LATE REFERRAL FOR AUTISM ASSESSMENT: AN INVESTIGATION OF ADOLESCENTS AND YOUNG ADULTS ADMITTED TO A PSYCHIATRIC HOSPITAL

by

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STATEMENT OF DISSERTATION APPROVAL

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ABSTRACT

This study explored the characteristics of adolescents and young adults referred for testing to rule out Autism Spectrum Disorder (ASD) while admitted to a psychiatric hospital for inpatient or day treatment between 2012 and 2017. Data regarding social-developmental, psychiatric, and ASD-symptom variables were collected from an archival database. Seventy-five files belonging to individuals between the ages of 13 and 25 at the time of admission were included. Forty-six participants (61%) were male, and 29 participants (39%) were female. Forty-two patients (56%) were diagnosed with ASD at time of discharge, and 33 patients (44%) were not.

Regression analyses were conducted to compare the ASD and non-ASD groups. Participants in the non-ASD group were more likely to be the first-born child in their family and had a greater number of symptoms related to obsessive-compulsiveness and psychosis. Individuals in the ASD group were more likely to use stereotyped or idiosyncratic language, display poor social response, use few emphatic and/or emotional gestures, and demonstrate limited acceptance of responsibility for their own behavior. Participants diagnosed with ASD were shown to be more impaired in terms parent-reported social awareness and self-reported social motivation compared to those in the non-ASD group. Qualitatively, a discharge diagnosis of ADHD was common for the ASD group, while substance use disorders were prevalent in the non-ASD group.

For the total sample, the most common reason for hospital admission was risk of

self-harm. Individuals in both groups had extensive psychiatric histories and had previously accessed various treatments. Most participants had been tried on four or more psychotropic medications, and nearly half received three or more diagnoses at discharge. The most common diagnoses both prior to admission and at discharge were depressive and anxiety disorders. These patients were typically referred for ASD evaluation due to social interaction difficulties and rigidity.

The retrospective design of this study presents multiple limitations. The data collected were limited to the information available in patients' charts, and the researchers were unable to address inconsistencies in these files. Future studies using prospective designs would allow researchers to obtain more detailed information and clarification on study variables.

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CHAPTER I

INTRODUCTION

An autism spectrum disorder (ASD) is defined in the American Psychiatric Association (APA) *Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition* (DSM-5; APA, 2013) as a neurodevelopmental disorder that involves persistent social communication and interaction weaknesses as well as repetitive and/or restricted behaviors. According to the DSM-5, social deficits of ASD individuals include problems with social-emotional reciprocity, nonverbal communication, and social relationships, and they often demonstrate restricted interests and repetitive behaviors by stereotyped movements or language, rigid thinking and/or behavior, narrow interests, and atypical response to sensory input. Although core symptoms tend to persist over a lifetime (Howlin, Moss, Savage, & Rutter, 2013), the severity of symptoms often fluctuates depending on factors such as age (Esbensen, Seltzer, Lam, & Bodfish, 2009; Howlin et al., 2013; Shattuck et al., 2007) and the effectiveness of interventions (e.g., Kokina & Kern, 2010; Virués-Ortega, 2010; Whalon, Conroy, Martinez, & Werch, 2015).

Current prevalence estimates of ASD from the Centers for Disease Control and Prevention's (CDC) Autism and Developmental Disabilities Monitoring (ADDM) Network (https://www.cdc.gov/ncbddd/autism/data.html) indicate that 1 in 68 eight-year-old children meet the criteria for ASD (Christensen et al., 2016). The CDC report also

noted that the prevalence of diagnosis is significantly higher in males than females, with males being more than 4.5 times more likely than females to have ASD. The CDC's current prevalence estimates for non-Hispanic, White children are 1.2 times higher than estimates for Black children and 1.5 times higher than estimates for Hispanic children.

According to the DSM-5 (APA, 2013), in order for an individual to be diagnosed with ASD, there must be evidence of symptom emergence during early childhood. A diagnosis, however, may not be made until a much later age. Some of the factors that are thought to contribute to later diagnosis include milder autistic symptoms, as well as a lack of knowledge about autism by the caregiver and others who interact with the child, such as family members, day care workers, and pediatricians (Daniels & Mandell, 2014). Behavioral problems in young children, however, can mask the presentation of ASD symptoms, especially when the child does not have more severe or obvious autistic traits such as self-stimulatory and/or self-harming behaviors (see Lai & Baron-Cohen, 2016; Levy et al., 2010; Meera, Kaipa, Thomas, & Shivashankar, 2013). Detracting behaviors can lead to "diagnostic overshadowing;" that is, a clinician's misattribution of an individual's symptoms to a particular condition while overlooking the primary disorder (Reiss, Levitan, & Szyszko, 1982). Researchers have found psychiatric problems that overshadow autistic symptoms in cases of ASD (Meera et al., 2013), and, in some cases, have caused a delay in an ASD diagnosis (Aggarwal & Angus, 2015).

Autistic Traits Among Those With Psychiatric Disorders

Among individuals diagnosed with psychiatric disorders, studies have also shown that there are those who display ASD traits. For example, within a sample of youth

receiving mental health treatment, Fraser et al. (2012) reported that approximately 8% of patients exhibited ASD-like traits, but had never been diagnosed with ASD. Individuals with schizophrenia and bipolar disorder have also been found to exhibit higher levels of ASD traits than unaffected samples (Matsuo et al., 2015). Research from other studies has shown elevated ASD characteristics among children and adults diagnosed with depression and anxiety (Geurts, Stek, & Comijs, 2016; Pine, Guyer, Goldwin, Towbin, & Leibenluft, 2008; Towbin, Pradella, Gorrindo, Pine, & Leibenluft, 2005). Moreover, pragmatic language deficits were found to be common in a sample of youth with conduct disorder (Gilmour, Hill, Place, & Skuse, 2004).

Comorbid Psychiatric Diagnoses

Psychiatric problems also are common among individuals with ASD (see Cidav, Lawer, Marcus, & Mandell, 2013; Lokhandwala, Khanna, & West-Strum, 2012; Moss, Howlin, Savage, Bolton, & Rutter, 2015; Wu, Kung, Li, & Tsai, 2015). Compared to typically developing peers, adolescents with ASD have been shown to have higher rates of psychiatric conditions (Backner, Clark, Jenson, Gardner, & Kahn, 2013), and are in greater need of treatment than those without ASD, due to increased functional impairment (Joshi et al., 2010). Adults with ASD have also been shown to have higher rates of comorbidity and greater impairment than adults who have psychiatric disorders but do not have ASD. In fact, a study by Moss et al. (2015) found that 28% of adults with ASD experienced severe psychiatric problems. The following section discusses the psychiatric problems that may co-occur with ASD, including internalizing disorders, externalizing disorders, schizophrenia spectrum disorders, bipolar disorder, and

obsessive-compulsive disorder.

Internalizing Disorders

Researchers have recommended that young people with ASD be regularly screened for internalizing disorders (Mayes, Calhoun, Murray, Ahuja, & Smith, 2011), given their high rate of symptoms related to anxiety, depression, and irritability (see Backner et al., 2013; Gotham, Brunwasser, & Lord, 2015; Mayes et al., 2011). For some individuals who have ASD, anxiety and depression may result from repeated negative interpersonal experiences (Tebartz van Elst et al., 2013). A recent meta-analysis showed that, in comparison to typically-developing peers, children with ASD experience significantly elevated levels of anxiety (e.g., Van Steensel & Heeman, 2017), showing effect sizes of .65 and 1.21 on self- and parent-report anxiety measures, respectively. These group differences were more pronounced for older youth and those with above-average IQ scores.

Depressive symptoms also appear to be common among ASD youth. Parent reports for a sample of youth with ASD without intellectual disability (ID) revealed that 54% experienced depressed mood and 88% exhibited irritability (Mayes, Calhoun, Murray, Ahuja, & Smith, 2011). Furthermore, among children and adolescents with ASD, Mazzone et al. (2013) found that the number of parent- and clinician-rated depressive symptoms was higher than those for typically developing controls; in fact, the number of depressive symptoms reported for the ASD group was more similar to those of peers with a diagnosis of a major depressive disorder (MDD).

Oftentimes, these symptoms meet the threshold to warrant a comorbid diagnosis.

In fact, compared to the general population, people with ASD are more frequently diagnosed with internalizing disorders (see Buck et al., 2014; Hofvander et al., 2009; Lugnegård, Hallerbäck, & Gillberg, 2011; Russell et al., 2016). According to a meta-analysis of anxiety disorders in children and adolescents with ASD, approximately 40% met criteria for an anxiety disorder (Van Steensel, Bogels, & Perrin, 2011). Across studies, 30% of participants were diagnosed with specific phobia and 17% were diagnosed with a social anxiety disorder. It is also important to note that these rates are elevated in comparison to population-based lifetime prevalence estimates for youth with anxiety disorders (i.e., 32.4% for any anxiety disorder, 20% for specific phobia, and 8.6% for social phobia; Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012).

In a review of depression in children with ASD, Magnuson and Constantino (2011) noted that comorbidity prevalence estimates vary widely due to issues such as overlap between the two disorders and atypical depressive symptom presentations in individuals with ASD. High rates of depression are more consistently reported for youth and adults with ASD, however, who do not have co-occurring ID (Buck et al., 2014). Among a sample of adolescents with ASD without ID, Backner et al. (2013) found that 46% had been diagnosed with depression. In a study which included young adults with Asperger's disorder, 70% of the sample had experienced a major depressive episode, and 50% had recurrent episodes (Lugnegård, Hallerbäck, & Gillberg, 2011). In a study by Hofvander et al. (2009), among adults with ASD without ID, 54% had a lifetime diagnosis of a mood disorder. These frequencies are higher than the lifetime prevalence estimate of depression of 20.9% reported by Kessler et al. (2012) for adults ages 18 to 64 in the general population.

Externalizing Disorders and Behaviors

Symptoms related to attention-deficit/hyperactivity disorder (ADHD) are also common among individuals with ASD (Mayes, Calhoun, Mayes, & Molitoris, 2012). Researchers have found both inattention and impulsivity to co-occur with ASD symptoms across each ASD symptom domain (i.e., social, communication, and restricted and/or repetitive interests or behaviors; Ronald, Larsson, Anckarsäter, & Lichtenstein, 2014). Mayes et al. (2012) also found that children with ASD and those with ADHD both demonstrated weaknesses on neuropsychological tasks involving attention, working memory, and processing speed. Given these overlaps, youth with ASD are diagnosed with ADHD more frequently than their typically developing peers (Backner, 2012; Stevens, Peng, & Barnard-Brak, 2016). Using survey data collected by the CDC, Stevens et al. (2016) found that 42% of individuals with ASD without ID had comorbid ADHD, which is far higher than the estimated 7.2% estimated rate of ADHD in the general population (Thomas, Sanders, Doust, Beller, & Glasziou, 2015). Some studies have shown that elevated rates of ADHD in individuals with ASD continue into adulthood, with reported frequencies of 30% (Hofvander et al., 2009) and 39% (Joshi et al., 2013). In addition to potential comorbidity with ADHD, differential diagnosis should also be considered, as individuals with ASD are sometimes initially misdiagnosed as having ADHD (Mayes et al., 2012; Tebartz van Elst et al., 2013). For example, a behavioral outburst may be interpreted as impulsivity, when in fact it is due to a change in routine (Tebartz van Elst et al., 2013).

Regarding other externalizing behaviors, parent reports revealed a significantly higher level of aggression among a sample of adolescents with ASD in comparison to a

typically-developing control group (Backner et al., 2013). As far as diagnosed behavior disorders, a review of the literature showed prevalence rates for oppositional defiant disorder (ODD) among youth with ASD ranging from 4% to 37%, with a median of 16% (Kaat & Lecavalier, 2013). For conduct disorder (CD), prevalence rates among youth with ASD were between 1% and 10%, with a median of 3.1%. In a clinical sample of adults with ASD, Joshi et al. (2013) found that 53% of participants had a lifetime diagnosis of ODD. These rates of appear to be elevated, in comparison to estimated prevalence rates of 6.5% for ODD and 2.2% for CD in the general population (Merikangas et al., 2010). It is important to note that underlying social/communication weaknesses can play a role in externalizing behaviors; among a sample of children diagnosed with CD, researchers determined that a subset of the sample had undiagnosed ASD (Gilmour, Hill, Place, & Skuse, 2004).

Schizophrenia Spectrum Disorders

Compared to age-matched control participants, individuals with ASD have been found to be at increased risk for psychosis, with odds ratios ranging from 2.81 to 12.3 (Selten, Lundberg, Rai, & Magnusson, 2015; Sullivan, Rai, Golding, Zammit, & Steer, 2013). Among individuals with psychotic disorders, a systematic review by Kincaid, Doris, Shannon, and Mulholland (2017) showed a wide variability in the prevalence of ASD diagnosis (0.78 to 52% among participants with psychosis). Across studies, the median rate of ASD among individuals with psychosis was 5.6%. Potential misdiagnosis may contribute to increased reports of the prevalence of schizophrenia spectrum disorder symptoms among individuals with ASD (Davidson, Greenwood, Stansfield, & Wright,

2014; Van Schalkwyk, Peluso, Qayyum, McPartland, & Volkmar, 2015), as thought patterns and behaviors associated with core ASD symptoms may be mistaken for signs of psychosis (Cochran, Dvir, & Frazier, 2013). For example, atypical preoccupations may be misjudged as delusional thinking, while stereotyped language and actions may be misinterpreted as disorganized thoughts and behaviors.

Bipolar Disorder

According to recent reviews of the literature, comorbid bipolar disorder is estimated to occur in 7% of individuals with ASD (Skokauskas, & Frodl, 2015), with reported rates ranging from 6% to 21% across studies of adults with Asperger's disorder (Vannucchi et al., 2014). Conversely, bipolar disorder is estimated to occur in only approximately 3% of the general population (Kessler et al., 2012). Further, in a recent population-based study, individuals with ASD without cognitive impairment were more likely to also be diagnosed with bipolar disorder than an age/sex-matched control group (Selten et al., 2015). Specifically, the adjusted odds ratios for bipolar diagnosis were 5.8 for individuals diagnosed with ASD before age 16 and 8.5 and for those diagnosed before age 28. These researchers found that siblings of individuals diagnosed with ASD by age 16 were also at increased risk for bipolar disorder compared to the control group; however, their level of risk (odds ratio 1.7) was less than that of the ASD group. Vannucchi et al. (2014) also found that a family history of bipolar disorder was elevated in this population.

Obsessive-Compulsive Disorder

Obsessions and compulsions are also common in individuals with ASD (Russell, Mataix-Cols, Anson, & Murphy, 2005). After differentiating symptoms related to OCD from the repetitive behaviors characteristic of ASD, Russell et al. (2005) found that approximately half of participants with ASD endorsed moderate impairment from OCD symptoms. As such, OCD is thought to be a common comorbid diagnosis. A meta-analysis in 2011 showed that 17% of youth with ASD also had a diagnosis of OCD (Van Steensel et al., 2011). In a sample of adults with ASD who were referred for psychiatric treatment, Joshi et al. (2013) also found that approximately 25% of the group reported having OCD. These rates appear to be elevated, as the lifetime prevalence of OCD in the general population is only estimated to be 2.3% (Ruscio, Stein, Chiu, & Kessler, 2010). Furthermore, the severity of OCD symptoms appears similar for youth with both ASD and OCD, compared to children who only have an OCD diagnosis (Lewin, Wood, Gunderson, Murphy, & Storch, 2011). It is important to note that, due to similarity in the appearance of certain symptoms, behaviors associated with ASD can be mistaken for those associated with OCD. For example, repetitive behaviors (e.g., rituals) demonstrated by individuals with ASD may be misinterpreted as compulsions (Tebartz van Elst et al., 2013).

ASD Diagnosis

Age of Diagnosis

Given the interrelatedness between ASD and psychiatric and behavioral problems, it is important to consider how these various symptoms may impact the timing of ASD

diagnosis. Researchers have found that ASD can be reliably diagnosed by the age of 2 (Corsello, Akshoomoff, & Stahmer, 2013) with the use of measures such as the Toddler Module of the *Autism Diagnostic Observation Schedule, Second Edition* (ADOS-2) which is normed on children as young as 12 months of age (Lord, Luyster, Gotham, & Guthrie, 2012). Children with ASD born after 2006 have been diagnosed, on average, at younger ages than children born before that time (Daniels & Mandell, 2014; Emerson, Morrell, & Neece, 2016; Mazurek et al., 2014). According to Christensen et al. (2016), the median age of ASD diagnosis is 4.2 years; however, studies between 2009 and 2014 have shown a range between 3 years and 6.8 years (e.g., Daniels & Mandell, 2014; Shattuck et al., 2009). Data show that children with ASD who do not have any language delays tend to be diagnosed later, with the median age of diagnosis found by Christensen et al. (2016) being 6.2 years (i.e., diagnosis of Asperger's Disorder using the DSM-IV-TR diagnosis of Asperger's Disorder).

Despite indications that ASD is being diagnosed earlier now than several years ago (Daniels & Mandell, 2014; Emerson, Morrell, & Neece, 2016), there are many instances of children being "missed" and diagnoses being not being made until later than expected based on research. In fact, a population-based study of elementary school students in the United Kingdom revealed that, for every five children who were found to have ASD, only three had a known diagnosis and the other two had not been identified prior to the study (Baron-Cohen et al., 2009). Additionally, the estimated rate of ASD in England based on an epidemiological study was 9.8 in 1,000 adults (Brugha et al., 2011). Within this sample, most participants who met the criteria for ASD had not previously been diagnosed, demonstrating that ASD had been undetected for many adults.

Factors Associated With Earlier Versus Later ASD Diagnosis

Various child and family factors have been shown to be associated with an earlier diagnosis of ASD. Those who are diagnosed at younger ages compared to older children and adults were found to have a higher level of symptom severity, greater degree of functional impairment, and increased need for support (see Brett, Warnell, McConachie, & Parr, 2016; Daniels & Mandell, 2014; Maenner, 2013; Salomone, Charman, Mcconachie, & Warreyn, 2016). There is also evidence that the presence of language or communication deficits is associated with earlier diagnosis (e.g., Bickel, Bridgemohan, Sideridis, & Huntington, 2015; Brett et al., 2016; Salomone et al., 2016), particularly for earlier birth cohorts (Fountain, King, & Bearman, 2011). Researchers have also found developmental regression (Mishaal, Ben-Itzchak, & Zachor, 2014; Rosenberg, Landa, Law, Stuart, & Law, 2011; Shattuck et al., 2009) and symptoms such as toe-walking, atypical play, and hand flapping to be related to earlier diagnosis (Mandell, Novak, & Zubritsky, 2005; Valicenti-McDermott et al., 2012).

Higher socioeconomic status (i.e., parent income and/or educational level) has also been found to be associated with earlier diagnosis of ASD (see Bickel, 2015; Daniels & Mandell, 2014; Emerson et al., 2016; Mazurek, 2014). Other factors associated with an earlier age of diagnosis include having an older sibling to whom parents can compare development and behavior (Bickel, Bridgemohan, Sideridis, & Huntington, 2015; Emerson, Morrell, & Neece, 2016; Fountain, et al., 2011; Mishaal et al, 2014), and being raised in the same home with both biological or adoptive parents (Jo et al., 2015).

There is variability, however, in the findings across studies with regard to both cognitive ability (Bickel et al., 2015; Daniels & Mandell, 2014; Mazurek et al., 2014) and

race/ethnicity (Daniels & Mandell, 2014). The systematic review conducted by Daniels and Mandell (2014) showed that two studies have found cognitive impairments to be associated with earlier ASD diagnosis; however, Daniels and Mandell noted that participants in those studies also had greater symptom severity, which might impact age of diagnosis. Furthermore, these researchers reported that one study found comorbid ID to be associated with later diagnosis, and additional researchers have found no significant relationship between cognitive ability and age of ASD diagnosis.

As far as race, Daniels and Mandell noted that three studies showed that Caucasian children tend to be diagnosed with ASD earlier than African-American children, while five studies found no relationship between race and age of ASD diagnosis. In a more recent study by Emerson, Morrell, and Neece (2016), these researchers found that children of ethnic/racial minority backgrounds were diagnosed with ASD earlier than Caucasian children; however, this relationship was moderated by symptom severity and having accessed continuous healthcare. Consistent care only predicted earlier diagnosis for Caucasian children.

In addition to variables that appear to facilitate earlier ASD diagnosis, there are a number of factors that may contribute to a delay in ASD diagnosis. This includes the degree to which social demands are placed on the child over time (APA, 2013). Some individuals learn strategies to better handle demands in the environment and mask their symptoms (see Baron-Cohen et al., 2009; Lai & Baron-Cohen, 2016; Tierney, Burns, & Kilbey, 2016). Females, particularly those without significant language delays or cognitive impairments, may be diagnosed with ASD later than males (Giarelli et al., 2010; Salomone et al., 2016) due to less impairment in social skills. Some children,

however, also have significant behavioral difficulties and/or psychiatric problems that mask symptoms at younger ages (see Daniels & Mandell, 2014). Although many of these individuals are referred for assessment and treatment to address behavioral and psychiatric problems, autistic symptoms may be neglected or overshadowed by the seriousness of these other concerns (e.g., extreme hyperactivity, impulsivity, and aggression). The following section addresses the way these problems may influence age of ASD diagnosis.

Impact of Psychiatric Comorbidity on Age of ASD Diagnosis

Past psychiatric diagnoses (Adelman, & Kubiszyn, 2017; Mazurek et al., 2014), as well as increased levels of current externalizing and internalizing symptoms, have been associated with later ASD identification (Mazurek et al., 2014). A surveillance study that identified children who met the criteria for ASD revealed that children with other diagnosed conditions were less likely to have a documented ASD diagnosis than children who did not have another diagnosis (i.e., psychiatric; Levy et al., 2010). Of the children who did have prior documentation of ASD, the presence of comorbid psychiatric problems was associated with later ASD diagnosis. In a recent study by Adelman and Kubiszyn (2017), these researchers found that children whose initial symptoms presented as behavioral difficulties tended to be diagnosed later than other children with ASD. Furthermore, parents' belief that a child's overall difficulties are caused by behavioral problems predicted later ASD diagnosis (Daniels & Mandell, 2014).

As far as specific psychiatric disorders, in a population-based study in Nova Scotia, Frenette et al. (2013) found that diagnosis of ASD was delayed approximately 1

year for children whose records revealed a history of ADHD. In a recent study using data provided by the CDC, researchers found even longer delays when ADHD symptoms were present. On average, children with both ASD and ADHD were diagnosed with ASD 3.5 years later than children who only had ASD (Stevens, Peng, & Barnard-Brak, 2016). These findings suggest that externalizing behaviors often associated with ADHD may have overshadowed these children's ASD characteristics. Significant internalizing symptoms, however, may also overshadow ASD symptoms. Meera et al. (2013) described a case in which severe symptoms of separation anxiety disorder initially masked the presence of a pervasive developmental disorder (PDD), thus delaying an accurate diagnosis of PDD.

Triggering Events for Later ASD Diagnosis

In some cases, during assessment or treatment for these other problems, questions have arisen as to whether the individual had ASD (Aggarwal & Angus, 2015). In a group of adolescents and young adults (ages 15 to 25) who were referred for an ASD evaluation, these researchers found that participants frequently presented with internalizing and psychotic symptoms. In another sample of later-referred individuals, Geurts and Jansen (2011) found that the most common concerns that prompted a referral to the mental healthcare system were social difficulties and internalizing symptoms. These researchers also found that nearly half of the participants in their study had received psychiatric diagnoses prior to a referral to rule out ASD. The most common diagnoses included anxiety disorders, mood disorders, and psychosis. Similarly, Happé et al. (2016) found that anxiety and depression were the most common diagnoses made

prior to a referral to rule out ASD.

Differences Between Referred-Diagnosed and Referred-Undiagnosed Groups

A few studies have been conducted to study the differences between later-referred individuals who were given an ASD diagnosis and those referred but not diagnosed with ASD. These studies often rely on retrospective review of mental health charts for adults being seen in a community setting. As seen below, each of the described studies compared individuals who were ultimately diagnosed with ASD and those who were not diagnosed with ASD using demographic, mental health, and autistic symptom data. In a study by Geurts and Jansen (2011), the ASD group was seen in a mental health clinic at a younger age, on average, than the referred-non-ASD group; however, the mean age at the time of ASD evaluation was comparable across groups. Other researchers have found that, at the time of ASD assessment, the average age of the individuals with ASD was younger than the average age of those referred but not diagnosed (Happé et al., 2016; Russell et al, 2016). Russell et al. (2016) also found the male-to-female ratio to be higher in the ASD group than in the referred-non-ASD group, while Happé et al. (2016) found similar male-to female ratios across groups.

Concerning differences in mental health variables, some researchers have found comparable rates of previous psychiatric diagnoses for ASD and referred-non-ASD groups (Happé et al., 2016; Russell et al. 2016). Conversely, in a study by Geurts and Jansen (2011), the referred-non-ASD group had a higher number of previous psychiatric diagnoses than the ASD group. In general, researchers have found the type of psychiatric

disorders to be similar across ASD and referred-non-ASD groups, with anxiety and depressive disorders being the most common diagnoses (Geurts & Jansen, 2011; Happé et al., 2016). There are some exceptions; in fact, Ketelaars et al. (2008) found that psychotic disorder not otherwise specified (NOS) was diagnosed more frequently in the referred non-ASD group than the ASD group. Further, a study by Russell et al. (2016) showed that obsessive-compulsive disorder (OCD) and anxiety disorders were more common for individuals referred and found to have ASD than those referred but not found to have ASD.

As far as ASD symptoms in later-referred individuals, in a pilot study by Ketelaars et al. (2008), researchers found that the Communication Domain of the Autism-Spectrum Quotient (AQ) test was elevated in the group diagnosed with ASD compared to a general psychiatric control group. However, no significant differences in AQ scores (i.e., Social Skill, Attention Switching, Attention to Detail, and Imagination) were found between the ASD group and the referred-non-ASD group.

Characteristics of Psychiatrically Treated Individuals With ASD

The current study examined the characteristics of later-referred ASD and non-ASD groups who were referred for evaluation in a psychiatric hospital setting. Compared to youth without ASD, children and adolescents with ASD have been found to be at increased risk for psychiatric hospitalization (Kalb, Stuart, Freedman, Zablotsky, & Vasa, 2012). Some researchers have found that 9% to 11% of individuals with ASD have had at least one inpatient psychiatric admission (Cidav, Lawer, Marcus, & Mandell, 2013; Mandell, 2008). According to Nayfack et al. (2014), between 1999 and 2009 the rate of

hospitalization for mental health treatment of adolescents with ASD significantly increased.

In individuals with ASD, psychiatric hospitalization may be required in response to aggressive/explosive behaviors in order to prevent harm to others (Dekeyzer, 2004; Mandell, 2008; Stark, Barnes, Young, & Gabriels, 2015). According to Bjørkly (2009), who reviewed the literature on violence risk among those with ASD, the misinterpretation of others' intentions and escaping sensory triggers were found to be associated with violent behaviors in approximately half of the incidents. Other researchers also identified several common antecedents of verbal and physical aggression and property destruction, including changes in routines and expectations, transitions, and the introduction of non-preferred tasks (Stark, Barnes, Young, & Gabriels, 2015).

Dekeyzer (2004) and Mandell (2008) found self-harm, suicidality, and depressive symptoms to be other common reasons for hospital admissions among individuals with ASD. As far as suicidality in youth with ASD, two recent systematic reviews revealed variability in the estimates of suicidal behavior, with rates of suicidal behavior ranging from 7% to 50% across studies; these researchers also noted methodological weaknesses within the literature (Hannon & Taylor, 2013; Segers & Rawana, 2014). Despite the paucity of research available, Segers and Rawana were able to identify several risk factors for suicidality, including history of being bullied and behavioral problems.

Purpose of the Current Study

The current study was conducted to help determine factors that may be associated with a later ASD diagnosis. To address this, the present study sought to better understand

a population whose referral for testing to rule out ASD occurred during adolescence or young adulthood following significant deterioration in functioning warranting hospital treatment.

Research Questions

Three major research questions were addressed in this study pertaining to the differences between those diagnosed with ASD and those who are not, in the following areas:

- Demographic and social-developmental history.
- History and severity of psychiatric symptoms and any associated psychiatric treatment.
- History and severity of core ASD symptoms.

1. **What are the differences between those diagnosed with ASD and those not diagnosed with ASD with regard to demographic and social-developmental history (e.g., age, sex, birth order)?** This question was assessed using the patients' history and physical report, admission notes, ASD assessment report, and discharge summary.
2. **What is the demographic and social-developmental history of those diagnosed with ASD?** This question was assessed using the patients' history and physical report, admission notes, ASD assessment report, and discharge summary.
3. **What is the demographic and social-developmental history of those not diagnosed with ASD?** This question was assessed using the patients' history and physical report, admission notes, ASD assessment report, and discharge summary.

4. **What are the differences between those diagnosed with ASD and those not diagnosed with ASD with regard to history and severity of psychiatric symptoms (e.g., symptom history prior to and at the time of hospitalization and referral for testing)?** This question was assessed using the patients' history and physical report, comprehensive diagnostic examination, admission notes, and discharge summary.
5. **What is the history and severity of psychiatric symptoms and any associated psychiatric treatment of those diagnosed with ASD?** This question was assessed using the patients' history and physical report, comprehensive diagnostic examination, admission notes, and discharge summary.
6. **What is the history and severity of psychiatric symptoms and any associated psychiatric treatment of those not diagnosed with ASD?** This question was assessed using the patients' history and physical report, admission psychiatric examination, admission notes, and discharge summary.
7. **What are the differences between those diagnosed with ASD and those not diagnosed with ASD with regard to the history and severity of core ASD symptoms?** This question was assessed using information from the ASD assessment report, ADOS-2 Scores, *Social Responsiveness Scale-Second Edition* (SRS-2) Scores, and *Social Communication Questionnaire* (SCQ) Scores.
8. **What is the history and severity of core ASD symptoms of those diagnosed with ASD?** This question was assessed using information from the ASD assessment report, ADOS-2 Scores, SRS-2 Scores, and SCQ Scores.
9. **What is the history and severity of core ASD symptoms of those not diagnosed**

with ASD? This question was assessed using information from the ASD assessment report, ADOS-2 Scores, SRS-2 Scores, and SCQ Scores.

CHAPTER II

METHODS

Participants

Electronic and paper files of adolescents and young adults from an archival client database at a university-affiliated psychiatric hospital were reviewed. Only charts belonging to individuals who were referred for ASD assessment between the years 2012 and 2017 were included in the study. All files belonged to individuals who had already been discharged from the hospital. In order to be included in the study, patient files were required to be complete, including an intake summary, raw test data from the ADOS-2 Module 4, and a discharge note. Exclusionary criteria included the patient being outside of the specified age range (13-29), indication of intellectual disability (ID), and the patient having a previous diagnosis or classification of ASD.

Procedures

The faculty supervisor, who is a licensed psychologist, a member of the hospital staff, and a professor in the Educational Psychology department, reviewed electronic and paper charts of patients who were seen for ASD testing to determine eligibility for inclusion in the study. The primary rater examined the selected files to determine if information required for the study was included (i.e., ADOS-2 test form, initial

psychiatric notes, and discharge summary). In addition, records were reviewed to ensure that demographic and other data could be coded relevant to the study, including age at the time of referral, symptom presentation, psychiatric diagnoses, and treatment history. These data were then transferred to a password-protected coding sheet (see Appendix B). To protect confidentiality, names were replaced with identification numbers without connection to the patients' medical records so no participant could be identified by name or any other background information.

A total of 98 files were reviewed for inclusion in this study. Of these files, 23 files were excluded for reasons such as incomplete data or the potential participant not meeting the eligibility criteria. Thirteen files did not meet inclusion criteria due to a previous diagnosis or educational classification of ASD, while four files belonged to individuals with a diagnosis of ID. An additional four files were excluded because the patients were outside of the study age range, and one individual showed evidence of ID and was also outside of the specified age range. One file was excluded because the examiner was unable to rule out ASD due to unavailability of parents to provide developmental history information.

Interrater Reliability

All charts were coded by the primary rater, a seventh-year school psychology doctoral student. In order to assess interrater reliability, twenty files (27%) were coded by a second rater, a school psychology master's student who had completed the first year of study. Cohen's kappa coefficients, which assess agreement between raters beyond what is expected by chance, were calculated. A kappa coefficient less than 0.80 suggests

inconsistent coding and indicates that the variable is not considered to be reliable. Efforts were made to increase reliability through training and reviewing coding procedures for clarification, and kappa coefficients were calculated for all variables included in the regression analyses as well as several additional variables. With the exception of number of depressive symptoms, all regression variables had reliability coefficients at or above 0.80. Kappa coefficients can be found in Appendix A.

Instruments

Data for several variables were collected and recorded on the coding sheet (see Appendix B), which was developed for the current study. Patient demographic information, such as age, sex, and race were included. Diagnostic (i.e., past and discharge diagnoses), medication (i.e., past and discharge medications), and treatment (e.g. length of stay, previous treatments accessed) history were recorded. Developmental (e.g., developmental delays, regression), social (e.g., birth order, living situation), educational (e.g., services received), and family psychiatric history (e.g., maternal diagnoses, paternal diagnoses) variables were also recorded. Additionally, the patient's history of behavioral (e.g., substance use, legal involvement), psychiatric (i.e., symptoms related to DSM-5 diagnoses), and ASD symptom (e.g., reason referral for ASD testing, ADOS-2 scores) histories were included on the coding sheet. Information was recorded based on the nature of the variable. For example, certain variables, such as ADOS-2 scores, were recorded as numbers, while other information was categorical (e.g., medications, diagnoses). On the coding sheet, the rater was able to clarify any symptoms or behaviors that were reported.

Autism Diagnostic Observation Schedule, Second Edition

The *Autism Diagnostic Observation Schedule, Second Edition* (ADOS-2; Lord et al., 2012) is a standardized, semistructured, clinician-administered series of tasks and interview questions designed for ASD assessment. All participants had been administered Module 4 of the ADOS-2, which is used with adolescents and adults who possess fluent language skills. Module 4 consists of 15 activities, and administration requires approximately one hour. This instrument evaluates language and communication, reciprocal social interaction, imagination, stereotyped behaviors, restricted interests, and other abnormal behaviors through a series of items coded by the examiner. On the ADOS-2, each item is rated from zero, representing relatively typical behavior, to either two or three, which correspond to markedly atypical behavior. Certain items may not be coded if the examiner is unable to observe them (e.g., if the examinee does not use gestures due to a physical disability).

The ADOS-2 has a scoring algorithm, which includes select items; for scoring, ratings of three are converted to scores of two, and items that cannot be coded are converted to zero. Communication and Reciprocal Interaction scores are calculated, which are combined into the Communication + Social Interaction Total; Imagination/Creativity and Stereotyped and Restricted Interests are each scored as separate domains. Cutoff scores are provided for Communication ("autism spectrum" 2; "autism" 3), Social Interaction ("autism spectrum" 4; "autism" 6), and Communication + Social Interaction ("autism spectrum" 7; "autism" 10) totals. If an individual meets the cutoff scores in each of these areas, the suggested classification for the individual is "autism;" if all scores do not meet the autism cutoff but do meet the "autism spectrum"

cutoff, the suggested classification for the individual is “autism spectrum” disorder. The ADOS-2 has strong psychometric properties (Lord et al., 2012). Exact agreement was found across raters for 80% of items in Modules 4. Correlations between each item and its domain (e.g., Communication, Social-Interaction) ranged from 0.50 to 0.88, and these within-domain relationships were stronger than those across domains. For the overall “autism” classification, the manual reports sensitivity and specificity values of 90% and 93%, respectively. Using the scoring algorithm Module 4, Fusar-Poli et al. (2017) found a positive predictive value of 91.8 and a negative predictive value of 72.5.

Social Responsiveness Scale-Second Edition (SRS-2)

The *Social Responsiveness Scale-Second Edition* (SRS-2) – School-Age, Adult (Relative/Other Report), and Adult (Self-Report) Forms (Constantino & Gruber, 2012) are questionnaires which assess symptoms related to ASD in children, adolescents, and adults. The School-Age form consists of 65 items and can be completed by an individual’s parent, other custodial adult, teacher, or other specialist. The Adult Form is completed by a relative or friend, and individuals ages 19 and older can complete the Adult Self-Report form. Respondents rate a series of items on a Likert scale ranging from 1, which represents “not true,” to 4, which represents “almost always true.” All forms provide an SRS-2 Total score and DSM-5 compatible scales for Social Communication and Interaction (SCI) and Restricted Interests and Repetitive Behaviors (RRB). The following treatment subscales are also calculated: Social Awareness (Awr), Social Cognition (Cog), Social Communication (Com), Social Motivation (Mot), and Restricted Interests and Repetitive Behavior (RRB). The SRS-2 demonstrates strong internal

consistency; alpha values ranged from .92 to .95 across age groups (Constantino & Gruber, 2012). Interrater reliability across parent and teacher report on the school age form was $r = 0.61$. On the adult form, interrater reliability ranged from $r = 0.61$ to 0.78 when comparing self-report to various observers (e.g., parent, spouse) and from $r = 0.69$ to 0.95 when comparing two observer reports. For a *T* score greater than 60, the manual notes a sensitivity value of 0.93 and a specificity value of 0.91.

Social Communication Questionnaire

The *Social Communication Questionnaire* (SCQ) Lifetime form is a questionnaire designed to screen for ASD (Rutter, Bailey, & Lord, 2003). It consists of 40 questions regarding the presence or absence of specific behaviors, which is completed by the individual's parent or another observer who knows the individual well. The respondent chooses "yes" or "no" for each item, and the number of items endorsed by the rater is summed. Scores of 15 and above are considered to indicate possible ASD, and further evaluation is indicated. The SCQ *Lifetime* form includes behavior from the individual's early developmental period through the present; half of the items address the individual's behavior between the ages of four and five. Alpha coefficients for internal consistency were between 0.81 and 0.93. Using a cut-off score of 15, this measure demonstrated a positive predictive value of 0.93 and a negative predictive value of 0.55. The sensitivity value was found to be 0.85, while the specificity value was 0.75. Some studies, however, found lower sensitivity (0.64) and specificity (0.72) values using the cutoff of 15; these researchers recommended using a cutoff score of 10 (Barnard-Brak, Brewer, Chesnut, Richman, & Schaeffer, 2016).

Analyses

Participant data were analyzed for two groups, those diagnosed with ASD (referred to in this study as the ASD group) and those not diagnosed with ASD (referred to in this study as the non-ASD group). For the majority of variables, participants were not divided into any further groups; however, for current school/employment status, descriptive results were categorized according to the participants' age (i.e., 18 and younger vs. 19 and older). For current educational variables (e.g., academic problems, behavioral problems), descriptive data were only provided for participants in the 18 and younger group, as this information was often not available for the older group.

Statistical analyses were completed using the IBM SPSS software. Binary logistic regression was used to determine significant predictors of diagnostic group (i.e., ASD or non-ASD). Social-developmental (e.g., age, sex, birth order) and psychiatric variables (e.g., number of diagnoses at admission, number of anxiety symptoms) were included in two separate regression analyses. Due to variability in the number of forms available, separate binary logistic regression analyses were conducted for the following ASD variables: ADOS-2 item ratings, SRS-2 Parent Report treatment scale *t* scores, SRS-2 Self Report treatment scale *t* scores, and SCQ Lifetime items endorsed during the developmental period between ages 4 and 5. In order to summarize the history and characteristics of participants, descriptive statistics were calculated; these included frequencies and percentages for categorical variables (e.g., discharge diagnoses) and means and standard deviations for continuous variables (e.g., SRS-2 *t* scores).

CHAPTER III

RESULTS

Characteristics of Participants

Participants included 42 (56%) individuals who were diagnosed with ASD and 33 (44%) individuals who were not diagnosed with ASD. For those evaluated prior to use of the DSM-5, individuals diagnosed with Autistic Disorder, Asperger's Disorder, or Pervasive Developmental Disorder-Not Otherwise Specified were included in the ASD group. Of the total sample, 71 individuals (95%) reported being non-Hispanic/Caucasian. One participant (1%) identified as Hispanic/Caucasian, and one participant (1%) was biracial. Race/ethnicity information was unavailable for two participants (3%). Thirty-eight participants (51%) were admitted to the adolescent or adult inpatient unit for acute treatment, while 15 individuals participated in both inpatient and day treatment (20%). Sixteen (21%) participants were admitted for inpatient comprehensive assessment and treatment, while six (8%) individuals received day treatment exclusively.

Results of Research Question 1

1. What are the differences between those diagnosed with ASD and those not diagnosed with ASD with regard to demographic and social-developmental history?

Binary logistic regression yielded a model to predict diagnostic category (i.e., ASD or non-ASD), which accurately classified 57.1% of the ASD group and 73.9% of the non-ASD group (see Table 1). Birth order ($p = 0.040$) emerged as a significant predictor, with an odds ratio (*OR*) of 0.265, 95% confidence interval (*CI*) = 0.074–0.943). Nine individuals (21.4%) in the ASD group, and 17 individuals (51.5%) in the non-ASD group were first-born or only children (see Table 2). Twenty-three participants (54.8%) in the ASD group and 12 participants (36.4%) in the non-ASD group were born second or later. Age, developmental delay, sexuality, childhood abuse/trauma, childhood living situation, and other disability variables were nonsignificant and were excluded from the model.

Results of Research Questions 2 and 3

2. What is the demographic and social-developmental history of those diagnosed with ASD?
3. What is the demographic and social-developmental history of those not diagnosed with ASD?

Nonsignificant Variables Included in Social-Developmental History Regression Analysis

Demographic Information

The ASD group consisted of 57.1% males and 42.9% females, resulting in a male-to-female ratio of 4:3. The non-ASD group included 66.7% males and 33.3% females, which represents a 2:1 male-to-female ratio.

Table 1

Classification Accuracy: Social-Developmental History Regression Model

	Predicted Group		Percentage Correct
Observed Group	non-ASD	ASD	
non-ASD	12	9	57.1
ASD	6	17	73.9
Overall Percentage			65.9

Table 2

Birth Order of ASD and non-ASD Participants

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
First or Only	9	*21.4*	17	*51.5*
Second or Later	23	*54.8*	12	*36.4*
Younger Siblings, No Mention of Older	7	*16.7*	3	*9.1*
Unknown	3	*7.1*	1	*3.0*

At the time of hospital admission, the mean age was 16.64 years (standard deviation [*SD*]: 2.77) for the ASD group and 17.63 years (*SD*: 2.84) for the non-ASD group. Participants ranged in age from 13 to 25. Information regarding the number of participants of each age is provided in Table 3. Approximately half of participants in both groups were between the ages of 15 and 17.

History of Developmental Delays or Regression

The majority of participants in both groups did not experience any type of developmental delay or regression (see Table 4). Within the ASD group, 19.0% of files indicated that the individual showed a developmental delay, and within the non-ASD group, 18.2% of files revealed that the individual had experienced a developmental delay.

For those participants who experienced developmental delays or regression, (ASD: 21.4%; non-ASD 18.2%), Table 5 shows the type of delays endorsed. Approximately 10% of the ASD group experienced a motor and/or toileting delay, while among the non-ASD group, 12% of individuals showed a toileting delay.

Childhood Experiences

Approximately half of participants (ASD: 54.8%, non-ASD: 51.5%) were raised in two-parent households (see Table 6). For 17 participants (40.5%) in the ASD group and 12 non-ASD participants (36.4%), childhood living situation was inconsistent over time (e.g., parents divorcing, a parent remarrying). A history of childhood trauma or abuse was found in 45.2% of individuals from the ASD group and 27.3% of individuals from non-ASD groups, respectively (see Table 7).

Table 3

Number and Percentage of ASD and non-ASD Participants by Age at Time of Admission

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
13	4	*9.5*	1	*3.0*
14	5	*11.9*	2	*6.1*
15	6	*14.3*	4	*12.1*
16	7	*16.7*	6	*18.2*
17	10	*23.8*	8	*24.2*
18	4	*9.5*	1	*3.0*
19	0	*0.0*	2	*6.1*
20	2	*4.8*	4	*12.1*
21	0	*0.0*	2	*6.1*
22	1	*2.4*	1	*3.0*
23	1	*2.4*	0	*0.0*
24	2	*4.8*	1	*3.0*
25	0	*0.0*	1	*3.0*

Table 4

History of Developmental Delay or Regression

	ASD (*n* = 42)		non-ASD *n* = 33)	
	n	*%*	*n*	*%*
No Delay	30	*71.4*	25	*75.8*
Delay	8	*19.0*	6	*18.2*
Regression	1	*2.4*	0	*0.0*
Not in File	3	*7.1*	2	*6.1*

Table 5

Developmental Delay/Regression by Type

	ASD (*n* = 9)		non-ASD (*n* = 6)	
	n	*% of Total*	*n*	*% of Total*
Language	3	*7.1*	1	*3.0*
Motor	4	*9.5*	2	*6.1*
Social	0	*0.0*	3	*9.1*
Toileting	4	*9.5*	4	*12.1*

Note. Some individuals appear in multiple categories due to delays in more than one area.

Table 6

Childhood Living Situation

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Both Parents	23	*54.8*	17	*51.5*
Single Parent	1	*2.4*	4	*12.1*
Inconsistent	17	*40.5*	12	*36.4*
Unknown	1	*2.4*	0	*0.0*

Table 7

Childhood Abuse and Trauma History

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Yes	19	*45.2*	9	*27.3*
No	20	*47.6*	23	*69.7*
Unknown	3	*7.1*	1	*3.0*

Sexuality

Twenty-seven participants (64.3%) in the ASD group and 23 participants in the non-ASD (69.7%) group reported identifying as heterosexual (see Table 8). The next most common reported sexual preference was bisexuality (ASD group: 14.3%; non-ASD: 15.2%). Within the ASD group 5 individuals (11.9%) described their sexuality as being undetermined; only one individual (3.0%) in the non-ASD group identified as questioning/undetermined.

Learning Disability Status

In the ASD group, 9 individuals (21.4%) had a reported learning disability, while among the non-ASD group, 5 files (15.2%) revealed the individual had a history of a learning disability. Information regarding types of learning disabilities endorsed is provided in Table 9.

Additional Social-Developmental Variables

Not Included in Regression Analysis

Educational and Employment Information

Most individuals in the study were ages 18 and younger; consequently, the majority of participants were students enrolled in school at the time of hospitalization (ASD: 69.0%; non-ASD: 57.6%). Table 10 illustrates educational and/or employment status for the overall sample, and Table 11 shows participants' grade or level of education at the time of admission. Table 12 shows educational status specifically for participants ages 18 and younger. Four participants (3, 8.3% of ASD group; 1, 4.5% of non-ASD

Table 8

Sexuality

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Heterosexual	27	*64.3*	23	*69.7*
Questioning/Undetermined	5	*11.9*	1	*3.0*
Homosexual	2	*4.8*	1	*3.0*
Bisexual	6	*14.3*	5	*15.2*
Transgender	0	*0.0*	1	*3.0*
No Preference/Asexual	1	*2.4*	1	*3.0*
Not in File	1	*2.4*	1	*3.0*

Table 9

Learning Disability

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Unclear/Not Mentioned in File	9	*21.4*	7	*21.2*
Reported No Learning Disability	23	*54.8*	21	*63.6*
Unspecified Learning Disorder/Learning Disorder NOS	5	*11.9*	1	*3.0*
Language Processing Disorder (Only)	1	*2.4*	0	*0.0*
SLD-Reading (Only)	1	*2.4*	1	*3.0*
Nonverbal Learning Disability	1	*2.4*	1	*3.0*
Received Specialized Instruction, No Mention of LD	1	*2.4*	0	*0.0*
SLD-Reading and Receptive Language Disorder	0	*0.0*	1	*3.0*
SLD- Math	1	*2.4*	1	*3.0*

Table 10

School/Employment Status

	ASD (n = 42)		non-ASD (n = 33)	
	n	*%*	*n*	*%*
Employed	1	*2.4*	4	*12.1*
Student, In School	29	*69.0*	19	*57.6*
Student, Not Enrolled in School Due to Treatment	3	*7.1*	1	*3.0*
Student, Employed for Summer	1	*2.4*	0	*0.0*
Student, Expelled from Previous School	1	*2.4*	0	*0.0*
Student Engaging in School Refusal/May Drop Out	2	*4.8*	0	*0.0*
Student, On Home and Hospital	1	*2.4*	0	*0.0*
Currently Unemployed	3	*7.1*	7	*21.2*
Unable to Maintain School Engagement/Dropped Out	0	*0.0*	2	*6.1*
On Disability	1	*2.4*	0	*0.0*

Table 11

Grade or Level of Education at Time of Admission

	ASD (n = 42)		non-ASD (n = 33)	
	n	%	*n*	%
7th Grade	1	*2.4*	1	*3.0*
8th Grade	5	*11.9*	0	*0.0*
9th Grade	4	*9.5*	3	*9.1*
10th Grade	11	*26.2*	6	*18.2*
11th Grade	5	*11.9*	6	*18.2*
12th Grade	8	*19.0*	3	*9.1*
Dropped Out/Current School Refusal	0	*0.0*	2	*6.1*
Completed High School- Taking College Classes	4	*9.5*	4	*12.1*
Completed GED	0	*0.0*	1	*3.0*
Completed High School-Not Taking College Classes	3	*7.1*	7	*21.2*
Completed College	1	*2.4*	0	*0.0*

Table 12

School/Employment Status for Participants 18 Years Old and Younger

	ASD (*n* = 36)		non-ASD (*n* = 22)	
	n	*%*	*n*	*%*
Employed	1	*2.8*	2	*9.1*
Student, In School	28	*77.8*	17	*77.3*
Student, Not Enrolled in School Due to Treatment	3	*8.3*	1	*4.5*
Student, Expelled from Previous School	1	*2.8*	0	*0.0*
Student Engaging in School Refusal/May Drop Out	2	*5.6*	0	*0.0*
Student, On Home and Hospital	1	*2.8*	0	*0.0*
Dropped Out/Unable to Maintain School Engagement	0	*0.0*	2	*9.1*

Note. Data reflect responses from participants ages 18 and younger (36 ASD group, 22 non-ASD group).

group) were not enrolled in school due to having spent extensive time periods in various treatment programs (e.g., wilderness programs). Within the ASD group, one individual (2.8%) had been expelled from school immediately prior to admission, two participants (5.6%) were engaging in school refusal or were considering dropping out, and one (2.8%) was enrolled in school and receiving instruction through home and hospital services. Among the non-ASD group, two participants (9.1%) ages 18 and younger had dropped out of school.

For those in the younger age group, academic difficulties, such as school failure, were reported in 14 files (38.9%) from the ASD group and 11 files (50.0%) from the non-ASD group (see Table 13). Behavioral difficulties in the school setting, including acting out and skipping classes, were reported in 12 ASD group files (33.3%) and 11 non-ASD group (50.0%) files (see Table 14). Among participants ages 19 and older, in the ASD group, three individuals (50.0%) were unemployed and one (16.7%) was on disability. In the non-ASD group, seven participants (63.6%) were unemployed (see Table 15).

For the overall sample, a history of receiving special education services was reported in 26.2% of files for the ASD group and 24.2% of files for the non-ASD group (see Table 16). Receipt of any educational services was denied by 21.4% of ASD-group participants and 36.4% of non-ASD group participants. Among those diagnosed with ASD, two individuals (4.8%) had received home and hospital services, and one file (2.4%) showed that the participant had a 504 plan; these services were not reported for any individuals in the non-ASD group.

Table 13

School Problems-Academic

	ASD (*n* = 36)		non-ASD (*n* = 22)	
	n	*%*	*n*	*%*
No Mention of Academic Difficulties	14	*38.9*	11	*50.0*
Academic Difficulties	22	*61.1*	11	*50.0*

Note. Participants older than 18 are excluded.

Table 14

School Problems-Behavioral

	ASD (*n* = 36)		non-ASD (*n* = 22)	
	n	*%*	*n*	*%*
No Report of Behavioral Problems at School	12	*33.3*	11	*50.0*
Behavioral Problems at School	24	*66.7*	11	*50.0*

Note. Participants older than 18 are excluded.

Table 15

School/Employment Status for Participants 19 Years Old and Older

	ASD (*n* = 6)		non-ASD (*n* = 11)	
	n	*%*	*n*	*%*
Employed	0	*0.0*	2	*18.2*
Student, In School	1	*16.7*	2	*18.2*
Student, Employed for Summer	1	*16.7*	0	*0.0*
Currently Unemployed	3	*50.0*	7	*63.6*
On Disability	1	*16.7*	0	*0.0*

Note. Data from participants over age 18 (6 ASD group, 11 non-ASD group).

Table 16

History of Receiving Educational Services

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Special Education Services	11	*26.2*	8	*24.2*
504 Plan	1	*2.4*	0	*0.0*
Home and Hospital	2	*4.8*	0	*0.0*
Pursuing Services	2	*4.8*	0	*0.0*
No Services	9	*21.4*	12	*36.4*
No Mention	17	*40.5*	13	*39.4*

Results of Research Question 4

4. What are the differences between those diagnosed with ASD and those not diagnosed with ASD with regard to history and severity of psychiatric symptoms (e.g., symptom history prior to and at the time of hospitalization and referral for testing)?

The model generated through binary logistic regression accurately classified 78.8% of the ASD and 56.7% of the non-ASD groups (see Table 17). Number of obsessive-compulsive symptoms ($p = 0.020$; $OR = 0.366$) and number of psychotic symptoms ($p = 0.039$; $OR = 0.442$) were significantly associated with the non-ASD group (see Table 18). In the two groups, obsessive-compulsive symptoms were not endorsed for the majority of participants (see Table 19); however, within the non-ASD group, 11 (33.3%) participants exhibited two obsessive-compulsive symptoms. Only one (2.4%) individual's file in the ASD group reported two obsessive-compulsive symptoms. One or more psychotic symptoms were reported in 8 (19%) of the ASD group files and 14 (42%) of the non-ASD group files (see Table 20).

Results of Research Questions 5 and 6

5. What is the history and severity of psychiatric symptoms and any associated psychiatric treatment of those diagnosed with ASD?
6. What is the history and severity of psychiatric symptoms and any associated psychiatric treatment of those not diagnosed with ASD?

Table 17

Classification Accuracy: Psychiatric History Regression Model

	Predicted Group		Percentage Correct
Observed Group	non-ASD	ASD	
non-ASD	17	13	56.7
ASD	7	26	78.8
Overall Percentage			68.3

Table 18

Psychiatric History Binary Logistic Regression Model

	β	*SE*	*OR*	95% CI	*p*
Number of Obsessive-Compulsive Symptoms	-1.006	0.433	0.366	0.157-0.855	0.020*
Number of Psychotic Symptoms	-0.871	0.396	0.442	0.203-0.961	0.039*

Note. *Significant ($p < 0.05$) for the non-ASD group.

Table 19

Reported Obsessive-Compulsive Symptoms

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Incomplete Review	3	*7.1*	0	*0.0*
No Symptoms Reported	31	*73.8*	19	*57.6*
1 Symptom	7	*16.7*	3	*9.1*
2 Symptoms	1	*2.4*	11	*33.3*

Table 20

Reported Psychotic Symptoms

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Unclear/Incomplete Review	3	*7.1*	1	*3.0*
No Symptoms Reported	31	*73.8*	18	*54.5*
1 Symptom	5	*11.9*	4	*12.1*
2 Symptoms	0	*0.0*	9	*27.3*
3 Symptoms	1	*2.4*	0	*0.0*
4 Symptoms	1	*2.4*	0	*0.0*
5 Symptoms	0	*0.0*	1	*3.0*
6 Symptoms	1	*2.4*	0	*0.0*
7 Symptoms	0	*0.0*	0	*0.0*

Nonsignificant Variables Included in Psychiatric History Regression Analysis

The following variables did not emerge as significant predictors in the psychiatric history binary logistic regression model: number of psychiatric diagnoses prior to admission, number of different medication trials prior to admission, number of non-ASD psychiatric diagnoses at discharge, number of medications prescribed at discharge, and number of reported symptoms related to anxiety, depression, ADHD, bipolar disorder, and behavior problems.

Prior to admission, the majority of participants in both groups had been diagnosed with at least two psychiatric disorders (see Table 21) and had been tried on four or more medications (see Table 22). Most individuals in both groups received multiple, non-ASD psychiatric diagnoses at discharge. Among the ASD group, 43% of participants were diagnosed with at least three comorbid psychiatric disorders, and within the non-ASD group, 52% of participants were diagnosed with at least three psychiatric disorders (see Table 23). At discharge, nearly all participants (ASD group: 100%, non-ASD group: 97%) were prescribed at least one psychotropic medication. Eight-six percent of the ASD group and 88% of the non-ASD group was prescribed multiple psychiatric medications (see Table 24).

Regarding reported psychiatric symptoms, 18 participants (42.8%) in the ASD group and 17 of participants (51.5%) in the non-ASD groups were reported to have at least one symptom related to ADHD (see Table 25). The majority of individuals' files in both groups reported at least two anxiety symptoms (see Table 26); the mean numbers of anxiety symptoms were 2.51 (*SD* = 1.68) for the ASD group and 3.21 (*SD* = 1.85) for the

Table 21

Number of Previous Psychiatric Diagnoses Prior to Admission

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
No Reported Diagnoses	1	*2.4*	0	*0.0*
1 Reported Diagnosis	10	*23.8*	3	*9.1*
2 Reported Diagnoses	13	*31.0*	10	*30.3*
3 Reported Diagnoses	11	*26.2*	10	*30.3*
4 or More Reported Diagnoses	7	*16.7*	10	*30.3*

Table 22

Number of Different Medication Trials Prior to Admission

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
No Medications	2	*4.8*	0	*0.0*
1 Medication	7	*16.7*	2	*6.1*
2 Medications	5	*11.9*	4	*12.1*
3 Medications	6	*14.3*	4	*12.1*
4 or More Medications	22	*52.4*	23	*69.7*

Table 23

Number of Psychiatric Diagnoses at Discharge

	ASD* (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
1 Diagnosis	10	23.8	3	*9.1*
2 Diagnoses	14	33.3	13	*39.4*
3 Diagnoses	12	28.6	9	*27.3*
4 or More Diagnoses	6	14.3	8	*24.2*

**Note*. For participants in the ASD group, number of discharge diagnoses excludes ASD.

Table 24

Number of Medications Prescribed at Discharge

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
No Medications	0	*0.0*	1	*3.0*
1 Medication	6	*14.3*	3	*9.1*
2 Medications	18	*42.9*	12	*36.4*
3 Medications	13	*31.0*	6	*18.2*
4 or More Medications	5	*11.9*	11	*33.3*

Table 25

Reported ADHD Symptoms

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Incomplete Review	6	*14.3*	1	*3.0*
No Symptoms Reported	18	*42.9*	15	*45.5*
1 Symptom	4	*9.5*	8	*24.2*
2 Symptoms	3	*7.1*	3	*9.1*
3 Symptoms	2	*4.8*	3	*9.1*
4 Symptoms	3	*7.1*	1	*3.0*
5 Symptoms	2	*4.8*	2	*6.1*
6 Symptoms	2	*4.8*	0	*0.0*
7 Symptoms	2	*4.8*	0	*0.0*

Table 26

Reported Anxiety Symptoms

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Incomplete Review	5	*11.9*	0	*0.0*
No Symptoms Reported	3	*7.1*	2	*6.1*
1 Symptom	10	*23.8*	3	*9.1*
2 Symptoms	7	*16.7*	9	*27.3*
3 Symptoms	6	*14.3*	4	*12.1*
4 Symptoms	6	*14.3*	7	*21.2*
5 Symptoms	3	*7.1*	6	*18.2*
6 Symptoms	2	*4.8*	0	*0.0*
7 Symptoms	0	*0.0*	1	*3.0*
8 Symptoms	0	*0.0*	1	*3.0*

non-ASD group. Fifty percent of participants (n = 21) in the ASD group and 33.3% of participants (n = 11) in the non-ASD group endorsed 10 or more depressive symptoms (see Table 27). Approximately 33% of the ASD group and 39% of the non-ASD group experienced symptoms specifically related to bipolar disorder (see Table 28).

The mean number of behavioral problems was 2.76 (*SD* = 2.70; *Mdn* = 2) for the ASD group and 3.67 (*SD* = 2.81; *Mdn* = 3) for the non-ASD group (see Table 29 for symptom count frequencies and percentages).

Additional Psychiatric Variables not Included in Regression Analysis

Reason for Hospitalization

For the majority of participants (ASD: 64.3%; non-ASD: 57.6%), multiple reasons for hospitalization were listed (see Table 30). For both groups, danger to self was the most common factor contributing to reason for hospitalization (ASD: 81.0%; non-ASD: 78.8%). Inability to function in a less restrictive setting (ASD: 28.6%; non-ASD: 24.2%) and danger to others (e.g., aggressive behaviors; ASD: 26.2%, non-ASD: 24.2%) were other common contributing causes of hospitalization for both groups. For the ASD group, depressive symptoms were identified as a reason for hospitalization in 35.7% of charts (non-ASD group: 9.1%). Psychotic symptoms contributed to the reason for hospitalization for 6 participants (18.2%) in the non-ASD group but were not a contributing factor for any participants in the ASD group.

Table 27

Reported Depressive Symptoms

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Incomplete Review	3	*7.1*	0	*0.0*
No Symptoms Reported	0	*0.0*	1	*3.0*
1 Symptom	0	*0.0*	0	*0.0*
2 Symptoms	0	*0.0*	0	*0.0*
3 Symptoms	1	*2.4*	3	*9.1*
4 Symptoms	1	*2.4*	2	*6.1*
5 Symptoms	1	*2.4*	1	*3.0*
6 Symptoms	2	*4.8*	0	*0.0*
7 Symptoms	5	*11.9*	5	*15.2*
8 Symptoms	4	*9.5*	2	*6.1*
9 Symptoms	4	*9.5*	8	*24.2*
10 Symptoms	5	*11.9*	2	*6.1*
11 Symptoms	1	*2.4*	3	*9.1*
12 Symptoms	6	*14.3*	2	*6.1*
13 Symptoms	4	*9.5*	2	*6.1*
14 Symptoms	2	*4.8*	0	*0.0*
15 Symptoms	1	*2.4*	2	*6.1*
16 Symptoms	1	*2.4*	0	*0.0*
17 Symptoms	1	*2.4*	0	*0.0*

Table 28

Reported Bipolar Symptoms

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Incomplete Review	3	*7.1*	1	*3.0*
No Symptoms Reported	25	*59.5*	19	*57.6*
1 Symptom	3	*7.1*	4	*12.1*
2 Symptoms	3	*7.1*	2	*6.1*
3 Symptoms	3	*7.1*	1	*3.0*
4 Symptoms	2	*4.8*	1	*3.0*
5 Symptoms	1	*2.4*	3	*9.1*
6 Symptoms	2	*4.8*	1	*3.0*
7 Symptoms	0	*0.0*	1	*3.0*

Table 29

Number of Behavioral Problems Reported

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
No Behavioral Problems Reported	11	*26.2*	4	*12.1*
1 Behavioral Problem Reported	9	*21.4*	6	*18.2*
2 Behavioral Problems Reported	4	*9.5*	6	*18.2*
3 Behavioral Problems Reported	1	*2.4*	2	*6.1*
4 Behavioral Problems Reported	5	*11.9*	1	*3.0*
5 Behavioral Problems Reported	5	*11.9*	2	*6.1*
6 Behavioral Problems Reported	2	*4.8*	5	*15.2*
7 Behavioral Problems Reported	3	*7.1*	3	*9.1*
8 Behavioral Problems Reported	0	*0.0*	4	*12.1*
9 Behavioral Problems Reported	2	*4.8*	0	*0.0*

Table 30

Reason for Hospitalization

	ASD (*n* = 42)		non-ASD (*n*= 33)	
	n	*%*	*n*	*%*
Danger to Self	34	*81.0*	26	*78.8*
Depression/Increasing Depression/Worsening Mood	15	*35.7*	3	*9.1*
Inability to Function in Less Restrictive Setting	12	*28.6*	8	*24.2*
Danger to Others/Aggressive Behaviors	11	*26.2*	8	*24.2*
Need for Further Assessment	5	*11.9*	2	*6.1*
Need to Monitor Treatment Effects	3	*7.1*	1	*3.0*
Stabilization of Psychiatric Issues	3	*7.1*	0	*0.0*
Explosive/Out of Control Behavior	2	*4.8*	1	*3.0*
Irritability	1	*2.4*	1	*3.0*
AWOL	1	*2.4*	1	*3.0*
Mood Instability/Reactivity	1	*2.4*	1	*3.0*
Inability to Maintain Adequate Social Functioning	1	*2.4*	2	*6.1*
Anxiety	1	*2.4*	2	*6.1*
Foggy Episodes	1	*2.4*	0	*0.0*
Unsafe/Impulsive Behaviors	1	*2.4*	0	*0.0*
Increasing Behavior Problems	1	*2.4*	0	*0.0*
Psychosis/Impaired Reality Testing/Hallucinations	0	*0.0*	6	*18.2*
Unspecified Danger	0	*0.0*	3	*9.1*
Hypersexual Behavior	0	*0.0*	1	*3.0*
Hostility/Feeling Assaultive Towards Peers	0	*0.0*	1	*3.0*
Worsening Obsessive Thinking	0	*0.0*	1	*3.0*
History of Anorexia With Worsening Diet Restriction	0	*0.0*	1	*3.0*
School Refusal/Failure	0	*0.0*	2	*6.1*

Note. Some individuals appear in multiple categories due to more than one reason for hospitalization.

Psychiatric Diagnostic History at Time of Admission

As far as patients' diagnostic history at the time of admission, depressive disorders were most common for both groups (ASD: 35, 83.3%; non-ASD: 28, 84.8%; see Table 31). History of a generalized or unspecified anxiety disorder was the next most frequent diagnosis for both groups (ASD: 35, 83.3%; non-ASD: 28, 84.8%). A previous diagnosis of ADHD was found in 35.7% of ASD group files and 27.3% of non-ASD files. A previous diagnosis of bipolar disorder was reported for 8 participants in each group (ASD: 19.0%; non-ASD: 24.2%).

Types of Treatment Accessed at the Time of Admission

Charts showed that patients had accessed various types of treatment prior to the current admission (e.g., outpatient, inpatient, residential; see Table 32). For the ASD group, the most frequent type of treatment previously accessed was outpatient only (ASD: 19, 45.2%; non-ASD: 4, 12.1%). Among the non-ASD group, a combination of outpatient and inpatient treatment was most common (ASD: 6, 14.3%; non-ASD: 9, 27.3%).

Length of Hospital Stay

Among participants admitted for acute, inpatient treatment, the median length of hospital stay was 11 days (range: 5 – 29) for the ASD group and 13 days (range: 4 – 34) for the non-ASD group (see Table 33). For individuals participating in the comprehensive assessment program, the median number of days admitted was 40 (range: 21 – 48) for the ASD group and 32.5 (range: 17 – 44) for the non-ASD group (see Table 34).

Table 31

Psychiatric Diagnostic History at Time of Admission

	ASD (n = 42)		non-ASD (n = 33)	
	n	%	*n*	%
None Reported	1	2.4	0	0.0
Depressive Disorder	35	83.3	28	84.8
Depressive Disorder With Mention of Psychotic Features	2	4.8	1	3.0
Anxiety	22	52.4	23	69.7
ADHD	15	35.7	9	27.3
Bipolar	8	19.0	8	24.2
Bipolar With Mention of Psychotic Features	0	0.0	1	3.0
PTSD	5	11.9	1	3.0
OCD	4	9.5	5	15.2
Social Anxiety	2	4.8	1	3.0
Psychotic Disorder	2	4.8	6	18.2
ODD	2	4.8	2	6.1
Reactive Attachment Disorder	2	4.8	1	3.0
Borderline Personality	1	2.4	2	6.1
Eating Disorder	1	2.4	3	9.1
Sensory Integration Disorder	1	2.4	0	0.0
Intermittent Explosive Disorder	1	2.4	0	0.0
Language Processing Disorder	1	2.4	0	0.0
Somatoform Disorder	1	2.4	0	0.0
Disruptive Behavior Disorder	1	2.4	1	3.0
Substance Abuse	0	0.0	4	12.1
Conduct Disorder	0	0.0	2	6.1
Pica	0	0.0	1	3.0
Tourette's	0	0.0	2	6.1
Disruptive Mood Dysregulation Disorder	0	0.0	1	3.0
Impulse Control Disorder	0	0.0	1	3.0
Separation Anxiety	0	0.0	1	3.0
Gender Dysphoria	0	0.0	1	3.0

Note: Italicized text signifies diagnostic subcategories.

Table 32

Types of Treatment Accessed at the Time of Admission

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
None	2	*4.8*	1	*3.0*
School-Based Group Counseling Only	1	*2.4*	0	*0.0*
Outpatient Only	19	*45.2*	4	*12.1*
Day Treatment Only	1	*2.4*	0	*0.0*
Inpatient Only	1	*2.4*	4	*12.1*
Wilderness Only	1	*2.4*	0	*0.0*
Outpatient, Social Skills Group	1	*2.4*	0	*0.0*
Outpatient, Day Treatment	2	*4.8*	1	*3.0*
Outpatient, Inpatient	6	*14.3*	9	*27.3*
Inpatient, Day Treatment	0	*0.0*	1	*3.0*
Outpatient, Residential	0	*0.0*	1	*3.0*
Day Treatment, Residential	0	*0.0*	1	*3.0*
Residential, Inpatient	1	*2.4*	3	*9.1*
Outpatient, Inpatient, 12-Step Program for Substance abuse	0	*0.0*	1	*3.0*
Outpatient, Inpatient, Day Treatment	3	*7.1*	2	*6.1*
Outpatient, Inpatient, Residential	1	*2.4*	0	*0.0*
Outpatient, Day Treatment, Wilderness	0	*0.0*	1	*3.0*
Outpatient, Intensive Outpatient, Wilderness	0	*0.0*	1	*3.0*
Outpatient, Residential, Therapeutic School	0	*0.0*	1	*3.0*
Residential, Wilderness, Drug rehabilitation	0	*0.0*	1	*3.0*
Residential, Wilderness, Inpatient	1	*2.4*	0	*0.0*
Outpatient, Inpatient, Residential, In-Home Behavioral Services	1	*2.4*	0	*0.0*
Residential, Inpatient, Wilderness, Alcoholics Anonymous	0	*0.0*	1	*3.0*
Inpatient, Outpatient, Substance abuse treatment; State Hospital	1	*2.4*	0	*0.0*

Table 33

Number of Inpatient Hospital Days

	ASD (*n* = 30)		non-ASD (*n* = 23)	
	n	*%*	*n*	*%*
4 Days	0	*0.0*	1	*4.3*
5 Days	1	*3.3*	0	*0.0*
6 Days	0	*0.0*	1	*4.3*
7 Days	6	*23.3*	0	*0.0*
8 Days	1	*3.3*	1	*4.3*
9 Days	5	*16.7*	1	*4.3*
10 Days	0	*0.0*	2	*8.7*
11 Days	5	*16.7*	1	*4.3*
12 Days	0	*0.0*	2	*8.7*
13 Days	1	*3.3*	3	*13.0*
14 Days	2	*3.3*	2	*8.7*
15 Days	3	*10.0*	2	*8.7*
16 Days	2	*6.7*	1	*4.3*
17 Days	0	*0.0*	1	*4.3*
18 Days	1	*3.3*	3	*13.0*
19 Days	1	*3.3*	0	*0.0*
22 Days	0	*0.0*	1	*4.3*
23 Days	1	*3.3*	0	*0.0*
29 Days	1	*3.3*	0	*0.0*
34 Days	0	*0.0*	1	*4.3*

Note. Patients in the comprehensive diagnostic program and day treatment are excluded.

Table 34

Number of Hospital Days-Comprehensive Assessment

	ASD (*n* = 7)		non-ASD (*n* = 8)	
	n	*%*	*n*	*%*
17 Days	0	*0.0*	1	*12.5*
21 Days	1	*14.3*	0	*0.0*
23 Days	0	*0.0*	1	*12.5*
26 Days	0	*0.0*	1	*12.5*
29 Days	1	*14.3*	0	*0.0*
30 Days	1	*14.3*	0	*0.0*
32 Days	0	*0.0*	1	*12.5*
33 Days	0	*0.0*	1	*12.5*
37 Days	0	*0.0*	1	*12.5*
40 Days	1	*14.3*	0	*0.0*
41 Days	2	*28.6*	0	*0.0*
43 Days	0	*0.0*	1	*12.5*
44 Days	0	*0.0*	1	*12.5*
48 Days	1	*14.3*	0	*0.0*

Note. Patients who were not admitted to the comprehensive assessment program are excluded.

Reported Behavioral Problems

Anger management problems were the most frequently reported behavioral difficulty for both groups (ASD: 42.9%; non-ASD: 51.5%; see Table 35). For the ASD group, verbal aggression (ASD: 33.3%; non-ASD: 33.3%), physical aggression (ASD: 31.0%; non-ASD: 48.5%), and property destruction (ASD: 31.0%; non-ASD: 27.3%) were the next most common problematic behaviors. In the non-ASD group, substance use was among the three most common behavioral problems noted (51.5%; ASD group: 23.8%). For 26.2% of the ASD-group and 12.1% of the non-ASD group files, no behavioral problems were endorsed.

Discharge Diagnoses

Similar to data from the time of admission, depressive disorders (ASD: 92.9%, non-ASD: 72.7%) and anxiety disorders (ASD group: 61.9%; non-ASD group: 66.7%) were the most common discharge diagnoses for both groups (see Table 36). For the ASD group, 33.3% of individuals received a comorbid diagnosis of ADHD at discharge (non-ASD: 18.2%). For the non-ASD group, substance abuse (27.3%) and psychotic disorders (18.2%) were among the five most frequent discharge diagnoses; these diagnoses were rarely found in ASD group files (substance abuse: 2.4 %; psychotic disorder: 4.8%).

Disposition Plan

Approximately half of patients in each group were transitioned to outpatient services at discharge (ASD group: 52.4%; non-ASD group: 45.5%). Among the ASD group, 23.8% of participants were discharged to day treatment followed

Table 35

Type of Behavioral Problems Reported

	ASD (n = 42)		non-ASD (n = 33)	
	n	*%*	*n*	*%*
None	11	*26.2*	4	*12.1*
Anger Management Problems	18	*42.9*	17	*51.5*
Verbal Aggression	14	*33.3*	11	*33.3*
Physical Aggression	13	*31.0*	16	*48.5*
Property Destruction	13	*31.0*	9	*27.3*
Substance Use	10	*23.8*	17	*51.5*
Run Away/AWOL	8	*19.0*	2	*6.1*
Legal Involvement	7	*16.7*	10	*30.3*
Threats	6	*14.3*	6	*18.2*
History of Stealing	5	*11.9*	6	*18.2*
History of Sexual Acting Out	5	*11.9*	5	*15.2*
Oppositional/Defiant/Noncompliant Behaviors	5	*11.9*	5	*15.2*
Homicidal Ideation/Thoughts of Harming Others	4	*9.5*	6	*18.2*
Blaming Others	2	*4.8*	2	*6.1*
Truancy	2	*4.8*	0	*0.0*
Unspecified Aggression/Explosive Behaviors	1	*2.4*	0	*0.0*
Use of a Weapon	1	*2.4*	1	*3.0*
Lying	1	*2.4*	1	*3.0*
Fire-setting	1	*2.4*	0	*0.0*
Cruelty to Animals	0	*0.0*	3	*9.1*
Arguing	0	*0.0*	3	*9.1*
Gang Involvement	0	*0*	1	*3.0*
Unspecified Risky Behavior	0	*0*	1	*3.0*

Table 36

Discharge Psychiatric Diagnoses

	ASD		non-ASD	
	n	%	*n*	%
Any Depressive Disorder	39	92.9	24	72.7
Major Depressive Disorder	*20*	*47.6*	*20*	*60.6*
Depressive Disorder with Mention of Psychotic Features	*1*	*2.4*	*3*	*9.1*
Any Anxiety Disorder	26	61.9	22	66.7
Unspecified Anxiety Disorder	*16*	*38.1*	*2*	*6.1*
Generalized Anxiety Disorder	*8*	*19.0*	*18*	*54.5*
Social Anxiety Disorder	*3*	*7.1*	*3*	*9.1*
ADHD	14	33.3	6	18.2
PTSD	3	7.1	1	3.0
Psychotic Disorder	2	4.8	6	18.2
ODD	2	4.8	2	6.1
Disruptive Mood Dysregulation Disorder	2	4.8	2	6.1
Substance Abuse	1	2.4	9	27.3
OCD	1	2.4	3	9.1
Bipolar	1	2.4	2	6.1
Bipolar with Mention of Psychotic Features	1	2.4	0	0.0
Eating Disorder	1	2.4	3	9.1
Intermittent Explosive Disorder	1	2.4	1	3.0
Reactive Attachment Disorder	1	2.4	1	3.0
Somatoform Disorder	1	2.4	0	0.0
Tic Disorder	1	2.4	3	9.1
Specific Phobia	1	2.4	0	0.0
Cluster C Personality Disorder	1	2.4	0	0.0
Complicated Bereavement	1	2.4	0	0.0
Sensory Integration Disorder	0	0.0	0	0.0
Language Processing Disorder	0	0.0	1	3.0
Conduct Disorder	0	0.0	0	0.0
Pica	0	0.0	1	3.0
Psychosis Risk Syndrome	0	0.0	1	3.0
Borderline Intellectual Functioning	0	0.0	1	3.0
Cognitive Disorder NOS	0	0.0	1	3.0
Male-to-Female Transgender	0	0.0	1	3.0

Note. Italicized text signifies diagnostic subcategories.

by outpatient (non-ASD: 12.1%). In the non-ASD group, 33.3% of patients were discharged to residential treatment settings (ASD group: 19.0%) (see Table 37).

Family Psychiatric History

For participants' mothers, depressive (ASD: 26.2%; non-ASD: 19.0%) and anxiety disorders (ASD: 36.4%; non-ASD 9.1%) were the most frequent psychiatric diagnoses (see Table 38). In the ASD group, mothers were reported to have a history of substance abuse in 19% of files (non-ASD: 6.1%) and bipolar disorder in 11.9% of files (non-ASD group: 3.0%). As far as fathers' psychiatric history (see Table 39), substance abuse was endorsed in 11.9% of ASD group files and 6.1% of non-ASD group files. Among participants' fathers, a history of a depressive disorder was reported for 9.5% of the ASD group and 15.2% of the non-ASD group. Regarding reported psychiatric history of participants' siblings (see Table 40), the most common diagnoses for both groups were depressive disorder (ASD: 14.3%; non-ASD: 15.2%) and suspected or confirmed ASD (ASD: 11.9%; non-ASD 15.2%).

Among extended family members (see Table 41), depressive disorders (ASD: 59.5%; non-ASD 48.5%) and substance abuse (ASD: 31.0%; non-ASD 39.4%) were the most common diagnoses in both groups. Reported extended family history was positive for suspected or confirmed psychotic disorders in 14.3% of the ASD files and 21.2% of the non-ASD group files. Bipolar disorder was reported to be present in the extended family of 11.9% of the ASD group and 33.3% of the non-ASD group records. Approximately 10% of ASD group and 21% of non-ASD group files revealed that the participant had an extended family member who had completed suicide.

Table 37

Disposition Plan

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Outpatient	22	*52.4*	15	*45.5*
Day Treatment (No Indication of Discharge After)	0	*0.0*	1	*3.0*
Day Treatment to Outpatient	10	*23.8*	4	*12.1*
Day Treatment to Substance Abuse Intensive Outpatient	1	*2.4*	0	*0.0*
Day Treatment to State Hospital	0	*0.0*	1	*3.0*
Residential	8	*19.0*	11	*33.3*
State Hospital	1	*2.4*	0	*0.0*
To Be Determined by Court	0	*0.0*	1	*3.0*

Table 38

Mother's Psychiatric History

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
None Reported	13	*31.0*	14	*42.4*
Depressive Disorder	11	*26.2*	12	*36.4*
Anxiety Disorder	8	*19.0*	3	*9.1*
Substance Abuse	8	*19.0*	2	*6.1*
Bipolar	5	*11.9*	1	*3.0*
Suicide Attempt	2	*4.8*	3	*9.1*
ADHD	1	*2.4*	0	*0.0*
OCD	1	*2.4*	0	*0.0*
Borderline Personality Disorder	1	*2.4*	0	*0.0*
PTSD	1	*2.4*	0	*0.0*
Required Hospitalization	0	*0.0*	1	*3.0*
Eating Disorder	0	*0*	1	*3.0*
Suspected ASD	0	*0*	1	*3.0*

Table 39

Father's Psychiatric History

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Substance Abuse	5	*11.9*	2	*6.1*
Depressive Disorder	4	*9.5*	5	*15.2*
Bipolar/Suspected Bipolar	4	*9.5*	2	*6.1*
Anxiety Disorder	3	*7.1*	1	*3.0*
Suicide Attempt	2	*4.8*	0	*0.0*
ADHD	2	*4.8*	0	*0.0*
Suspected ASD	1	*2.4*	0	*0.0*
Anger Management Problems	1	*2.4*	0	*0.0*
Suspected Schizophrenia	1	*2.4*	0	*0.0*
Incarcerated	1	*2.4*	1	*3.0*
Required Hospitalization	1	*2.4*	0	*0.0*
OCD	0	*0.0*	1	*3.0*
Borderline Personality Disorder	0	*0.0*	0	*0.0*
PTSD	0	*0.0*	0	*0.0*
Eating Disorder	0	*0.0*	0	*0.0*
Learning Disability	0	*0.0*	2	*6.1*
Unspecified Mental Health Problem	0	*0.0*	1	*3.0*

Table 40

Sibling Psychiatric History

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Unknown/No Mention of Siblings	10	*23.8*	6	*18.2*
No Diagnosis Reported	17	*40.5*	10	*30.3*
Mood Disorder	6	*14.3*	5	*15.2*
Suspected or Confirmed ASD	5	*11.9*	5	*15.2*
ADHD	3	*7.1*	4	*12.1*
Anxiety	2	*4.8*	2	*6.1*
Required Hospitalization	2	*4.8*	2	*6.1*
Substance Abuse	2	*4.8*	1	*3.0*
ID/Below Average IQ	2	*4.8*	1	*3.0*
Eating Disorder	1	*2.4*	0	*0.0*
Suicide Attempt	0	*0.0*	2	*6.1*
Bipolar/Possible Bipolar	0	*0.0*	2	*6.1*
Learning Disability	0	*0.0*	2	*6.1*
OCD	0	*0.0*	1	*3.0*
Neurofibromatosis	0	*0.0*	1	*3.0*
Unspecified Mental Health Problem	0	*0.0*	1	*3.0*

Table 41

Extended Family Psychiatric History

	ASD (*n* = 42)		non-ASD (*n* = 33)	
	n	*%*	*n*	*%*
Unknown/No Mention of Siblings	2	*4.8*	3	*9.1*
No Diagnosis Reported	6	*14.3*	2	*6.1*
Depressive Disorder	25	*59.5*	16	*48.5*
Substance Abuse	13	*31.0*	13	*39.4*
Anxiety Disorder	9	*21.4*	6	*18.2*
Psychotic Disorder/Suspected Psychosis	6	*14.3*	7	*21.2*
Suicide Attempt	6	*14.3*	5	*15.2*
Bipolar/Possible Bipolar	5	*11.9*	11	*33.3*
ADHD	4	*9.5*	3	*9.1*
Completed Suicide	4	*9.5*	7	*21.2*
Required Hospitalization	2	*4.8*	5	*15.2*
OCD	2	*4.8*	0	*0.0*
Suspected ASD	2	*4.8*	2	*6.1*
ID/Low IQ	1	*2.4*	0	*0.0*
Fragile X	1	*2.4*	0	*0.0*
LD	1	*2.4*	0	*0.0*

Results of Research Question 7

7. What are the differences between those diagnosed with ASD and those not diagnosed with ASD with regard to the history and severity of core ASD symptoms?

Group Differences in ADOS-2 Scores

In order to determine differences in observed ASD symptoms between the ASD and non-ASD groups, ADOS-2 item scores were put into a binary logistic regression, which yielded a model that accurately predicted diagnostic category for 93.1% of the non-ASD group and 89.2% of the ASD group (see Table 42).

Significant ($p < 0.05$) predictors of ASD group status included the following ADOS-2 items (see Table 43): A4 Stereotyped/Idiosyncratic Use of Words or Phrases ($p = 0.008$), A10 Emphatic or Emotional Gestures ($p = 0.016$), B8 Responsibility (0.017), and B11 Quality of Social Response (0.010). On item A4: Stereotyped/Idiosyncratic Use of Words or Phrases, 26.2% of the ASD group was coded either 1 or 2, compared to 3.0% of the non-ASD group. Of the ASD group, 69% (non-ASD: 27%) were given a score of 1, 2, or 3 on item A10: Emphatic or Emotional Gestures. Among ASD participants, item B8: Responsibility was coded 1 or 2 for 78.5% of participants (non-ASD: 39.4%). For Item B11: Quality of Social Response, 83.4% of ASD group and 27.3% of non-ASD group participants were assigned a score of 1 or 2.

In the regression analysis, items A5 Offers Information ($p = 0.023$) and B2 Facial Expressions Directed to Examiner ($p = 0.020$) were significant predictors of non-ASD group status; however, the statistics program excluded some participants from the analyses due to missing data. When considering all available data, item A5 was generally

Table 42

Classification Accuracy: ADOS-2 Regression Model

	Predicted Group		Percentage Correct
Observed Group	non-ASD	ASD	
non-ASD	27	2	93.1
ASD	4	33	89.2
Overall Percentage			90.9

Table 43

ADOS-2 Item Binary Logistic Regression Model

	B	*SE*	*OR*	95% CI	*p*
A4: Stereotyped/Idiosyncratic Use of Words or Phrases	8.978	3.378	>1,000	10.6->1,000	0.008*
A5: Offers Information	-8.166	3.605	<0.001	<0.001-0.3	0.023ˆ
A7: Reporting of Events	2.451	1.289	11.599	0.9-145.0	0.057
A10: Emphatic or Emotional Gestures	1.982	0.824	7.257	1.4-36.5	0.016*
B2: Facial Expressions Directed to Examiner	-4.867	2.099	0.008	<0.001-0.471	0.020ˆ
B8: Responsibility	3.640	1.528	38.089	1.9-760.6	0.017*
B11: Quality of Social Response	4.871	1.887	130.476	3.2->1,000	0.010*
D4: Excessive Interest in or References to Unusual or Highly Specific Topics or Objects or Repetitive Behaviors	19.374	7100.7	>1,000.0		0.998

Note. *Significantly ($p < 0.05$) associated with ASD group.
ˆSignificantly ($p < 0.05$) associated with non-ASD group.

scored 0 for both groups (ASD: 88.1%; non-ASD: 87.9%), and item B2 was coded 1 or 2 more frequently for the ASD group (ASD: 61.9%, non-ASD: 33.4%). Of note, item B3 (Language Production and Linked Nonverbal Communication) was excluded from this analysis, as it could not be coded for multiple participants (ASD group: 52.4%; non-ASD group: 21.2%).

Group Differences in SRS-2 Scores

Treatment scales in the SRS-2 parent-report (i.e., Social Awareness, Social Cognition, Social Communication, Social Motivation, and Restricted Interest and Repetitive Behavior) were put into the regression analysis. The binary logistic regression model for the SRS-2 parent report (see Table 44) accurately predicted group status for 82.8% of the ASD group and 66.7% of the non-ASD group. The Social Awareness scale ($p = 0.004$) was identified as a significant predictor of diagnostic status ($OR = 1.130$, CI = 1.040 – 1.227); the mean t Score was 65.48 (*SD*: 10.97) for the ASD group and 52.87 (*SD*: 10.04) for the non-ASD group.

The classification accuracy for the SRS-2 self-report regression model (see Table 45) was 66.7% for the ASD group and 80.0% for the non-ASD group. For the SRS-2 self-report model, the Social Motivation scale was significantly associated with ASD group status ($p = 0.025$; $OR = 1.123$, CI = 1.015 – 1.244). The self-report Social Motivation mean t Score was 69.78 (*SD*: 14.70) for the ASD group and 50.80 (*SD*: 9.98) for the non-ASD group. All other treatment scales (i.e., Social Awareness, Social Cognition, Social Communication, and Restricted Interest and Repetitive Behavior) were not significant.

Table 44

Classification Accuracy: SRS-2 Parent-Report Treatment Scale Regression Model

	Predicted Group		Percentage Correct
Observed Group	non-ASD	ASD	
non-ASD	10	5	66.7
ASD	5	24	82.8
Overall Percentage			77.3

Table 45

Classification Accuracy: SRS-2 Self-Report Treatment Scale Regression Model

	Predicted Group		Percentage Correct
Observed Group	non-ASD	ASD	
non-ASD	8	2	80.0
ASD	3	6	66.7
Overall Percentage			73.7

Group Differences in SCQ-Lifetime Scores

Items corresponding to the participants' development from age 4 to 5 were put into the regression analysis. The binary logistic regression model, which accurately predicted 64.3% of the ASD group and 92.9% of the non-ASD group (see Table 46) identified a response of "no" on item 29 ("when she/he was 4 to 5, did she/he ever offer to share things other than food with you?") as a predictor of ASD group status, which approached statistical significance ($p = 0.055$; see Table 47). For item 29, the response was "no" for 35.7% of the ASD group and 7.1% of the non-ASD groups.

Results of Research Questions 8 and 9

8. What is the history and severity of core ASD symptoms of those diagnosed with ASD?
9. What is the history and severity of core ASD symptoms of those not diagnosed with ASD?

Table 48 includes ADOS-2 summary scores, which were not included in the regression analyses. The average total score (i.e., Communication + Reciprocal Social Interaction) was 8.21 (*SD*: 3.12) for the ASD group and 3.36 (*SD*: 4.69) for the non-ASD group. Frequencies and percentages of each item score are provided for Language and Communication (see Table 49), Reciprocal Social Interaction (see Table 50), Imagination/Stereotyped Behaviors and Restricted Interests (see Table 51), and Other Abnormal Behaviors (see Table 52).

Table 46

Classification Accuracy: SCQ-Lifetime Age 4 – 5 Item Regression Model

	Predicted Group		Percentage Correct
Observed Group	non-ASD	ASD	
non-ASD	13	1	92.9
ASD	10	18	64.3
Overall Percentage			73.8

Table 47

SCQ-Lifetime Binary Logistic Regression Model

	β	*OR*	95% CI	*p*
Item 29	-2.208	0.110	0.012-1.044	0.055
Item 36	-20.663	<0.001		0.999

Table 48

ADOS-2 Summary Scores

	ASD Mean (*SD*)	Range	Median	non-ASD Mean (*SD*)	Range	Median
Communication	2.62 (1.23)	0 – 6	2	0.97 (1.59)	0 – 5	0
Reciprocal Social Interaction (RSI)	5.83 (2.39)	0 – 11	6	2.39 (3.30)	0 – 13	1
Communication + RSI	8.21 (3.12)	1 – 16	8	3.36 (4.69)	0 – 18	1
Imagination/ Creativity	0.88 (0.77)	0 – 3	1	0.60 (0.62)	0 – 2	1
Stereotyped Behaviors and Restricted Interests	0.43 (0.74)	0 – 3	0	0.00 (0.00)	0 – 0	0

Table 49

ADOS-2 Scores–Language and Communication (A Section)

		ASD (*n* = 42)		non-ASD (*n* = 33)	
Item	Score	*n*	*%*	*n*	*%*
A1: Overall Level of Nonechoed Spoken Language	0	42	*100.0*	33	*100.0*
A2: Speech Abnormalities Associated With Autism	0	24	*57.1*	26	*78.8*
	1	16	*38.1*	6	*18.2*
	2	2	*4.8*	1	*3.0*
A3: Immediate Echolalia	0	42	*100.0*	33	*100.0*
A4: Stereotyped/Idiosyncratic Use of Words or Phrases	0	31	*73.8*	32	*97.0*
	1	10	*23.8*	1	*3.0*
	2	1	*2.4*	0	*0.0*
A5: Offers Information	0	37	*88.1*	29	*87.9*
	1	4	*9.5*	3	*9.1*
	2	1	*2.4*	1	*3.0*
A6: Asks for Information	0	7	*16.7*	8	*24.2*
	1	18	*42.9*	11	*33.3*
	2	14	*33.3*	9	*27.3*
	3	3	*7.1*	4	*12.1*
	Not Coded	0	*0.0*	1	*3.0*
A7: Reporting of Events	0	28	*66.7*	27	*81.8*
	1	11	*26.2*	5	*15.2*
	2	1	*2.4*	1	*3.0*
	3	2	*4.8*	0	*0.0*

Table 49 (continued)

Item	Score	ASD (*n* = 42) *n*	ASD (*n* = 42) *%*	non-ASD (*n* = 33) *n*	non-ASD (*n* = 33) *%*
A8: Conversation	0	12	*28.6*	24	*72.7*
	1	27	*64.3*	8	*24.2*
	2	3	*7.1*	1	*3.0*
A9: Descriptive, Conventional, Instrumental, or Informational Gestures	0	15	*35.7*	27	*81.8*
	1	23	*54.8*	2	*6.1*
	2	3	*7.1*	3	*9.1*
	3	1	*2.4*	1	*3.0*
A10: Emphatic or Emotional Gestures	0	13	*31.0*	24	*72.7*
	1	24	*57.1*	7	*21.2*
	2	1	*2.4*	1	*3.0*
	3	4	*9.5*	1	*3.0*

Table 50

ADOS-2 Scores–Reciprocal Social Interaction (B Section)

Item	Score	ASD (n = 42)		non-ASD (n = 33)	
		n	*%*	*n*	*%*
B1: Unusual Eye Contact	0	19	*45.2*	22	*66.7*
	1	23	*54.8*	11	*33.3*
B2: Facial Expressions Directed to Examiner	0	16	*38.1*	22	*66.7*
	1	26	*61.9*	9	*27.3*
	2	0	*0.0*	2	*6.1*
B3: Language Production and Linked Nonverbal Communication	0	11	*26.2*	22	*66.7*
	1	9	*21.4*	2	*6.1*
	2	0	*0.0*	2	*6.1*
	8	22	*52.4*	7	*21.2*
B4: Shared Enjoyment in Interaction	0	29	*69.0*	26	*78.8*
	1	5	*11.9*	3	*9.1*
	2	7	*16.7*	3	*9.1*
	3	1	*2.4*	0	*0.0*
	Not Coded	0	*0.0*	1	*3.0*
B5: Communication of Own Affect	0	18	*42.9*	26	*78.8*
	1	22	*52.4*	5	*15.2*
	2	0	*0.0*	1	*3.0*
	Not Coded	2	*4.8*	1	*3.0*
B6: Comments on Others' Emotions/Empathy	0	13	*31.0*	27	*81.8*
	1	29	*69.0*	5	*15.2*
	2	0	*0.0*	1	*3.0*

Table 50 (continued)

Item	Score	ASD (n = 42) n	ASD (n = 42) *%*	non-ASD (n = 33) n	non-ASD (n = 33) *%*
B7: Insights Into Typical Social Situations and Relationships	0	11	*26.2*	23	*69.7*
	1	18	*42.9*	8	*24.2*
	2	10	*23.8*	1	*3.0*
	Not Coded	3	*7.1*	1	*3.0*
B8: Responsibility	0	9	*21.4*	20	*60.6*
	1	29	*69.0*	13	*39.4*
	2	4	*9.5*	0	*0.0*
B9: Quality of Social Overtures	0	7	*16.7*	24	*72.7*
	1	32	*76.2*	6	*18.2*
	2	3	*7.1*	3	*9.1*
B10: Amount of Social Overtures/Maintenance of Attention	0	22	*52.4*	27	*81.8*
	1	14	*33.3*	3	*9.1*
	2	4	*9.5*	2	*6.1*
	3	1	*2.4*	0	*0.0*
	Not Coded	1	*2.4*	1	*3.0*
B11: Quality of Social Response	0	7	*16.7*	24	*72.7*
	1	33	*78.6*	7	*21.2*
	2	2	*4.8*	2	*6.1*
B12: Amount of Reciprocal Social Communication	0	17	*40.5*	27	*81.8*
	1	22	*52.4*	6	*18.2*
	2	3	*7.1*	0	*0.0*

Table 50 (continued)

Item	Score	ASD (*n* = 42) *n*	*%*	non-ASD (*n* = 33) *n*	*%*
B13: Overall Quality of Rapport	0	25	*59.5*	28	*84.8*
	1	14	*33.3*	2	*6.1*
	2	1	*2.4*	2	*6.1*
	3	1	*2.4*	0	*0.0*
	Not Coded	1	*2.4*	1	*3.0*

Table 51

ADOS-2 Scores–Imagination (C Section) and Stereotyped Behaviors and Restricted Interests (D Section)

Item	Score	ASD (*n* = 42) *n*	*%*	non-ASD (*n* = 33) *n*	*%*
C1: Imagination/Creativity	0	13	*31.0*	16	*48.5*
	1	21	*50.0*	13	*39.4*
	2	7	*16.7*	2	*6.1*
	3	1	*2.4*	2	*6.1*
D1: Unusual Sensory Interest	0	42	*100.0*	33	*100.0*
D2: Hand and Finger and Other Complex Mannerisms	0	42	*100.0*	33	*100.0*
D3: Self-Injurious Behavior	0	41	*97.6*	31	*93.9*
	Not Coded	1	*2.4*	2	*6.1*
D4: Excessive Interest in or References to Unusual or Highly Specific Topics or Objects or Repetitive Behaviors	0	31	*73.8*	33	*100.0*
	1	8	*19.0*	0	*0.0*
	2	1	*2.4*	0	*0.0*
	3	2	*4.8*	0	*0.0*
D5: Compulsions or Rituals	0	42	*100.0*	33	*100.0*

Table 52

ADOS-2 Scores–Other Abnormal Behaviors (E Section)

		ASD (n = 42)		non-ASD (n = 33)	
	Score	*n*	*%*	*n*	*%*
E1: Overactivity/Agitation	0	38	*90.5*	32	*97.0*
	1	3	*7.1*	0	*0.0*
	2	0	*0.0*	1	*3.0*
	Not Coded	1	*2.4*	0	*0.0*
E2: Tantrums, Aggression, Negative, or Disruptive Behavior	0	41	*97.6*	33	*100.0*
	Not Coded	1	*2.4*	0	*0.0*
E3: Anxiety	0	32	*76.2*	27	*81.8*
	1	6	*14.3*	5	*15.2*
	2	2	*4.8*	1	*3.0*
	Not Coded	2	*4.8*	0	*0.0*

Social Responsiveness Scale–Second Edition Scores

Mean *t* scores for the SRS-2 parent report are provided in Table 53. The Social Cognition, Social Communication, Social Motivation, and Restricted Interests and Repetitive Behavior scales were not found to be significant predictors of group status. Composite scores (i.e., SRS-2 total score, Social Communication and Interaction score) were not included in the regression analysis. The mean total score was 75.31 (*SD*: 11.09) for the ASD group and 61.57 (*SD*: 14.55) for the non-ASD group. On the Social Communication and Interaction scale, the ASD group had a mean *t* score of 75.41 (10.37), and the non-ASD group had a mean *t* score of 61.27 (*SD*: 14.50). For the SRS-2 total score, parent responses resulted in *t* scores greater than 60 for 79% of the ASD group and 50% of the non-ASD group. Parent responses resulted in Social Awareness *t* scores greater than 60 for 58.6% of participants in the ASD group and 13.3% of participants in the non-ASD group (see Table 54).

On the SRS-2 self-report, the regression analysis did not find significant group differences for Social Awareness, Social Cognition, Social Communication, and Restricted Interests and Repetitive Behaviors scales. (Mean *t* scores for each scale can be found in Table 55.) The mean total score (not included in the regression analysis) was 64.89 (*SD*: 14.57) for the ASD group and 50.60 (*SD*: 8.44) for the non-ASD group. Forty four percent of the ASD group and 10% of the non-ASD group had total *t* scores greater than 50 (see Table 56). Among individuals in the ASD group, 66.67% of participants' self-report Social Motivation *t* scores were greater than 60 (non-ASD: 20.0%).

Table 53

SRS-2 Parent Report Mean T Scores

	ASD (n = 29)		non-ASD (n = 15)	
	Mean	*SD*	Mean	*SD*
Total	75.31	*11.09*	61.57	*14.55*
Social Awareness*	65.48	*10.97*	52.87	*10.04*
Social Cognition	71.83	*11.78*	59.87	*14.84*
Social Communication	74.34	*11.56*	59.53	*14.75*
Social Motivation	75.03	*8.78*	66.93	*15.08*
Restricted Interests/Repetitive Behavior	73.07	*12.40*	62.20	*13.48*
Social Communication and Interaction	75.41	*10.37*	61.27	*14.50*

**Note*. Significant ($p < 0.05$) for ASD group; the Social Awareness scale includes the following items:

2. Expressions on his or her face don't match what he or she is saying.
7. Is aware of what others are thinking or feeling.
25. Doesn't seem to mind being out of step with or "not on the same wavelength" as others.
32. Has good personal hygiene.
45. Focuses his or her attention to where others are looking or listening.
52. Knows when he or she is talking too loud or making too much noise.
54. Seems to react to people as if they are objects.
56. Walks in between two people who are talking.

Table 54

SRS-2 Parent Report T Scores Greater than 60

	ASD Number > 60 Out of 29 Completed Forms	*%*	non-ASD Number > 60 Out of 15 Completed Forms	*%*
Total	23	*79.31*	7*	*50.00*
Social Awareness	17	*58.62*	2	*13.33*
Social Cognition	23	*79.31*	7	*46.67*
Social Communication	25	*86.21*	8	*53.33*
Social Motivation	26	*89.66*	8	*53.33*
Restricted Interests and Repetitive Behavior	21	*72.41*	7	*46.67*
Social Communication and Interaction	27	*93.10*	8	*53.33*

**Note.* The total score for the non-ASD group is based on 14 calculated total scores

Table 55

SRS-2 Self-Report Mean T Scores

	ASD (n = 9)		non-ASD (n = 10)	
	Mean	*SD*	Mean	*SD*
Total	64.89	*14.57*	50.60	*8.44*
Social Awareness	62.33	*10.76*	48.20	*9.76*
Social Cognition	55.44	*13.51*	49.50	*8.28*
Social Communication	65.11	*15.78*	48.20	*6.58*
Social Motivation*	69.78	*14.70*	50.80	*9.98*
Restricted Interests and Repetitive Behavior	59.44	*13.94*	56.40	*10.01*
Social Communication and Interaction	65.11	*15.02*	48.10	*7.62*

**Note.* Significant ($p < 0.05$) for the ASD group. The Social Motivation scale includes the items:

1. I am much more uncomfortable in social situations than when I am by myself.
3. I feel self-confident when interacting with others.
6. I would rather be alone than with others.
9. I am overly dependent on others for help with meeting my everyday needs.
11. I have good self-confidence.
23. I do not join group activities or social events unless prompted or strongly urged to do so.
27. I avoid starting social interactions with other adults.
34. I avoid people who want to be emotionally close to me.
43. I enjoy small talk (casual conversation with others).
64. I am much more tense in social settings than when I am by myself.

Table 56

SRS-2 Self-Report T Scores Greater than 60

	ASD		non-ASD	
	Number > 60 Out of 9 Completed Forms	*%*	Number > 60 Out of 10 Completed Forms	*%*
Total	4	*44.44*	1	*10.00*
Social Awareness	4	*44.44*	1	*10.00*
Social Cognition	3	*33.33*	1	*10.00*
Social Communication	5	*55.56*	0	*0.00*
Social Motivation	6	*66.67*	2	*20.00*
Restricted Interests and Repetitive Behavior	4	*44.44*	4	*40.00*
Social Communication and Interaction	5	*55.56*	1	*10.00*

Social Communication Questionnaire Scores

On the SCQ-Lifetime, total scores were not included in the regression analysis. The mean scores were 12.07 (*SD* = 6.01) for the ASD group and 5.86 (*SD* = 3.01) for the non-ASD group. Within the ASD group, eight participants (27.59 %) received scores at or above the cutoff score of 15 suggested by the manual (Rutter, Bailey, & Lord, 2003). No scores in the non-ASD group met this criterion. Fifteen individuals (52.72%) in the ASD group and two individuals (14.29%) in the non-ASD group had total scores at or above the cutoff of 10 suggested by Barnard-Brak et al. (2016). (Information regarding SCQ items endorsed can be found in Table 57.)

Reason for Referral for ASD Evaluation

Study participants were referred for ASD evaluation for a variety of reasons (see Table 58). For some participants, multiple ASD-related symptoms prompted referral for evaluation. For both groups, social interaction deficits (e.g., social awkwardness; ASD: 61.9%; non-ASD: 45.5%) and insistence on sameness/adherence to routine/ritualized patterns of behavior (e.g., cognitive rigidity; 38.1%; 30.3%) were the most common symptoms prompting referral for ASD testing. For approximately one quarter of participants in each group (ASD: 26.2%, 27.3%), relationship difficulties (e.g., few friends) contributed to reason for ASD evaluation referral. Perseverative/highly restricted, fixated interests was noted as a reason for referral for 28.6% the ASD group (non-ASD: 9.1%).

Table 57

SCQ-Lifetime Age 4-5 Items Endorsed

	ASD		non-ASD	
	# Endorsed Out of 29 Completed Forms	*%*	# Endorsed Out of 14 Completed Forms	*%*
20	5	*17.2*	1	*7.1*
21	15	*51.7*	8	*57.1*
22	5	*17.2*	6	*42.9*
23	18	*62.1*	8	*57.1*
24	1	*3.4*	1	*7.1*
25	1	*3.4*	2	*14.3*
26	5	*17.2*	0	*0.0*
27	1	*3.4*	0	*0.0*
28	4*	*14.3*	0	*0.0*
29	10*	*35.7*	1	*7.1*
30	2*	*7.1*	0	*0.0*
31	12*	*42.9*	2	*14.3*
32	4	*13.8*	3	*21.4*
33	3	*10.3*	0	*0.0*
34	9	*31.0*	2	*14.3*
35	4*	*14.3*	1	*7.1*
36	10	*34.5*	0	*0.0*
37	2	*6.9*	0	*0.0*
38	5	*17.2*	1	*7.1*
39	3*	*10.7*	3	*21.4*
40	4	*13.8*	4	*28.6*

**Note.* Items 28, 29, 30, 31, 35, and 39 in the ASD Group are based on 28 responses

Table 58

Reason for Referral for ASD Evaluation

	ASD		non-ASD	
	n	%	*n*	%
Social Interaction Deficits	26	61.9	15	45.5
Insistence on Sameness, Inflexible Adherence to Routine, Ritualized Patterns of Behavior	16	38.1	10	30.3
Perseverative/Highly Restricted, Fixated Interests	12	28.6	3	9.1
Relationship Difficulties	11	26.2	9	27.3
Deficits in Nonverbal Communicative Behavior	6	14.3	5	15.2
Sensory	5	11.9	1	3.0
Mood	3	7.1	0	0.0
Unspecified Behaviors	2	4.8	2	6.1
Family History	2	4.8	2	6.1
Behavioral Difficulties	2	4.8	0	0.0
History of Developmental Delays	1	2.4	1	3.0
Stereotyped Movements, Use of Objects of Speech	0	0.0	1	3.0

Note: Some individuals appear in multiple categories due to multiple reasons for referral.

CHAPTER IV

DISCUSSION

Although researchers have found that the median age of ASD diagnosis ranges from 3 to 6.8 years (e.g., Daniels & Mandell, 2014; Shattuck et al., 2009), a subset of individuals are not diagnosed until adolescence or adulthood (Aggarwal & Angus, 2015; Lai & Baron-Cohen, 2016). In some cases, individuals seek treatment for reasons other than suspected ASD, that is, treatment for psychiatric and/or behavioral problems, and it is at that time that questions about the presence of ASD arise (Aggarwal & Angus, 2015). Only a few studies to date, however, have been conducted that examine what variables might lead to a delay in diagnosis, or for that matter, referral for testing. Studies that have been conducted to address these questions often involved a retrospective review of psychiatric records of individuals who are referred for testing to rule out ASD in community settings (i.e., Geurts & Jansen, 2011; Happé et al., 2016; Ketelaars et al., 2008; Russell et al. 2016). These cited studies examined variables such as the individual's demographics, autistic symptoms, and/or psychological characteristics and analyzed differences between those who end up being diagnosed with ASD and those who were not. The current study is the first known investigation comparing ASD diagnosed and referred-non-diagnosed adolescents and young adults whose referral for ASD testing occurred during participation in a psychiatric hospital inpatient or day

treatment program.

Differences Between Diagnosed ASD and Referred, Non-ASD Groups

In the present study, regression analyses were used to show differences between the diagnosed ASD and referred-non-ASD groups. The only social-developmental variable that emerged as a significant predictor of group status was birth order. Individuals in the non-ASD group were more likely than participants in the ASD group to be first-born or only children. This finding is surprising, as previous research has suggested that ASD diagnosis is often made later for first-born children compared to those who have older siblings (see Bickel, Bridgemohan, Sideridis, & Huntington, 2015; Emerson, Morrell, & Neece, 2016).

As far as group differences in psychiatric variables, in the current sample, psychotic symptoms were significantly more frequent among the non-ASD group than the ASD group. This result is consistent with a previous study in which researchers found a higher prevalence of psychotic disorder NOS in referred-non-ASD participants than those ultimately diagnosed with ASD (Ketelaars et al., 2008). An increased number of OCD-related symptoms was also significantly associated with non-ASD group status in the present sample. This finding is inconsistent with the results of a study which found a higher prevalence of OCD among individuals diagnosed with ASD compared to those who were referred but not diagnosed (Russell et al., 2016). Notably, in the current sample, insistence on sameness/inflexible adherence to routine/ritualized patterns of behavior contributed to the reason for ASD testing referral for 30% of the non-ASD group. It is possible that compulsive behaviors may have initially been considered as

possible repetitive behaviors associated with ASD and, subsequently, prompted referral for further assessment to rule out ASD. In addition to those differences in psychiatric variables identified by the regression analysis, qualitatively, the results show that substance abuse disorders were relatively common in the non-ASD group (27.3%); however, they were rare in members of the ASD group (2.4%)

Among the current sample, the regression analysis of ADOS-2 items revealed that the ASD group was more likely to engage in the use of stereotyped or idiosyncratic language, demonstrate atypical of use of gestures, show limited acceptance of responsibility for their own behavior, and display poor social responses. On the SRS-2 parent-report measure, elevated scores on the Social Awareness scale (e.g., lacking awareness of others' perspectives, reacting to others in an inappropriate way) were associated with ASD diagnosis. For the self-report version of this scale, difficulty with Social Motivation (e.g., social discomfort, avoidance of social interactions) was associated with ASD group membership. Of items pertaining to the developmental period between ages 4 and 5 on the SCQ, parent response of "no" to the question "when she/he was 4 to 5, did she/he ever offer to share things other than food with you?" approached significance as a predictor of ASD group status.

These findings add to the literature, as prior studies comparing ASD symptoms of later-referred ASD and referred-non-ASD groups has been limited to AQ scores and have not identified group differences with regard to specific symptoms (Happé et al., 2016; Ketelaars et al., 2008). Happé et al. (2016) found self-report of overall autism symptoms to be elevated in the ASD group in comparison to the referred-non-ASD group; however, the Empathy and Systemizing quotients on the AQ were similar across groups. In the

study by Ketelaars et al. (2008), no component of the AQ self-report discriminated individuals who were diagnosed with mild ASD from those who were not. A summary of the findings of the current study in comparison to previous research comparing later-referred diagnosed and undiagnosed groups can be found in Table 59.

Characteristics of the Diagnosed ASD and Referred, Non-ASD Groups

Consistent with previous studies (e.g., Geurts & Jansen, 2011; Happe et al., 2016), the current study found many similarities between those who, after testing, were diagnosed with ASD and those who are not diagnosed with ASD. Overall, regardless of group membership (i.e., ASD versus non-ASD), the reason for hospital treatment typically had to do with concerns about the potential for self-harming behaviors, including suicidality. This has been shown by other researchers, including Dekeyzer (2004) and Mandell (2008). Participants in the current study had not only expressed suicidal thoughts but had extensive psychiatric histories as evidenced by numerous medication trials, treatments that had been sought, and the number of psychiatric diagnoses given prior to hospital admission and at discharge. Among both groups, participants were typically referred for ASD assessment based on evidence of social interaction difficulties and rigidity (i.e., cognitive and/or behavioral rigidity). The following section describes the characteristics of the two groups with regard to social developmental, psychiatric, and ASD-symptom variables.

Table 59

Studies Comparing Referred-Diagnosed and Referred-Undiagnosed Groups

	Current Study	Geurts & Jansen, 2011	Happé et al., 2016	Ketelaars et al., 2008	Russell et al, 2016
Age	No significant difference in age at time of hospital admission.	No significant differences were found for age at time of autism evaluation. On average, the age of first contact with the mental healthcare system was younger for the ASD group.	ASD group significantly younger than non-ASD group.	ASD group significantly younger than non-ASD group.	ASD group significantly younger than non-ASD group.
Sex	No significant group differences. ASD group: 57% male, 43% female, non-ASD group: 67% male, 33% female	Group differences not analyzed. ASD group: 76% male, 24% female, non-ASD group: 45% male, 55% female	No significant group differences. ASD group: 75% male, 25% female, non-ASD: 80% male, 20% female	No significant group differences. ASD group: 80% male, 20% female, non-ASD group: 86% male, 14% female	No significant group differences. ASD group: 78% male, 22% female, non-ASD group: 71% male, 29% female

Table 59 *(continued)*

	Current Study	Geurts & Jansen, 2011	Happé et al., 2016	Ketelaars et al., 2008	Russell et al, 2016
Learning Disability	No significant group differences. Reported learning disability: ASD group: 21%, non-ASD group: 15%	Not Reported	No significant differences. Reported learning disability: ASD group: 4%, non-ASD group: 4%	Not Reported	Not Reported
Psychiatric Disorder Differences	No significant differences in number of comorbid psychiatric diagnoses. The non-ASD group exhibited significantly higher numbers of obsessive-compulsive symptoms and psychotic symptoms.	The non-ASD group had a significantly greater number of lifetime psychiatric diagnoses. No significant differences were found for types of previous psychiatric diagnoses.	No significant differences in comorbid psychiatric diagnoses.	Psychotic Disorder NOS was significantly more common in the non-ASD group. No significant differences were found for rates of other comorbid psychiatric diagnoses.	Diagnosis of OCD was significantly more prevalent in the ASD group (18%) than the non-ASD group (13%). No significant group differences were found for other comorbid disorders or number of comorbid psychiatric diagnoses.

Table 59 *(continued)*

	Current Study	Geurts & Jansen, 2011	Happé et al., 2016	Ketelaars et al., 2008	Russell et al, 2016
Psychiatric Disorder Prevalence Rates	Comorbid diagnoses (at discharge): Any Depressive Disorder–ASD: 93%; non-ASD: 73%. Any Anxiety Disorder–ASD: 62%; non-ASD: 67%. ADHD–ASD-33%; non-ASD: 18%. OCD–ASD: 2%; non-ASD: 9%	Former diagnosis: Mood Disorder–ASD: 13%; non-ASD: 25%. Anxiety Disorder–ASD: 10%; non-ASD: 25%. Psychotic Disorder–ASD: 9%; non-ASD 20%	Comorbid psychiatric diagnoses: Any comorbidity–ASD: 58%; non-ASD: 59%. Depression–ASD: 35%; non-ASD: 30%. Anxiety– ASD: 28%; non-ASD: 20%	Comorbid psychiatric diagnoses: Any Comorbidity–ASD: 53%; non-ASD: 67%. Mood Disorder–ASD: 26%; non-ASD: 14%. Substance Abuse–ASD: 20%; non-ASD: 10%	Comorbid psychiatric diagnoses: Any Mood Disorder–ASD: 20%; non-ASD: 22%. Any Anxiety Disorder–ASD: 39%; non-ASD: 33%. ADHD–ASD: 10%; non-ASD: 10%. Psychotic Disorder– ASD: 2%; non-ASD: 4%
Self-Reported ASD Symptoms	The ASD group reported significantly more impairment in the area of social motivation than the non-ASD group.	Not Reported	The ASD group had significantly higher Autism Quotient total. No differences were found for the Empathy and Systemizing Quotients.	No significant group differences in Autism Quotient-Dutch version scores between the ASD and non-ASD groups.	Not Reported

Social-Developmental History

In the current study, participants' sex was not found to be a significant predictor of diagnostic status, indicating no significant differences in the number of males and females between the ASD and non-ASD groups. This result is consistent with the findings of previous studies (Happé et al., 2016; Ketelaars et al.; 2008; Russell et al. 2016). However, it is important to note that the male-to-female ratio of 4 to 3 found for the ASD group is lower than the expected ratio of 4.5 to 1 (Christensen et al., 2016). In their study of individuals between the ages of 15 and 25 who were referred for ASD evaluation in a community mental health setting, Aggarwal and Angus (2015) also found a lower than anticipated male-to-female ratio (i.e., 7 to 4). These researchers proposed that females in their sample may have been able to "camouflage" symptoms of ASD and that, in the process of treatment for psychiatric problems, the symptoms were revealed.

Among both groups in the current study, reported history of developmental delays was relatively uncommon. For the ASD group in particular, delayed achievement of language milestones was only reported for only 7% of the sample, which is infrequent when compared to surveillance data which showed that 63% of 8-year old children with ASD experienced language delays (Levy et al., 2010). This discrepancy is expected within this population, as researchers have found that language and communication difficulties are associated with earlier rather than later ASD diagnosis (e.g., Bickel, Bridgemohan, Sideridis, & Huntington, 2015; Brett et al., 2016; Salomone et al., 2016).

Regarding social history, approximately half of participants in both groups were raised in two-parent households, which is comparable to CDC survey reports showing 48.4% of children living with nuclear families (Blackwell, 2010). This finding suggests

that childhood living situation may not have been a factor in delaying ASD referral in the current sample. As far as childhood abuse and trauma, in the current sample, childhood abuse or other traumatic experiences were endorsed in 45.2% of ASD group files and 27.3% of non-ASD group files. In the current study, information was restricted to what was available in patients' files; as such, a complete review of adverse childhood experiences could not be completed. However, given the association between childhood adversity and psychiatric problems (Rytilä-Manninen, 2014), it is not surprising that abuse or trauma was endorsed in many of the participants' files.

Concerning sexuality, CDC estimates show that 96.6% of adults identify as being heterosexual (Ward, Dahlhamer, Galinsky, & Joestl, 2014), whereas only 67% of the current sample reported being heterosexual. For the ASD group, this finding is comparable to the findings of a recent meta-analysis which demonstrated that between 15% and 35% of individuals with ASD without ID identify as being bisexual or homosexual (Pecora, Mesibov, & Stokes, 2016). Pecora et al. also noted that individuals with ASD may be less likely to consider gender when choosing a partner. Researchers have also found gender dysphoria to be more common among individuals with ASD than in the general population (Glidden, Bouman, Jones, & Arcelus, 2016); however, in the current sample, gender dysphoria was not reported in any files belonging to the ASD group.

As far as learning and education, behavioral difficulties in the school setting were reported in 67% of ASD files and 50% of non-ASD files. Often these problems included attendance issues (i.e., skipping class) or work refusal. Using the data available, it is unclear how significantly these behaviors impacted the academic problems, such as class

failure, which were reported with a similar frequency. Records showed that 21.4% of the ASD group and 15.2% of the non-ASD group had a learning disability. These frequencies appear to be elevated in comparison to the general population, as data collected through the National Health Interview Survey (NHIS) showed that 8% of parents reported that their child had a learning disability (Bloom, Jones, & Freeman, 2013). This discrepancy with population estimates of learning disabilities is reasonable for both the ASD and non-ASD groups. A recent meta-analysis demonstrated that executive functioning weaknesses, which influence learning, are common in youth with ASD without ID (Lai et al., 2017). For the non-ASD group, researchers have found that children with learning disabilities are more likely to use mental healthcare services than children without any developmental disorder (Schieve et al., 2012). For approximately 25% of each group, records showed that special education services had been provided. A small number of participants in the ASD group received other services, such as having a 504 plan or Home and Hospital; records did not show that any patients in the non-ASD received these services. Although the number of participants ages 19 and older was small (ASD: 6, non-ASD 11), nearly 66% of both groups were either unemployed or on disability at the time of evaluation, suggesting that the severity of their symptoms may have impacted their ability to maintain stable employment.

Psychiatric History and Presentation

In the current study, the majority of participants had received multiple psychiatric diagnoses and had been tried on four or more medications prior to admission. At discharge, 43% of the ASD group and 52% of the non-ASD group received at least three

comorbid psychiatric diagnoses. The ASD and non-ASD groups exhibited similar rates of psychiatric comorbidity. This finding is consistent with previous studies which, in general, have found few differences between referred-ASD and referred-non-ASD groups with regard to number of psychiatric diagnoses (Happé et al., 2016; Ketelaars et al., 2008; Russell et al. 2016). In the present study, depressive and anxiety disorders were the most common diagnoses for both groups prior to admission and at discharge. This finding is also similar to previous research in which mood and anxiety disorders were the most common past and/or current diagnoses for adults referred for ASD assessment (Geurts & Jansen, 2011; Happé et al., 2016; Russell et al. 2016). Endorsement of anxiety was even more common among both the ASD and non-ASD groups of the present study than in previous samples. For current study participants, 61.9% of the ASD group and 66.7% of the non-ASD group were diagnosed with an anxiety disorder at discharge. These frequencies are also elevated in comparison to estimates for lifetime anxiety disorder diagnosis of approximately 33% in the general population (Kessler et al., 2012) and 40% for youth with ASD (Van Steensel, Bogels, & Perrin, 2011). However, the rate of anxiety for the current study's ASD group is comparable to the rate of 58% found in a sample of adolescents treated for psychiatric problems (Backner, Clark, Jenson, Gardner, & Kahn, 2013).

In the current study, 47.6% of the ASD group and 60.6% of the non-ASD group were diagnosed with major depressive disorder (MDD) upon discharge. When unspecified depressive disorder is included with MDD, the percentage of discharge mood disorder diagnoses increases to 92.9% for the ASD group and 72.7% for the non-ASD group. The rates of depression found in this sample were elevated in comparison to the

lifetime (11%) and 12-month (7.5%) rates of MDD found using the National Comorbidity Survey–Adolescent Supplement (Avenevoli, Swendsen, He, Burstein, & Merikangas, 2015) and an estimated lifetime prevalence of 20.9% for adults ages 18 to 64 (Kessler et al., 2012). This discrepancy is expected, as researchers have found elevated depressive symptoms among individuals with ASD (see Backner et al., 2013; Gotham, Brunwasser, & Lord, 2015; Mayes et al., 2011). Furthermore, in the current sample, depressive symptoms contributed to the reason for hospitalization for many participants, so it is expected that the rate of mood disorders would be elevated in this population.

As far as behavioral problems, the following were common in both the ASD and non-ASD groups: anger management problems, verbal aggression, physical aggression, substance use, and property destruction, as they were reported for approximately 25% to 50% of participants in each group. This finding is consistent with previous research suggesting that psychiatrically treated youth with ASD exhibit mildly to moderately elevated rule-breaking and aggressive behaviors (Backner et al., 2013).

Symptoms Related to Autism Spectrum Disorder

Of note, although they did not meet the diagnostic criteria for ASD, parent report suggested that the non-ASD group did demonstrate related symptoms. For this group, the mean SRS-2 (parent-report) total *t* score was approximately 62, which falls in the mild range of symptoms. Mean parent-report *t* scores on the Social Cognition, Social Communication, Social Motivation, and Restricted Interests and Repetitive Behavior treatment scales fell within the mild to moderate ranges. These results are consistent with those of previous studies in which subclinical traits related to ASD have been reported

among individuals who have various psychiatric problems, such as internalizing and psychotic disorders (Matsuo et al., 2015).

Limitations

There are several limitations associated with the present study, generally related to retrospective research design. Patient information was limited to that which was included in the file. No contact was made with participants for the purpose of the study, so there was no opportunity to supplement incomplete data. For the ASD assessment, a completed ADOS-2 was a criterion for inclusion in the current study. However, additional measures (i.e., SRS-2, SCQ) were not available for all participants. As such, analyses were conducted separately for these forms.

Additionally, potential problems regarding the consistency and accuracy of the information in the files is another limitation of the study. The researchers were not present at the time of psychiatric and social work evaluations. Across the various hospital units where treatment was received, and over the 6-year time frame during which patients were admitted, several practitioners completed these assessments. The current study was unable to gauge consistency across these reports or verify any content included in files. Information regarding early development, such as the presence or absence of developmental delays, was reported retrospectively. It is likely that memory impacted the accuracy of these reports, which may partially account for the infrequent report of developmental delays in our sample. It is also unclear to what extent memory or limited knowledge may have influenced reported family psychiatric history. Additionally, patients and their parents provided information about patients' present symptoms and

history. It is likely that the completeness of these reports was somewhat variable across individuals. In a few cases, an individual's file showed a history of a previous diagnosis (e.g., bipolar, OCD); however, psychiatric assessment notes specified that the parents and/or patient denied a history of symptoms related to that disorder (e.g., manic symptoms, obsessive-compulsive symptoms). In these cases, the information was coded as reported in the file because further information regarding the discrepancy was unavailable. Furthermore, as the data were historical, interrater reliability data could not be collected for ADOS-2 scores or the overall decision regarding ASD diagnosis. However, each patient was under the care of a treatment team (e.g., psychiatrist, psychologist, social worker), and discharge diagnoses of ASD were made using comprehensive information collected by this team.

Additional limitations of this study arise from the study sample and setting characteristics. The sample was relatively homogenous; nearly all participants in the sample identified as being non-Hispanic, Caucasian. Furthermore, every patient had visited the same hospital and had been evaluated for ASD by the same clinician. This study focused on individuals without known intellectual impairment who exhibited psychiatric problems severe enough to warrant hospital treatment, and the results may not generalize to other individuals who were referred for ASD evaluation in adolescence or adulthood.

This study included individuals who were evaluated for ASD both before and after the publication of the DSM-5. It is unclear if patients diagnosed with PDD-NOS or Asperger's disorder using the previous edition would meet the criteria for ASD using the DSM-5. Additionally, in this study, the non-ASD group was used as a control group. A

typically developing control group was not available, as historical data were used. A control group of adolescents and young adults who had been diagnosed with ASD during childhood was also unavailable.

Due to the exploratory nature of this study, a variety of variables were coded and analyzed. In order to limit the opportunity for Type I error, binary logistic regression was chosen to analyze differences between the ASD and non-ASD groups. However, this type of analysis also presents an important limitation, as variables which correlate with those included in the regression model are excluded from the regression model. As such, only the strongest independent predictors of group status were found to be statistically significant, and other variables that may have been clinically useful for discriminating groups may not have been identified.

Future Research

Future research should include prospective data collection. At the time of ASD assessment, patients could be asked if they are interested in research participation. For those who provide consent, researchers could collect data at the time of evaluation or at a future date. This study design would allow for clarification and elaboration on patients' social-developmental history and symptom reports. It would also provide researchers with the opportunity to ensure that data are collected uniformly for all participants. Additional information regarding variables not included in hospital records, such as more detailed information about development and symptom trajectories, could also be collected. Researchers could also have parents complete any missing forms during study participation, so questionnaires would be collected for all participants. Additional

research also could use the descriptive data reported in this study to guide hypotheses and limit the number of variables and analyses addressed. Including a smaller number of variables would allow researchers to use different analyses, such as *t* tests, in order to determine if group differences are significant.

Additional studies could also include a broader group of participants. Data could be collected from multiple hospital sites in different areas, including rural, urban, and suburban locations across the country. Patients from a variety of racial and ethnic backgrounds should be included. In addition to expanding on the experimental group, further research may also include different control groups. For example, using a control group of individuals who were diagnosed with ASD during childhood may allow researchers to see how this later-diagnosed population differs from those who were identified at an earlier age. This information may provide further insight into reasons for delays in diagnosis in this subset. Alternatively, using a control group of typically developing individuals may highlight characteristics of this later-referred population that may signal need for assessment at an earlier time.

Implications for Practice

The results of this study emphasize the need for effective interventions for individuals with ASD and co-occurring psychiatric conditions. Approximately half of the ASD group had been prescribed four or more medications prior to admission, and nearly all participants had accessed some type of psychiatric treatment before the current hospital admission. Despite these efforts, all participants continued to exhibit symptoms that warranted hospital treatment. This indicates that more targeted interventions are

needed for individuals with ASD and comorbid psychiatric conditions. The current sample represents a population with complex presentations, and both psychiatric and ASD symptoms should be assessed in order to ensure that all of their needs are addressed.

Overall, participants in the ASD and non-ASD groups demonstrated relatively similar psychiatric profiles. Furthermore, although they did not meet the diagnostic criteria for ASD, records indicated that many individuals in the non-ASD group demonstrated some degree of related, subclinical symptoms. These group similarities indicate that clinicians should use caution when assessing ASD in a psychiatric hospital setting, as typical psychiatric evaluations may be insufficient for diagnosing ASD. More comprehensive evaluations, which incorporate tools such as the ADOS-2, which are specifically designed for ASD assessment, are recommended.

APPENDIX A

KAPPA COEFFICIENTS

Interrater Reliability

Kappa Coefficients

Variable	Kappa
Age at Admission	0.94
Treatment Program	1.00
Disposition Plan	1.00
Work or School Status	1.00
Reason for Hospitalization	0.93
Developmental Delay	0.90
Sexuality	0.92
Childhood Abuse/Trauma	1.00
Birth Order	1.00
Childhood Living Situation	1.00
Grade	1.00
Academic Problems	0.86
School Behavior Problems	1.00
School Services	1.00
Other Disability	0.87
Number of Past Psychiatric Diagnoses at Admission	0.80
Number of Discharge Psychiatric Diagnoses	0.86
Number of Past Psychiatric Medications at Admission	0.84
Number of Psychiatric Medications at Discharge	0.86
Number of Behavioral Problems	0.87
Number of Anxiety Symptoms	0.81
Number of Depressive Symptoms	0.51
Number of Obsessive-Compulsive Symptoms	1.00
Number of ADHD Symptoms	0.80
Number of Bipolar - Mania Symptoms	1.00
Number of Psychotic Symptoms	1.00
Reason for ASD Referral - Social Interaction Deficits	0.91
Reason for ASD Referral - Deficits in Nonverbal Communicative Behavior	1.00
Reason for ASD Referral - Relationship Difficulties	1.00
Reason for ASD Referral -Stereotyped Movements, Use of Objects of Speech	1.00
Reason for ASD Referral - Insistence on Sameness, Inflexible Adherence to Routine, Ritualized Patterns of Behavior	0.91
Reason for ASD Referral - Highly Restricted, Fixated Interests	1.00

Note: "C" indicates that a kappa coefficient could not calculated due to ratings being constant across files.

Kappa Coefficients Continued

Variable	Kappa
Reason for ASD Referral–Atypical Sensory Behavior	1.00
Reason for ASD Referral–Behavioral Difficulties	1.00
Reason for ASD Referral–Family History	1.00
Reason for ASD Referral–Mood	0.83
Reason for ASD Referral–History of Developmental Delays	1.00
ADOS-2 Scores	
Communication	1.00
Reciprocal Social Interaction (RSI)	1.00
Communication + Reciprocal Social Interaction (RSI)	1.00
Imagination/Creativity	0.92
Stereotyped Behaviors and Restricted Interests	1.00
ADOS-2 Item Scores	1.00
A1: Overall Level of Nonechoed Spoken Language	C
A2: Speech Abnormalities Associated with Autism	1.00
A3: Immediate Echolalia	C
A4: Stereotyped/Idiosyncratic Use of Words or Phrases	1.00
A5: Offers Information	1.00
A6: Asks for Information	1.00
A7: Reporting of Events	1.00
A8: Conversation	1.00
A9: Descriptive, Conventional, Instrumental, or Informational Gestures	1.00
A10: Emphatic or Emotional Gestures	1.00
B1: Unusual Eye Contact	1.00
B2: Facial Expressions Directed to Examiner	1.00
B3: Language Production and Linked Nonverbal Communication	1.00
B4: Shared Enjoyment in Interaction	1.00
B5: Communication of Own Affect	1.00
B6: Comments on Others' Emotions/Empathy	1.00
B7: Insights Into Typical Social Situations and Relationships	1.00
B8: Responsibility	1.00
B9: Quality of Social Overtures	1.00
B10: Amount of Social Overtures/Maintenance of Attention	1.00
B11: Quality of Social Response	1.00
B12: Amount of Reciprocal Social Communication	1.00
B13: Overall Quality of Rapport	1.00

Note: "C" indicates that a kappa coefficient could not calculated due to ratings being constant across files.

Kappa Coefficients Continued

Variable	Kappa
C1: Imagination/Creativity	0.92
D1: Unusual Sensory Interest in Play Material/Person	C
D2: Hand and Finger and Other Complex Mannerisms	C
D3: Self-Injurious Behavior	C
D4: Excessive Interest in or References to Unusual or Highly Specific Topics or Objects or Repetitive Behaviors	0.88
E1: Overactivity/Agitation	1.00
E2: Tantrums, Aggression, Negative, or Disruptive Behavior	C
E3: Anxiety	1.00
Social-Responsiveness Scale Total Score (Parent Report)	1.00
Social Awareness (Parent Report)	1.00
Social Cognition (Parent Report)	1.00
Social Communication (Parent Report)	1.00
Social Motivation (Parent Report)	1.00
Restricted Interests and Repetitive Behavior (Parent Report)	1.00
Social Communication and Interaction (Parent Report)	1.00
Social-Responsiveness Scale Total Score (Self Report)	1.00
Social Awareness (Self Report)	1.00
Social Cognition (Self Report)	1.00
Social Communication (Self Report)	1.00
Social Motivation (Self Report)	1.00
Restricted Interests and Repetitive Behavior (Self Report)	1.00
Social Communication and Interaction (Self Report)	1.00
Social Communication Questionnaire Total Score	1.00
SCQ Item 20	1.00
SCQ Item 21	1.00
SCQ Item 22	1.00
SCQ Item 23	1.00
SCQ Item 24	C
SCQ Item 25	C
SCQ Item 26	C
SCQ Item 27	C
SCQ Item 28	1.00
SCQ Item 29	1.00

Note: "C" indicates that a kappa coefficient could not calculated due to ratings being constant across files.

Kappa Coefficients Continued

Variable	Kappa
SCQ Item 30	C
SCQ Item 31	1.00
SCQ Item 32	1.00
SCQ Item 33	C
SCQ Item 34	1.00
SCQ Item 35	1.00
SCQ Item 36	1.00
SCQ Item 37	1.00
SCQ Item 38	1.00
SCQ Item 39	1.00
SCQ Item 40	1.00

Note: "C" indicates that a kappa coefficient could not calculated due to ratings being constant across files.

APPENDIX B

DATA CODING SHEET

Patient Information:

Assigned Research ID:
Group:
Age at Admission:
Sex:
Race:
Reason for Current Hospitalization:
Current Work or School Status:
Medical Problems:
Disposition Planning:
Treatment Program: Inpatient ☐ Day Treatment ☐ Inpatient + Day Treatment ☐

Diagnostic History:
Past Diagnoses:
Diagnoses at Admission:
Diagnoses at Discharge:
Prior Question of ASD Diagnosis: yes ☐ no ☐ Details:
Prior Testing of ASD: yes ☐ no ☐
Other Disability:

Medications:
Medications at Admission:
Medications at Discharge:
Additional Past Medications:

Admission Psychiatric Examination:
General Appearance:
Eye Contact:
Affect:
Mood:
Speech:
Thought Processes/Associations:
Ideations:
Behaviors:
Hallucinations/Delusions:
Other Thought Content:
Mental Status/Cognition:
Insight:
Judgement:

Admission Risk Assessment:
Suicide Risk Factors:
Suicide Protective Factors:
Developmental History:
Pregnancy Complications: yes ☐ no ☐ unknown ☐ If yes, describe: Enter text
Delivery Complications: yes ☐ no ☐ unknown ☐ If yes, describe: Enter text
Developmental Delay: yes ☐ no ☐ unknown ☐
If yes:
Language Delay: yes ☐ no ☐ unknown ☐
Social Delay: yes ☐ no ☐ unknown ☐
Motor Delay: yes ☐ no ☐ unknown ☐
Other Delay: yes ☐ no ☐ unknown ☐ If yes, describe:
Regression: yes ☐ no ☐ unknown ☐
If yes:
Language Regression: yes ☐ no ☐ unknown ☐
Social Regression: yes ☐ no ☐ unknown ☐
Motor Regression: yes ☐ no ☐ unknown ☐
Other Delay: yes ☐ no ☐ unknown ☐ If yes, describe:

Family History:
Maternal Diagnoses:
Paternal Diagnoses:
Sibling Diagnoses:
Extended Family Diagnoses:

Social History:
Gender Identity:
Sexuality:
Abuse: yes ☐ no ☐ If yes, describe:
DCFS Contact: yes ☐ no ☐ If yes, describe:
SES/Community:
Birth Order: First Child ☐ Second or Later Child ☐
Childhood Living Situation: Single Parent ☐ Multiple Parent ☐ Varied Across Childhood (e.g., parents divorced or remarried during patient's childhood)
Current Living Situation:
Individuals Currently Living in the Home:
Family Conflict:

Educational and Employment History
Grade:
School Type:
School Problems: yes ☐ no ☐ If yes, describe:

Educational Services Received: yes ☐ no ☐ If yes, classification:

Treatment History
Length of Current Hospital Stay:
Previous Inpatient: yes ☐ no ☐ If yes, describe:
Previous Residential: yes ☐ no ☐ unknown ☐ If yes, describe:
Previous Day Treatment: yes ☐ no ☐ unknown ☐ If yes, describe:
Previous Outpatient Therapy: yes ☐ no ☐

Behavioral History
Substance Use: yes ☐ no ☐ If yes, describe:
Legal Involvement: yes ☐ no ☐ If yes, details:
History of Stealing: yes ☐ no ☐ If yes, details:
History of Sexual Perpetration: yes ☐ no ☐ If yes, details:
Run Away from Home: yes ☐ no ☐ If yes, details:
Wandering: yes ☐ no ☐ If yes, details:
Anger Management Problems: reported ☐ not reported ☐ If yes, describe:
Verbal Aggression: reported ☐ not reported ☐ If yes, describe:
Physical Aggression: reported ☐ not reported ☐ If yes, describe:
Use of a Weapon: yes ☐ no ☐ If yes, details:
Property Destruction: reported ☐ not reported ☐ If yes, describe:
Rumination about Harming Others: reported ☐ not reported ☐ If yes, describe:
Threats toward Others: reported ☐ not reported ☐ If yes, describe:
History of Cruelty to Animals: yes ☐ no ☐ If yes, details:

Psychiatric Symptoms and Behaviors (Current or By History):

Eating Problems: reported ☐ not reported ☐ If yes, describe:
Sleep Problems: reported ☐ not reported ☐ ☐ If yes, describe
Changes in Personality: reported ☐ not reported ☐ If yes, describe:
Memory Problems: reported ☐ not reported ☐ If yes, describe:
Agitation: reported ☐ not reported ☐ If yes, describe:
Anxiety: reported ☐ not reported ☐ If yes, describe:
Excessive Worry: reported ☐ not reported ☐ If yes, describe:
Separation Anxiety: reported ☐ not reported ☐ If yes, describe:
Social Anxiety: reported ☐ not reported ☐ If yes, describe:
Phobia(s): reported ☐ not reported ☐ If yes, describe:
Panic Attacks: reported ☐ not reported ☐ If yes, describe:
Agoraphobia: reported ☐ not reported ☐ If yes, describe:
Physical Symptoms of Anxiety: reported ☐ not reported ☐ If yes, describe:
Restlessness/Feeling Keyed Up/On Edge: reported ☐ not reported ☐ If yes, describe:

Psychiatric Symptoms and Behaviors (Current or By History) Continued:
Muscle Tension: reported ☐ not reported ☐ If yes, describe:
Depressed Mood: reported ☐ not reported ☐ If yes, describe:
Anhedonia: reported ☐ not reported ☐ If yes, describe:
Withdrawn: reported ☐ not reported ☐ If yes, describe:
Low Motivation: reported ☐ not reported ☐ If yes, describe:
Apathy: reported ☐ not reported ☐ If yes, describe:
Tearful: reported ☐ not reported ☐ If yes, describe:
Guilt/Worthlessness: reported ☐ not reported ☐ If yes, describe:
Fatigue: reported ☐ not reported ☐ If yes, describe:
Poor Concentration: reported ☐ not reported ☐ If yes, describe:
Irritability: reported ☐ not reported ☐ If yes, describe:
Hopelessness: reported ☐ not reported ☐ If yes, describe:
Helplessness: reported ☐ not reported ☐ If yes, describe:
Fatigue or Loss of Energy: reported ☐ not reported ☐ If yes, describe:
Recurrent Thoughts of Death: reported ☐ not reported ☐ If yes, describe:
Suicide Attempt(s): reported ☐ not reported ☐ If yes, number of attempts:
Suicidal Ideation (s): reported ☐ not reported ☐ If yes, describe:
Other Self-Harm (s): reported ☐ not reported ☐ If yes, describe:
Obsessions: reported ☐ not reported ☐ If yes, describe:
Compulsive Behaviors: reported ☐ not reported ☐ If yes, describe:
Attention Difficulties: reported ☐ not reported ☐ If yes, describe:
Hyperactivity: reported ☐ not reported ☐ If yes, describe:
Impulsivity: reported ☐ not reported ☐ If yes, describe:
Restlessness/Over-activity: reported ☐ not reported ☐ If yes, describe:
Vocal Tics: reported ☐ not reported ☐ If yes, describe:
Motor Tics: reported ☐ not reported ☐ If yes, describe:
Mood Swings: reported ☐ not reported ☐ If yes, describe:
Mania: reported ☐ not reported ☐ If yes, describe:
Extended Period of Elevated Mood: reported ☐ not reported ☐ If yes, describe:
Inflated Self-Esteem or Grandiose Ideas: reported ☐ not reported ☐ If yes, describe:
Increased Goal-Directed Activity: reported ☐ not reported ☐ If yes, describe:
Flight of Ideas: reported ☐ not reported ☐ If yes, describe:
Decreased Need for Sleep: reported ☐ not reported ☐ If yes, describe:
More Talkative: reported ☐ not reported ☐ If yes, describe:
Excessive Involvement in High Risk Activities: reported ☐ not reported ☐ If yes, describe:
Distractibility: reported ☐ not reported ☐ If yes, describe:
Auditory Hallucinations: reported ☐ not reported ☐ If yes, describe:
Visual Hallucinations: reported ☐ not reported ☐ If yes, describe:

Psychiatric Symptoms and Behaviors (Current or By History) Continued:
Paranoia: reported ☐ not reported ☐ If yes, describe:
Delusions: reported ☐ not reported ☐ If yes, describe:
Thought Problems: reported ☐ not reported ☐ If yes, describe:
Disorganized Speech: reported ☐ not reported ☐ If yes, describe:
Grossly Disorganized or Catatonic Behaviors: reported ☐ not reported ☐ If yes, describe:
Other:

Autism Assessment Information:
Symptoms Prompting ASD Referral:
With Insight: yes ☐ no ☐ unknown ☐

History of Behaviors Related to ASD
Deficits in Social-Emotional Reciprocity: reported ☐ not reported ☐

- Abnormal Social Approach: reported ☐ not reported ☐
- Abnormal Reciprocal Conversation: reported ☐ not reported ☐
- Reduced Sharing of Interests, Emotions, or Affect: reported ☐ not reported ☐
- Sharing Too Much/Inappropriate Information: reported ☐ not reported ☐
- Abnormal Social Initiation: reported ☐ not reported ☐
- Abnormal Social Response: reported ☐ not reported ☐
- Reduced Imitation: reported ☐ not reported ☐

Deficits in Nonverbal Communicative Behaviors: reported ☐ not reported ☐

- Poorly Integrated Verbal and Nonverbal Information: reported ☐ not reported ☐
- Abnormal Use Eye Contact: reported ☐ not reported ☐
- Abnormal Use of Facial Expressions: reported ☐ not reported ☐
- Abnormal Use of Body Language: reported ☐ not reported ☐
- Abnormal Understanding Gestures: reported ☐ not reported ☐
- Abnormal Use of Gestures: reported ☐ not reported ☐
- Atypical Speech Intonation: reported ☐ not reported ☐

Deficits in Developing Relationships: reported ☐ not reported ☐

- Lack of Interest in Peers: reported ☐ not reported ☐
- Isolated/Withdrawn: reported ☐ not reported ☐

Deficits in Maintaining Relationships: reported ☐ not reported ☐

- Difficulty Sharing in Imaginative Play: reported ☐ not reported ☐

Deficits in Understanding Relationships: reported ☐ not reported ☐

- Difficulty Adjusting Behavior to Suit Situation: reported ☐ not reported ☐
- Misreading Social Situations: reported ☐ not reported ☐

Stereotyped or Repetitive Movements: reported ☐ not reported ☐

- Toe Walking: reported ☐ not reported ☐

History of Behaviors Related to ASD Continued

Stereotyped or Repetitive Object Use: reported ☐ not reported ☐
- Lining Up or Flipping Objects: reported ☐ not reported ☐

Stereotyped or Repetitive Speech: reported ☐ not reported ☐
- Immediate or Delayed Echolalia: reported ☐ not reported ☐
- Idiosyncratic Phrases: reported ☐ not reported ☐

Insistence on Sameness: reported ☐ not reported ☐
- Extreme Distress at Small Changes: reported ☐ not reported ☐
- Difficulty with Transitions: reported ☐ not reported ☐
- Rigid Thinking Patterns: reported ☐ not reported ☐

Inflexible Adherence to Routine: reported ☐ not reported ☐

Ritualized Patterns of Verbal Behavior: reported ☐ not reported ☐
- Greeting Rituals: reported ☐ not reported ☐

Ritualized Patterns of Nonverbal Behavior: reported ☐ not reported ☐
- Need to Take Same Route: reported ☐ not reported ☐
- Need to Eat Same Food: reported ☐ not reported ☐

Highly Restricted, Fixated Interests: reported ☐ not reported ☐

Atypical Interests: reported ☐ not reported ☐

Hyper-reactivity to Sensory Input: reported ☐ not reported ☐
- Sound: reported ☐ not reported ☐
- Texture: reported ☐ not reported ☐
- Light: reported ☐ not reported ☐
- Unusual Response to Physical Contact: reported ☐ not reported ☐

Hypo-reactivity to Sensory Input: reported ☐ not reported ☐
- Apparent Indifference to Pain: reported ☐ not reported ☐

Unusual Interest in Sensory Aspects of the Environment: reported ☐ not reported ☐
- Excessive Smelling of Objects: reported ☐ not reported ☐
- Excessive Touching of Objects: reported ☐ not reported ☐
- Visual Inspection: reported ☐ not reported ☐

Autism Diagnostic Observation Schedule Second Edition (ADOS-2)

Comm	RSI	Comm +RSI	I/C	SBRI	Comm Class	RSI Class	Comm-RSI Class

Ados-2 Item Scores:

A1:	A2:	A3:	A4:	A5:	A6:	A7:	A8:	A9:	A10:

B1:	B2:	B3:	B4:	B5:	B6:	B7:	B8:	B9:	B10:	B11:	B12:	B13:

C1:	D1:	D2:	D3:	D4:	D5:	E1:	E2:	E3:

Social Responsiveness Scale, Second Edition (SRS-2)
Parent Report

SRS Total	Awr	Cog	Com	Mot	RRB	SCI	RRB

Social Responsiveness Scale, Second Edition (SRS-2)
Self-Report

SRS Total	Awr	Cog	Com	Mot	RRB	SCI	RRB

Social Communication Questionnaire (SCQ):

Total Score:
Age 4-5 Items Endorsed:

Other Test Data: Click here to enter text.

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