 sociability in children with autism spectrum disorders. *Molecular Autism*, 5(1), 1–9.
14 <https://doi.org/10.1186/2040-2392-5-19>
- 15 Higgins, E. T. (1987). Self-Discrepancy: A Theory Relating Self and Affect. *Psychological*
16 *Review*, 94(3), 319–340. <https://doi.org/10.1037/0033-295X.94.3.319>
- 17 Hollocks, M. J., Lerh, J. W., Magiati, I., Meiser-Stedman, R., & Brugha, T. S. (2019). Anxiety
18 and depression in adults with autism spectrum disorder: A systematic review and meta-
19 analysis. In *Psychological Medicine* (Vol. 49, Issue 4, pp. 559–572). Cambridge University
20 Press. <https://doi.org/10.1017/S0033291718002283>
- 21 Hull, L., Lai, M. C., Baron-Cohen, S., Allison, C., Smith, P., Petrides, K. V., & Mandy, W.
22 (2020). Gender differences in self-reported camouflaging in autistic and non-autistic adults.
23 *Autism*, 24(2), 352–363. <https://doi.org/10.1177/1362361319864804>

- 1 Kasari, C., Locke, J., Gulsrud, A., & Rotheram-Fuller, E. (2011). Social networks and
2 friendships at school: Comparing children with and without ASD. *Journal of Autism and*
3 *Developmental Disorders, 41*(5), 533–544. <https://doi.org/10.1007/s10803-010-1076-x>
- 4 Keenan, K., Feng, X., Hipwell, A., & Klostermann, S. (2009). Depression begets depression:
5 Comparing the predictive utility of depression and anxiety symptoms to later depression.
6 *Journal of Child Psychology and Psychiatry and Allied Disciplines, 50*(9), 1167–1175.
7 <https://doi.org/10.1111/j.1469-7610.2009.02080.x>
- 8 Kim, J. A., Szatmari, P., Bryson, S. E., Streiner, D. L., & Wilson, F. J. (2000). The Prevalence of
9 Anxiety and Mood Problems among Children with Autism and Asperger Syndrome.
10 *Autism, 4*(2), 117–132. <https://doi.org/10.1177/1362361300004002002>
- 11 Kjellmer, L., Hedvall, Å., Fernell, E., Gillberg, C., & Norrelgen, F. (2012). Language and
12 communication skills in preschool children with autism spectrum disorders: Contribution of
13 cognition, severity of autism symptoms, and adaptive functioning to the variability.
14 *Research in Developmental Disabilities, 33*(1), 172–180.
15 <https://doi.org/10.1016/J.RIDD.2011.09.003>
- 16 Klin, A., McPartland, J., & Volkmar, F. R. (2005). Asperger syndrome. In *Handbook of autism*
17 *and pervasive developmental disorders: Diagnosis, development, neurobiology, and*
18 *behavior, Vol. 1, 3rd ed.* (pp. 88–125). John Wiley & Sons Inc.
- 19 Kuo, M. H., Orsmond, G. I., Cohn, E. S., & Coster, W. J. (2013). Friendship characteristics and
20 activity patterns of adolescents with an autism spectrum disorder. *Autism, 17*(4), 481–500.
21 <https://doi.org/10.1177/1362361311416380>
- 22 Kuusikko, S., Pollock-Wurman, R., Jussila, K., Carter, A. S., Mattila, M. L., Ebeling, H., Pauls,
23 D. L., & Moilanen, I. (2008). Social anxiety in high-functioning children and adolescents

- 1 with autism and Asperger syndrome. *Journal of Autism and Developmental Disorders*,
2 38(9), 1697–1709. <https://doi.org/10.1007/s10803-008-0555-9>
- 3 Ladd, G. W. (2006). Peer rejection, aggressive or withdrawn behavior, and psychological
4 maladjustment from ages 5 to 12: An examination of four predictive models. In *Child*
5 *Development* (Vol. 77, Issue 4, pp. 822–846). <https://doi.org/10.1111/j.1467->
6 8624.2006.00905.x
- 7 Lai, M. C., Kasse, C., Besney, R., Bonato, S., Hull, L., Mandy, W., Szatmari, P., & Ameis, S.
8 H. (2019). Prevalence of co-occurring mental health diagnoses in the autism population: a
9 systematic review and meta-analysis. *The Lancet Psychiatry*, 6(10), 819–829.
10 [https://doi.org/10.1016/S2215-0366\(19\)30289-5](https://doi.org/10.1016/S2215-0366(19)30289-5)
- 11 Livingston, L. A., Colvert, E., Bolton, P., & Happé, F. (2019). Good social skills despite poor
12 theory of mind: exploring compensation in autism spectrum disorder. *Journal of Child*
13 *Psychology and Psychiatry and Allied Disciplines*, 60(1), 102–110.
14 <https://doi.org/10.1111/jcpp.12886>
- 15 Locke, J., Ishijima, E. H., Kasari, C., & London, N. (2010). Loneliness, friendship quality and
16 the social networks of adolescents with high-functioning autism in an inclusive school
17 setting. *Journal of Research in Special Educational Needs*, 10(2), 74–81.
18 <https://doi.org/10.1111/j.1471-3802.2010.01148.x>
- 19 Matson, J. L. (2007). Current status of differential diagnosis for children with autism spectrum
20 disorders. *Research in Developmental Disabilities*, 28(2), 109–118.
21 <https://doi.org/10.1016/j.ridd.2005.07.005>
- 22 Matson, J. L., & Shoemaker, M. (2009). Intellectual disability and its relationship to autism
23 spectrum disorders. In *Research in Developmental Disabilities* (Vol. 30, Issue 6, pp. 1107–

- 1 1114). <https://doi.org/10.1016/j.ridd.2009.06.003>
- 2 Mazefsky, C. A., & White, S. W. (2014). Emotion Regulation. Concepts & Practice in Autism
3 Spectrum Disorder. In *Child and Adolescent Psychiatric Clinics of North America* (Vol. 23,
4 Issue 1, pp. 15–24). NIH Public Access. <https://doi.org/10.1016/j.chc.2013.07.002>
- 5 Mazurek, M. O., & Kanne, S. M. (2010). Friendship and internalizing symptoms among children
6 and adolescents with ASD. *Journal of Autism and Developmental Disorders*, 40(12), 1512–
7 1520. <https://doi.org/10.1007/s10803-010-1014-y>
- 8 Muris, P., & Meesters, C. (2002). Attachment, behavioral inhibition, and anxiety disorders
9 symptoms in normal adolescents. *Journal of Psychopathology and Behavioral Assessment*,
10 24(2), 97–106. <https://doi.org/10.1023/A:1015388724539>
- 11 Muris, P., Meesters, C., Van Melick, M., & Zwambag, L. (2001). Self-reported attachment style,
12 attachment quality, and symptoms of anxiety and depression in young adolescents.
13 *Personality and Individual Differences*, 30(5), 809–818. <https://doi.org/10.1016/S0191->
14 8869(00)00074-X
- 15 Nangle, D. W., Erdley, C. A., Newman, J. E., Mason, C. A., & Carpenter, E. M. (2003).
16 Popularity, friendship quantity, and friendship quality: Interactive influences on children's
17 loneliness and depression. *Journal of Clinical Child and Adolescent Psychology*, 32(4),
18 546–555. https://doi.org/10.1207/S15374424JCCP3204_7
- 19 Orsmond, G. I., Krauss, M. W., & Seltzer, M. M. (2004). Peer relationships and social and
20 recreational activities among adolescents and adults with autism. *Journal of Autism and*
21 *Developmental Disorders*, 34(3), 245–256.
22 <https://doi.org/10.1023/B:JADD.0000029547.96610.df>
- 23 Orsmond, G. I., Shattuck, P. T., Cooper, B. P., Sterzing, P. R., & Anderson, K. A. (2013). Social

- 1 participation among young adults with an autism spectrum disorder. *Journal of Autism and*
2 *Developmental Disorders*, 43(11), 2710–2719. <https://doi.org/10.1007/s10803-013-1833-8>
- 3 Pandolfi, V., Magyar, C. I., & Norris, M. (2014). Validity Study of the CBCL 6–18 for the
4 Assessment of Emotional Problems in Youth With ASD. *Journal of Mental Health*
5 *Research in Intellectual Disabilities*, 7(4), 306–322.
6 <https://doi.org/10.1080/19315864.2014.930547>
- 7 Prior, M., Leekam, S., Ong, B., Eisenmajer, R., Wing, L., Gould, J., & Dove, D. (1998). Are
8 There Subgroups within the Autistic Spectrum? A Cluster Analysis of a Group of Children
9 with Autistic Spectrum Disorders. *Journal of Child Psychology and Psychiatry*, 39(6), 893–
10 902. <https://doi.org/10.1111/1469-7610.00389>
- 11 Rieffe, C., Oosterveld, P., Terwogt, M. M., Mootz, S., Van Leeuwen, E., & Stockmann, L.
12 (2011). Emotion regulation and internalizing symptoms in children with autism spectrum
13 disorders. *Autism : The International Journal of Research and Practice*, 15(6), 655–670.
14 <https://doi.org/10.1177/1362361310366571>
- 15 Rowley, E., Chandler, S., Baird, G., Simonoff, E., Pickles, A., Loucas, T., & Charman, T.
16 (2012). The experience of friendship, victimization and bullying in children with an autism
17 spectrum disorder: Associations with child characteristics and school placement. *Research*
18 *in Autism Spectrum Disorders*, 6(3), 1126–1134. <https://doi.org/10.1016/j.rasd.2012.03.004>
- 19 Schneider, B. H. (2009). An observational study of the interactions of socially
20 withdrawn/anxious early adolescents and their friends. *Journal of Child Psychology and*
21 *Psychiatry*, 50(7), 799–806. <https://doi.org/10.1111/j.1469-7610.2008.02056.x>
- 22 Schwartzman, J. M., & Corbett, B. A. (2020). Higher depressive symptoms in early adolescents
23 with Autism Spectrum Disorder by self- and parent-report compared to typically-developing

- 1 peers. *Research in Autism Spectrum Disorders*, 77, 101613.
2 <https://doi.org/10.1016/j.rasd.2020.101613>
- 3 Schwichtenberg, A. J., Young, G. S., Hutman, T., Iosif, A. M., Sigman, M., Rogers, S. J., &
4 Ozonoff, S. (2013). Behavior and Sleep Problems in Children With a Family History of
5 Autism. *Autism Research*, 6(3), 169–176. <https://doi.org/10.1002/aur.1278>
- 6 Sedgewick, F., Hill, V., Yates, R., Pickering, L., & Pellicano, E. (2016). Gender Differences in
7 the Social Motivation and Friendship Experiences of Autistic and Non-autistic Adolescents.
8 *Journal of Autism and Developmental Disorders*, 46(4), 1297–1306.
9 <https://doi.org/10.1007/s10803-015-2669-1>
- 10 Seligman, L. D., & Ollendick, T. H. (1998). Comorbidity of anxiety and depression in children
11 and adolescents: An integrative review. *Clinical Child and Family Psychology Review*, 1(2),
12 125–144. <https://doi.org/10.1023/A:1021887712873>
- 13 Siener, S., & Kerns, K. A. (2012). Emotion regulation and depressive symptoms in
14 preadolescence. *Child Psychiatry and Human Development*, 43(3), 414–430.
15 <https://doi.org/10.1007/S10578-011-0274-X>
- 16 Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric
17 disorders in children with autism spectrum disorders: Prevalence, comorbidity, and
18 associated factors in a population-derived sample. *Journal of the American Academy of*
19 *Child and Adolescent Psychiatry*, 47(8), 921–929.
20 <https://doi.org/10.1097/CHI.0b013e318179964f>
- 21 Smith, I. C., & White, S. W. (2020). Socio-emotional determinants of depressive symptoms in
22 adolescents and adults with autism spectrum disorder: A systematic review. *Autism*, 24(4),
23 995–1010. <https://doi.org/10.1177/1362361320908101>

- 1 Spence, S. H., Donovan, C., & Brechman-Toussaint, M. (1999). Social skills, social outcomes,
2 and cognitive features of childhood social phobia. *Journal of Abnormal Psychology, 108*(2),
3 211–221. <https://doi.org/10.1037/0021-843X.108.2.211>
- 4 Sterling, L., Dawson, G., Estes, A., & Greenson, J. (2008). Characteristics associated with
5 presence of depressive symptoms in adults with autism spectrum disorder. *Journal of*
6 *Autism and Developmental Disorders, 38*(6), 1011–1018. [https://doi.org/10.1007/s10803-](https://doi.org/10.1007/s10803-007-0477-y)
7 [007-0477-y](https://doi.org/10.1007/s10803-007-0477-y)
- 8 Sukhodolsky, D. G., Scahill, L., Gadow, K. D., Arnold, L. E., Aman, M. G., McDougle, C. J.,
9 McCracken, J. T., Tierney, E., Williams White, S., Lecavalier, L., & Vitiello, B. (2008).
10 Parent-rated anxiety symptoms in children with pervasive developmental disorders:
11 Frequency and association with core autism symptoms and cognitive functioning. *Journal*
12 *of Abnormal Child Psychology, 36*(1), 117–128. <https://doi.org/10.1007/s10802-007-9165-9>
- 13 Tubío-Fungueiriño, M., Cruz, S., Sampaio, A., Carracedo, A., & Fernández-Prieto, M. (2021).
14 Social Camouflaging in Females with Autism Spectrum Disorder: A Systematic Review.
15 *Journal of Autism and Developmental Disorders, 51*(7), 2190–2199.
16 <https://doi.org/10.1007/s10803-020-04695-x>
- 17 Volkmar, F. R., Reichow, B., & McPartland, J. (2012). Classification of autism and related
18 conditions: Progress, challenges, and opportunities. *Dialogues in Clinical Neuroscience,*
19 *14*(3), 229–237. www.dialogues-cns.org
- 20 Wells, A. (1985). Relationship between private self-consciousness and anxiety scores in
21 threatening situations. *Psychological Reports, 57*(3 II), 1063–1066.
22 <https://doi.org/10.2466/pr0.1985.57.3f.1063>
- 23 Witwer, A. N., & Lecavalier, L. (2010). Validity of comorbid psychiatric disorders in youngsters

1 with autism spectrum disorders. *Journal of Developmental and Physical Disabilities*, 22(4),
2 367–380. <https://doi.org/10.1007/s10882-010-9194-0>

3 Zimmer-Gembeck, M. J. (2016). Peer Rejection, Victimization, and Relational Self-System
4 Processes in Adolescence: Toward a Transactional Model of Stress, Coping, and
5 Developing Sensitivities. *Child Development Perspectives*, 10(2), 122–127.
6 <https://doi.org/10.1111/cdep.12174>

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1 **Table 1** *Sample characteristics*
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	Total	ASD	NT	Sig. Dif.
	<i>n (%) / M (SD)</i>			
<i>n</i>	80	40	40	
Age	13.18 (1.91)	13.21 (1.94)	13.25 (1.9)	$t(78) = .14, p = 0.892$
Gender				
Male	100%	100%	100%	
Race				$p = 0.263$
Caucasian	72 (90%)	38 (95%)	34 (85%)	
Other ^a	8 (10%)	2 (5%)	6 (15%)	
Income				$\chi^2(6) = 17.27, p = .008$
Under 15K	4 (5%)	3 (7.5%)	1 (2.5%)	
15-24,999	5 (6.25%)	4 (10%)	1 (2.5%)	
25-34,999	6 (7.5%)	4 (10%)	2 (5%)	
35-49,999	7 (8.75%)	7 (17.5%)	0 (0%)	
50-74,999	18 (22.5%)	5 (12.5%)	13 (32.5%)	
75-99,999	19 (23.75%)	10 (25%)	9 (22.5%)	
100K+	20 (25%)	6 (15%)	14 (35%)	
Missing	1 (1.25%)	1 (2.5%)	0 (0%)	

3 ^aIn the ASD group, 2 participants were Multiracial. In the NT group, 3 participants were
 4 Multiracial, 2 participants were Asian, and 1 participant was Black.
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Table 2 Comparisons of ASD symptom severity, internalizing symptoms, and friendship outcomes for the NT and ASD groups

	ASD	NT	Sig. Dif.
	<i>n (%) / M (SD)</i>		
SRS-2	76.33 (9.67)	43.26 (3.7)	$t(75) = 19.72, p < .001$
CBCL Anxious/Depressed	6.92 (4.85)	1.95 (2.28)	$t(76) = 5.79, p < .001$
Having a best friend			$p < .001$
Yes	16 (40%)	34 (85%)	
No	22 (55%)	5 (15%)	
Missing	2 (5%)	0 (0%)	
Having a group of close friends			$p < .001$
Yes	17 (42.5%)	37 (92.5%)	
No	22 (55%)	3 (7.5%)	
Missing	1 (2.5%)	0 (0%)	
Time spent with friends			$\chi^2(1) = 10.75, p = .001$
At least once per week	15 (37.5%)	30 (75%)	
Less than once per week	24 (60%)	10 (25%)	
Missing	1 (2.5%)	0 (0%)	
Number of close friends	1.47 (1.91)	3.8 (1.53)	$t(73) = -5.84, p < .001$

5 ^aThe Social Responsive Scale-2 (SRS-2) T-score reflects the sum of responses which serves as
6 an index of severity of social skills across the autism spectrum.
7 ^bThe Child Behavioral Checklist (CBCL) Anxious/Depression scale is an empirically derived
8 syndrome scale. The raw score provides a sum of scored responses consistent with
9 anxious/depression symptomology and reflects the absolute level of problems.

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1 **Table 3** Multiple group regressions examining associations between clinical and demographic
 2 characteristics and friendship for NT and ASD groups

	ASD	NT
	<i>B (SE), p</i>	<i>B (SE), p</i>
Having a best friend		
CBCL Anxious/Depressed raw score	.02 (.09), <i>p</i> = .855	.15 (.24), <i>p</i> = .541
SRS T-score	.02 (.05), <i>p</i> = .692	-.01 (.17), <i>p</i> = .947
Age	-.02 (.21), <i>p</i> = .908	-.46 (.41), <i>p</i> = .256
Income	.12 (.21), <i>p</i> = .578	.28 (.33), <i>p</i> = .399
Having a group of close friends		
CBCL Anxious/Depressed raw score	.26 (.12), <i>p</i> = .032	.73 (.79), <i>p</i> = .359
SRS T-score	-.11 (.06), <i>p</i> = .066	-.12 (.20), <i>p</i> = .547
Age	.02 (.20), <i>p</i> = .938	-.20 (.45), <i>p</i> = .660
Income	-.20 (.19), <i>p</i> = .287	-1.33 (.54), <i>p</i> = .015
Number of close friends		
CBCL Anxious/Depressed raw score	.19 (.07), <i>p</i> = .007	.06 (.10), <i>p</i> = .547
SRS T-score	-.08 (.03), <i>p</i> = .021	.12 (.08), <i>p</i> = .166
Age	-.12 (.17), <i>p</i> = .460	-.09 (.18), <i>p</i> = .631
Income	-.23 (.18), <i>p</i> = .193	-.26 (.18), <i>p</i> = .152
Contact with friends		
CBCL Anxious/Depressed raw score	-.01 (.09), <i>p</i> = .902	-.03 (.13), <i>p</i> = .840
SRS T-score	.04 (.04), <i>p</i> = .393	-.02 (.11), <i>p</i> = .848
Age	-.13 (.19), <i>p</i> = .498	-.29 (.27), <i>p</i> = .282
Income	-.26 (.21), <i>p</i> = .221	-.39 (.30), <i>p</i> = .191

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1 **Table 4** Differences in CBCL Anxious/Depressed beta coefficients and friendship variables for
 2 ASD and NT groups

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	Group differences		
	in <i>B</i> ^a	χ^2	<i>p</i>
Having a best friend	-0.13	$\chi^2 (1) = .26$	0.607
Having a group of close friends	-0.47	$\chi^2 (1) = .34$	0.558
Number of close friends	0.13	$\chi^2 (1) = 1.19$	0.275
Contact with friends	0.02	$\chi^2 (1) = .01$	0.919

4 ^aGroup differences are ASD minus NT

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