Autism Spectrum Disorder during the Adolescent Years

A thesis submitted in partial fulfillment of the requirements
For the degree of Master Arts in Psychology,
Clinical Psychology

By
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Sun-Mee Kang, Ph.D., Chair ___________________________ Date

California State University, Northridge
ACKNOWLEDGEMENT

I would like to thank my committee members who supported my efforts in writing this thesis.

To my chair, Dr. Kang,

To Dr. Katz,

To Dr. Lagana,
DEDICATION

This thesis is dedicated to:

Every individual diagnosed with Autism Spectrum Disorder or Asperger’s syndrome and their loving parents that offer unconditional love and support throughout all the battles encountered.
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ABSTRACT

AUTISM SPECTRUM DISORDER DURING THE ADOLESCENT YEARS

By

Maribel Garcia

Major of Arts in Psychology,
Clinical Psychology

The purpose of this study was to test whether poor verbal intelligence leads to aggression in adolescents diagnosed with Autism Spectrum Disorder (ASD). Research studies have supported that deficits in verbal intelligence are often seen in highly aggressive individuals. However, these studies do not usually include individuals with ASD in their sample. The present study assessed these variables in teens diagnosed with ASD by utilizing the WASI and the BASC-2. Results indicated that poor verbal ability was associated with greater amounts of aggression. Additionally, anxiety being one of the most debilitating symptom with high prevalence rates within this population was also investigated. Results demonstrated that cognitive ability as represented by FSIQ scores were positively correlated with parent-reported anxiety scores. However, a negative relationship existed between FSIQ scores and self-reported anxiety scores. Anxiety scores were also correlated with parent reported functional communication scores from the BASC-2. While parents perceived teens with good communication skills as less anxious, teens with effective communication skills reported deeper feelings of anxiety. These findings highlight the discrepancies that exist in utilizing informant-based measures and self-reported surveys. Overall, this study adds knowledge on factors that may be exacerbating feelings of anxiety and aggression in adolescents with ASD.
CHAPTER I

INTRODUCTION

Currently, there seems to be an epidemic of Autism Spectrum Disorders (ASD) affecting children all over the United States (Center for Disease Control and Prevention, 2014). The Center for Disease Control and Prevention (2014) has reported rapid increases on the prevalence rates for children diagnosed with ASD causing public awareness of the disorder. The CDC reported that in 2007, 1 out of 150 children was diagnosed with ASD. However, only 2 years later they found that 1 in every 110 children had ASD (CDC, 2014). Yet, in 2012, the number of children living with ASD increased to 1 in every 88 children. If this is not alarming enough, a more recent publication from the CDC estimated that 1 out of 68 children have ASD. This means that the estimated prevalence rate has increased 123% from 2002, 64% from 2006, and 29% from 2008 (CDC, 2014). These staggering numbers are provoking high levels of stress for parents of toddlers who are worried about their child being affected with ASD. Similarly, clinicians and researchers are working vigorously to learn more about the causes, risk factors, symptomatology, and consequences of the disorder.

The American Psychiatric Association (2013) defines ASD as a pervasive developmental disorder that affects the brain and can cause problems with thinking, feeling, communicating, and the ability to relate to others. According the newest edition of the Diagnostic and Statistical Manual of Mental Disorders (2013) criteria for ASD has been modified and previously known disorders such as Asperger’s syndrome (AS) and Pervasive Developmental Disorder Not Otherwise Specified (PDD-NOS) are no longer being diagnosed on patients with autistic traits. Asperger’s syndrome was a diagnosis
given to individuals that shared similar symptoms to those seen in ASD but were considered to be high functioning and less severely affected than individuals diagnosed with Autism. PDD-NOS was a diagnosis given to individuals that had symptoms similar to those of ASD but did not meet all criterions necessary for an ASD diagnosis.

Deficits presented in ASD originate during neurodevelopment and may exacerbate as the child ages causing significant impairment in his or her life (Matson, Rieske, & Tureck, 2011). Matson, Hess, and Boisjoli (2010) found that parents and guardians of toddlers diagnosed with ASD reported more symptoms associated with anxiety, avoidance behavior, and repetitive behaviors in their children when compared to toddlers not diagnosed with ASD. In a study on adolescents with ASD, parents of participants reported high levels of social anxiety, physical symptoms of anxiety, panic and attachment problems in their offspring (Bellini, 2004). Additionally, caregivers of adults with ASD not only reported high levels of anxiety and repetitive behaviors in the individual they were caring for but also rated them high on inattention, hyperactivity, and impulsivity (Matson & Lovullo, 2009).

Early recognition of symptoms is crucial in helping individuals with ASD. Fortunately, there are countless websites and organizations that focus on identifying early signs of ASD (e.g., www.autismspeaks.org; www.autism-society.org; www.autism.com; www.ahany.org; www.autismhwy.com). However, there is much less information on ASD during the adolescent years even though this is a crucial time for all individuals. Indeed, many developmental milestones occur during the adolescent years including the need for individuals to accept and resolve contradictory views of self, address issues of identity, recognize self within the broader society and transition to young adults (Bukatko
& Daehler, 2004). Research studies targeting individuals with ASD during the adolescent years may help find interventions that can palliate some of the more severe symptoms that may develop in adulthood as seen in Matson and Lovullo’s study (2009).

Comorbidity in ASD Population

Researchers have reported very high rates of co-occurring psychological disorders in the ASD population. Simonoff and his colleagues (2008) found that 70% of their 112 participants with ASD met criteria for at least another disorder. Anxiety and aggression are among the most common comorbid disorders and symptoms seen in individuals with ASD (Kanne & Mazurek, 2011; Mazurek, Kanne, & Wodka, 2013; Sukhodolsky et al., 2008; van Steensel, Bögels, & Perrin, 2011). This increased risk of comorbid disorders among the ASD population warrants an assessment of psychopathology and severity of comorbid symptoms. Broad band measures of psychopathology are commonly used to screen for a broad range of psychopathology symptoms. One commonly used scale in the ASD population is the Behavioral Assessment System for Children, Second Edition (BASC-2) which helps screen for psychopathology in children and adolescents (Reynolds & Kamphaus, 2005).

The BASC-2 is an integrated system that provides a comprehensive picture of the client with more accurate diagnoses (Reynolds & Kamphaus, 2005). Goldin, Matson, Konst, and Adams (2014) used the BASC-2 to discern ASD individuals from typically developing individuals. These researchers found that, overall, ASD individuals were significantly more impaired than typically developing individuals. However, because Goldin and colleagues (2014) included female and male participants who ranged in age from 2 years old to 16 years old, studies with a more narrow age range and a single
gender are needed to control for confounding factors.

**Anxiety in ASD Population**

One study that focused on a specific sex and age group was conducted by Green and colleagues (2000). These scholars looked at emotional and behavioral differences between clinically referred teen boys with Asperger’s syndrome (AS) and clinically referred teen boys with conduct disorder and found that those with AS had significantly more symptoms of anxiety. Anxiety is a common feature seen within the ASD population with more than hundredths of studies being conducted on anxiety symptomatology in individuals with the diagnosis (van Steensel, Bogels & Perrin, 2011). The American Psychiatric Association defines anxiety as an emotion characterized by feelings of tension, worried thoughts and physical changes (APA, 2014). People with anxiety disorders usually have recurring intrusive thoughts or concerns, avoid certain situations out of worry, and have physical symptoms such as sweating, trembling, dizziness or a rapid heartbeat (APA, 2014).

A systematic review of the literature conducted by van Steensel, Bögels and Perrin (2011) identified 31 studies involving 2,121 individuals aged 18 years and younger with ASD and symptoms of anxiety. The authors found that across studies 39.6% of young people with ASD had at least one comorbid DSM-IV anxiety disorder. Additionally, Sukhodolsky et al. (2008) reported that 43% of their sample diagnosed with Autism Disorder (age ranged between 5 to 17 years old) met the cut-off on the screening scale for at least one anxiety disorder based on parent ratings. Sukhodolsky and colleagues (2008) also discovered that individuals with higher IQ and greater social impairment were more severely anxious than individuals with a lower IQ. Studies that
investigate whether intellectual intelligence may exacerbate symptom severity in anxiety are warranted in the adolescent population.

One study that explored intelligence and anxiety found a positive correlation between IQ and anxiety in children (Vasa et al., 2013). Results showed that higher IQs were indicative of greater symptoms of anxiety. However, when Vasa and colleagues (2013) attempted to replicate their study with adolescents they found two major limitations that they overlooked with this age group. They reported that they lacked to measure social anxiety symptoms, which is a common form of anxiety seen in this age group, and that their participants had low IQs, severely affecting the design and results of their study. Testing individuals with higher IQs that are considered to be at the higher end of the Autism spectrum (high functioning) and using a designated anxiety measure specifically for adolescents is imperative when investigating if higher IQs predict greater anxiety symptoms in teen males.

Lecavalier (2006) used a valid measure when assessing anxiety in participants between the ages of 3 years old and 21 years old. The scale assessed feelings of nervousness and tension, fear and anxiety, and worry. The results indicated that 21% of 487 participants in the study were nervous and tense, 17% were fearful and anxious, and 14% were worried based on parents observations. Results also indicated that symptom severity increased with age with adolescents and young adults experiencing more severe symptoms than children. However, Lacavalier also lacked to report a) participants’ IQs and, although it has been established that individuals with Autism are more anxious than other clinical groups (Mcintosh et al., 2011) b) their data on the relationship between IQs and severity of anxiety is limited.
Additionally, Lacavalier’s study (2006) used a single rating scale to assess anxiety in participants. Measures that allow information from at least two sources are warranted and recommended in the assessment of anxiety (Strang et al., 2012; Vase et al., 2013) because they help reduce the threats to validity, i.e., bias reporting, that would be present in studies that only use a single measure (MacNeil, Lopes, & Minnes, 2009; Reynolds & Kamphaus, 2005; White et al., 2009). Therefore, the current study used both a self-report anxiety scale and a parent-report rating scale to better measure anxiety when investigating the relationship between IQ and anxiety in adolescent males.

**Aggressive Behaviors in ASD Population**

Apart from anxiety, there are other challenging behaviors that occur at very high rates in the ASD population (Healy, Brett, & Leader, 2013). In fact, multiple sources have identified that aggression is the most common and most disruptive challenging behavior within the ASD community (Kanne & Mazurek, 2011; Matson & Boisjoli, 2007). Aggression is the tendency to hurt others physically, emotionally, or to destroy other’s property (American Psychiatric Association, 2013). Approximately half of individuals with ASD exhibit aggression (Kanne & Mazurek, 2011; Mazurek, Kanne, & Wodka, 2013), this is an alarming number that has sparked the interest of many researchers.

In a study of 1584 children and adolescents with ASD who were enrolled in the Autism Treatment Network, it was found that the prevalence rate of aggression was as high as 53% (Mazurek et al., 2013). When compared to individuals without ASD, Kozlowski, Matson, and Rieske (2012) reported that participants with ASD were more aggressive than typically developing individuals. Other studies have also supported these
findings regarding differences in levels of aggression between individuals with ASD and typically developing individuals with the latter group being less aggressive (Mayes et al., 2012; McClintock, Hall, Oliver, 2003; McTernan, Leader, Healy, & Mannion, 2011).

In an effort to further explore aggressive behavior, Matson, Wilkins, and Macken (2009) pointed out some of the antecedents of aggression in their study. They found that poor communication, social problems, cognitive rigidity, and poor emotional regulation appear to be among the problems that lead to aggression. Additionally, they discovered that symptoms of anxiety can exacerbate aggression (Matson et al., 2009). They were not the only ones who discovered a link between communication and aggression. Mazurek et al. (2013) also found that individuals with poor communication skills were significantly more aggressive than those with better communication skills.

It is important to note that Mazurek and colleagues (2013) assessed aggression in their study by a single dichotomy yes or no question. Specifically, they used the following question: “is your child currently demonstrating physical aggression by hitting, biting, or other physical acts of aggression?” A more valid measure of aggression is warranted. The current study was designed to investigate aggression in adolescents by using a standardized measurement of aggression.

**Verbal Intelligence and Aggression in ASD Population**

There are a handful of psychometric tests that measure intellectual functioning by assessing verbal comprehension, working memory, perceptual reasoning, processing speed, and other aspects that are used to define intelligence (Sattler, 2008). The Wechsler Abbreviated Scale of Intelligence (WASI) is a test developed to assess general intellectual functioning of individuals. The WASI has a strong association with general
cognitive abilities and with the constructs of intelligence (Wechsler, 1999). Wechsler described intelligence as “the capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment” (as cited in Flanagan & Kaufman, 2009, p. 8).

Intelligence researchers have reported that individuals who perform poorly on verbal subtests of intelligence tests have higher risks for antisocial behaviors (Camp, 1977; Lynam, Moffitt, & Stouthamer-Loeber, 1993; Warr-Leeper, Wright, & Mack, 1994). In fact, highly aggressive individuals consistently score very low on tests assessing verbal intelligence (Harmon-Jones, Barratt, & Wigg, 1997; Stanford & Barratt, 1996; Stanford, Greve, Boudreaux, Mathias, & Brumbelow, 1996). Longitudinal studies have also shown that low verbal intelligence predicts an increase in delinquency, including aggression (Lynam, Moffitt, & Stouthamer-Loeber, 1993). In a more recent study, Ayduck, Rodriguez, Mischel, Shoda, and Wright (2007) found that children with low verbal intelligence who did not have effective self-regulatory competencies were significantly more aggressive than children with high verbal intelligence. The current study explored whether poor verbal intelligence is a predictor of aggressive behavior in the ASD population.

There are plenty of research studies that have been conducted within the past years on IQ differences between the ASD population and typically developing peers (Brady et al., 2014; Inokuchi & Kamio, 2013). For example, Planche and Lemonnier (2012) found that although not statistically significant, individuals with high functioning autism or Asperger’s syndrome had lower IQ scores than typically developing individuals. Grossman and Tager-Flusberg (2012) discovered in their youth sample that
participants diagnosed with Autism had lower verbal IQ scores than typically developing participants, even though the discrepancy between the groups were not statistically significant. This existing data on the overall performance of individuals with ASD on intelligence tests shows a common trend within this population; individuals with ASD seem to perform poorer than typically developing peers, although this difference typically is not statistically significant. However, these previous studies failed to verify whether the association between poor verbal intelligence and aggression generalizes to people diagnosed with ASD.

One study that investigated the relationship between aggression and intelligence in children with ASD was conducted by Tureck, Matson, Cervantes, & Konst (2014). They reported a negative correlation between full-scale IQ scores and hostile behavior in children, indicating that children with higher IQs had less challenging behavior (i.e., tantrums) than children with lower IQs. However, Tureck and colleagues (2014) failed to provide data on the relationship between verbal IQ and aggression. There is a shortage of studies supporting the concept that poor performance on verbal intelligence tests is linked to aggression (Camp, 1977; Harmon-Jones, Barrat, & Wigg, 1997; Stanford & Barrat, 1996) in people diagnosed with ASD. More recent studies are needed to test the link between aggression and verbal IQ not only in children but also in adolescents diagnosed with ASD.

The objective of the present study was to investigate whether poor verbal skills are associated with more aggressive behaviors in adolescents. Verbal skills were measured by the verbal IQ score of the WASI and aggression was measured by the aggression subscale of the BASC-2. It was hypothesized that participants with low verbal
IQ scores, indicative of poor verbal ability, would be more aggressive than individuals with higher verbal IQ scores. In addition, it was hypothesized that a positive correlation would exist between full-scale IQ and anxiety. Higher full-scale IQs would predict greater symptoms of anxiety in adolescents with ASD.
CHAPTER II

METHOD

Participants

Eleven male participants diagnosed with Autism Spectrum Disorder participated in the study. The age range of the adolescents was 14 - 17 years of age ($M = 15.73$, $SD = 1.01$). The sample consisted of 7 participants of European-American/White/Anglo ethnic background, 1 Hispanic Latino participant, 1 Armenian participant, and 2 Asian American participants. All participants were in high school with a total of 2 freshmen, 4 sophomores, and 5 juniors. Participants with Full Scale IQ lower than 70 were excluded from the study, given that the present study aimed at studying individuals with high functioning autism. Participants received monetary compensation for their time. Each participant’s parent was asked to verify his child’s functioning level. All participants did not have auditory difficulties or vision problems. All participants were required to attend with an English speaking parent.

Research participants were recruited through local newspaper advertisement, as well as via online website posting, and posted flyers in the community.

Materials

Behavioral Assessment System for Children, second edition (BASC-2; Reynolds & Kamphaus, 2005). The BASC-2 is a standardized assessment measure that is used to evaluate emotions and behaviors of people between the ages of two years old to twenty-five years old. It is composed of three rating scales, a parent rating scale, a self-report personality rating scale and a teacher rating scale. For the present study, only the parent rating scale and the self-rating scale were considered. Parents or legal guardians served as
informants for the parent rating scale. Caregivers were asked to rate occurrences of adaptive skills and problem behaviors by using a 4-point Likert scale (1 for Never, 2 for sometimes, 3 for often, and 4 for almost always). The measure helps identify clinical diagnoses of disorders that are typically seen in childhood or adolescence (Tan, 2007). A unique attribute of BASC-2 is that it is composed of three different measures targeting age differences. For the present study the measure for adolescents was implemented targeting ages from 12 years old to 21 years old. The BASC-2 is an appropriate measure to use with adolescents because the scale has special indexes that are used to assess the validity of the respondent’s answers by detecting faking good, poor reading comprehension, and failure to follow directions that may often be seen in teenagers.

*Parent Rating Scale of the Behavioral Assessment System for Children, second edition (BASC-2; Reynolds & Kamphaus, 2005).* The parent rating scale consists of three composites: externalizing behaviors, internalizing behaviors, and adaptive behaviors. Externalizing behaviors are composed of the following scales: hyperactivity, aggression, and conduct problems. The present study aimed to measure the aggression of adolescents by using the aggression scale. Questions that assess aggression in adolescents are: “Does he tease others? “Argues when denied own way” and “Does he bully others? (among many other questions). Parents were instructed to rate their child’s aggression by selecting the following responses to the previous questions: never, sometimes, often, and almost always.

Internalizing behaviors are composed of the following scales: anxiety, depression, and somatization. Because the current study measured the anxiety of adolescents as reported by the parent and the child, the anxiety scale was included in the test battery.
Questions that assess anxiety in adolescents as observed by their parents are: “Does he worry about making mistakes? Worries about what teachers think? and “Is he nervous? (among many other questions). Parents were instructed to rate their child’s anxiety by using the 4-point Likert response format.

The functional communication scale of the BASC-2 was utilized to measure a person’s ability to express ideas and communicate in ways others can easily understand. Behaviors assessed on this scale included both basic and advanced expressive-communication skills, receptive-communication skills, and written skills. Parents were asked to rate their children’s functional communication skills. They were asked questions such as “Is he able to describe feelings appropriately,” “Does he responds appropriately when asked questions” and “Is he clear when telling personal experiences” among other questions.

Self-Report of Personality of the Behavioral Assessment System for Children, second edition (BASC-2; Reynolds & Kamphaus, 2005). Participants were instructed to rate their own anxiety by answering questions such as, “I get so nervous I can’t breathe,” “I worry a lot of the time,” and “I worry but I don’t know why,” among many other questions. The self-report personality rating scale is an omnibus personality inventory also consisting of a 4-point Likert scale ranging from “Never” to “Almost always” and true and false questions. The entire self-report personality rating scale takes about 20 to 30 minutes to complete and is written at the third grade level for respondents to understand. The current study used the anxiety scale of the adolescent form to measure self-report levels of anxiety in participants. The self-report of personality rating scale has high reliability coefficients ranging from .80 to .90.
A T score of 59 and below in the scales indicate typical levels of aggression and anxiety displayed by the average adolescent of this age. A T score of 60 or higher on the aggression scale indicate problematic levels of aggression; the adolescent may display or engage in threats, tendency to argue, and/or hitting others. A T score of 60 or higher on the anxiety scale indicates problematic levels of anxiety; the adolescent may display worrying, nervousness, and irrational fears. A T score of 70 or above on any of the clinical scales indicates clinical significance for a disorder. Internal consistency ranged from .76 to .95 for the adolescent forms with median test-retest reliability of .81.

Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler 1999). The WASI is an individually administered standardized and abbreviates test of intelligence. It is composed of four subtests, Vocabulary, Similarities, Block Design, and Matrix reasoning and takes approximately 30 minutes to administer. The WASI can be administered to any person between the ages of eight years old and eighty-nine years old. The WASI measures verbal and non-verbal intelligence as well as providing a full-scale IQ score (FSIQ).

The vocabulary subtest measures expressive vocabulary, verbal knowledge, and fund of information (Sattler, 2008). The similarities subtest measures verbal concept formation and abstract verbal reasoning ability. Both of these two subtests make up the verbal scale IQ (VIQ). Raw scores are converted to norm-referenced standard scores with a mean of 100 and standard deviation of 15. The subtests in the verbal scale have higher g loadings than those in the non-verbal scale (Sattler, 2008). The present study used the VIQ as a measure of verbal intelligence.

Performance IQ scale of the Wechsler Abbreviated Scale of Intelligence (WASI;
Wechsler 1999). The Performance IQ (PIQ) scale consists of the Block Design and Matrix Reasoning subtests. The Block Design subtest measures perceptual organization and the Matrix Reasoning subtest measures nonverbal reasoning ability. The inclusion of all four subtests produces a full-scale IQ. In prior research, IQs obtained on the four-subtests combination increased on retest by about 2.5 points in the adult sample and 4 points in the children sample (Sattler, 2008).

The WASI has satisfactory internal consistency reliabilities higher than .91 for the VIQ, PIQ, and FSIQ in both the children’s sample and adult’s sample. Internal consistency reliabilities for the subtests in children’s sample and adult’s sample ranged from .81 to .96 and .84 to .98, respectively. Reliability coefficients for each subtest in the adult sample ranged from .90 to .98 for the Vocabulary subtest, .84 to .96 for the Similarities subtest, .90 to .94 for the Block Design subtest, and .88 to .96 for the Matrix Reasoning subtest. Stability coefficients for the subtests range from .81 to .90 in the adult’s sample and .76 to .84 in the children’s sample. Concurrent validity studies with other well respected tests supports the use of the WASI as a measure of intelligence (Wechsler, 1999).

Procedure

Parents of participants were explained the general purpose and procedure of the study. Parents were asked questions regarding their child’s level of functioning to verify qualification of the study. For example, caregivers were asked whether their child can carry daily living skills independently, or if he needs assistance the majority of the time. Parents were required to provide identification of their child diagnosis (i.e., IEP) to ensure that they met criteria for the study. Furthermore, questions regarding enrollment in
special education were asked to parents to help identify severity of the disorder. Individuals who seemed to be on the more severe end of the spectrum were disqualified because the study was designed for higher functioning individuals. Individuals who qualified were invited to participate in individual testing sessions on campus at California State University, Northridge. During this session participants were granted two to three minute breaks in between tests, or as the participant requested.

Upon arrival, the participant and his parent were separated and led into two different rooms after reading and agreeing to consent forms. In one testing room, the respondent was administered the WASI (along other measures that were not included in the present study using a computer). The WASI was conducted at a rectangular table face to face with the examiner. The order of the tests was randomly assigned to control for any biases and threats to the internal validity of the study.

In another testing room, the caregiver was instructed to fill out a demographic questionnaire about herself/himself and the child. Caregivers were prompted to describe the history and the current status of the diagnosis as well as any past treatments or interventions received. Additionally, parents were given the parent-report rating scale of the BASC-2. At the end of the WASI test, the adolescent switched room with the parent and was expected to fill out the self-report of personality rating scale of the BASC-2 while the parent engaged in computer testing, not included in the present study.
CHAPTER III

RESULTS

Data on the BASC-2 were examined to determine whether performance on each measure fell under typical levels of behavior displayed by the average adolescent (see Table 1). The mean scores for the aggression, functional communication, and anxiety scales were considered to be within normal range. Similarly, the mean scores for the FSIQ and VIQ scores also fell within the average range (see Table 1).

To address Hypothesis 1 (low verbal intelligence will predict more aggressive behavior in adolescents), a correlation analysis was performed. VCI scores (representing the degree of verbal intelligence) were the independent variable and scores of aggression were the dependent variable.

The hypothesis was supported in the direction of the predicted outcome. The lower the VCI scores the greater the aggression scores \((r = -.275, p = .413)\). However, the correlation was not statistically significant, perhaps, due to the small sample size \((N = 11)\). Results are displayed in Table 2.

To further test hypothesis 1 with different measures, scores on the functional communication scale as rated by parents (representing the degree of their child expressing his feelings appropriately and communicating in ways others can easily understand) were correlated with scores of aggression. The results indicated that there was a stronger relationship between these two variables. The lower the functional communication scores the greater the aggression scores as displayed in Table 2 \((r = -.440, p = .203)\).

To address Hypothesis 2 (higher intelligence scores will predict more anxiety...
behavior in adolescents), the correlation analysis was performed. FSIQ scores (representing participants’ intellectual intelligence) were the independent variable and self-reported anxiety scores were the dependent variable.

The hypothesis was not supported in the direction of the predicted relationship. There was no positive correlation between FSIQ scores and self-reported anxiety scores. In fact, higher FSIQ scores were associated with lower self-reported anxiety scores ($r = - .361, p = .306$). The correlation was not statistically significant due to the small sample size.

However, there was a positive correlation between FSIQ scores and adolescents’ parent reported anxiety scores. Higher FSIQ scores were associated with greater parent reported anxiety scores in their children ($r = .249, p = .461$). These analyses indicate that although the correlation is weak, individuals with higher intelligence are perceived as more anxious by their caregivers than those with lower intelligence.

Further analyses were run to investigate the relationship between self-reported anxiety in adolescents and their ability to communicate functionally with others as rated by their caregivers. The statistical analysis revealed a positive correlation between functional communication scores and self reported anxiety scores ($r = .553, p = .123$). These results indicate that individuals who reported higher scores of anxiety are more effective in functional communication than those with lower scores.

Additionally, parent reported anxiety scores were also correlated with parent reported functional communication scores. The statistical analysis revealed a negative correlation between these two variables ($r = -.281, p = .432$) indicating that individuals with lower functional communication skills are more likely to be perceived as more...
anxious by their caregivers than those with higher scores.

Table 1

*Descriptive statistics of Major Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
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<tbody>
<tr>
<td>PR Agg</td>
<td>45.63</td>
<td>6.46</td>
<td>36-55</td>
</tr>
<tr>
<td>SR Anx</td>
<td>51.60</td>
<td>9.15</td>
<td>35-64</td>
</tr>
<tr>
<td>PR Anx</td>
<td>53.54</td>
<td>8.98</td>
<td>41-69</td>
</tr>
<tr>
<td>PR FC</td>
<td>46.70</td>
<td>6.91</td>
<td>35-56</td>
</tr>
<tr>
<td>VIQ</td>
<td>93.36</td>
<td>18.12</td>
<td>66-119</td>
</tr>
<tr>
<td>FSIQ</td>
<td>97</td>
<td>13.78</td>
<td>71-114</td>
</tr>
</tbody>
</table>

*Note.* PR= parent rated scales; SR= self-report scales; Anx= anxiety; Agg= aggression; FC= functional communication; VIQ= verbal IQ; FSIQ= full scale IQ

Table 2

*Intercorrelations among the Symptoms of Aggression and Anxiety on Verbal and Cognitive Ability*

<table>
<thead>
<tr>
<th>Variable</th>
<th>PR Agg</th>
<th>SR Anx</th>
<th>PR Anx</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIQ</td>
<td>-.275</td>
<td>-.260</td>
<td>.122</td>
</tr>
<tr>
<td>PR FC</td>
<td>-.440</td>
<td>.553</td>
<td>-.281</td>
</tr>
<tr>
<td>FSIQ</td>
<td>-.150</td>
<td>-.361</td>
<td>.249</td>
</tr>
</tbody>
</table>

*Note.* N = 11. Numbers in the parentheses are alpha coefficients. PR= parent rated scales; SR= self-report scales; Anx= anxiety; Agg= aggression; VIQ= verbal IQ; FC= functional communication; FSIQ= full scale IQ.
CHAPTER V
DISCUSSION

According to Ghaziudin (2002), the most presenting problem for adolescents with ASD is feelings of anxiety. Anxiety disorders are common among the ASD population (Muris, Steerman, Merckelbach, Holdrinet, & Meester, 1998; Simonoff et al., 2008). This high rate of comorbidity within this population has influenced researchers to examine differences in anxiety symptoms across ASD diagnoses and their typically developing peers (Bellini, 2004; Kanai et al., 2004; Kim et al., 2000; Muris et al., 1998; Thede & Coolidge, 2006; Tonge, Brereton, Gray, & Einfeld, 1999). The results of these previous studies have continuously demonstrated that individuals with an ASD diagnosis have a greater amount of anxiety than individuals without an ASD diagnosis. However, little research is available on what causes and exacerbates feelings of anxiety within the ASD adolescent population.

This study attempted to look specifically at the influences of cognitive ability on anxiety symptom severity in high functioning adolescents with ASD. Previous exploration of intellectual functioning and anxiety has shown that higher IQ scores are associated with higher levels of anxiety among children (Gadow et al., 2005). However, the role of intellectual functioning in influencing symptoms of anxiety has not been explored among adolescents in depth, and this project was conducted to shed some light on it.

The findings of the current study showed that as adolescents’ IQs increased so did their anxiety scores as rated by their caregivers. This indicates that the adolescents whose parents rated them as more anxious obtained higher IQs than the adolescents whose
parents rated their child as less anxious. These findings supported previous studies where they showed that children with higher IQs were found to experience the most severe anxiety than those with lower IQs (Gadow et al., 2005; Sukhodolsky et al., 2008; Weisbrot et al., 2005; White, Oswald, Ollendick, & Scanhill, 2009). It is essential to note that only participants with scores of 70 or above were included in the current study analysis because an IQ below 70 is a red flag for an intellectual disability. It is also important to highlight that in the current study the small sample size affected the significance level of the analysis and although this correlation was in the direction predicted, it was not statistically significant.

Interestingly, when IQs were correlated with self-report anxiety scores, the analysis revealed that symptoms of self-reported anxiety decreased as IQs increased. The direction of results obtained was not consistent with the author’s prediction. In a study by Vasa and colleagues (2013), they found a positive correlation between high IQs and anxiety in children but found that these variables were negatively associated in adolescents. In fact, much of the research conducted in this area including those studies previously mentioned used mostly children in their sample, therefore, the results may not generalize to teenagers. Future studies using adolescents is warranted. Additionally, because researchers have the option to use self-report or informant-based assessments to assess anxiety in participants there may be a discrepancy between these measures in anxiety scores due to the function of rater bias.

To further explore anxiety, the parent reported functional communication scale from the BASC-2 was utilized to test whether poor effective communication leads to anxiety in teens. Teenagers with higher parent rated functional communication scores
reported increased feelings of anxiety. This indicates that the more effective adolescents with ASD can communicate with others, the greater the degree of nervousness. This finding contradicts established literature on communication impairments where individuals with deficits in communication experience significantly deeper feelings of nervousness and fear than their typically developing peers (Hall, Cooper, & Creswell, 2015). Effective verbal communication is integral to our ability to learn and develop, establish relationships, and maintain a sense of well-being (Iverach, O’Brian, et al., 2009). Therefore, one possible explanation is that participants with effective communication skills may have a greater number of successful social interactions and as a result they may have more to worry about than those with limited communication skills.

For example, a teenager who effectively communicates with his peers may be more successful in obtaining a friendship with a classmate, develop a boyfriend-girlfriend relationship, and become friends with the football team compared to a teen that has major communication skills deficits. However, this hypothetical teen will have more to be worried about as his social interactions increase. For instance, he may find himself worrying about what the football team may think if he doesn’t make the team, what will happen if his girlfriend breaks up with him, or what will his friend think if he fails his physical education class. Further exploration on the differences between how functional communication affects self-reported anxiety is needed.

Lower scores on the parent reported functional communication scale were associated with increased parent reported anxiety scores. This means that parents who rated their children with good communication skills were perceived as less anxious than those with poor communication skills. This result fits well with existing data on anxiety.
and individuals with language impairments (i.e., stuttering, communication disorders) where individuals with greater communication difficulties experienced deeper feelings of anxiety compared to people with good verbal ability (Blumgart, Tran, & Craig, 2010; Iverach et al., 2009; Menzies et al., 2008; Stein, Baird, & Walker, 1996). Future studies testing these variables in individuals with ASD is necessary.

It is critical to state that both of these scales (functional communication scale and parent rated anxiety scale) come from the parent-rating survey. Therefore, one must consider the possibility of parents overestimating and underrating their child’s level of communication skills and anxiety. Parents may also be more prone to perceive their children with problematic communication skills as more anxious than they really are so results should be interpreted with caution.

It is often assumed that people with ASD prefer to be isolated but many are aware of their social disconnectedness and appear to wish it could be somehow different (Attwood, 200). It is logical to conclude that this self-awareness may intensify feelings of anxiety in higher functioning adolescents with ASD. Studies that explore social connectedness as it relates to verbal ability and symptoms of anxiety are needed. Furthermore, understanding a person’s verbal ability is essential when creating programs designed to help increase social skills and decrease emotional problem behaviors.

The current author also examined adolescents’ performance on the aggression scale of the BASC-2 as it relates to one’s verbal ability. Researchers have found that poor verbal intelligence (Camp, 1977; Lynam, Moffitt, & Stouthamer-Loeber, 1993; Warr-Leeper, Wright, & Mack, 1994) and poor communication skills (Matson et al., 2009; Mazureck et al., 2013) predict higher risks for aggressive behavior in both the general
population (Lynam et al., 1993) and in troubled individuals (Harmon-Jones, Barratt, & Wigg, 1997; Stanford & Barratt, 1996; Stanford, Greve, Boudreaux, Mathias, & Brumbelow, 1996). The aim of the current study was to test whether these findings generalize to individuals with ASD. Specifically, whether poor verbal intelligence and poor communication skills influence aggressive behavior in high functioning adolescents with ASD.

The relationship between verbal intelligence and parent reported aggressive behavior in adolescents with ASD is in the same direction as those found in previous studies mentioned above. Individuals with poor verbal IQs are more likely to engage in aggressive acts. Additionally, lower scores on the functional communication scale (representing poor communication skills) were associated with exceeding acts of aggression in adolescents. The literature on the relationship between poor verbal ability and delinquent behavior seems to not discriminate between non-ASD individuals and the ASD population. An inevitable question is whether the high comorbid symptoms of aggression in ASD are more a result of the limited verbal knowledge than of conduct issues. One possible explanation to these findings is that individuals who have a difficulty with expressive-communication skills and receptive-communication may get overly frustrated with their inability to communicate functionally with others and as a result engage in aggressive behavior.

For example, a participant shared with the researcher that he was very upset at his "friend" to the point that he terminated their friendship because he "stole" his idea. However, when the participant’s mom attempted to assist him in better explaining the situation to the researcher, his frustration immediately increased because his mom did not
understand him and was “changing” his message. Therefore, being misunderstood by others when telling an experience may cause even more frustration to the individual than the occurrence of the disturbing situation. This demonstrates that functional communication is essential not only in solving one’s own problems appropriately with others but also in sharing experiences in a functional manner without resorting to hostile behavior.

The findings of the current study shed light into the nature of two of the most challenging behaviors commonly seen in the ASD population. Aggressive behavior and symptoms of anxiety were explored in terms of examining the influences verbal ability and cognitive ability have on them. This study of a very limited number of participants demonstrates that teaching verbal skills to adolescents with emotional problematic behavior may be beneficial to them. Additionally, the data in this study showed the need for researchers to further explore the association between poor verbal ability and aggression as well as intellectual functioning and anxiety.

LIMITATIONS

Results of the current study should be interpreted with caution in light of the following limitations. Some of the data was collected through the snowball method of convenience sampling. The author made efforts to collect data by spreading the word about the survey in various online forums, local schools, as well as by recruiting participants from the Autism Walk. The author also contacted vendors, regional center workers, advocates and professors who work with teens with ASD, as well as clinics who specialize with the population of interest. The sample size of 11 respondents was
extremely small, representing a fraction of the population of adolescents with ASD in the US. It is quite possible that this data may not be truly reflective of the diversity in emotional behavior and cognitive ability that are seen in the ASD community in the US.

Second, the study was targeted at adolescents who are high functioning so many individuals that did not meet this requirement had to be turned down making it more difficult to increase the sample size of the study. Furthermore, even though participants were screen over a telephone conversation to assure that they were high functioning, the data of two participants had to be excluded from the analyses because they had a FSIQ below 70. In addition, individuals who were at the lower end of the high functioning spectrum took a longer time in completing the study. As a result, testing sessions ranged from two hours and thirty minutes to four hours. These longer sessions were arduous on participants and may have influenced their performance.

Fourth, this study used a parent-report survey to measure both aggression and functional communication in adolescents. Adolescents were not asked to rate their own aggressive behavior or communication skills. Parents may have overrated or underrated their child’s aggression and functional communication, therefore the inclusion of a self-reported aggression survey and a functional communication scale is a potential route of investigation for future researchers.

Finally, the flyer handed out to recruit participants listed the amount of money that families would be compensated with for their time. Additionally, most families that contacted the researcher to participate saw the research flyer on the internet. There may be certain characteristics about them that set them apart from others in the ASD population. Certain kinds of people may self select to volunteer to complete a survey to
expand research concerning this disorder. Emotional behavior expressed by such respondents may be quite different compared to those who do not volunteer to participate in such a study.

**IMPLICATIONS**

This study has practical implications for professionals working with the ASD population in the US. Results focusing on verbal ability showed that lower FC scores as well as VCI scores were associated with additional amounts of aggression. Therefore, the first implication is for conducting outreach efforts with this community. The results of the present study indicate that adolescents with ASD will be more likely to resort to aggression if they have poor communication skills. Targeting adolescents that engage in aggressive behavior and teaching them functional communication skills seems a logical implication from the results.

The benefit of creating workshop classes designed to increase verbal communication in ASD adolescents is to help prevent or reduce hostile behavior. Additionally, education programs should be tailored to individuals’ cognitive ability as differences in emotional problems may exist based on their intellectual functioning. Professionals working with adolescents with ASD would benefit from partnering with psychologist and counselors. A program designed to increase verbal intelligence, expressive-communication, and receptive-communication by psychologists and expression of emotional behavior under the guidance of professionals who specialize in working with ASD adolescents would be incredibly amazing. For example, a service such as Social Skills, which focuses on social interaction, is delivered by specialists who work with the ASD population but may have limited insight on how cognitive ability and
symptoms of anxiety and aggression all influence each other. Similarly, behavior specialists who work on challenging behaviors in individuals with ASD such as aggression may not be educated on the influences intellectual functioning has on hostile behavior. There are many great vendors that already provide high quality services to this population but a more integrated program can tie the loose ends that are left in participating in several separate programs. Partnering with an organization that already has credibility with the target population will help to create trust and hopefully promote better quality of life for this population.

Special education teachers and school administrators should also look into this type of research so that they can improve their program. Students in special education classes usually have low IQs so teaching them how to communicate better can help them reduce challenging behaviors. Similarly, school psychologists and counselors that work with typically developing students who are highly aggressive would also benefit from this study because the results supported existing literature that low verbal ability predicts aggression. It is in the best interest of the school personnel to improve verbal ability in highly aggressive students.

Psychologists and counselors working with adolescents for emotional disturbances should really dig into this type of research as their type of problems may be influenced by their cognitive ability. Students that are expressing feelings of anxiety should be given a complete assessment that includes anxiety questionnaires as well intelligence tests among other measures. Practitioners must not only interview the student but also take into account the results of the tests when delivering services. For example, students with IQs below 70 with anxiety problems may benefit from counseling that uses
social stories and pictures while students with IQs of 100 may benefit from talk therapy alone. These results highlight that clinicians cannot isolate one deficit from another without taking into account if one exacerbates the other. By looking at how intellectual functioning affects symptoms of anxiety and verbal ability affects levels of aggression, troubled students may be seen in a more positive light.

CONCLUSION

Research findings in the general population show that aggressive individuals repeatedly score poorly on verbal ability tests. The purpose of the current study was to test this common finding in the ASD population. The high rates of anxiety symptoms and aggressive behavior in the ASD population motivated the current author to explore more in depth these variables. Specifically, the current study was designed to examine whether poor verbal intelligence affected aggressive behavior in adolescents with ASD. Functional communication was also assessed in this study which showed that individuals with poor communication skills had higher levels of aggression. The same relationship was found in teens with lower verbal IQ scores compared to those with higher verbal IQ score.

Additionally, the current study aimed at shedding more light on ASD individuals who suffer from anxiety. The results showed that parent-reported anxiety scores were positively correlated with adolescents’ FSIQ scores. However, self-reported anxiety scores were negatively correlated with FSIQ scores. This indicates that there is a disparity between parent and children on how they interpret and rate feelings of anxiety. Nonetheless, this means that clinicians must take into account an adolescent’s cognitive ability and verbal ability when assessing their emotional behaviors. As such, improving
one person’s communication skills may unquestionably improve their social interactions. Similarly, improving a student’s mental ability can lead to a reduction of feelings of anxiety. School staff, psychologists, counselors, behavior therapists, social skill therapists, parents, and all other professionals that work with the ASD population can benefit from this study as it examines two of the most common behaviors seen in this disorder. Future studies can utilize self-reported measures and teacher-reported surveys of aggression and functional communication for participants to better assess them.
References


