



# Cognitive and emotional intelligence in young adults with Autism Spectrum Disorder without an accompanying intellectual or language disorder



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## ABSTRACT

Research in the neurosciences has identified distinctions between neural structures that subserve cognitive intelligence (CI) and those subserving emotional intelligence (EI). This study explored the performance of young adults with Autism Spectrum Disorder (ASD) without an accompanying intellectual or language disorder relative to typically-developing peers, on indices of CI and EI. Both the ASD and age- and sex-matched typically-developing groups exhibited high average cognitive intellectual abilities. In contrast, the ASD group reported lower levels of EI relative to their typically-developing peers, as expected given the social and emotional challenges faced by individuals with ASD. Importantly, cognitive intelligence did not correlate with EI in either group. Taken together, these findings further support the theory of dissociable neural systems underlying CI and EI. These findings also highlight the need to address not only the intellectual aspects of cognition, but also the emotional components to increase understanding of, and improve treatment for individuals on the autism spectrum. This understanding would enhance our ability to assess and support young adults with ASD, and ultimately ease their transition into adulthood.

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## 1. Introduction

### 1.1. Recent diagnostic changes in ASD

Autism Spectrum Disorder (ASD), defined by the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association (APA), 2013), describes individuals who experience (a) persistent deficits in social communication and social interaction across contexts; (b) restricted, repetitive patterns of behavior, interests, or activities; (c) symptoms that are present in the early developmental period (but may not become fully manifest until later in life when social demands exceed limited capacities); and (d) symptoms that cause clinically significant impairment in everyday

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functioning that (e) is not better described by intellectual disability, or global developmental delay. The recent diagnostic classification change to the broader term Autism Spectrum Disorder (ASD) replaces the previous fourth edition of the DSM's (i.e., DSM-IV-TR; APA, 2000) Pervasive Developmental Disorders category which specified subtypes, including Asperger's syndrome (AS). AS, as defined by the DSM-IV-TR, is expressed through impairments in behavior, social interaction, communication, and pragmatic language. AS was historically differentiated from autistic disorder (AD) by the degree of cognitive impairment and the course of early speech development (Frith, 1991; Wing, 1981). In contrast to those with other ASDs such as AD, individuals with AS display average to above average intelligence, and their speech and language develops similarly to that of typically-developing children in the first three years of life. Additionally, highly specialized skills and circumscribed interests are often present in individuals with AS (Wing, 1981). Although individuals with AS typically have average to superior intellect, they often have limited understanding of their own emotions and the emotions of others, and they demonstrate deficient skills in social contexts (Wing, 1981). In the context of the recent revisions to the DSM, the participants in this study (who were originally diagnosed with AS), would now be reclassified under the broader DSM-5 ASD classification, with the specifiers of without intellectual or language impairments. Despite the recent diagnostic changes, this research will be discussed using the diagnostic terms that were relevant during the time this investigation was conducted.

### 1.2. Emotional intelligence

Proponents of emotional intelligence (EI) suggest that the construct facilitates an enhanced understanding of individual differences, beyond that accounted for by cognitive intelligence (CI), in social and emotional competencies (Austin & Saklofske, 2005) that enriches functional conceptualizations of emotions and the breadth of human intelligence (Mayer, Roberts, & Barsade, 2008). Theorists have generated several distinct models of EI and two predominant approaches have emerged: the ability and trait approaches.

The ability model formulated by Mayer and colleagues Mayer & Geher (1996), Mayer, Salovey, and Caruso (2000) and captured within the Mayer–Salovey–Caruso Emotional Intelligence Tests, defines EI as a cognitive process involving the intellectual and reasoning skills required to identify, express, label emotions, and to solve problems using emotions. This approach attempts to incorporate EI into the overall psychometric structure of intelligence (e.g., Mayer, Caruso, & Salovey, 1999). In contrast, trait EI is concerned with cross-situational consistencies that are present in specific traits or behaviors, such as empathy, assertiveness and optimism, thereby drawing heavily on personality variables and 'facilitators' of optimal socio-emotional functioning (e.g., stress management, mood; Bar-On, 1997, 2006, 2010). The Bar-On EQ-i (Bar-On, 1997) operationalizes EI according to the broad, yet interdependent, domains of intrapersonal skills (self-regard, emotional self-awareness, assertiveness, independence and self-actualization); interpersonal skills (empathy, social responsibility, and interpersonal relationship); adaptability (reality-testing, flexibility, and problem-solving); stress management (stress tolerance and impulse control); and general mood (optimism and happiness), and it represents one of the predominant approaches to the measurement of trait EI. This approach to EI encompasses capabilities related to the awareness of and ability to express emotions, to understand others' emotions and develop interpersonal relationships, to regulate emotion, to exhibit flexibility and adaptability in personal and interpersonal matters, and to generate positive affect needed for self-motivation required to achieve personal goals (Bar-On, Tranel, Denburg, & Bechara, 2003). Bar-On (1997) has argued that assessing self-reports of emotionally-competent behaviors is akin to measuring one's 'common sense' and ability to 'get along with the world.' (Bar-On, 2006, 2010).

### 1.3. Neural substrates of cognitive and emotional intelligence

Research in the neurosciences has identified distinctions between neural structures that subserve cognitive intelligence and those subserving emotions and feelings (Bechara, Damasio, & Bar-On, 2006). Different neural systems subserving these functions have been proposed to underlie cognitive and emotional processing streams that are potentially dissociable (Eslinger & Biddle, 2008). Bar-On et al. (2003) contends that the major difference between these critical components of intelligence may be that CI relies more heavily on cortical structures that underlie logical reasoning whereas EI is more dependent on limbic and related neural systems that support the processing of emotions. Additionally, the integrity of specific brain regions such as the ventromedial prefrontal cortex (VM-PFC), believed to be responsible for affective functions, have also been associated with changes in emotional processing, personal judgment in decision-making, social functioning, and EI (Damasio, 1994; Bechara, Tranel, & Damasio, 2000a; Bechara, Tranel, & Damasio, 2000b; Bechara et al., 2006). Numerous investigations with individuals with VM-PFC damage have found that despite uncompromised CI, these individuals make emotional and social decisions that profoundly and negatively impact their lives (e.g., Bechara et al., 2000a).

Bar-On et al. (2003) further theorize that cognitive, emotional, and social intelligence are critical components of general intelligence. CI is distinguished from social and emotional intelligences as it is believed to predominantly relate to mental reasoning abilities, while the latter two are predominantly related to abilities to perceive, process, and apply emotional and social information. Bar-On et al.'s (2003) investigation into cognitive and emotional intelligence in individuals with focal brain injuries revealed no significant differences in cognitive abilities across clinical and control groups. The clinical group was characterized as having experienced injury to the neural system believed to subserve EI, namely the amygdala, insular/

somatosensory, ventromedial prefrontal cortex, and anterior cingulate cortex, whereas the control group was defined as having experienced damage to neural substrates outside of this system believed to subserve EI (e.g., the posterior sector of the superior and/or middle temporal gyrus). Importantly, despite uncompromised CI, individuals within the clinical group displayed impaired social and emotional functioning compared to the control group. Furthermore, levels of EI were significantly related to the ability to exercise personal judgment in decision making. Furthermore, no significant correlation was found between CI and EI. In sum, the authors argue that there is substantial evidence that suggests that the neural systems associated with EI overlap with those subserving the processing of emotions but not with those related to cognitive intelligence (Bar-On et al., 2003; Bechara et al., 2006).

#### 1.4. Emotional intelligence in Asperger's syndrome

AS is characterized by social and emotional difficulties including poor social and affective relatedness, difficulty initiating and maintaining peer relationships, and significant difficulties displaying age-appropriate social behavior (Grossman, Carter, & Volkmar, 1997). Tasks of face and emotion recognition, imitation of body movements, interpretation and use of non-verbal behaviors, and 'theory of mind' development indicate that individuals with ASD (including AS) display difficulties in the processing of social and emotional stimuli (Baron-Cohen, Tager-Flusberg, & Cohen, 1993; Davies, Bishop, Manstead, & Tantam, 1994; Hobson, Ouston, & Lee, 1998; Mundy, Sigman, Ungerer, & Sherman, 1986; Smith & Bryson, 1994; Teunisse & DeGelder, 1994), which ultimately lead to poor behavioral self-regulation in response to ever-changing dynamics in the social context and consequently, undesirable social outcomes. Moreover, difficulties developing and maintaining peer relationships, despite a desire for social engagement, has also been associated with an increased likelihood of affective, anxiety, and conduct disorders in ASDs (Ghaziuddin, Weidmer-Mikhail, & Ghaziuddin, 1998; Szatmari, Bartolucci, & Bremner, 1989; Tantam, 1988, 2000).

It is widely accepted that individuals with AS display specific impairments in social cognition, despite uncompromised CI. Indeed, Hans Asperger noted that the individuals with whom he worked lacked a "harmony between affect and intellect" (Frith, 1991, p. 79). Many parallels can be drawn between the distinct emotional challenges experienced by those with AS, and the clinical populations with focal brain lesions discussed previously. Consequently, individuals with AS represent an ideal population to study the distinctiveness of cognitive and emotional processes.

Positive relationships have been found between various measures of EI and the quality of an individual's social interactions (Lopes et al., 2004; Lopes, Salovey, Cote, & Beers, 2005; Summerfeldt, Kloosterman, Antony, & Parker, 2006). Recent investigation of trait EI in individuals with AS found lower self-reported EI scores, relative to controls (Montgomery, McCrimmon, Schwan, & Saklofske, 2010; Petrides, Hudry, Michalarea, Swami, & Sevdalis, 2011). These authors argue that their findings demonstrate support for the assertion that individuals with AS have some awareness and insight into their social and emotional difficulties. This insight likely contributes to the previously mentioned increased likelihood of affective, anxiety, and conduct disorders within this population and consequently, these findings further support the importance of exploring EI in young adults with AS. In addition, investigation into the clinical utility of EI in informing socially or affectively mediated interventions may positively impact long-term social outcomes for those with ASD (Lopes, 2003; Montgomery et al., 2010).

#### 1.5. Study rationale

In pursuit of a more comprehensive understanding of the unique social and emotional challenges experienced by individuals with AS, two research inquiries were investigated. First, in support of the hypothesis that EI is different from CI, based on neurophysiological models that suggest that these types of intelligence are supported by dissociable neural substrates, the relationship between the Wechsler Abbreviated Scales of Intelligence (WASI; Wechsler, 1999), and the short version of the BarOn Emotional Quotient Inventory (EQ-i:S; Bar-On, 2002) was examined in individuals with AS and age- and sex-matched typically-developing peers. Specifically, CI was hypothesized to be unrelated to EI both in individuals with AS and their typically-developing peers (see Saklofske, Austin, & Minski, 2003). Second, given the significant and pervasive emotional difficulties faced by individuals with AS, they were hypothesized to exhibit less well developed EI than their typically-developing peers on the EQ-i:S, while no differences in cognitive intellectual abilities were expected between the two groups.

## 2. Method

This research was part of a larger tri-university collaboration conducted through the universities of Calgary, Saskatchewan and Manitoba. The overarching goal of the research program was to investigate the unique emotional and executive abilities of young adults with AS and to subsequently utilize that information to support these individuals as they transition into adulthood. Participants with AS, aged 16–21 years, were recruited (self- and parent-referred) from schools, mental health settings, university clinics, and service organizations for those with ASD in three cities across three provinces. In addition, media campaigns helped to highlight the research project, which also resulted in inquiries about participation. Control group participants were recruited through advertisements in local papers and community newsletters, posters placed in various service centers (e.g., private, community and education centers), and on the university campuses, as well as

**Table 1**  
Sample demographic characteristics.

Characteristic	Total sample ( <i>n</i> = 68) <i>M</i> ( <i>SD</i> )	Asperger's syndrome ( <i>n</i> = 34) <i>M</i> ( <i>SD</i> )	Typically developing peers ( <i>n</i> = 34) <i>M</i> ( <i>SD</i> )
Age	18.8 (1.54)	18.8 (1.54)	18.9 (1.56)
Sex (% male)	76.5	76.5	76.5

Note: Age is reported in decimalized format (e.g., 18 years, 8 months is 18.8 years).

by word of mouth. Participants with AS and typically-developing participants were either currently enrolled in high school, had completed high school or were enrolled in studies at a post-secondary institution. All research participants provided their informed consent prior to their inclusion in this study, and all participants completed all research requirements. Interestingly, the male: female ratio for this study is 3:1, similar to reported ratios in one of the most commonly cited epidemiological study (Ehlers & Gillberg, 1993). Demographics for the samples are described in Table 1.

## 2.1. Procedures: inclusionary criteria

(1) *Clinical diagnosis*. Clinical participants required a diagnosis of AS from a medical doctor, psychologist, or psychiatrist. Participants were required to provide documentation specifying the professional who provided their diagnosis, as well as information pertaining to their developmental history.

(2) *Validation of diagnosis*. Participants were required to display a classification within the high to very high ranges of likelihood of having AS on the Krug Asperger Disorder Index (KADI; Krug & Arick, 2003), a measure designed to distinguish individuals with AS from other forms of high-functioning autism.

(3) *Intelligence*. All participants demonstrated verbal IQ (VIQ), performance IQ (PIQ), and full scale intelligence (FSIQ) in the average or higher ranges (i.e., standard scores of 85 or greater) on the WASI. This inclusionary criterion was necessary to ensure that potential poor performance on the EI measure was not attributable to lower cognitive ability and to ensure that the clinical sample met the diagnostic criterion of no impairment in cognitive abilities. The control participants were not matched according to VIQ, PIQ, or FSIQ, as research has shown that individuals with AS often demonstrate an uneven and uncommon profile of intellectual abilities (Motttron, 2004) which is quite difficult to match in typically-developing individuals, and the purpose of the control group was to provide a comparison of individuals typical of the normative population.

(4) *Typical early language development*. Clinical and control participants must not have experienced a language delay in early childhood (i.e., single words by two years of age and communicative two to three word phrases by 3 years of age).

(5) *Neurological integrity*. Finally, all participants were required to have no history of head injury or diagnosis of neurologically-based medical conditions.

## 2.2. Measures

### 2.2.1. The Krug Asperger's disorder index

The Krug Asperger's disorder index (KADI; Krug & Arick, 2003) is designed to discriminate between AS and other forms of high-functioning autism. It is a norm-referenced, 32-item report completed by a clinician with ratings provided by close friends, parents, or relatives of the individual. The KADI has a pre-screening section used to discriminate individuals with and without an ASD. It is important to note that rather than reflecting numbers of individuals in the general population who manifest the characteristics, this scale reflects the number of participants with AS who achieved a score in the various ranges. For example, if an individual receives a score of 100 or higher, interpretation standards indicate that 50% of individuals with AS scored the same as or higher than that individual. For this study, individuals with a score of 80 or higher (i.e., standard score in the 80–115 range, which corresponds to the 'somewhat likely', 'likely' and 'very likely' KADI qualitative classification ranges) were included. The KADI demonstrates internal reliability of .89 and excellent stability over a two week period (.98). Further, 90% agreement was demonstrated for inter-rater reliability (Nellis & Trotter, 2005). While many screening measures for AS do not have acceptable psychometric properties, the KADI meets standards for psychometric adequacy (see Bracken, 1987; Campbell, 2005), and it appears to currently be one of the most reliable and valid screens for identifying individuals with AS (Campbell, 2005; Stoesz, Montgomery, Smart, & Hellsten, 2011).

### 2.2.2. The Wechsler abbreviated scale of intelligence

The Wechsler abbreviated scale of intelligence (WASI; Wechsler, 1999) is an individually administered standardized and abbreviated test of intelligence. It contains four subtests (Vocabulary, Similarities, Block Design and Matrix Reasoning) and is used for individuals ages 8–89 years, providing measures of verbal- and performance- (non-verbal) intelligence, as well as a full-scale IQ (FSIQ). Raw scores were converted to norm-referenced standard scores (*M* = 100, *SD* = 15). Reliability for childrens' FSIQ with 4 subtests was .96 and for adults .97, and confirmatory factor analysis has shown that all four subtests

**Table 2**

Descriptive statistics for measures of cognitive and emotional intelligence in individuals with Asperger's syndrome and typically-developing peers.

Measure	Asperger's syndrome (n = 34) M (SD)	Typically-developing peers (n = 34) M (SD)
Cognitive intelligence (WASI)		
FSIQ	112.76 (10.73)	110.44 (8.68)
VIQ	114.29 (12.02)	109.32 (11.02)
PIQ	108.03 (11.06)	109.03 (9.42)
Emotional intelligence (BarOn EQ-i:S)		
Total emotional quotient	83.26 (14.86)*	100.62 (12.55)*
Intrapersonal scale	86.00 (17.88)*	97.23 (14.03)*
Interpersonal scale	86.03 (16.00)*	101.37 (11.85)*
Stress management scale	89.97 (18.76)*	102.71 (15.31)*
Adaptability scale	86.49 (17.11)*	97.17 (13.14)*
General mood scale	85.11 (16.13)*	103.11 (12.14)*

Note: All scores are presented in standardized form, with a mean of 100 and a standard deviation of 15.

\*  $p < .01$ ; two-tailed.

define a single general factor. Concurrent validity studies with other well know tests assessing general mental ability supports the use of the WASI as a measure of intelligence (Wechsler, 1999).

### 2.2.3. The Bar-On emotional quotient inventory, short version

The Bar-On emotional quotient inventory, short version (BarOn EQ-i:S; Bar-On, 2002) assesses the key aspects that define emotionally intelligent behavior in individuals 16 years of age and older. Participants rate themselves on 51 items using a five point likert scale that ranges from “very seldom true of me” to “very often true of me”. The BarOn EQ-i:S provides scores for: (1) intrapersonal EQ (measuring self-awareness and self-expression); (2) interpersonal EQ (measuring social awareness and interpersonal relationships); (3) stress management EQ (measuring emotional management and regulation); (4) adaptability EQ (measuring change management); and (5) a full scale emotional quotient score (total EQ). As well, a general mood scale (general mood EQ) provides additional information on the respondent's general level of happiness and tendency to remain optimistic, as general mood is seen as a facilitator for EQ (Bar-On & Parker, 2000). The BarOn EQ-i:S was developed through an exploratory and confirmatory factor analysis of its predecessor, the *BarOn Emotional Quotient Inventory (BarOn EQ-i)*. Results of these analyses formed the basis for item selection for the short form, and it supports a five factor structure. The BarOn EQ-i:S was normed on 3174 adults in the United States and Canada. Acceptable internal consistency is reported for this measure, with most values ranging from .70 to .80 (Bar-On, 2002). Test-retest values for a 6 month retest period ranged from .46 to .80 for each scale by gender. Information is available for factorial validity, construct validity, and predictive validity and is outlined in the technical manual (Dogget & Sheperis, 2005). Correlations between the BarOn EQ-i and BarOn EQ-i:S are reported to range from .73 to .97 and are provided as evidence for the construct validity of the short form (BarOn, 2002).

## 3. Results

The VIQ, PIQ, and FSIQ scores for those with AS, as well as the typically-developing peers, are presented in Table 2. The two groups did not differ with respect to age ( $t(66) = -0.106$ ,  $p = 0.916$ ); VIQ ( $t(66) = 1.777$ ,  $p = 0.080$ ); PIQ ( $t(66) = -0.401$ ,  $p = 0.689$ ), or FSIQ ( $t(66) = 0.982$ ,  $p = 0.330$ ).

Despite overall high average CI across both groups, individuals with AS exhibited significantly lower scores relative to their typically-developing peers on total trait EI ( $t(66) = -5.20$ ,  $p < .001$ ,  $d = -1.26$ ), and on all five EI indices: (1) intrapersonal ( $t(66) = -2.92$ ,  $p < .01$ ,  $d = 0.71$ ); (2) interpersonal ( $t(66) = -4.56$ ,  $p < .01$ ,  $d = 1.11$ ); (3) adaptability ( $t(66) = -2.78$ ,  $p < .01$ ,  $d = 0.67$ ); (4) stress management ( $t(66) = -3.11$ ,  $p < .01$ ,  $d = 0.75$ ) and (5) general mood ( $t(66) = -5.28$ ,  $p < .01$ ,  $d = 1.28$ ). Importantly, CI was not significantly correlated with EI in either the AS ( $r(34) = .121$ ,  $p = .497$ ) or typically-developing ( $r(34) = -.019$ ,  $p = .914$ ) samples. Means and standard deviations for all EQ indices are presented in Table 2.

## 4. Discussion

Both the AS and matched typically-developing groups in this study exhibited high average cognitive intellectual abilities. Not surprisingly given the social and emotional challenges faced by individuals with AS, lower levels of trait EI were observed in this group, and this finding is consistent with previous research investigating trait EI in individuals with AS (Petrides et al., 2011). Furthermore, consistent with previous literature on the trait EI model, CI did not correlate with EI in either group (see Matthews, Zeidner, & Roberts, 2002). Taken together, these findings further support the theory that the neural systems that subserve EI appear to be quite separate from those underlying CI. These findings are also consistent with the observation of a



disconnect between intellect and affect reported by Hans Asperger in his initial description of the syndrome (see Frith, 1991), and with previous research (Bar-On et al., 2003) reporting dissociable neural systems underlying cognitive and emotional intelligence. Bar-On et al. (2003) proposed that the major difference between these critical components of intelligence may be that cognitive intelligence relies more heavily on cortical structures that underlie logical reasoning whereas EI is more dependent on limbic and related neural systems that support the processing of emotions.

In a practical sense, the finding that cognitive and emotional skills are for the most part, distinct, has important implications. Despite intact intellectual skills, individuals with AS are significantly impaired in their ability to function in social-emotional situations, which is part of everyday living in vocational, educational and personal contexts. Combined with the knowledge that those with less developed EI are at risk for many undesirable outcomes such as developing mental health concerns (particularly mood disorders), and substance use issues (Slaski & Cartwright, 2002; Saklofske et al., 2003; Zeidner, Matthews, & Roberts, 2012), it is critical that we address not only the intellectual aspects of cognition, but also the emotional components to truly understand individuals on the spectrum and how to best support them. This understanding would also enhance our ability to assess and support young adults with ASD, and ultimately ease their transition into adulthood.

#### 4.1. Limitations

##### 4.1.1. Self-report

The question arises as to whether the self-report EI instrument provides both a reliable and valid measure of EI, particularly for young adults with AS. Persons with AS experience varying and often profound social and emotional difficulties, which then raises the question of their awareness and insight into their behavior and how they might report this to others or on a questionnaire measure such as the EQ-i:S. This measure contains two validity scales to assist in interpreting accuracy in responding. An inconsistency scale serves to identify inconsistent response styles and values were well within the acceptable range. The positive impression index screens for social desirability response styles. Our sample did generate elevated positive impression scores, indicating that they were likely under-reporting their difficulties. Importantly however, they did report that they experienced EI challenges. Similarly, results from previous studies indicate that young adults with AS were more likely to under report, rather than over report, their social and emotional difficulties (Montgomery, 2007; Montgomery et al., 2010).

The issue of self-awareness of social and emotional deficits is critical in situations where self-report measures may fail to detect known deficits, in which case collateral information is typically needed to document concerns. In the present study however, the lower scores across all five measured EI factors suggests that youth with AS have not necessarily overrated their EI challenges, as is sometimes seen in self-reports. However, without corroborating data, it cannot be said that they may have also underrated their difficulties in understanding and managing EI related facets. To this point, it appears that they have an awareness into their social and emotional challenges, yet it is also likely that they still underestimated the severity of their difficulties when self-rating their EI. Previous research using a different self-report EI scale (Petrides et al., 2011), was also able to detect social and emotional challenges known to be present in individuals with AS. Although the EQ-i:S has been frequently used in research with wide ranging samples of children, youth and adults and is one of the most psychometrically sound scales for assessing EI (Stough, Saklofske, & Parker, 2009), the limitations of self-report EI measures should nonetheless be considered when interpreting the results of this research.

##### 4.1.2. Generalizability

The generalizability of the findings to broader populations should be made with caution. The sample with AS studied here was in their mid- to late-adolescent and early adulthood years and consequently, the results may not be generalizable to other developmental periods or ASD populations.

#### 4.2. Future research

##### 4.2.1. Focal brain injury

The study of EI in ASD would benefit from comparisons with a clinical population of individuals with localized injury to areas believed to subserve EI, such as limbic regions. It is unclear whether the relationships found between the present group of individuals with AS, and the typically-developing sample, would be consistent with those that might be found if a third brain-injured population was also included. Pending control for extraneous factors such as comorbidity and psychotropic medication use, clinical populations with focal damage represent an interesting population for future investigations to examine theories of EI in ASD.

##### 4.2.2. Cognitive versus emotional intelligence

The nature of the dissociation between CI and EI is still undetermined. As Bar-On et al. (2003) noted, the neural systems subserving CI and EI may be completely independent (i.e., impaired CI does not compromise EI) or the dissociation may be partial (i.e., impaired EI does not compromise CI), as was evident in this research. Furthermore, the impact of below average CI on EI is unknown, and difficult to assess using currently available materials. Additional study is needed to further delineate

the nature of the relationship between CI and EI. In doing so, it might be interesting to include a typically-developing sample with less of a restricted range of CI that would also help to yield additional information about the relationships between the neural systems that support CI versus EI.

#### 4.2.3. Emotional intelligence: clinical applications

Findings from the present study indicate that individuals with AS present with, and self-report less well developed EI relative to their assessed cognitive ability and in comparison with typically-developing youth. A greater understanding of the nature of these challenges is therefore needed, not only to better understand the unique social and emotional difficulties experienced by young adults with ASD, but also to inform assessment and treatment efforts that foster social-emotional knowledge and skills. In turn, it is hoped that these enhanced social and emotional capabilities would ultimately promote resilience that would serve those with ASD well as they transition into adulthood.

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