Adult Autism Spectrum Disorder and Intimate Relationships

By

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Submitted in partial fulfilment for the degree of

Doctorate of Psychology (Clinical)

Deakin University Burwood, November 2015
I am the author of the thesis entitled

Adult Autism Spectrum Disorder and Intimate Relationships

submitted for the degree of Doctor of Psychology (Clinical)

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Finally I would like to extend my gratitude to my friends and family for their continuous support and patience during my Doctoral studies. In particular, I would like to thank my fiancé Adrian Griffith for his patience, support and encouragement during the past three and a half years. I also thank my parents Jane and Graeme Birt for believing in me and encouraging me from a young age, and making it possible for me to continue my studies and achieve my goal of becoming a Clinical Psychologist.
Chapter 1 - Introduction to Autism Spectrum Disorder

Autism spectrum disorder (ASD) is characterised by impairment across two domains: social communication and restrictive behaviours or interests (APA, 2013). ASD is pervasive, in that behaviour within these domains may either be absent or atypical, and functional impairments are sustained over time, continuing to impair successful social and independent functioning in adulthood (Seltzer et al., 2003).

This chapter will discuss ASD in relation to history, diagnostic issues, epidemiology, aetiology, and outcomes in adult life. The aim is to provide a comprehensive background to ASD before discussing how functional impairments pose challenges to successful intimate relationship development and experiences in adulthood.

History of Autism Spectrum Disorder

In the first published account of autism, Kanner (1943) detailed the cases of 11 children with obsessive and repetitive behaviours, social deficits, and echolalia (repetitive speech patterns). He described them as appearing self-absorbed, oblivious to the presence of others and exhibiting ‘extreme aloneness’. However, autism was not included in the Diagnostic and Statistical Manual of Mental Disorders until the third edition (DSM-III; APA, 1980) in the 1980s.

The gap between Kanner’s (1943) paper and the inclusion of autism in the DSM-III in the 1980s is reflective of the controversy surrounding the validity of autism as a diagnostic concept. There was debate around whether or not it was best conceptualised as the earliest onset of schizophrenia (Volkmar, Bregman, Cohen, & Cicchetti, 1988). However, Rutter (1978), in his frequent reference to Kanner’s (1943) paper, argued for the validity of Kanner’s proposed behavioural grouping and directly impacted the development of the DSM-III diagnostic criteria (Frith, 1991).
In 1944, Asperger published a paper titled ‘autistic psychopathy’, in which he described a group of children with various behavioural disturbances manifesting in difficulties with social functioning and integration. Asperger (1944, 1991) remarked that social problems in this group may either present as severe, such as in the case of comorbid intellectual disability, or mild if compensated by various strengths, such as a high level of original thought and experience. Further, he noted that the latter group often achieve successful employment and long-term relationships in later life.

Taken together, Kanner’s (1943) and Asperger’s (1944) work suggested a spectrum of autistic-like conditions ranging in symptom expression and severity, although this notion was not formally introduced until several decades later by Wing (1981). At the time of their publications, Kanner and Asperger were unaware of each other’s work, and Asperger’s (1944) paper, originally published in German, was not familiar in English-speaking countries until the 1980s (Frith, 1991). However, Wing’s (1981) paper ignited interest in Asperger’s (1944) work, leading to the characterisation of Asperger’s disorder (AD) as a new disorder similar to autism; eventually included in the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV; APA, 1994) and retained in the DSM-IV-TR (APA, 2000) as a distinct disorder from autism, not necessarily as it was proposed to be (Frith, 2004; Sanders, 2009). Since its inclusion in the DSM-IV (APA, 1994), there has been a great deal of research examining whether AD is distinct from autism. Consistent with the vast range of manifestations of the core diagnostic features of ASD, Wing (1981) conceptualised autistic disorders as lying on a spectrum with varying degrees of severity in the domains of social and communication impairment, and restricted repetitive behaviour.

In line with the view that symptoms of these disorders lie on a continuum of mild to severe impairments, in the current DSM-5 (APA, 2013), the American
Psychiatric Association (APA) consolidated DSM-IV-TR diagnostic subcategories of autistic disorder, AD, and pervasive developmental disorder into one umbrella diagnosis, ASD (APA). This reconceptualisation reflects an inherent change from the previous categorical structure of earlier editions of the DSM towards a dimensional approach to diagnosis in the current DSM-5 (APA).

**Diagnostic Issues Regarding Autism Spectrum Disorder**

**Diagnostic criteria.** Prior to outlining the current DSM-5 diagnostic criteria for ASD, it is necessary to outline the DSM-IV-TR and International Statistical Classification of Diseases and Disorders - Tenth Revision (ICD-10; WHO, 1993) criteria for autism and Asperger’s disorder, given the recent transition to a dimensional approach in DSM-5 (March 2012).

The essential features of autism in the DSM-IV-TR were the presence of noticeably abnormal or impaired development in social interaction and communication and restricted behaviours, activities and interests with onset before the age of three years. A diagnosis of autism in the ICD-10 (WHO, 1993), is comparable to the DSM-IV-TR. However, in the ICD-10, autism is divided into several subgroups based on the age of onset and symptomatology. Table 1 presents an outline of the DSM-IV-TR and ICD-10 diagnostic criteria for autism.
### Table 1

**DSM-IV-TR and ICD-10 Diagnostic Criteria for Autism**

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Other names</strong></td>
<td>Early infantile Autism, Childhood Autism, or Kanner's Autism</td>
<td>The presence of abnormal and/or impaired development that is manifest before the age of three years.</td>
</tr>
<tr>
<td><strong>Age of onset</strong></td>
<td>Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (1) social interaction, (2) language as used in social communication, or (3) symbolic or imaginative play.</td>
<td>There are always qualitative impairments in reciprocal social interaction. These take the form of an inadequate appreciation of socio-emotional cues, as shown by a lack of responses to other people's emotions and/or a lack of modulation of behaviour according to social context; poor use of social signals and a weak integration of social, emotional, and communicative behaviours; and, especially, a lack of socio-emotional reciprocity.</td>
</tr>
<tr>
<td><strong>Social interaction</strong></td>
<td>Qualitative impairment in social interaction, as manifested by at least two of the following: a) marked impairment in the use of multiple nonverbal behaviours such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction, b) failure to develop peer-relationships appropriate to developmental level, c) a lack of spontaneous seeking to share enjoyment, interests, or achievements with others (e.g., by a lack of showing, bringing, or pointing out objects of interest), d) lack of social or emotional reciprocity.</td>
<td>There are always qualitative impairments in reciprocal social interaction. These take the form of an inadequate appreciation of socio-emotional cues, as shown by a lack of responses to other people's emotions and/or a lack of modulation of behaviour according to social context; poor use of social signals and a weak integration of social, emotional, and communicative behaviours; and, especially, a lack of socio-emotional reciprocity. Qualitative impairments in communications are universal. These take the form of a lack of social usage whatever language skills are present; impairment in make-believe and social imitative play; poor synchrony and lack of reciprocity in conversational interchange; poor flexibility in language expression and a relative lack of creativity and fantasy in thought processes; lack of emotional response to other people's verbal and non-verbal overtures; impaired use of variations in cadence or emphasis to reflect communicative modulations; and a similar lack of accompanying gesture to provide emphasis or aid meaning in spoken communication.</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>Qualitative impairments in communication as manifested by at least one of the following: a) delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes of communication such as gesture or mime), b) in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others, c) stereotyped and repetitive use of language or idiosyncratic language, d) lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level.</td>
<td>Qualitative impairments in communications are universal. These take the form of a lack of social usage whatever language skills are present; impairment in make-believe and social imitative play; poor synchrony and lack of reciprocity in conversational interchange; poor flexibility in language expression and a relative lack of creativity and fantasy in thought processes; lack of emotional response to other people's verbal and non-verbal overtures; impaired use of variations in cadence or emphasis to reflect communicative modulations; and a similar lack of accompanying gesture to provide emphasis or aid meaning in spoken communication.</td>
</tr>
<tr>
<td><strong>Behaviour</strong></td>
<td>Restricted repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following: a) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus, b) apparently inflexible adherence to specific, non-functional routines or rituals, c) stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements), d) persistent preoccupation with parts of objects.</td>
<td>Restricted, repetitive and stereotyped patterns of behaviour, interests and activities, as manifested by at least two of the following six: a) encompassing preoccupation with stereotyped and restricted patterns of interest, b) specific attachments to unusual objects, c) apparently compulsive adherence to specific, non-functional routines or rituals, d) stereotyped and repetitive motor mannerisms, e) preoccupations with part-objects or non-functional elements of play material, distress over changes in small, non-functional details of the environment.</td>
</tr>
</tbody>
</table>
Table 1 Continued

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.</td>
<td>Symptoms must not be better explained by other Pervasive Developmental Disorders, attachment disorders, Schizophrenia, specific developmental language disorder with secondary socio-emotional problems, or Intellectual Disability with association emotional/behavioural disorder.</td>
</tr>
</tbody>
</table>

*Note.* The DSM-IV-TR and ICD-10 diagnostic criteria for Autism were taken directly from the DSM-IV-TR and the ICD-10.

DSM-IV-TR diagnostic criteria for AD were similar to autism yet with slight differences, such as an absence of diagnostic criteria in the communication domain, absence of language delay and absence of the requirement for onset before the age of three years (APA, 2000). Diagnostic criteria for AD are essentially identical in the ICD-10, although it is referred to as Asperger’s Syndrome. Table 2 presents an outline of the DSM-IV-TR and ICD-10 criteria for Asperger’s Syndrome/Disorder.
# Table 2

**DSM-IV-TR and ICD-10 Diagnostic Criteria for Asperger’s Disorder**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Other names</strong></td>
<td>Asperger's Disorder</td>
<td>Autistic Psychopathy, Schizoid disorder of childhood.</td>
</tr>
<tr>
<td><strong>Age of onset</strong></td>
<td>No clinically significant delay in language, cognitive development, or development of age-appropriate self-help skills, adaptive behaviour, and curiosity about the environment in childhood.</td>
<td>Characterised by the same kind of qualitative abnormalities of reciprocal and social interaction that typify Autism.</td>
</tr>
<tr>
<td><strong>Social interaction</strong></td>
<td>Qualitative impairment in social interaction, as manifested by at least two of the following: a) marked impairment in the use of multiple non-verbal behaviours (i.e., eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction), b) failure to develop peer relationship appropriate to developmental level, c) lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest); d) lack of social or emotional reciprocity.</td>
<td>Restricted, stereotyped, repetitive repertoire of interests and activities.</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>There is no clinically significant general delay in language (e.g., single words used by age 2 years, communicative phrases used by 3 years old).</td>
<td>There may or may not be problems in communication similar to those associated with Autism but there is no general delay in or retardation in language.</td>
</tr>
<tr>
<td><strong>Behaviour</strong></td>
<td>Restricted repetitive and stereotyped patterns of behaviour, interests and activities, as manifested by at least one of the following: 1) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus, 2) apparently inflexible adherence to specific, nonfunctional routines or rituals, 3) stereotyped and repetitive motor mannerisms (e.g., hand or ringer flapping or twisting, or complex whole-body movements), 4) persistent preoccupation with parts or objects.</td>
<td>Restricted, stereotyped, repetitive repertoire of interests and activities.</td>
</tr>
<tr>
<td><strong>Cognitive</strong></td>
<td>There is no clinically significant delay in cognitive development or in the development of age-appropriate self-help skills, adaptive behaviour (other than in social interaction), and curiosity about the environment in childhood.</td>
<td>No general delay in cognitive development.</td>
</tr>
<tr>
<td><strong>Other aspects</strong></td>
<td>The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.</td>
<td>Most individuals are of normal intelligence but it is common for them to be markedly clumsy. Psychotic episodes occasionally occur in early adult life.</td>
</tr>
<tr>
<td><strong>Exclusions</strong></td>
<td>Criteria are not met for another specific Pervasive Developmental Disorder or Schizophrenia.</td>
<td>Criteria not met for anakastic personality disorder, attachment disorders of childhood, obsessive-compulsive disorder, schizotypal disorder, Schizophrenia.</td>
</tr>
</tbody>
</table>

*Note.* DSM-IV-TR and ICD-10 diagnostic criteria for Asperger's Syndrome were taken directly from the DSM-IV-TR and the ICD-10.
Additionally, Gillberg and Gillberg (1989) proposed a set of operationalised diagnostic criteria (e.g., odd prosody and semantic-pragmatic problems) based on Asperger’s (1944) and Wing’s (1981) work, clinical experience and comparative studies. These criteria were later modified by Gillberg (1991). See Table 3 for an outline of Gillberg’s 1991 diagnostic criteria for Asperger’s.

### Table 3

**Gillberg (1991) Diagnostic Criteria for Asperger’s Syndrome**

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other names</strong></td>
<td>NA</td>
</tr>
<tr>
<td>Age of onset</td>
<td>NA</td>
</tr>
<tr>
<td>Social interaction</td>
<td>Extreme egocentricity. At least two of the following: a) inability to interact with peers, b) lack of desire to interact with peers, c) lack of appreciation of social cues, d) socially and emotionally inappropriate behaviour.</td>
</tr>
<tr>
<td>Communication</td>
<td>Speech and language peculiarities (at least three of the following): a) delayed development, b) superficially perfect expressive language, c) formal pedantic language, d) odd prosody, peculiar voice characteristics, e) impairment of comprehension including misinterpretations of literal/implied meanings. Non-verbal communication problems (at least one of the following): a) limited use of gestures, b) clumsy/gauche body language, c) limited facial expression, d) inappropriate expression, e) peculiar, stiff gaze.</td>
</tr>
<tr>
<td>Behaviour</td>
<td>Narrow interest (at least one of the following): a) exclusion of other activities, b) repetitive adherence, c) more rote than meaning. Repetitive routines (at least one of the following): a) on self, in aspects of life, b) on others.</td>
</tr>
<tr>
<td>Cognitive</td>
<td>NA</td>
</tr>
<tr>
<td>Other aspects</td>
<td>Motor clumsiness: poor performance on neuro-developmental examination.</td>
</tr>
<tr>
<td>Exclusions</td>
<td>NA</td>
</tr>
</tbody>
</table>

*Note.* Criteria were taken directly from Gillberg’s (1991) criteria for Asperger’s Syndrome.
In the DSM-5 (APA, 2013) the diagnostic construct of ASD has been reduced from three to two core symptoms by combining social and communication impairments into a single domain. The second category is fixated interests and repetitive behaviours. Specifically, in DSM-5, ASD is characterised by persistent deficits in social communication and social interaction across multiple settings, inclusive of deficits in social reciprocity, non-verbal communication employed in social interaction, and skills in forming, maintaining, and understanding relationships. In addition to these deficits, a diagnosis of ASD requires the presence of restricted, repetitive patterns of behaviour, interests, or activities. Further, in recognition that symptoms may change across development, a diagnosis can be made on the basis of historical information. As such, a universal age of onset criterion has been introduced, in recognition that symptoms may present later (i.e., adolescence or adulthood; see Table 4 for current DSM-5 ASD criteria).
Table 4

Current DSM-5 Criteria for Autism Spectrum Disorder

Must meet criteria A, B, C, and D:
A Persistent deficits in social communication and social interaction across contexts, not accounted for by general developmental delays, and manifest by all 3 of the following:
1. Deficits in social-emotional reciprocity; ranging from abnormal social approach and failure of normal back and forth conversation through reduced sharing of interests, emotions, and affect and response to total lack of initiation of social interaction,
2. Deficits in nonverbal communicative behaviours used for social interaction; ranging from poorly integrated- verbal and nonverbal communication, through abnormalities in eye contact and body-language, or deficits in understanding and use of nonverbal communication, to total lack of facial expression or gestures.
3. Deficits in developing and maintaining relationships, appropriate to developmental level (beyond those with caregivers); ranging from difficulties adjusting behaviour to suit different social contexts through difficulties in sharing imaginative play and in making friends to an apparent absence of interest in people
B Restricted, repetitive patterns of behaviour, interests, or activities as manifested by at least two of the following:
1. Stereotyped or repetitive speech, motor movements, or use of objects; (such as simple motor stereotypies, echolalia, repetitive use of objects, or idiosyncratic phrases).
2. Excessive adherence to routines, ritualized patterns of verbal or nonverbal behaviour, or excessive resistance to change; (such as motoric rituals, insistence on same route or food, repetitive questioning or extreme distress at small changes).
3. Highly restricted, fixated interests that are abnormal in intensity or focus; (such as strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
4. Hyper-or hypo-reactivity to sensory input or unusual interest in sensory aspects of environment; (such as apparent indifference to pain/heat/cold, adverse response to specific sounds or textures, excessive smelling or touching of objects, fascination with lights or spinning objects).
C Symptoms must be present in early childhood (but may not become fully manifest until social demands exceed limited capacities)
D Symptoms together limit and impair everyday functioning.

Note. Criteria for Autism Spectrum Disorder were taken directly from DSM-5.

However, the diagnostic criteria for Autism Spectrum Disorder in DSM-5 are only met when the current presentation across the two core domains cause significant impairment, such as in occupational and social functioning (APA, 2012). Further, the ability to adapt diagnoses to individual clinical presentations has been incorporated,
by inclusion of clinical specifiers of severity (ranging from mild, 1 ‘requiring support’, to severe, 3 ‘requiring very substantial support’) and verbal abilities, as well as associated features such as known genetic disorders and intellectual disability (APA, 2012; McPartland, Reichow, & Volkmar, 2012). These clinical specifiers are presented in Table 5.
### Table 5

**DSM-5 Autism Spectrum Disorders Clinical Specifiers**

<table>
<thead>
<tr>
<th>Severity Level for ASD</th>
<th>Social Communication</th>
<th>Restricted interests &amp; repetitive behaviours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 3</td>
<td><strong>‘Requiring very substantial support’</strong></td>
<td>Preoccupations, fixated rituals and/or repetitive behaviours markedly interfere with functioning in all spheres. Marked distress when rituals or routines are interrupted; very difficult to redirect from fixated interest or returns to it quickly.</td>
</tr>
<tr>
<td></td>
<td>Severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning; very limited initiation of social interactions and minimal response to social overtures from others.</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td><strong>‘Requiring substantial support’</strong></td>
<td>RRBs and/or preoccupations or fixated interests appear frequently enough to be obvious to the casual observer and interfere with functioning in a variety of contexts. Distress or frustration is apparent when RRB’s are interrupted; difficult to redirect from fixated interest.</td>
</tr>
<tr>
<td></td>
<td>Marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiation of social interactions and reduced or abnormal response to social overtures from others.</td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td><strong>‘Requiring support’</strong></td>
<td>Rituals and repetitive behaviours (RRB’s) cause significant interference with functioning in one or more contexts. Resists attempts by others to interrupt RRB’s or to be redirected from fixated interest.</td>
</tr>
<tr>
<td></td>
<td>Without supports in place, deficits in social communication cause noticeable impairments. Has difficulty initiating social interactions and demonstrates clear examples of atypical or unsuccessful responses to social overtures of others. May appear to have decreased interest in social interactions.</td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Clinical specifiers for Autism Spectrum Disorder were taken directly from DSM-5.

Whilst the ICD-11 revision is not due for publication until 2017, the current draft proposes to follow the DSM-5 dimensional approach to diagnosis, re-classifying pervasive developmental disorders including Asperger’s disorder and
Autistic disorder into the umbrella category, ASD (World Health Organisation, 2013).

**Diagnostic assessment of ASD.** Abnormalities in the core ASD domains of enduring deficits in social communication and social interaction across multiple contexts are typically present from infancy. Therefore, early identification and intervention of ASD is emphasised, with the desired age between 18 months and three years of age (Spence, Sharifi, & Wiznitzer, 2004). However, although diagnosis may occur considerably later (i.e., in adolescence or adulthood), especially in atypical, complex or mild cases, classification systems and diagnostic instruments for ASD are typically most accurate in diagnosing young to school age children, with decreasing interpretability beyond this group (Happé & Charlton, 2012; Lord, Rutter, & Le Couteur, 1994).

In recent years, the number of individuals coming for first diagnosis of ASD in adulthood has greatly increased, frequently prompted by an ASD diagnosis in a child within the family (Happé & Charlton, 2012). However, the majority of questionnaires and diagnostic tools for the formal assessment of ASD are designed for children. As a consequence, diagnosing adults presents various challenges, such as difficulties in obtaining accurate retrospective developmental information (Happé & Charlton; Kanai et al., 2011).

In response to these difficulties, Baron-Cohen, Wheelwright, Skinner, Martin and Clubley (2001) developed a screening tool, the Autism-Spectrum Quotient (AQ), to assess self-reported ASD traits in adults of normal intelligence in both the general population and the autism spectrum community. There are several lines of support for the validity of the AQ in community samples and the autism spectrum community (e.g., Auyeung, Baron-Cohen, Wheelwright, & Allison, 2008; Baron-
Cohen et al., 2001; Wakabayashi, Baron-Cohen, & Wheelwright, 2006). For example, in the study by Boradbent, Galic and Stokes (2013), results demonstrated an approximately normal distribution in AQ scores in both groups of TD (n=128) and ASD participants (n=104), indicating that the AQ measures the degree of autistic symptomatology in line with the view that characteristics of ASD traits form part of a broader phenotype, and that traits lie on a continuum. Further, Broadbent, Galic and Stokes found that the ASD group scored significantly higher on AQ total, and each of its subscales, indicating that the AQ can discriminate autistic symptomatology and shows promise, and thus has acceptable discriminative validity. However, other studies (e.g., Brugha et al. 2011) raise concerns about the validity of the AQ in community samples as a specific test for ASD, relative to standardised diagnostic assessments of ASD such as the Autism Diagnostic Observation Schedule module-4 (ADOS-4; Lord et al. 1994).

Later, Baron-Cohen and Wheelwright (2004) developed another screening measure, the Empathy Quotient (EQ), to specifically assess empathy levels in adults. In combination, the AQ and EQ screening measures form the Adult Asperger Assessment (AAA; Baron-Cohen, Wheelwright, Robinson, & Woodbury-Smith, 2005), along with a measure to retrospectively assess developmental information through parent or relative-report, the Relatives Questionnaire (RQ).

More recently, the Ritvo Autism Asperger Diagnostic Scale – Revised (RAADS-R; R. A. Ritvo et al., 2011), an adjunct clinical diagnostic tool to assess ASD symptoms in adults, was developed. The RAADS-R is shown to be psychometrically sound, with the ability to accurately distinguish between those with and without a clinical diagnosis of ASD and those with another clinical diagnosis (sensitivity = 97%, specificity = 100%, test-retest reliability = .987, accuracy = 98.5%; Ritvo et al., 2011). Similarly, a validation study of the Swedish version of the
RAADS-R was administered to an adult ASD group \(n=75\) and a comparison TD group \(n=197\). Findings revealed that sensitivity was 91\% and specificity was 93\%.

**Epidemiology of Autism Spectrum Disorder**

**Prevalence and incidence.** Several studies are suggestive of a rise in the rate of ASD diagnoses over recent years (e.g., Brugha et al., 2011; Williams, MacDermott, Ridley, Glasson, & Wray, 2008). In a review of 43 studies (published between 1966 and 2009), prevalence estimates of autism in children ranged from 0.7/10,000 to 72.6/10,000 (0.7\%; Fombonne, 2009). In this study, a statistically significant correlation between year of publication and prevalence was observed, indicating that prevalence estimates have increased in the last 15-20 years (Fombonne). Further demonstrating a rise in ASD diagnoses, in 18 studies published since 2000, the combined prevalence for all ASDs was estimated to be 63.7/10,000 (0.64\%, Fombonne). Additionally, recent prevalence rates published by the US Center for Disease Control (CDC, 2015) reflect the rising rate of ASD diagnoses, from approximately 1 in 150 children diagnosed in 2000 to approximately 1 in 68 diagnosed in 2010.

However, whilst it is evident that the number of ASD diagnoses has increased, research strongly suggests that this rise is not reflective of a true increase (e.g., Brugha et al., 2011). Rather, when differentiating rates of ASD and recognition of ASD or ASD diagnoses, evidence strongly suggests that the rise is reflective of the latter, increased recognition. Specifically, Brugha et al. show and discuss that rates of autism in older adults do not differ significantly from rates in younger adults, which suggests that birth rates of people who develop autism are stable at least since the 1930s; it cannot be compared with other studies of adults, which have only studied possible trends in diagnostic rates.
**Gender disparity.** Until recently, a consistent observation in the epidemiology of ASD was the gender disparity, that is, the dominance of males cases (Fombonne, 2009). For instance, the mean male to female ratio has consistently been reported between 2.5-4:1 (Bryson, Clark, & Smith, 1988; Ehlers & Gillberg, 1993; Fombonne, 2009; Ritvo, Jorde, Mason-Brothers, & Freeman, 1990; Scott, Baron-Cohen, Bolton, & Brayne, 2002; Yeargin-Allsopp et al., 2003). Whilst several explanatory theories have been proposed, such as the extreme male brain theory (Baron-Cohen, 2002), our knowledge regarding the mechanisms underlying this gender discrepancy remains unclear (Cheslack-Postava & Jordan-Young, 2012). However, there is evidence of genuinely better adaptation/compensation in girls with ASD, inferring that ASD traits may often remain undetected in females (Dworzynski, Ronald, Bolton, & Happé, 2012; Wing, 1981). Further, the known gender disparity of ASD has led to a larger focus on the male ASD profile (i.e., the male bias), leaving a noticeable gap in our understanding of the female ASD profile (Lai et al., 2012). However, in a sample of 319 children at-risk for ASD (i.e., siblings of children with ASD), Zwagenbaum et al. (2012) found that ASD rates were only modestly higher in boys than girls, with a mean male to female ratio reported as 1.65:1. This finding that there may be a lower male bias in ASD than suggested by previous research highlights the need for a better understanding of females with ASD (Lai et al., 2012).

**Conditions Comorbid with Autism Spectrum Disorder**

Previous research demonstrates high rates of comorbidity in children with ASD (e.g., Lugnegard, Hallerback, & Gillberg, 2011). Comorbid conditions include intellectual disability, epilepsy, mood disorders, anxiety disorders, obsessive-compulsive traits (inflexibility, and behavioural rigidity), attention deficit disorder,
motor coordination disorder, language disorder and dyslexia (Attwood, 2007; Frith, 2003). Whilst there has been comparatively less research on comorbid diagnoses in adults with ASD, research also indicates a higher incidence of mood and anxiety disorders in this group (Lugnegard et al., 2011; Ramsay et al., 2005). For example, in a sample of adults with ASD (N=54), Lugnegard et al. (2011) found that 70% had experienced at least one major depressive episode, 50% had suffered from recurrent depressive episodes, and 50% had a comorbid anxiety disorder.

**Aetiology of Autism Spectrum Disorder**

**Cognitive and psychological theories.**

*Theory of Mind.* Impaired theory of mind (ToM), the ability to socially infer or attribute unobservable states of self and others (e.g., beliefs, intentions and desires), and to predict and understand behaviour upon such inferences (Premack & Woodruff, 1978), is hypothesised to underlie social impairments in ASD (Baron-Cohen, Leslie, & Frith, 1985). According to this view, individuals with ASD tend to predict others’ behaviour on the basis of the actual state of the world rather than on the perceived mental states of others (Frith, 2004).

ToM impairments have been reported in adults with ASD and normal intelligence, however findings are mixed (Beaumont & Newcombe, 2006; Frith, 2003; Rutherford, Baron-Cohen, & Wheelwright, 2002). Moreover, behavioural ToM task failure is ambiguous with regard to the underlying cognitive deficits (Happé, 1999). Nevertheless, the ToM account provides an important framework for understanding the degree of social impairment in individuals with ASD (Howlin, Goode, Hutton, & Rutter, 2004).
**Weak central coherence.** According to Frith (2003), typically developing (TD) individuals process incoming information for meaning and gestalt (whole) form by integrating information on multiple levels. Frith (1989) termed this ability ‘central coherence’, and hypothesised that individuals with ASD show ‘weak central coherence’, a style of information processing that focuses upon details while sacrificing an understanding of the whole. This account provides an explanation for variable patterns of excellent performance (e.g., superior perceptual processing abilities) and poor performance (e.g., heightened sensitivity to sounds leading to distress) associated with ASD (Frith, 1991). Further, this hypothesis is associated with the pursuit of narrow interests in this group, with abnormal attention strategies, including strong focus of attention or high attention to detail and poor attention switching, associated with dedication and determination, often yielding superior performance in a particular area (Frith, 2004). As Frith (2004) states, this sometimes leads to outstanding achievements and professional success, often in specialised in high positions.

**Executive dysfunction.** Some of the non-social aspects of autism may be accounted for by the theory of executive dysfunction (Frith, 2003). Executive functions are mediated by the frontal lobes, including: organisation and planning abilities, working memory, inhibition and impulse control, self-reflection, self-monitoring, and mental flexibility (Attwood, 2007; Hill, 2004). Individuals with ASD, including those who are high functioning with high intellectual ability, exhibit various executive problems (Frith, 2003). As Frith (2003) states, these executive functions are vital for the control of actions (i.e., switching attention between tasks) and for high-level decisions (i.e., resolving conflicting responses, overriding automatic behaviour, and inhibiting inappropriate impulsive actions), but not for
routine, well-practiced actions such as repetitive behaviours and restricted interests associated with ASD (Frith, 2003).

**Extreme male brain.** Baron-Cohen (2002) proposed that ASD can be considered as an extreme of the normal male brain profile. According to this theory, the dimensions of ‘empathising’ and ‘systematising’ define the female and male brain. Empathising refers to the drive to care about and the ability to attribute and predict another’s emotions, thoughts and behaviours (i.e., ToM) and to provide an emotionally appropriate response (i.e., predicting the social world). According to this theory, empathy is a spontaneous response that is greater in females compared to males. In contrast, systematising, which refers to the drive to construct systems that are predictable and controllable, is more of a spontaneous male response than for females. Ultimately the extreme male brain theory purports that systemising is hyper-developed and empathising is hypo-developed in individuals with ASD (Baron-Cohen, 2002).

**Biological theories.** The heterogeneity of ASD suggests that multiple and interacting predisposing factors underlie the disorder and interfere with normal developmental (Belmonte et al., 2004). In this sense, ASD is generally considered polygenic or multifactorial (Freitag, 2007). Nevertheless, various at-risk factors or initial triggering conditions have been identified and a brief summary of these findings follows.

**Genetic.** Evidence from twin studies provides partial support for the genetic aetiology of ASD (Volker & Lopata, 2008). The median concordance rate for autism is shown to be approximately 60% in monozygotic twins, increasing to a median
value of 91% when considering the broader autism spectrum (Fombonne, 2005; Rutter, 2005). Recently, an autism prevalence rate of approximately 18.7% was found among baby siblings (N=664) of children with ASD (Ozonoff et al., 2011). Additionally, studies have demonstrated an increased risk of autism in families where a child has a diagnosis of ASD (e.g., Jorde et al., 1990).

Research in this area indicates that as many as 15 genes are involved in the genetic aetiology of ASD (Santangelo & Tsatsanis, 2005). For instance, investigations of genome-wide scans relating to autism show that at least one positive genetic linkage on almost every chromosome (Santangelo & Tsatsanis; Yang & Gill, 2007). However, a specific identified genetic issue is found in as few as 10% of ASD cases (Akshoomoff, Pierce, & Courchesne, 2002).

**Assortative mating.** Following on from the extreme male brain or hyper-systemising theory of ASD, Baron-Cohen (2006b) proposed the assortative mating theory of ASD. According to this perspective, ASD could be the genetic result of two high systematisers mating with one another (Baron-Cohen, 2006b). Baron-Cohen draws on research to support the view that systematising is part of the broader cognitive phenotype for ASD, including evidence that fathers and grandfathers of children with ASD are twice as likely to work in the systematising occupation of engineering (Baron-Cohen, Wheelwright, Stott, Bolton, & Goodyer, 1997) and students who study systematising-related subjects (engineering, mathematics and physics) have a higher number of relatives with ASD than students in humanities (Baron-Cohen et al., 1998). In support of the assortative mating theory of ASD, Baron-Cohen (2006) highlights that mothers and fathers of children with ASD demonstrate superior ability to find embedded figures on the Embedded Figures Test, indicative of strong systematising abilities (Happé, 1996); both parents of children
with ASD have increased rates of systematising occupations among their fathers (Baron-Cohen, Wheelwright, Stott, et al., 1997); and both parents demonstrate hyper-masculinised patterns of brain activity on fRMI during a systematising task (Baron-Cohen et al., 2006). However, this theory is somewhat speculative, and requires further investigation.

**Structural and neurological brain abnormalities.** Anatomically, abnormalities in the autistic brain have been found in several neocortical structures, including the cerebellum and brain stem, the hippocampus and amygdala, and frontal lobes (Belmonte et al., 2004). Additionally, it has been proposed that abnormal development of mirror neurons (a class of visuomotor neurons) in individuals with ASD may be responsible for impairments in social relating (Williams, Whiten, Suddendorf, & Perrett, 2001). Specifically, mirror neurons discharge in sympathy with associated motor neurons when some behaviour is undertaken by the individual, ‘mirroring’ the motor neurons, and when behaviour is observed in another, by the owner of the mirror neuron. In this sense, mirror neurons are reported as playing a role in imitation deficits seen in individuals with ASD (Enticott et al., 2012; Williams et al.).

Unusual brain growth patterns of children with ASD have also been observed. There appears to be a period of premature accelerated head and brain growth soon after birth, accompanied by enlarged cerebral volumes, abnormal cerebral cortical thickening, and excess numbers of neurons or glia (Volker et al., 2008). Once completed, a time of abnormally slow brain growth follows so that, between middle childhood and early adolescence, the average overall brain volume appears to be within what is expected for that age (Volker & Lopata, 2008). This abnormal brain growth pattern is purported to explain the anatomic heterogeneity observed in the
autistic brain (Akshoomoff et al., 2002; Courchesne & Pierce, 2005). Accordingly, core dysfunctions in ASD may involve pervasive interruptions or changes in neural processing, possibly produced by abnormal neural connectivity (Belmonte et al., 2004).

**Strengths in those with Autism Spectrum Disorder**

It is important to recognise that individuals with ASD also possess strengths associated with the symptoms of their disorder that are often unique and exceptional. Hans Asperger (1944) drew attention to individuals who show the core symptoms of autism in the presence of high verbal intelligence and emphasised that some of his cases demonstrated high originality of thought and imagination (Asperger, 1944; Frith, 2004).

Firstly, numerous cognitive strengths are often apparent in individuals with ASD. For example, in contrast with the social difficulties, people at the higher end of the Autism spectrum have a good understanding of the non-social world (Frith, 2004). Frith theorised that the cognitive style of weak central coherence facilitates scrupulous analysis of perceptual and verbal detail, and is associated with high performance in non-social domains. Moreover, individuals with ASD can be talented in understanding the logical and physical world, and may have strong attention to detail and ability to remember and re-arrange facts systematically. Additionally, the ability to accumulate facts about a particularly topic is often evident in individuals with ASD, which can be reflected in a special interest, a remarkable ability in a chosen area of expertise, and an excellent long-term memory for facts and details (Attwood, 2007; Hénault, 2006). Some individuals with ASD have excellent perceptual and memory abilities, which are theorised to assist in learning about the social world (Frith, 2003).
From Baron-Cohen’s (2002) extreme male brain perspective, cognitive strengths can be explained by the concept of ‘systemising’, the tendency to systematically collect facts about the physical world. Baron-Cohen refers to the triad of strengths in autism, positing that repetitive behaviour, islets of ability and obsession with systems all arise from heightened systematising abilities.

Other strengths commonly observed in those with ASD include honesty, sincerity, charm, independence and individuality, good understanding of concrete concepts and high professional abilities (Attwood, 2007). Attwood and Gray (1999) developed a measure of strengths in high functioning individuals with ASD, which included: social interactions based on authentic relationships, lack of judgement of others (not sexist or racist), and rich vocabulary. Researchers (e.g., Frith, 1991; Jordan & Caldwell-Harris, 2012) have emphasised the positive role certain ASD traits (e.g., restricted, fixated interests) can play in adult life. However, unfortunately there has been limited research attention paid to the relative strengths in individuals with ASD and most of our knowledge comes from clinical expertise and autobiographical accounts (Attwood, 2007; Frith, 2004). In particular, to date, there has been limited investigation of whether strengths and talents associated with ASD positively influence adult outcome.

Outcome in Adults with ASD

Considering the rise in ASD diagnoses and life-long nature of the disorder, there is presumably a growing population of adults with ASD (Brugha et al., 2011; Nylander & Gillberg, 2001). As such, it is imperative that we understand the manifestation of core ASD deficits across the lifespan (Seltzer et al., 2003). However, up until recently there has been a scarcity of research in this area.
Earlier outcome studies generally indicate poor, yet highly variable outcomes. For instance, the majority of Kanner’s (1943) participants did not achieve good outcomes in adulthood (Kanner, 1992). Additionally, in his review of eight follow-up studies of children with autism conducted up until the mid-1970s, Lotter (1978) reported that as little as 5% to 17% had a good outcome, whereas 61% to 71% had a generally poor outcome. It was also noted that few were employed and around half were institutionalised (Lotter, 1978). Similarly, in a review of follow-up studies published up until the mid-1990s, Nordin and Gillberg (1998) reported that good outcome was evident in 5% to 15% of cases, leading to the conclusion that a small proportion of individuals with autism develop into relatively normal adults (Nordin & Gillberg, 1998). Similarly, in a review of follow-up studies on adults with ASD conducted prior to 2000, Howlin and Moss (2012) reported the mean percentage of individuals living independently or semi-independently to be 18% (range 1%-44%).

However, earlier outcome studies were undertaken with samples biased towards lower functioning individuals, given that the higher functioning population has become increasingly recognised since (Nordin & Gillberg, 1998). Given this bias, it would be expected to observe few good outcomes, and it is unclear what proportion of the results relate to autism uniquely, and what are linked to low intellectual functioning (Nordin & Gillberg, 1998).

In light of the broadening of DSM criteria for ASD and the inclusion of AD in the DSM-IV, it follows that more recent outcome studies incorporate adults at the higher functioning end of the spectrum with IQ in the normal range (Billstedt, Gillberg, & Gillberg, 2005). For example, Farley et al. (2009) investigated outcome in a sample of adults with ASD of average intelligence (N=41), finding half of the sample rated as ‘very good’ or ‘good’ on a global outcome measure. In particular, participants demonstrated good outcomes in education, with 56% attending special
education until 21 years or age, 46% completing high school at grade 12 with a
diploma, and 39% completing postsecondary education; and in employment, with
half of participants employed either full-time or part time. With regard to overall
social outcome, the majority of the sample was classified in outcome categories of
good and fair. However, intimate relationships appeared to be a problematic area for
the sample; only 7% were married, 5% were divorced, 7% were in long-term
relationships, 44% had never dated and 54% had dated.

Whilst research in this area is limited, adult life outcomes also appear highly
variable in terms of the experience of intimate relationships. As Howlin and Moss
(2012) and Henninger and Taylor (2013) acknowledge, cross comparisons of follow-
up studies with varying initial case finding methods at different times historically are
problematic. A long-term follow up of young adults (N=26) diagnosed with high-
functioning ASD in childhood found that only one individual was married and three
were regularly dating (Szatmari, Bartolucci, Bremner, Bond, & Rich, 1989).
Similarly, in a 30-year follow-up study of a small sample of adults diagnosed with
high-functioning ASD (N=9) in childhood, 56% were currently or previously
married and several couples were raising children (Larsen & Mouridsen, 1997). In
another study (Engström, Ekström, & Emilsson, 2003) reporting on the psychosocial
functioning of adults with high-functioning ASD (N=16), 38% were currently in a
relationship.

Further, a review of outcome studies conducted in the last decade revealed that
the mean percentage of people with ASD classified as having good-very good
outcome is below 20% (Howlin & Moss, 2012). Similarly, a more recent paper
(Magiati, Tay, & Howlin, 2014) that systematically reviewed outcome studies
assessing individuals diagnosed with ASD in childhood and following them up in
adulthood (N=25), found that, although adaptive functioning, particularly in daily
living skills and possibly communication, tended to improve somewhat overtime, impaired social skills were less likely to improve, with adult outcomes in social integration and independence typically reported to range from poor to very poor. Further, impairment in functional and social aspects of communication skills tended to remain stable over time.

Taken together, findings demonstrate that at least some individuals with ASD are capable of being in an intimate, couple relationship (Lau & Peterson, 2011). Further, whilst follow-up studies such as these provide important information on the incidence of intimate relationships in this cohort, they tell us little about the ability to develop intimate relationships and the factors that may impede this. As such, there remains a distinct lack of research in this area, with very little data available on the quality of these relationships (Howlin & Moss, 2012).

**Factors influencing adult outcome.** The large variability in outcome studies for adults with ASD is reflective of various factors. IQ at age of diagnosis appears to be one of the best predictors of prognosis in ASD (Howlin & Moss, 2012; Nordin & Gillberg, 1998). Additionally, a strong link between early language abilities and subsequent outcome is strongly established (Howlin et al., 2004; Mawhood, Howlin, & Rutter, 2000; Nordin & Gillberg, 1998).

Most people who achieve good outcomes as adults have usually developed at least some useful speech by the age of five years. Expectedly, in adulthood, individuals with good verbal comprehension, functional use of speech, and a verbal IQ in the normal range are significantly more likely to function well socially compared to those who are impaired in these areas (Howlin & Moss, 2012). An association between severity of early autistic symptomatology and later outcome is also evident, although findings are mixed. Additionally, both severity of repetitive
and stereotyped behaviours and the level of impairment in the social domain have been identified as strong prognostic factors. Moreover, comorbid mental health and medical problems also tend to have a negative impact on outcome, as would be expected. Furthermore, environmental factors such as appropriate support, appear to impact on outcome and quality of life in this group (Howlin & Moss).

**Conclusion**

In conclusion, ASD is a pervasive, life-long developmental disorder characterised by severe impairment across social and communication impairments and rigid/repetitive behaviour (APA, 2013). Epidemiological research indicates that the prevalence of ASD diagnoses has dramatically risen over recent years (e.g., Williams et al., 2008). Although limited, outcome studies of this population indicate that most will become adults with a significant degree of impairment, particularly in the social domain (Cederlund, Hagberg, Billstedt, Gillberg, & Gillberg, 2008; Howlin et al., 2004). Despite the ever-growing knowledge about ASD, researchers and practitioners have historically focused their attention only on the earlier part of the lifespan, leaving a noticeable gap in our understanding of the complex issues facing adults with ASD. In particular, one area that has been largely neglected is how ASD impacts intimate relationships in adulthood and the particular challenges that may be faced by couples where one partner has ASD. The following chapter will further discuss social and communication difficulties in those with ASD that may impede or enhance their ability to develop intimate relationships in adulthood.
Chapter 2 – Relationship Development of Adults with ASD

In light of the growing population of adults with ASD, and knowledge that impairments of ASD generally persist throughout the life course (Seltzer et al., 2003), there is increased urgency to describe and understand the challenges faced by the adult ASD population (Brugha et al., 2011; Nylander & Gillberg, 2001). Researchers have begun to investigate the manifestation of core ASD deficits in social behaviour and interaction across the lifespan (Seltzer et al., 2003). However, as discussed in Chapter 1, comparatively little attention has been paid to investigating the influence of the core features of ASD, social impairments and difficulties with social communication and interpersonal interaction, on the ability to develop intimate couple relationships in adulthood. Expectedly, the development of intimate relationships is an area positing particular challenges to adults with ASD, given the core difficulties involve skills essential for developing close interpersonal relationships. It is hoped that research into outcomes with regard to the development of intimate relationships will further our understanding of the lifespan developmental trajectories of ASD. The aim of this chapter is to review the literature on relationship development in the general population, before turning to discussion of how ASD traits and associated deficits in forming relationships may manifest in difficulties with intimate relationship development for adults with ASD.

Impairments in social functioning and social deficits are at the core of all diagnostic systems for ASD, and underlie the social communication barriers faced by this group (Howlin et al., 2004; MacKay, Knott, & Dunlop, 2007). Earlier in the lifespan, children with ASD are more withdrawn and more likely to be neglected by others. In young children with ASD, impairments are demonstrated in difficulties with engaging in social play, joining in activities with one’s peer group, or forming close friendships (Howlin, 2004). Empirical evidence and clinical observation further
indicate that children and adolescents with ASD generally have poor friendships, often lack social skills, commonly experience teasing and rejection by peers and often experience feelings of loneliness (Attwood, 2007; Bauminger, Shulman, & Agam, 2003; Lasgaard, Nielsen, Eriksen, & Goossens, 2010; Orsmond, Krauss, & Seltzer, 2004).

Later in development, it would appear that ASD traits impact on finding an intimate partner and on romantic relationship functioning. However, there is a distinct lack of knowledge in this area. Predominantly, research on the social relationships of individuals with a clinical diagnosis of ASD has focused on peer relationships in childhood (Bauminger et al., 2003; Orsmond et al., 2004). Nevertheless, it appears that ASD is associated with impaired relationship functioning in adulthood, as it is known that those with ASD are generally less likely to be married or in an intimate relationship than TD individuals (Howlin & Moss, 2012). However, adult outcomes in this group are highly variable, and it is known that some individuals with ASD do find partners and marry (Lau & Peterson, 2011). Seemingly, individuals with higher severity of autistic traits would have more difficulty with relationship development, however little research has been conducted to inform this assumption. To date, there has been a paucity of empirical literature to explore how ASD traits impact on intimate relationship development and experiences. As a consequence, there is a lack of evidence-based interventions to assist adults with ASD in this important area of adult functioning, leading us to draw on clinical experience and anecdotal evidence.

Clinical experience (e.g., Attwood, 2007) informs us that ASD traits, particularly in domains of social communication, have a detrimental impact on the ability to develop intimate relationships. In particular, Attwood (2012) highlights that social communication difficulties, such as impaired theory of mind (ToM), adversely
impact the development of relationship skills of empathy, trust and the ability to understand and relate to others and develop closeness. Further, as Attwood states, difficulty with understanding and expressing emotions is associated with anxiety, depression and difficulty managing anger, factors that expectedly interfere with relationship development. Therefore, clinical experience points to the need to further understand the factors that may inhibit the development of relationships of adults with ASD.

Though preliminary, there is evidence suggesting that the core social and communicative impairments reflected in problems understanding other peoples’ perspectives and in difficulties with social-emotional reciprocity (Knott, Dunlop, & Mackay, 2006), persist into adulthood. For instance, evidence suggests that adults with ASD have difficulty with empathy (Lawson, Baron-Cohen, & Wheelwright, 2004). In one study, adults with ASD (N=18) were found to perform significantly worse than TD counterparts (N=44) on an empathising task requiring participants to demonstrate understandings of social outcomes within a set of social stories (d=0.92) (Lawson et al., 2004). In another study, Baron-Cohen and Wheelwright (2003) assessed empathy using a self-report questionnaire in adults with high functioning ASD (N=90) and TD adults (N=90). In this study, the ASD group scored significantly lower than TD controls (d=0.48), indicating an empathising deficit in individuals with ASD. Similarly, Spek, Scholte and Van Berckelaer-Onnes (2010) found significant differences in theory of mind (ToM) between a sample of 61 adults with high functioning autism (HFA) and Asperger’s Syndrome (AS) and 32 TD counterparts, with the ASD group demonstrating more self-reported theory of mind problems.

In another study, Baron-Cohen, Wheelwright and Jolliffe (1997) measured the ability of both TD adults (N=17) and adults with ASD (N=16) to detect complex
mental states from a range of facial images and images of eyes alone. The ASD group performed significantly worse on the complex mental state tasks compared to controls (R²=0.34). Differences were even more marked in the eyes alone task, with the ASD group performing significantly worse on both basic eyes (R²=0.21) and complex eyes tasks (R²=0.44). Taken together, evidence suggests that adults with ASD have difficulty identifying and responding appropriately to thoughts and emotions in others or with producing a spontaneous emotional reaction, as well as difficulty integrating socially relevant verbal and non-verbal experience, posing several potential barriers to the development of intimacy.

There is further evidence to suggest that adolescents and adults with ASD continue to have problems in the social realm, as demonstrated by poor social outcomes with regard to social integration (friendships, dating). However, research in this area is limited with respect to the adult ASD population. One study (Orsmond et al., 2004) found that only 8.1% of the whole sample of adolescents (N=185) and adults (N=50) with ASD, had at least one friendship with a same aged peer that involved engagement in reciprocal activities (i.e., socialising with friends or work friends, occurring outside of prearranged settings). Further, having peer relationships was predicated by younger age and less impairment in social interaction skills, as measured by the Autism Diagnostic Interview – Revised (ADI-R; Lord et al., 1994). Such findings highlight that the core social deficits of ASD persist into adolescence and adulthood, as do the associated difficulties developing relationships. However, for inclusion, all participants in this study were required to be living in the parental home, meaning that potentially higher functioning, independent and more socially adept adults with ASD were excluded.

In another study, Orsmond, Shattuck, Cooper, Sterzing and Anderson (2013) found that young adults with ASD had significantly lower levels of social
participation and higher levels of social isolation compared to a sample of individuals with intellectual, emotional/behavioural and learning disabilities. Similarly, in a sample of 97 TD university students, Jobe and White (2007) found that individuals with higher ASD symptomatology, as measured by the Autism Spectrum Quotient (AQ; Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) reported significantly more loneliness, and fewer and shorter duration friendships. Taken together, preliminary research in this area suggests that characteristics of ASD associated with difficulties in developing relationships persist into adulthood.

Despite the challenges adults with ASD may face in developing intimate relationships, research indicates that individuals with ASD do desire intimate relationships and many do form relationships and marry (Byers, Nichols, & Voyer, 2013; Henault & Attwood, 2002; Stokes, Newton, & Kaur, 2007). However, as highlighted in our review of outcome studies of adults with ASD (see Chapter 1), outcome with regard to intimate relationship development appears to be poor, highlighting the need to further understand the factors that may impede or enhance relationship development and experiences for this group.

As yet, it is unclear as to why some high-functioning individuals with ASD have better outcomes in adulthood with regard to intimate relationship development. To date, there has been little research into the association between ASD traits and difficulties with social integration with regard to intimate relationship development. As such, there are many widely held assumptions, with limited empirical basis, regarding the inability of individuals with ASD to form intimate relationships. However, research (Goldsworthy, 2010) exploring aspects of TD individuals’ attraction to their ASD partners, suggests that strengths associated with autistic
symptomatology may assist individuals with ASD in compensating for difficulties in relationship initiation.

Specifically, Goldsworthy (2010) found that TD females with an ASD partner regarded their ASD partners’ ability to obtain resources and provide for their offspring as more important to initial attraction than TD females with a TD partner. Findings also showed that, for TD/ASD dyads, TD partners were likely to trade-off high emotional skills and low physical attractiveness for high physical attractiveness, high resources and high security with low emotional skills. The associated autistic symptomatology with high resources and security is special or circumscribed interests, expressed as an intense interest and focus in a specific subject often associated with the acquisition of knowledge (Attwood, 2007; Jordan & Caldwell-Harris, 2012). Whilst little is known about the role of circumscribed interests in adulthood, researchers (e.g., Frith, 1991; Jordan & Caldwell-Harris, 2012) have emphasised the positive role they can play in adult life. For instance, clinical experience indicates that circumscribed interests, which are typically in non-social domains, assist the development of unique skills and areas of expertise, often leading to rewarding careers (Attwood, 2007). Taken together, special interests can be a positive trait or strength that may assist ASD individuals in compensating for social difficulties with interaction and relationship initiation (Attwood; Frith).

To the authors’ knowledge only two studies have explored how ASD symptomatology impacts the ability to initiate intimate relationships in adulthood. Further, these studies have yielded mixed results. For instance, Stokes, Newton and Kaur’s (2007) findings suggest that ASD symptomatology may negatively impact the ability to initiate intimate relationships, with levels of social and romantic functioning significantly lower in a sample of ASD adolescents and adults (N=25) compared to a sample of typically development (TD) adolescents and adults (N=38).
Additionally, findings demonstrated that individuals with ASD had difficulty determining how to appropriately initiate relationships. Specifically, individuals with ASD were nine times more likely to act inappropriately when initiating relationships compared to TD individuals, with TD individuals demonstrating 10% of inappropriate courting behaviour compared to 49% for ASD individuals. Therefore, whilst individuals with ASD desire and are capable of being in intimate relationships (Lau & Peterson, 2011), the limited systematic data available suggests that this population lacks the appropriate skills to initiate them effectively (Stokes et al., 2007).

Another study (Byers et al., 2013) examined whether the degree of autism symptomatology impedes the ability of individuals with ASD to develop intimate relationships. No significant differences were found between those with intimate relationship experience of three months or longer (N=76) and those with no relationship experience of three months or longer (N=53) on ASD symptomatology, as measured by the AQ. Therefore, results appeared to undermine the notion that lower level functioning and skills deficits associated with ASD hinders the possibility of forming intimate relationships (Byers et al.). However, Byers et al.’s (2013) sample comprised only 29% of individuals without a formal ASD diagnosis from a clinical professional. As such, these findings relating to the broader autism phenotype may not be representative of those with a clinical diagnosis of ASD from a health professional (Pollmann, Finkenauer, & Begeer, 2010). In this sense, this study did not specifically address whether actually having a formal diagnosis of ASD mediated the relationship between ASD traits and the ability to form intimate relationships. This may have limited the validity of the results given that autistic traits can be shared across diagnostic categories and are considered to lie on a continuum. Further, given undiagnosed participants with a high rate of self-reported
autistic traits on one measure alone (the AQ) was relied upon to demonstrate that participants were on the autism spectrum, these findings are in need of replication for confirmation. Additionally, given the small sample size, the robustness of this study, and consequently the generalisability of findings to the adult ASD population, is questionable. For instance, when considering the sub-group of formally diagnosed HFA and AS participants in the study alone, the sample size was considerably smaller (N=79).

Taken together, albeit limited, evidence indicates that the impairments of ASD generally persist into adulthood (Seltzer et al., 2003). However, research has typically focused on the outcome of social functioning impairments in children and adolescents with ASD, leaving a noticeable gap in our knowledge about how these traits impact important areas of adult functioning. In particular, there has been a paucity of empirical literature to explore the impact of ASD traits on the ability to develop intimate relationships in adulthood. Research in this area is needed given that whilst this group may lack the skills needed to develop relationships, they do desire intimate relationships (Stokes & Kaur, 2005) and many do form them (Howlin et al., 2004). Therefore, it is vital we are able to discern how the severity of ASD traits in particular domains may influence the ability to form relationships, to inform clinical interventions to assist this group. Consequently, in our first study, presented in Chapter 4, we sought to explore the association between autistic symptomatology and intimate relationship development in a large sample of adults with a professional diagnosis of ASD.
Chapter 3 – Characteristics of ASD and the Impact on Intimate Relationships

Research demonstrates that individuals with ASD do desire intimate relationships and some do marry (Howlin et al., 2004). However, studies (e.g., Howlin & Moss, 2012) examining adult outcome in this cohort consistently indicate that a relatively unique segment of this population form intimate relationships or marry (for a review see Chapter 1). Further, unsurprisingly given the characteristic social communication difficulties of ASD, the minimal anecdotal and empirical evidence to date highlights the challenges faced in relationships involving a partner with ASD, for both the individual diagnosed and their TD partner. Specifically, narrative and clinical experience consistently predicts that an ASD diagnosis is associated with impaired intimate relationship functioning (Aston, 2003; Attwood, 2007; Bentley, 2007; Hendrickx, 2008; Jacobs, 2006; Marshack, 2009; Weston, 2010). Whilst such accounts provide valuable insight into the challenges faced by these couples, there is limited empirical evidence to inform the specific challenges faced in these relationships, from the perspective of both ASD and TD partners. Given the lack of empirical evidence regarding this topic, we call for caution before concluding that an ASD diagnosis necessarily implies severely impaired couple relationships. Nevertheless, an exploration of the risks to these individuals relationship quality and functioning is needed given that clinical, anecdotal and empirical evidence, as well as theoretical views, suggest the core deficits of ASD indicate major difficulties in ASD/TD dyads.

To explore how the characteristics of ASD may impact on intimate relationship experiences, this chapter will begin by introducing the key concepts and theoretical perspectives of intimacy, in context of the core social and communicative impairments of ASD. Next, how intimacy relates to relationship satisfaction, and the relationship characteristics that contribute to or hinder intimacy, will be discussed.
Following this, evidence that intimacy relies upon communication and reciprocity and the association between intimacy and relationship satisfaction will be explored and discussed with reference to couples where one partner has ASD. Given the paucity of empirical literature available about the nature of relationships for adults with ASD, this chapter draws on anecdotal and clinical evidence, which includes narrative accounts of TD partners of a spouse or partner with ASD (e.g., Aston, 2001, 2003, 2012; Weston, 2010).

**Theoretical Perspectives and Key Components of Intimacy**

The need to develop and maintain close relationships and connections with others has been recognised as central and essential to human motivation (Baumeister & Leary, 1995). Intimacy is the core component of close relationships (Baumeister & Leary). Schaefer and Olson (1981) made a theoretical distinction between intimate experiences and intimate relationships. From this perspective, intimate experience refers to a feeling of closeness with another on many levels, and an intimate relationship is one in which an individual shares intimate experiences in several areas over a long period of time, with the expectation that the closeness will continue. Olson (1975) defined intimate experience as multidimensional, involving five factors or types of closeness between partners: emotional, social, intellectual, sexual, and recreational. Emotional intimacy refers to the feeling of emotional closeness and connection, and the ability to share feelings and to be supported without defensiveness. Social intimacy refers to having common friends and social network. Intellectual intimacy relates to the sharing of ideas and experiences about life and work. Sexual intimacy describes affectionate sharing, touching, as well as physical and sexual closeness. Lastly, recreational intimacy involves the sharing of
experiences, including common activities and shared involvement in activities (Olson, 1975).

The development of intimate experience is theorised to involve several dyadic communication processes, such as self-disclosure, reciprocity (i.e., sharing something similar with the other) and processing of emotional signals, all of which are impaired in ASD (Laurenceau, Barrett, & Rovine, 2005; Perlman & Fehr, 1987; Travis & Sigman, 1998). Reis and Shaver (1988) state that with continuing reciprocity and self-disclosure, each partner feels validated, understood, and cared for by the other, leading to increased intimacy. Prager (1995) refers to this process as reciprocal intimate sharing of both verbal (e.g., divulging personal information) and non-verbal (e.g., affectionate touching) communication. In this sense, reciprocal intimate sharing is likely to be impaired in those with ASD given the characteristic difficulties with both verbal and non-verbal communication (Aston, 2001). Conceivably, such difficulties would also yield negative consequences for TD partners.

However, Reis and Patrick (1996) contend that self-disclosure alone fails to take account the mutual influence of intimate interactions, and is insufficient to instil a sense of intimacy between partners. This lead them to develop the interactional process model of intimacy, which describes the progression of mutual intimacy as occurring across communication sequences of self-revealing disclosure, partner responsiveness and partner disclosure (Reis & Patrick, 1996). Partner responsiveness refers to the belief that one’s partner is considerate of, sensitive to, and supportive of the self (Reis, 2007). According to this model, intimacy is initiated when one partner communicates personally relevant and self-revealing information to their partner. In response, the listener must communicate in a way that is responsive to the initial disclosure, whilst conveying understanding, validation and caring for the speaker.
(i.e., partner responsiveness). Further, if the speaker perceives the listener’s response as demonstrating partner responsiveness, they will feel valued and encouraged to further disclose (i.e., partner disclosure), meaning that partner responsiveness mediates self and partner disclosure (Reis & Patrick, 1996). Accordingly, in light of the strong communication elements and mutual influence within intimate interactions, it is ascertained that ASD traits are likely to hinder the development of intimacy for both TD and ASD partners.

Reis and Patrick’s (1996) interactional process model of intimacy has been empirically supported. In one study, Laurenceau, Barrett and Pietromonaco (1998) asked a sample of undergraduate participants to record self-disclosures, partner disclosures, perceived partner responsiveness, and degree of intimacy perceived in their daily interactions. Results of the first study (N=69) revealed that both self-disclosure (including the expression of emotion) (R2= 0.22) and partner disclosure (R2=0.06) predicted intimacy across a range of interpersonal interactions and social relationships, with partner responsiveness (i.e., conceptualised narrowly as acceptance) having a moderate mediating effect. Thus findings supported the notion that self-disclosure and intimacy occur within the context of partner responsiveness, in line with Reis and Patrick’s (1996) model. In a second study (N=89) partner responsiveness was measured more broadly as feeling understood, cared for and accepted by one’s partner, strengthening its role as a partial mediator in the intimacy process (R2=0.13). Results further indicated that self-disclosure of emotion was a significant predictor of intimacy (R2=0.13).

In another study, Lippert and Prager (2001) investigated the definitions partners’ (N=113 dyads) used to classify and evaluate their daily relationship experiences, to determine which interactions they considered intimate. Results indicated that the significant unique variance in interaction intimacy was accounted for by self-
disclosure, partner-disclosure, self-expressed positive feelings, and partner-disclosed emotions.

Later, comparable findings were observed in a sample of married couples (N=96), in a study assessing aspects of intimacy using daily diary methodology (Laurenceau et al., 2005). In this study, Laurenceau et al. (2005) found that self-disclosure for husbands and wives, and partner disclosure for husbands and wives significantly predicted intimacy. Additionally, partner responsiveness partially mediated the effects of self and partner disclosure on intimacy for both husbands ($R^2=0.25$) and wives ($R^2=0.32$). Furthermore, results indicated that increases in intimacy were more strongly dependent on partner responsiveness for wives ($R^2=0.36$) relative to husbands ($R^2=0.28$). These husband and wife differences in the intimacy process were significant ($d=0.37$).

Overall, the above evidence highlights the contention that communication is a key component of intimacy and that partner responsiveness is important in facilitating this process, particularly for female partners. However, adults with ASD have difficulties with complex communication, demonstrating a weakness in pragmatic inference which requires social and cognitive processes to interpret the meaning of what is being communicated (Loukusa & Moilanen, 2009). Moreover, this group demonstrates difficulties decoding non-verbal cues, such as in recognising emotion on the human face (Golan, Sinai-Gavrilov, & Baron-Cohen, 2015). Together with the known social and communicative impairments in individuals with ASD, empirical evidence regarding the mutual influence within intimacy suggests that the development of intimacy would be constrained for ASD/TD dyads. In particular, TD partners within ASD/TD dyads may be less likely to feel understood, validated, accepted and cared for by their partner, and therefore less satisfied in their relationship, compared to partners in TD/TD dyads.
Communication, Relationship Satisfaction and Intimacy

Taking into account the impact of communication on relationship satisfaction within TD couples is necessary before inferring the potential impact of ASD traits on intimate relationships. Evidence suggests that deficit or absence in communication is a large source of relationship distress. For instance, in a meta-analytic review of longitudinal studies (N=115) representing over 45,000 marriages, communication competencies were found to be the most important predictor of relationship satisfaction (Karney & Bradbury, 1995). Moreover, issues with communication are reported to be the most common complaint of couples seeking therapy (e.g., Geiss & O'Leary, 1981). For instance, in a study using open-ended questions to explore problems in couples seeking therapy (N=108 dyads), Boisvert, Wright, Tremblay and McDuff (2011) reported that general communication was the highest reported problem by both men (39.2%) and women (46.8%). Unsurprisingly, most programs for preventing relationship distress seek to help couples enhance their communication and problem-solving skills with the aim of improving the quality of their relationship (Bodenmann & Shantinath, 2004).

Additionally, research demonstrates that particular dysfunctional communication and conflict styles, such as demandingness and withdrawal, are predictive of later relationship distress (Christensen & Heavey, 1999). In this interaction pattern, the wife makes a demand for change or instigates discussion about a problem and the husband disengages (i.e., withdraws). Furthermore, evidence suggests that interactions characterised by woman-demand-man-withdraw have a particularly negative impact on relationship satisfaction (e.g., Heavey, Christensen, & Malamuth, 1995).

In one study, Heavey et al. (1995) measured communication style and relationship satisfaction in a sample of couples (N=48) at time one and again two and
a half years later to measure change. Results demonstrated that men withdrawing during conflict negatively predicted women’s relationship satisfaction at time one (R²= 0.47), and at follow-up (R²=0.13), and women’s demand negatively predicted men’s relationship satisfaction at time one (R²= 0.24) and at follow-up (R²= 0.12). Furthermore, results pertaining to the relationship of demandingness and withdrawal to change in relationship satisfaction indicated that significant declines in women’s satisfaction were associated with withdrawal by men (R²= 0.34), and woman-demand-man-withdraw (R²=0.35). Therefore, findings suggest that withdrawal by men and woman-demand-man-withdraw patterns during relationship conflict predict decline in the relationship satisfaction of female partners (Heavey et al., 1995).

These findings are of relevance to couples where one partner has a diagnosis of ASD, given there appear to be differences in communication and conflict resolution style between TD and ASD partners. However, whilst there is evidence to suggest that avoidance coping in men with ASD (N=21) is associated with higher rates of psychological stress for themselves (R²=0.19; Renty & Roeyers, 2007), the impact of the ASD partner’s avoidance coping on non-ASD partners has not been addressed. However, empirical investigation into such partner effects, that is, whether ASD traits (particularly communication and social skill deficits) of one partner influence the relationship satisfaction of the other, is imperative given that clinical observation and narrative accounts suggest that the ASD partner’s lack of communication during conflict negatively impacts the TD partner (Aston, 2012; Bentley, 2007).

Individuals with ASD are said to withdraw during conflict to find their thoughts and solutions given their minimum tolerance of intense emotions, whereas TD partners may prefer to discuss their emotions and expect their partners to be there in times of distress (Bentley, 2007; Boduryan, 2012). In narrative accounts of TD partners, this has been described as a lack of ‘togetherness’ in the relationship, and is
reported to leave partners feeling unloved, negatively impacting TD partner’s relationship satisfaction (e.g., Bentley, 2007; Boduryan, 2012). For instance, Jacobs (2006) informally questioned several partners of individuals with ASD and one of the biggest grievances reported was the ASD partner’s demand for their own space (i.e., detachment), suggesting that their withdrawal is a major issue in the breakdown of a relationship. It is reasonable to assume that this may come down to a lack of communication between partners. In fact, evidence suggests that the expression of emotions by male spouses is particularly important for the relationship satisfaction of females.

For instance, Cordova et al. (2005) measured the ability to identify emotions, and levels of relationship satisfaction for both TD partners in a sample of married couples (N=66 dyads). Whilst results revealed that self-perceived difficulty with identifying emotions was negatively associated with relationship satisfaction for both wives and husbands, further analyses of partner effects yielded interesting findings. In this study, husbands’ difficulty communicating emotions was negatively correlated with wives’ relationship satisfaction, however wives’ difficulty communicating emotions was not significantly correlated with husbands’ relationship satisfaction (Cordova et al., 2005). Conceivably, these findings would be more pronounced for TD female partners of male partners with ASD given their pronounced difficulties with emotional expression (Jacobs, 2006).

Communication, particularly of emotions (i.e., the ability to identify and express emotions, empathise, and manage challenging emotions) is critical to the maintenance of relationship satisfaction through its impact on the intimacy process (Cordova et al., 2005). Prager (1995) theorised that relational intimacy positively impacts relationship satisfaction because of the many rewards associated, such as partners feeling accepted and appreciated when their most personal selves are
responded to with warmth and sensitivity. The notion that intimacy exerts a positive impact on relationship functioning has been supported by empirical evidence. For example, Goodman (1999) surveyed a sample of men and women (N=180) in long-term stable marriages to examine the effects of partner intimacy on relationship satisfaction. Results demonstrated that relationship satisfaction was positively predicted by intimacy ($R^2=.45$).

Thus, upon consideration of the evidence regarding the key components of intimacy and its association with relationship satisfaction, as well as the social and communicative deficits associated with ASD, it is anticipated that ASD traits would negatively impact the ability to develop relationships and the quality of intimate relationships. Specifically, it would appear that ASD traits pose many challenges to the development of closeness between TD and ASD partners. Further, ASD traits are likely to manifest in the relationships of those with ASD as a failure to understand or appropriately reciprocate their partner’s feelings or emotions, and a restricted ability to share emotions or experiences with their partner, thereby negatively impacting relationship intimacy and satisfaction (Howlin et al., 2004). However, there is a paucity of research in this area to empirically support this conjecture.

It can be reasonably assumed that elements important for facilitating intimacy in relationships, such as self-disclosure (verbal and non-verbal), reciprocity of self-disclosure (particularly regarding emotions), responsiveness, and partner cohesiveness, would be inhibited in relationships where one partner has a diagnosis of ASD. However, whilst there is an emerging literature on the sexual behaviour of adolescents and adults with ASD (e.g., Hénault, 2006; Koller, 2000), comparatively less research has systematically investigated issues pertaining to other areas of intimacy and relationship satisfaction in ASD/TD dyads.
Anecdotal evidence and clinical observation overwhelmingly suggest that intimate relationships with a person with ASD pose many unique challenges, generating negative consequences for both partners (e.g., Bentley, 2007; Myhill & Jekel, 2008). For instance, interviews with experienced clinicians regarding this topic revealed a general consensus that difficulties faced by individuals with ASD, such as in empathy, and expression of emotion, commonly lead to relationship conflicts given the lack of appropriate compassion and affection shown to TD partners (Boduryan, 2012). Research suggests that this issue may be prominent for TD partners, given that emotional distance was the second highest reported problem (30.4%) by women partners within a sample of TD couples (N=108) (N=108; Boisvert et al., 2011). What follows is a review of the existing literature regarding the challenges faced within these relationships, drawing on clinical experience, anecdotal evidence (largely based on the TD partner’s perspective) and empirical research.

Evidence Regarding the Impact of ASD Traits on Intimate Relationships
(ASD/TD Dyads)

Clinical experience. Several impacts of a partner’s ASD traits within intimate relationships have been emphasised by clinicians in the field, highlighting that there are many potential problems within ASD/TD relationships (e.g., Attwood, 2007). Whilst these problems may not be noticed initially due to strengths of the ASD partner, such as attractiveness, high resources, good looks (Goldsworthy, 2010), admiration, and loyalty towards partner (Bentley, 2007), Attwood (2007) reports that endearing characteristics later manifest as problems within the relationship. According to Attwood (2007), TD partners often initially believe that his or her
partner may learn to become more emotionally and socially skilled, which can later ‘dissolve into despair’ when it is recognised that their partner has characteristic deficits in these domains.

Many of the problems emphasised by clinicians relate to the core social communicative deficits of ASD. For instance, Attwood (2007) highlights the mismatched expectations and needs of ASD and TD partners with regard to social interaction, both within and outside the relationship (e.g., socialising with other couples). As a consequence, Attwood and other clinicians in the field (e.g., Boduryan, 2012) assert that a major partner effect of ASD traits is loneliness, with TD partners need for emotional intimacy and reciprocity unmet. For example, Attwood states that, despite living together, conversation between ASD and TD partners is lacking and largely focused on the exchange of information, with an absence of expressions of affection. Attwood describes that the ASD partner is often ‘detached’. As Boduryan (2012) maintains, outcomes for TD partners include feelings of deprivation as they rarely receive compliments and praise from their partner, and increases in dissatisfaction and unhappiness when noticing that their partner has minimum motivation to be social and possesses limited social skills. As a result, TD partners often feel uncertain as to whether their partner loves them. Similarly, during personal distress or arguments within the relationship, Attwood highlights that the tendency of those with ASD withdraw into solitude as a coping mechanism, adds to the TD partner’s sense of loneliness. Further, problems with sexual intimacy are often emphasised by clinicians in the field (e.g., Hénault, 2006), with some individuals with ASD disliking or becoming overwhelmed by close physical contact.

For instance, Hénault (2006) remarked that ASD partners may express empathy by fixing something, rather than sharing in the emotion with their TD partner.
However, with a lack of understanding of their partner’s ASD traits, the non-ASD partner may interpret their actions as inconsiderate or selfish. Additionally, individuals with ASD often experience difficulties coping with change, and high levels of anxiety in response to criticism from their partner, further constraining the relationship. Overall, clinicians indicate that the more impaired the individual is in skills of impulse control, empathy and expression of emotion, the more difficulties they experience in social and romantic relationships (Boduryan, 2012). Therefore, clinical experience strongly implies that the severity of ASD traits impedes relationship communication, relationship satisfaction and intimacy, particularly for TD partners.

Whilst the current thesis does not focus on the sexual behaviour of adults with ASD, it is important to provide a brief review of this literature, to explore how ASD characteristics may impact on sexual intimacy. As stated by Hénault (2006), there is a lack of information on the sexuality of individuals with ASD. However, clinical experience indicates that several aspects of ASD may be problematic to the experience of sexuality, including traits of circumscribed interests, sensory sensitivity and interpersonal difficulties (Hénault, 2006). For example, clinical anecdote suggests that given individuals with ASD have a propensity towards circumscribed or restricted interests, sexual behaviours may become a circumscribed interest (Hénault). Additionally, hypersensitivity, the extreme sensitivity in one or more of the five senses often characteristic of ASD, can hinder sexual relationships by causing discomfort and pain (Hénault). For individuals with ASD who have tactile sensitivities, physical and emotional closeness (sexual intimacy) may be problematic in the romantic relationship. Further, Hénault highlights that sexual interaction is filled with subtleties, non-verbal gestures and intentions that require decoding, which poses particular challenges to individuals with ASD who have
inherit difficulties in social interaction. As Hénault puts forward, individuals with ASD may experience these subtleties of interpersonal and sexual interaction as a foreign language, with misunderstandings ensuing. Taken together, clinical observation informs various precipitating and maintaining factors for difficulties with sexual intimacy in those with ASD and their TD partners.

Anecdotal evidence – typically developing partners. Several accounts of life with a partner or spouse with an ASD diagnosis have been published (e.g., Aston, 2003), as well as several instructional and self-help guides for living with an ASD partner (e.g., Hendrickx, 2008). Overwhelmingly, this literature emphasises that ASD/TD relationships are challenging and dysfunctional, and that ASD traits negatively impact the TD partner’s well-being, as well as the overall relationship communication, satisfaction and intimacy (Bentley, 2007). Common themes regarding the particular challenges these couples face include mismatched expectations, needs and responsibilities in many areas; blaming each other for problems; communication break-downs, misunderstandings and daily arguments that often remain unresolved; lack of social interactions with other couples and friends; and a lack of ‘togetherness’, connection and intimacy (e.g., Aston, 2001, 2003, 2012; Bentley, 2007). In particular, these challenges are often attributed, by TD partners, to the core social and communication deficits of ASD, which has been described as TD and ASD partners ‘talking a different language’ (Aston, 2003). These accounts commonly convey that the behaviour of ASD partners confuses the TD partner, affects their confidence and contributes to feelings of loneliness (e.g., Bentley, 2007).

Others (e.g., Weston, 2010) emphasise the impact of these relationship challenges on the ASD partner, positing that, due to difficulties in meeting their TD
partners’ needs, he or she may feel irritated and depressed and experience low self-esteem. However, given that it appears to be the TD partner’s needs and expectations that are often unmet in these relationships, and who therefore require further support, the available anecdotal evidence largely centres on the TD partner’s perspective. Further, whilst anecdotal evidence points towards the unique difficulties experienced by couples in which one partner or spouse has an ASD diagnosis, these accounts are predominantly based on individual experiences and observations. Therefore, the authors call for caution in generalising the issues identified by a select few individuals’ experiences, to the entire ASD/TD population. However, these accounts highlight the need to better understand how autistic traits may manifest in intimate relationships.

More recently, researchers have begun paying attention to the impact of autistic traits on the TD partner. A recent systematic review of peer-reviewed journal articles and theses (N=10) investigating adult couple relationships where one partner has ASD, Bostock-Ling, Cumming and Bundy (2012) aimed to explore the nature and impact of ASD symptoms on TD partner’s psychosocial wellbeing, in the context of this relationship. However, the researchers identified a paucity of evidence-based literature to inform this enquiry. Nevertheless, as highlighted by Bostock-Ling et al., the existing literature indicates that the expression of ASD symptoms within the context of intimate ASD/TD relationships negatively impacts the wellbeing of TD partners. Though preliminary, impacts reported include mood disorders, social isolation, decline in physical health, financial stress, self-criticism, negative self-image, impaired sexual functioning and feelings of confusion and hopelessness. From this perspective, it is theorised that impairments in relationship communication and intimacy in several areas, and thereby satisfaction between partners, would be associated with these negative impacts.
Empirical evidence. Through an extensive review of the literature, only four studies (Lau & Peterson, 2011; Pollmann et al., 2010; Renty & Roeyers, 2007; Stokes et al., 2007) addressing the impact of ASD traits on relationship satisfaction were found. Further, only two of these studies (Lau & Peterson, 2011; Renty & Roeyers, 2007) used dyadic data and included an investigation of both actor (individual with ASD) and partner effects (TD partner) of ASD traits on relationship quality and functioning. Actor or direct effects occur when the individual is affected by their own behaviour, symptoms or characteristics (i.e., ASD traits). Conversely, partner or crossed effects take place when one partner is affected by the behaviour, symptoms or characteristics (i.e., ASD traits) of his or her partner (Kenny & Cook, 1999). Whilst the study by Pollmann, Finkenauer and Begeer (2010) utilised dyadic data, the association between ASD traits and relationship satisfaction was investigated in a non-clinical sample. Lastly, the study by Stokes, Newton and Kaur (2005) did not investigate the link between ASD traits and relationship satisfaction in couples, but rather assessed this at the individual level through parental report.

Further, these studies have predominantly measured ASD/TD relationship experience narrowly as relationship satisfaction, and have not explored difficulties with communication or intimacy.

Lau and Peterson’s (2011) study assessed romantic attachment processes, relationship satisfaction, and emotional experiences across four groups of parents in couple relationships. The focal diagnostic group comprised adults with a diagnosis of ASD as well a child with ASD (N=22). Group two (N=11) comprised TD partners whose spouse and child had a diagnosis of ASD; Group three comprised TD participants whose child only had an ASD diagnosis (N=49); and Group four, the control group (N=75), comprised TD adults with neither self, child or spouse ASD diagnoses present. Somewhat unexpectedly, results indicated no effect of ASD
diagnosis of spouse, self, or offspring, on relationship satisfaction, with relationship satisfaction reported to be high across all four groups. Interestingly, relationship satisfaction was significantly lower in those with a child and spouse with ASD, compared to controls (d=0.66). Although, upon further analyses, it appeared that it was the child’s rather than the spouse’s ASD diagnosis that negatively impacted relationship satisfaction.

Therefore, Lau and Peterson’s (2011) results suggested that one’s own ASD status or their spouses had little effect on relationship satisfaction, whereas the ASD status of one’s child did. However, various limitations were present in this study, such as power, in that a particularly small number of participants with a spouse and child with ASD were represented. Nevertheless, these findings may indicate that positive qualities (e.g., loyalty, intelligence) of high-functioning partners with ASD could conceivably compensate for difficulties that may arise within their interactions with TD partners (Lau & Peterson, 2011).

The study by Renty and Roeyers (2007) explored relationship satisfaction, as measured by the Dyadic Adjustment Scale (DAS; Spanier, 1976), in men with ASD and their spouses (N=21 dyads). Findings demonstrated no significant association between severity of ASD, as measured by the AQ (Baron-Cohen et al., 2001) and relationship satisfaction in men with ASD. Conversely, severity of partner’s ASD traits was inversely related to relationship satisfaction of female TD partners (R2=0.20), providing support for the potential relational impact of ASD emphasised in the non-academic literature.

Pollmann et al.’s (2010) study investigated the association between ASD traits, as measured on a short-form AQ (Baron-Cohen et al., 2001) and relationship satisfaction, as measured by the DAS (Spanier, 1976), in a non-clinical sample (N=195 dyads). Findings revealed a negative association between higher ASD traits
and relationship satisfaction for the sample as a whole (R²=0.23). However, separate analyses with wives and husbands revealed a significant negative association between ASD traits and relationship satisfaction for husbands (R²=0.08), but not for wives. Whilst initially surprising, such findings are to be expected given that, in this sample, fewer females had higher ASD traits than males (d=0.45). However, further investigation of ASD trait partner effects on relationship satisfaction revealed no main effect of ASD traits, nor an interaction with gender. Thus, partners of both men and women with more ASD traits did not appear to report lower relationship satisfaction than partners of people with fewer ASD traits. However, given this study relied on non-clinical data, findings are not directly generalisable to the clinical ASD population and their TD partners.

The Stokes, Newton and Kaur (2007) study examined the nature and predictors of social and romantic functioning in adolescents and adults with ASD, as assessed by parent-report (N=25), compared to a sample of TD adolescents and adults (N=38). Results demonstrated that adults with ASD reported lower romantic functioning, operationalised as self-reported desire, knowledge and experience with intimate relationships, compared to TD controls (R²=.28). Further, social functioning of those with ASD predicted 53% of the variance in romantic functioning. Therefore, results indicated that social functioning plays an important role in the development of romantic functioning, and provided support for the view that an ASD diagnosis implies impaired functioning in intimate and romantic relationships.

On a related note, the emerging literature on adults with ASD and sexuality typically demonstrates that individuals with ASD may demonstrate problematic sexual behaviours, deficits in sexual knowledge, and negative sexual attitudes (e.g., Hellemans, Colson, Verbrakken, Vermeiren, & Deboutte, 2007; Stokes & Kaur, 2005; Stokes et al., 2007). However, as highlighted by Byers, Nichols, Voyer and
Reilly (2012), most of the participants in previous studies were not currently or had never been in a romantic relationship. Therefore, our understanding of how ASD traits impact on sexual intimacy within the romantic relationship is limited.

To address these limitations, Byers et al. (2012) explored factors (gender, age, relationship status and ASD symptomatology as measured by the AQ) associated with the sexual well-being of adults with high-functioning ASD living in the community who were currently in a relationship or had been in at least one relationship of three months or longer (N=141). Dyadic sexual well-being was operationalised broadly as a multidimensional construct involving sexual satisfaction, self-esteem, assertiveness, anxiety, arousability, dyadic desire, frequency of affection, dyadic genital frequency, problems, knowledge, positive cognitions, solitary desire and solitary genital frequency. Findings demonstrated that lower severity of ASD symptomatology predicted better sexual well-being, including higher dyadic sexual satisfaction (R² = 0.22), assertiveness (R² = 0.13), arousability (R² = 0.74) and dyadic desire (R² = 0.58); and lower anxiety (R² = -0.25) and sexual problems (e.g., premature orgasm, trouble getting excited, and inhibited orgasm; R² = -0.17). Specifically, higher severity of AQ social skills and AQ communication deficits were associated with lower sexual satisfaction and sexual esteem, and higher sexual anxiety. In contrast, ASD symptomatology in the domains of attention switching, lack of imagination and high attention to detail was not associated with dyadic sexual well-being. Therefore, results demonstrated that some aspects of ASD, particularly the social skills and communication deficits, affect some domains of sexual well-being and may therefore pose a barrier to the development of sexual intimacy with ASD/TD relationships.

Taken together, preliminary research exploring the relationship quality of adults with ASD and their TD partners has several shortcomings. In particular, the studies
(Lau & Peterson, 2011; Pollmann et al., 2010; Renty & Roeyers, 2007) investigating both actor and partner effects of ASD traits on the romantic relationship have yielded mixed results. In sum, for a sample of clinically diagnosed adults with ASD and their TD partners, the work of Renty and Roeyers’ (2007) did not find evidence for an actor effect of ASD traits on relationship satisfaction, yet did show a partner effect of ASD traits. In contrast, in a sample of non-clinical couples, Pollmann, Finkenauer and Begeer’s (2010) work found that ASD trait severity was associated with lower relationship satisfaction in men (actor effect), yet no partner-effect of ASD traits was found. Lastly, in the work of Lau and Peterson (2011), neither an actor or partner effect of ASD traits on relationship quality was found, yet they did observe an offspring effect. Therefore, the limited research conducted thus far has yielded mixed results. In light of the inconsistency of these findings, it is important to address the limitations of previous research in attempt to clearly elucidate the impact of ASD traits on the romantic relationship.

**Conclusion**

In sum, based on the narrative and clinical literature, and the limited empirical studies, it appears that the challenges faced by ASD/TD couples are impacted by the manifestation of ASD traits within the relationship. However, the limited research in this area has several methodological shortcomings, such as small sample sizes, and has yielded mixed results. Further, only two of the four studies on this topic compared the relationship quality of adults with ASD to that of TD controls (Lau & Peterson, 2011; Stokes et al., 2007). In addition, as highlighted by narrative accounts of TD partners and clinical experience, the relational impact of ASD is a particularly important area for empirical investigation. However, only two studies (Lau & Peterson, 2011; Renty & Roeyers, 2007) have explored the impact of ASD traits on
both clinically-diagnosed adults with ASD and their TD partners, only one of which included a control sample (Lau & Peterson, 2011). As such, an analysis of the relational impact of clinical ASD using dyadic data and appropriate analytical techniques is needed to further our understanding of ASD/TD relationship difficulties. In addition, the focus in the research thus far has been on relationship satisfaction to the exclusion of relationship communication and intimacy, all of which are areas emphasised as problematic in the non-academic (e.g., Bentley, 2007) and clinical literature (e.g., Attwood, 2007). Therefore, further empirical investigation into the impact of ASD traits on relationship satisfaction, communication and intimacy is needed to inform clinical interventions to assist this group. Consequently, in our second study, presented in Chapter 5, we sought to explore the relationship experiences of ASD and TD partners in an ASD/TD dyad, relative to TD control partners in a TD/TD dyad, to examine which specific ASD traits are associated with poor relationship outcomes. Additionally, in our third study, presented in Chapter 6, we aimed to further investigate the relational impact of ASD within a sample of ASD/TD dyads, to examine the bidirectional influence of ASD traits on relationship outcome.
Chapter 4 – Study 1: Intimate Relationship Development of Adults with ASD

The core difficulties of ASD involve skills essential for developing close interpersonal relationships. However, research has typically focused on the outcome of social functioning impairments in children and adolescents with ASD, leaving a noticeable gap in our knowledge about how these traits impact the relationship development of adults. Research shows that the core social and communicative impairments of ASD persist into adulthood (Baron-Cohen & Wheelwright, 2003; Baron-Cohen, Wheelwright, & Jolliffe, 1997; Knott et al., 2006; Lawson et al., 2004; Spek et al., 2010) and negatively impact social outcomes (Orsmond et al., 2004; Orsmond et al., 2013). In addition, clinical experience (e.g., Attwood, 2007) indicates that social communication difficulties in adults with ASD have a detrimental impact on relationship skills such as empathy, trust and the ability to relate to others. Despite this knowledge, as discussed in Chapter 2, there have been few studies on the intimate relationship development of adults with ASD and available findings are inconsistent (Byers et al., 2013; Stokes et al., 2007). Further, research suggests that whilst this group may lack the skills needed to develop relationships, they do desire intimate relationships (Stokes & Kaur, 2005) and many do form them (Howlin et al., 2004). Therefore, it is vital we are able to discern how the severity of ASD traits in particular domains may influence the ability to form relationships, to inform clinical interventions to assist this group.

As stated above, research demonstrates that the core social and communication impairments associated with ASD persist into adulthood. Lawson, Baron-Cohen and Wheelwright (2004) examined empathising ability in adults with ASD (N=18) compared to TD counterparts (N=44) using social stories, and found that adults with ASD performed significantly worse ($d=0.92$). Similarly, Baron-Cohen and Wheelwright (2003) assessed self-reported empathy in adults with ASD (N=90) and
TD adults (N=90), finding that the ASD group scored significantly lower than TD controls (d=0.48). Similarly, Spek et al. (2010) found evidence of impaired theory of mind (ToM) abilities in adults with ASD relative to TD counterparts. Taken together, evidence suggests that adults with ASD continue to have problems in the social realm, posing several potential barriers to the development of intimate relationships.

Several lines of research suggest that the core deficits of ASD continue to negatively impact social outcomes in adolescence and adulthood with regard to friendships and social participation. One study (Ormond et al., 2004) found that only 8.1% of the whole sample of adolescents (N=185) and adults (N=50) with ASD, had at least one friendship with a same aged peer that involved engagement in reciprocal activities. Further, in this study, having peer relationships was predicted by less impairment in social interaction skills. Similarly, Ormond, Shattuck, Cooper, Sterzing and Anderson (2013) found that young adults with ASD had significantly lower levels of social participation and higher levels of social isolation compared to a sample of individuals with intellectual, emotional, behavioural and learning disabilities. In a non-clinical sample (N=97), Jobe and White (2007) found that individuals with higher ASD symptom severity reported significantly more loneliness, and fewer and shorter duration friendships. In sum, these results suggest that ASD trait severity interferes with the development of social connections.

However, to the authors’ knowledge, only two studies (Byers et al., 2013; Stokes et al., 2007) have explored how ASD symptomatology impacts the ability to develop intimate relationships in adulthood, and findings have been mixed. Stokes, Newton and Kaur’s (2007) findings suggest that ASD symptomatology may negatively impact the ability to initiate intimate relationships, with levels of social and romantic functioning significantly lower in a sample of ASD adolescents and adults (N=25) compared to a sample of TD adolescents and adults (N=38). In this study,
individuals with ASD were nine times more likely to act inappropriately when initiating relationships compared to TD individuals. Therefore, whilst individuals with ASD desire and are capable of being in intimate relationships (Lau & Peterson, 2011), the limited systematic data available suggests this group lack the appropriate skills to initiate them effectively (Stokes et al., 2007).

However, Byers et al., (2013) found no evidence to suggest that the degree of autism symptomatology impedes relationship development in adults with ASD. Specifically, no significant differences were found between those with intimate relationship experience of three months or longer (N=76) and those with no relationship experience of three months or longer (N=53) on ASD symptomatology. However, 39% of the sample in Byers et al.’s study did not have a diagnosis of ASD given to them by a professional, instead they assumed the diagnosis. Given the small sub-group of those with a professional diagnosis (N=50), and the lack of an analysis that separated those with a diagnosis from those assuming a diagnosis, the robustness of this study and the generalisability of findings to the broader clinical ASD population are questionable.

Previous research on this topic has not yet explored the impact of specific ASD traits on relationship development. In line with a strengths-based perspective, it is anticipated that traits associated with strengths and talents in non-social domains may assist this group in developing intimate relationships. As discussed in Chapter 1, Frith’s (2003) weak central coherence theory of ASD, which describes a detail-focused cognitive style associated with superior perceptual processing abilities and associated restricted, fixated and circumscribed interests, can facilitate outstanding achievements and professional success. Further, researchers and clinicians in the field (e.g., Attwood, 2007; Frith, 1991; Jordan & Caldwell-Harris, 2012) have emphasised the positive role these traits can play in adult life. Thus, moving away
from a deficit-focused model of ASD and relationships, it would be interesting to investigate whether ASD traits in this domain can positively influence relationship development.

We now report our study of relationship development in a sample of adults with ASD. The overall aim of the present study was to examine the extent to which ASD symptomatology impacts the ability of individuals with a professional diagnosis of ASD to develop intimate relationships. It is anticipated that these findings will provide important information on what differentiates those with ASD who are better able to develop intimate relationships. Overall, it is hoped that these findings will increase our understanding of the unique challenges some adults with ASD face in developing intimate relationships, as well as the abilities that may assist in compensating for these difficulties.

This study aimed to explore the association between autistic symptomatology and intimate relationship development more thoroughly and broadly than previous studies (e.g., Byers et al., 2013). Therefore, along with a required professional diagnosis, two measures of ASD, the Autism Spectrum Quotient (AQ; Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) and the Ritvo Autism Asperger Diagnostic Scale – Revised (RAADS-R; R. A. Ritvo et al., 2011) were used. Additionally, several relationship development outcome variables were measured, including number of prior intimate couple relationships, age at first partner, duration of longest relationship, current relationship status, and relationship experience as grouped by Byers et al. (2013).

In the current study, relationship development was assessed by the following variables: number of previous intimate relationships, duration of longest intimate relationship, and current relationship status. Number of previous intimate relationships was deemed indicative of successful relationship development on the
basis of research on normative romantic relationship trajectories demonstrating that the capacity to develop intimacy is strengthened with experience (Cantor, Acker, & Cook-Flanagan, 1992). However, this must be tempered by consideration of the duration of one’s longest relationship, as was measured in the current study, as the capacity to form a committed relationship may be more indicative of successful relationship development and the ability to maintain intimacy. Further, research with normative samples indicates that in late adolescence, relationship development culminates in a single, committed intimate relationship of extended duration (e.g., Seiffge-Krenke, 2003). Last, current relationship status was included as another measure of relationship commitment (e.g., cohabiting, married, engaged) or relationship difficulties (e.g., divorced).

Two primary questions were of interest in the current investigation. First, what does having a diagnosis of ASD do to the development of intimate relationships? Second, which features of ASD might be related to poorer or better relationship development outcomes? It was hypothesised that the ability to develop intimate relationships would be predicted by severity of autistic symptoms, particularly the core social and communicative deficits. Specifically, it was hypothesised that individuals with higher severity of ASD symptomatology in these domains would report fewer and shorter duration of intimate relationships, and be more likely to be single and have no intimate relationship experience of three months or longer. Further, from a strengths-based perspective, it was expected that higher circumscribed interests would predict better relationship outcomes. Lastly, our analyses of participant characteristics of gender, chronological age, age at first partner and diagnosis age, including investigation of potential interactions, were largely exploratory, thus no predictions were made.
Method

Participants

Following ethical review with the Deakin University Human Research Ethics Committee (2012-296), approximately 60 national and international ASD organisations, online-ASD related message boards, Facebook groups and support groups were contacted to ask for their assistance in recruiting potential participants. Approximately 30 organisations cooperated and were involved in recruitment. A flyer providing information on the study was provided to each organisation and online network (See Appendix A). This flyer recruited participants for an online questionnaire titled *The Impact of Autism Spectrum Disorder Diagnoses on Intimate Relationship Development.*

In total, 242 participants completed the questionnaire, 43 males and 196 females (three did not indicate their gender). Forty-five participants were excluded from the sample. Of these, two were detected as duplicate cases by date of birth analysis and time and date of completion, and confirmed by Pearson’s correlation; 30 did not report having a clinical diagnosis of ASD from either a Psychologist, Psychiatrist, Paediatrician, Neuropsychologist or specialist team involving the former, two of whom also did not indicate their gender; and a further 13 had excessive missing data (>2%). Of the cases excluded, three also did not identify diagnosis type and five did not have a clinical diagnosis of ASD; two also scored below the ASD cut-off point of at or above 65 on the RAADS-R, one of which did not report having a formal diagnosis, and four of which also had excessive missing data (>2%). Therefore, the final sample consisted of 197 participants with ages ranging from 17 to 77 (*M* = 32.83, *SD* = 12.41), including 168 females, 28 males and one with gender unknown. The majority of participants were living in Australia, the United States, Canada and New Zealand.
Measures

**Relationship development and demographic questionnaire.** Participants’ relationship history and experience (e.g., duration of longest relationship in years, current relationship status) and demographic information (e.g., chronological age, age at diagnosis, type of diagnosis) was assessed with a questionnaire developed by the authors, with items rated on predefined categories. Whilst some items were open-ended, these were not utilised in the current study (See Appendix B).

**Ritvo Autism Asperger Diagnostic Scale (RAADS-R; Ritvo et al., 2011).** The severity of ASD traits was measured with the RAADS-R (R. A. Ritvo et al., 2011), a modified version of the Ritvo Autism Asperger Diagnostic Scale (RAADS; R. A. Ritvo et al., 2008) designed as an adjunct diagnostic tool to assist clinicians in diagnosing adults (18 years and above) with suspected ASD. The construction and validation of the RAADS-R is described in detail in Ritvo et al., (2011). Identifying questions included in the RAADS-R were removed for the purposes of retaining anonymity in this study (e.g., name, address, phone number). This scale comprises 80-questions falling into four sub-scales: social relatedness, circumscribed interests, sensory motor, and social anxiety. Participants rate the extent to which certain life experiences and personality characteristics apply to them across two types of questions, 64 of which are ASD symptom-based, e.g., “I often don’t know how to act in social situations”; scored in order of severity, 0 = “never true” - 3 = “true now and when I was young”, and 16 of which describe non-symptomatic (normative) behaviours (e.g., “I speak with normal rhythm”; 0 = “true now and when I was young” – 3 = “never true”. Scores on the total scale range from 0 to 240, with higher scores indicating greater severity of ASD symptoms. Ritvo et al., (2011) recommend utilising a cut-off score of at or above 65 to maintain diagnostic accuracy. The scale
shows good psychometric properties. The internal consistency of the each subscale was shown to be satisfactory in the present sample, with Cronbach’s Alpha coefficients of .79 (social relatedness), .84 (circumscribed interests), .81 (sensory motor), and .70 (social anxiety).

**Autism Spectrum Quotient (AQ ; Baron-Cohen et al., 2001).** ASD traits were also measured with the AQ *(Baron-Cohen et al., 2001)*. The AQ was designed as a screening tool to identify autistic traits in adults. It comprises 50-items across five subscales: social skills, attention switching, attention to detail, communication and imagination. Scores on the total scale range from 0 to 50, with higher scores indicating a larger extent of ASD traits demonstrated by the person. A differentiation cut-off total AQ score of 32 or above is recommended by Baron-Cohen et al. (2001) for correctly identifying individuals with clinically significant levels of autistic traits. The questionnaire shows good psychometric properties *(Baron-Cohen et al., 2001)*. The internal consistency of the total score (AQ total was satisfactory in the present sample, with a Cronbach’s Alpha coefficient of .914. Internal consistency of each subscale ranged from poor to questionable in the present sample, with a Cronbach’s Alpha coefficient of .62 (communication), .58 (social skill), .59 (attention switching), .66 (imagination) and .59 (attention to detail). However, each subscale contains fewer items than the entire scale, and it is known that as the number of items increase, the Cronbach’s alpha is known to have a number of limitations. For instance, Cronbach’s alpha only represents the small lower bound of reliability, which is not the actual value of reliability; see *(Sijtsma, 2009)* for statistical demonstration. It has also been suggested that the averaging of ratings in the formula decreases the variability of respondents’ scores, removing error variance *(Barrett, 2001)*. For these reasons, the subscales were retained in subsequent analyses.
Procedure

Once participants accessed the website, they first read an informed consent page describing the purpose of the study, eligibility criteria, procedures, potential benefits and risks, confidentiality, and contact information for the researchers. Participants who agreed to participate were then linked to the online questionnaire. Therefore, all persons gave their informed consent prior to their inclusion in the study. The criteria for inclusion in this study were that: (1) individuals had to be 18 years-old or above; (2) individuals had received an ASD diagnosis (i.e., HFA or AS) from a Psychologist, Paediatrician, Neuropsychologist, Psychiatrist or specialist team involving a combination of the former; and (3) individuals met the cut-off criteria on an adjunct diagnostic screening tool assessing ASD symptoms based upon DSM-IV-TR criteria, the RAADS-R (R. A. Ritvo et al., 2011).

First, participants completed these two ASD measures, the RAADS-R (R. A. Ritvo et al., 2011) and the AQ (Baron-Cohen, Wheelwright, Skinner, Martin & Clubley, 2001). Following this, participants completed a background information survey including demographic questions and questions relating to their diagnosis and relationship history.

Results

Data were screened for missing values and outliers. Missing values analysis established each case’s proportion of missing values on variables: RAADS-R and AQ items, diagnosis age, number of relationships, gender, living status, employment status, diagnosis type and diagnosis clinician. In one case missing gender was replaced by reading qualitative responses for mentions of gender. For the two remaining cases missing gender a discriminant function analysis was conducted to
estimate the gender based upon all other variables. However this was unsuccessful and these cases dropped.

Demographics

Table 1 summarises the demographic and background characteristics of the sample. Table 1 reveals that the sample consisted primarily of women in middle adulthood. In the whole sample, the sex distribution was 28 men (14.20%) and 167 women (85.30%). For the whole sample, ages ranged from 17 to 77 years with a mean age of 32.83 years (SD = 12.41). Male participants ranged in age from 19 to 77 ($M = 39.21, SD = 17.80$). Female participants ranged in age from 17 to 69 ($M = 31.66, SD = 10.93$).
Table 1  
*Participant Characteristics: Adults with ASD (N=210)*

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender: Female</td>
<td>85.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender: Male</td>
<td>14.20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronological age</td>
<td>32.83</td>
<td>12.41</td>
<td>17 - 77</td>
</tr>
<tr>
<td>Age at diagnosis</td>
<td>28.10</td>
<td>14.36</td>
<td>2 - 71</td>
</tr>
<tr>
<td>Age at first partner</td>
<td>18.00</td>
<td>3.82</td>
<td>11 - 35</td>
</tr>
<tr>
<td>Number of couple relations</td>
<td>3.24</td>
<td>3.51</td>
<td>0 - 20</td>
</tr>
<tr>
<td>Longest relationship duration (years)</td>
<td>6.37</td>
<td>7.30</td>
<td>0 - 43</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asperger Syndrome</td>
<td>85.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HFA</td>
<td>14.70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnosing health practitioner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychologist</td>
<td>52.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychiatrist</td>
<td>35.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paediatrician</td>
<td>5.60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuropsychologist</td>
<td>4.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialist team comprising some or all of the above</td>
<td>1.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current living circumstances</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independently</td>
<td>25.90%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With parents</td>
<td>28.40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With partner</td>
<td>40.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With partner and child/children</td>
<td>2.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With child/children</td>
<td>1.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-supported accommodation</td>
<td>0.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported accommodation</td>
<td>0.50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current employment status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>28.40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part time/casual</td>
<td>20.80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>50.80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current relationship status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>38.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In a committed relationship, living separately</td>
<td>10.70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In a committed relationship, co-habitating</td>
<td>14.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casual (non-committed) relationship, living separately</td>
<td>3.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engaged</td>
<td>5.10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>23.40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separated or divorced</td>
<td>3.60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.50%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
All participants reported being formally diagnosed with either HFA or AS. The majority of participants reported a diagnosis of AS (86.20%), specifically 87.40% of females and 78.80% of males. The remainder of the sample reported a diagnosis of HFA (12.20% of males and 12.60% of females). The age at the time of diagnosis varied considerably. Sixty-eight individuals were diagnosed as children or adolescents (1-20 years); 89 were diagnosed in adulthood (21-40 years); 39 were diagnosed in older adulthood (41-71 years); and one did not report this. For the entire sample, the average age at diagnosis was 28.10 years ($SD = 14.36$). Diagnosis age was slightly younger for females ($N = 167; M = 27.12$ years, $SD = 12.95$) compared to males ($N = 28; M = 33.21, SD = 20.19$). All participants retained in the sample self-reported receiving a diagnosis of AS or HFA by a health professional, either a Psychologist (52.30%), Psychiatrist (33.50%), Paediatrician (5.60%), Neuropsychologist (4.10%) or specialist team including the former (1.00%).

Fifty-one of the individuals lived independently, 56 at home with their parents, 79 with partner, four specified with partner and children, three with child/children, one in supported accommodation, one in semi-supported accommodation and two other (e.g., boarding with a family, and living between both the family home and university accommodation).

One hundred participants reported being currently unemployed, 50.80% of the sample (57.00% of males and 50.00% of females), 56 indicated they were currently employed full-time (39.30% of males and 26.20% of females), and 41 reported they were currently employed part time or casual (3.60% of males and 23.80% of females).

**Intimate relationships.** Seventy-five participants (42.90% of males and 37.50% of females) reported being currently single, 46 reported being married (24.20% of
males and 23.80% of females), 28 were currently in a committed relationship and cohabitating (21.40% of males and 12.00% of females), six reported being in a casual non-committed relationship (3.60% of females, no males), ten were currently engaged (6.00% of females, no males), seven were currently separated or divorced (10.70% of males and 1.80% of females), and three indicated other (e.g., polyamorous and polyfidelous relationships). The average total number of couple relationships was 3.24 ($SD = 3.51$) for the whole sample, 2.14 ($SD = 2.31$) for males with a range of 0 to ten, and 3.39 ($SD = 3.64$) for females with a range of 0 to 20. For the whole sample, the duration of longest relationship ranged from 0 to 43 years ($M = 6.37, SD = 7.30$). Female participants’ longest relationship duration ranged from 0 to 43 years ($M = 6.40, SD = 7.41$), and 0 to 21 years for males ($M = 6.25, SD = 6.89$).

For the purposes of replicating Byers et al.’s (2013) study which comprised single adults with ASD (undiagnosed and diagnosed), participants in the current study who reported they were currently single ($N=82$), were delineated into groups of relationship experience (at least one prior relationship of three months or longer) and no relationship experience (no prior relationships of three months or longer). In the current sample, 41 participants of those who were currently single (20.80%) were classified as having no relationship experience (35.70% of males and 18.50% of females), and 41 of those who were single (20.80%) were classified as having relationship experience (17.90% of males and 20.80% of females).

**Statistical Analyses**

A Poisson regression analysis was conducted to investigate total number of couple relationships using covariates of gender, age, diagnosis age, the interaction between age and diagnosis age, and severity of ASD traits (as measured by the AQ
and the RAADS-R). Poisson regression was selected over linear regression given the dependent variable (number of relationships) was count data. More specifically, Poisson regression is preferred over Ordinary Least Squares when variables are integer in nature (i.e.: cannot adopt any value, but instead are restrained to whole integers), must be non-negative, and therefore cannot adopt negative values, and when these have a likely preponderance of 0 values (Cohen, Cohen, West, & Aiken, 2013). As the number of relationships a person has been involved in is clearly count data, and as there was a likelihood that many individuals with ASD would have had no relationships, creating a preponderance of 0 values, and as there was no possibility of there being negative values in the data, Cohen et al. recommend Poisson regression as the preferred approach. See Table 2 for results.
Table 2
Poisson Regression Results Examining Number of Couple Relationships:
Odds Ratios and 95% CI

<table>
<thead>
<tr>
<th>Covariates</th>
<th>B</th>
<th>SE B</th>
<th>Ratio</th>
<th>+95% CI</th>
<th>-95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male)</td>
<td>-0.409</td>
<td>0.144</td>
<td>0.664</td>
<td>0.501</td>
<td>0.880</td>
<td>0.004</td>
</tr>
<tr>
<td>Age</td>
<td>0.044</td>
<td>0.012</td>
<td>1.045</td>
<td>1.020</td>
<td>1.071</td>
<td>0.000</td>
</tr>
<tr>
<td>Diagnosis age</td>
<td>0.031</td>
<td>0.010</td>
<td>1.032</td>
<td>1.011</td>
<td>1.054</td>
<td>0.003</td>
</tr>
<tr>
<td>AQ Communication</td>
<td>-0.031</td>
<td>0.030</td>
<td>0.969</td>
<td>0.914</td>
<td>1.027</td>
<td>0.292</td>
</tr>
<tr>
<td>AQ Social Skill</td>
<td>-0.092</td>
<td>0.030</td>
<td>0.912</td>
<td>0.860</td>
<td>0.967</td>
<td>0.002</td>
</tr>
<tr>
<td>AQ Attention Switching</td>
<td>0.029</td>
<td>0.032</td>
<td>1.030</td>
<td>0.968</td>
<td>1.095</td>
<td>0.358</td>
</tr>
<tr>
<td>AQ Imagination</td>
<td>0.021</td>
<td>0.021</td>
<td>1.021</td>
<td>0.979</td>
<td>1.065</td>
<td>0.322</td>
</tr>
<tr>
<td>AQ Detail</td>
<td>0.022</td>
<td>0.025</td>
<td>1.022</td>
<td>0.974</td>
<td>1.073</td>
<td>0.371</td>
</tr>
<tr>
<td>RAADS-R Social Rel</td>
<td>-0.013</td>
<td>0.005</td>
<td>0.987</td>
<td>0.977</td>
<td>0.997</td>
<td>0.014</td>
</tr>
<tr>
<td>RAADS-R Circ Interests</td>
<td>0.010</td>
<td>0.005</td>
<td>1.011</td>
<td>1.000</td>
<td>1.021</td>
<td>0.043</td>
</tr>
<tr>
<td>RAADS-R Sensory Motor</td>
<td>0.016</td>
<td>0.005</td>
<td>1.016</td>
<td>1.006</td>
<td>1.026</td>
<td>0.002</td>
</tr>
<tr>
<td>RAADS-R Social Anxiety</td>
<td>-0.008</td>
<td>0.010</td>
<td>0.992</td>
<td>0.973</td>
<td>1.011</td>
<td>0.400</td>
</tr>
<tr>
<td>Int: Age by diagnosis age</td>
<td>-0.001</td>
<td>0.000</td>
<td>0.999</td>
<td>0.999</td>
<td>1.000</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Note. Rel: Relatedness; Circ: Circumscribed; Int: Interaction.

In order to assess the significance of model fit, we obtained model deviance accounted for in the intercept only model and divided this into the model deviance of the developed model to estimate unexplained variance. Subtracting this from 1 gave variance explained as an analogue of $R^2$ ($R^2$). For this model, $R^2$ was 0.26 ($\chi^2_{13} = 145.59, p <.001$), indicating 26% of variance was accounted for by inclusion of the covariates in the model. The Wald criterion demonstrated that significant contributions to the model were made by gender, age, diagnosis age, AQ Social Skill, RAADS-R Social Relatedness, RAADS-R Circumscribed Interests, and RAADS-R Sensory motor. These results indicated that the count of couple relationships was
higher for females than males, and that it increased with increasing chronological age, diagnosis age, and with higher severity of circumscribed interests and sensory motor symptomatology, as measured by the RAADS-R. These results further indicated that the count of couple relationships decreased with higher severity of symptomatology in the social domain, as measured by the AQ Social Skills and RAADS-R Social Relatedness sub-scales. The Wald criterion also demonstrated a significant contribution to the model was made by the interaction between age and diagnosis age (see Figure 1).
Figure 1. Two-way Poisson interaction effect between age and diagnosis age with total number of couple relationships. A value of 0.1 was added to all cases in order to represent cases that had not had a relationship. This is necessary in order to represent 0 value data within a loglinear framework.
Figure 1 reveals the interaction between age of diagnosis and chronological age. In order to represent the cases with 0 values (those who had no relationships), 0.1 was added to all cases; this had no effect on the trends. The interaction effect for total number of couple relationships between age and diagnosis age revealed that persons diagnosed at a young age, under 21 years (the young trend), had an increasing count of relationships with chronological age. For adults (participants 21 and 41 years), the count of relationships also increases with chronological age, but not as steeply as for those diagnosed younger. For older adults (persons diagnosed over 41 years), the count of relationships was found to decrease with chronological age. Therefore, both diagnosis age and chronological age are necessary to analyse the number of couple relationships. Overall, earlier diagnoses resulted in an increased number of relationships with age, whereas late diagnoses tended to be associated with fewer relationships as age increased.

**Count of couple relationships – gender differences (exploratory analysis).**

Next, the ‘total number of couple relationships’ model was run separately for males and females to explore whether the importance of characteristics of ASD for relationship development differed for males and females (see Table 3 for results). However, given the small number of males in the sample (n=28), design power was low.
Table 3

Poisson Regression Results Examining Number of Couple Relationships for Male and Female Participants: Odds Ratios and 95% CI

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Males (N=28)</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>p</th>
<th>Females (N=156)</th>
<th>Odds Ratio</th>
<th>95% CI</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.153</td>
<td>1.166</td>
<td>1.049</td>
<td>1.295</td>
<td>0.061</td>
<td>1.063</td>
<td>1.033</td>
<td>1.094</td>
</tr>
<tr>
<td>Diagnosis age</td>
<td>0.017</td>
<td>1.017</td>
<td>0.949</td>
<td>1.089</td>
<td>0.065</td>
<td>1.057</td>
<td>1.031</td>
<td>1.084</td>
</tr>
<tr>
<td>AQ Communication</td>
<td>0.424</td>
<td>1.529</td>
<td>1.055</td>
<td>2.215</td>
<td>-0.053</td>
<td>0.949</td>
<td>0.892</td>
<td>1.009</td>
</tr>
<tr>
<td>AQ Social Skill</td>
<td>0.072</td>
<td>1.075</td>
<td>0.736</td>
<td>1.569</td>
<td>-0.080</td>
<td>0.923</td>
<td>0.868</td>
<td>0.982</td>
</tr>
<tr>
<td>AQ Attention Switching</td>
<td>-0.251</td>
<td>0.778</td>
<td>0.536</td>
<td>1.129</td>
<td>0.059</td>
<td>1.060</td>
<td>0.993</td>
<td>1.132</td>
</tr>
<tr>
<td>AQ Imagination</td>
<td>-0.141</td>
<td>0.868</td>
<td>0.712</td>
<td>1.059</td>
<td>0.020</td>
<td>1.020</td>
<td>0.975</td>
<td>1.068</td>
</tr>
<tr>
<td>AQ Detail</td>
<td>-0.132</td>
<td>0.877</td>
<td>0.688</td>
<td>1.117</td>
<td>0.022</td>
<td>1.022</td>
<td>0.971</td>
<td>1.076</td>
</tr>
<tr>
<td>RAADS-R Social Relatedness</td>
<td>0.021</td>
<td>1.022</td>
<td>0.966</td>
<td>1.059</td>
<td>-0.018</td>
<td>0.983</td>
<td>0.971</td>
<td>0.994</td>
</tr>
<tr>
<td>RAADS-R Circ Interests</td>
<td>0.022</td>
<td>1.022</td>
<td>0.974</td>
<td>1.073</td>
<td>0.012</td>
<td>1.012</td>
<td>1.001</td>
<td>1.023</td>
</tr>
<tr>
<td>RAADS-R Sensory Motor</td>
<td>0.013</td>
<td>1.013</td>
<td>0.960</td>
<td>1.069</td>
<td>0.021</td>
<td>1.021</td>
<td>1.010</td>
<td>1.032</td>
</tr>
<tr>
<td>RAADS-R Social Anxiety</td>
<td>-0.081</td>
<td>0.922</td>
<td>0.835</td>
<td>1.018</td>
<td>-0.015</td>
<td>0.985</td>
<td>0.965</td>
<td>1.004</td>
</tr>
<tr>
<td>Int: Age by diagnosis age</td>
<td>-0.001</td>
<td>0.999</td>
<td>0.997</td>
<td>1.000</td>
<td>-0.001</td>
<td>0.999</td>
<td>0.998</td>
<td>0.999</td>
</tr>
</tbody>
</table>

As shown in Table 3, the Wald criterion demonstrated that significant contributions were made by AQ Communication for males, but not for females; and for females but not males significant contributions were made by AQ Social Skill and RAADS-R Social Relatedness, RAADS-R Circumscribed Interests and RAADS-R Sensory Motor. However, in each of these, though not significant, the b-weights observed for males were of similar magnitude to females’ scores, though in opposite directions, suggesting the lack of significance may be due mainly to power issues. Age was significant for both males and females; and diagnosis age was only significant for females. These results indicate the different or relative importance of these skills to each gender. Specifically, for males only, the count of couple relationships decreased with higher severity of symptomatology in the communication domain. In contrast, for females only, the count of relationships decreased with higher severity of symptomatology in the social domain. Therefore, the results suggest that communication skills are necessary to analyse the number of couple relationships for males, whereas social skills are necessary to analyse the number of couple relationships for females.
**Duration of longest intimate relationship.** Next we investigated duration of longest intimate relationship (in years) using gender, age, and severity of ASD traits (as measured by the AQ and the RAADS-R). Prior to conducting this analysis, we transformed relationship duration by natural log to address that all measures of time are non-normally distributed (Cohen et al., 2013). A value of .1 was added to all values so that 0 values would have some meaningful value.

Next, a two stage hierarchical linear multiple regression was conducted with duration of longest relationship, whilst controlling for the effects of age and gender as the first step, $F(2,192) = 53.31, p < .001$, then entering the ASD variables at the second step. See Table 4 for results.
Table 3

Summary of Hierarchical Regression Analysis for Variables (Age, Gender and ASD Characteristics) Predicting Duration of Longest Intimate Relationship

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>SE b</th>
<th>β</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.090</td>
<td>0.009</td>
<td>0.605</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Gender</td>
<td>1.158</td>
<td>0.311</td>
<td>0.221</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQ communication</td>
<td>0.041</td>
<td>0.082</td>
<td>0.043</td>
<td>0.621</td>
</tr>
<tr>
<td>AQ social skill</td>
<td>-0.041</td>
<td>0.086</td>
<td>-0.038</td>
<td>0.630</td>
</tr>
<tr>
<td>AQ attention switching</td>
<td>0.012</td>
<td>0.084</td>
<td>0.010</td>
<td>0.884</td>
</tr>
<tr>
<td>AQ imagination</td>
<td>-0.007</td>
<td>0.055</td>
<td>-0.008</td>
<td>0.901</td>
</tr>
<tr>
<td>AQ detail</td>
<td>0.016</td>
<td>0.063</td>
<td>0.017</td>
<td>0.797</td>
</tr>
<tr>
<td>RAADS-R social relatedness</td>
<td>-0.015</td>
<td>0.013</td>
<td>-0.096</td>
<td>0.223</td>
</tr>
<tr>
<td>RAADS-R circumscribed interests</td>
<td>0.009</td>
<td>0.013</td>
<td>0.061</td>
<td>0.518</td>
</tr>
<tr>
<td>RAADS-R sensory motor</td>
<td>0.021</td>
<td>0.013</td>
<td>0.124</td>
<td>0.118</td>
</tr>
<tr>
<td>RAADS-R social anxiety</td>
<td>0.013</td>
<td>0.026</td>
<td>0.040</td>
<td>0.624</td>
</tr>
</tbody>
</table>

Note. $R^2=.350$ for step 1: $R^2$ change = .039 for Step 2 ($p = .24$).

As in Table 3, no significant difference was made to the model with the addition of the ASD variables and there was no significant change in the significance of $R^2$.

Thus the first model was retained. These results indicated that for longer relationship duration was predicated by older age at first partner, and gender, and that ASD characteristics were not important to the prediction of duration of longest relationship.
Current relationship status. Another multinomial logistic regression was conducted to assess the impact of several factors on the likelihood that participants would report relationship experience (e.g., currently in a relationship and living separately, currently in a relationship and cohabitating or married/ Previously married), compared to the likelihood of reporting current relationship status as single (see Table 4 for results).
Table 4
Multinomial Logistic Regression Results Examining Variables Analysing Current Relationship Statuses of In a Relationship Living Separately, In a Relationship Cohabitating and Married or Previously Married: Odds Ratio

<table>
<thead>
<tr>
<th></th>
<th>In rel living separate (N = 27)</th>
<th>In rel cohabitating (N = 38)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Odds Ratio</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>B</td>
<td>SE</td>
</tr>
<tr>
<td>Age</td>
<td>-0.078</td>
<td>0.052</td>
</tr>
<tr>
<td>Diagnosis age</td>
<td>-0.020</td>
<td>0.038</td>
</tr>
<tr>
<td>AQ Communication</td>
<td>0.103</td>
<td>0.192</td>
</tr>
<tr>
<td>AQ Social Skill</td>
<td>-0.301</td>
<td>0.199</td>
</tr>
<tr>
<td>AQ Att</td>
<td>-0.087</td>
<td>0.201</td>
</tr>
<tr>
<td>AQ Imagination</td>
<td>0.188</td>
<td>0.141</td>
</tr>
<tr>
<td>AQ Detail</td>
<td>0.254</td>
<td>0.152</td>
</tr>
<tr>
<td>RAADS-R Social</td>
<td>-0.035</td>
<td>0.031</td>
</tr>
<tr>
<td>RAADS-R Circ</td>
<td>-0.051</td>
<td>0.032</td>
</tr>
<tr>
<td>RAADS-R Sensory</td>
<td>0.036</td>
<td>0.034</td>
</tr>
<tr>
<td>RAADS-R Soc Anx</td>
<td>0.068</td>
<td>0.063</td>
</tr>
</tbody>
</table>

Note. Rel: Relationship. Att: Attention Switching; Social: Social Relatedness; Circ: Circumscribed Interests; Sensory: Sensory Motor; Soc Anx: Social Anxiety. Reference category is single (N = 74).
Table 4 Continued

|                        | Married (N = 46) |            |       |      |      |  
|------------------------|-----------------|------------|-------|------|------|------|-------|  
|                        | Odds B          | SE B       | ratio | 95% CI | -95% CI | p   |      |  
| Gender (male)          | -0.187          | 0.722      | 0.830 | 0.202 | 3.415 | 0.796 |      |  
| Age                    | 0.027           | 0.048      | 1.028 | 0.934 | 1.130 | 0.574 |      |  
| Diagnosis age          | 0.073           | 0.043      | 1.076 | 0.989 | 1.170 | 0.088 |      |  
| AQ Communication       | 0.095           | 0.171      | 1.099 | 0.787 | 1.535 | 0.579 |      |  
| AQ Social Skill        | 0.272           | 0.183      | 1.313 | 0.917 | 1.880 | 0.137 |      |  
| AQ Att                 | -0.188          | 0.176      | 0.829 | 0.587 | 1.171 | 0.287 |      |  
| AQ Imagination         | -0.089          | 0.116      | 0.915 | 0.728 | 1.149 | 0.442 |      |  
| AQ Detail              | 0.016           | 0.134      | 1.016 | 0.780 | 1.322 | 0.907 |      |  
| RAADS-R Social         | -0.060          | 0.028      | 0.942 | 0.892 | 0.994 | 0.030 |      |  
| RAADS-R Circ           | 0.020           | 0.028      | 1.020 | 0.965 | 1.079 | 0.477 |      |  
| RAADS-R Sensory        | -0.019          | 0.027      | 0.981 | 0.930 | 1.035 | 0.485 |      |  
| RAADS-R Soc Anx        | 0.117           | 0.058      | 1.124 | 1.003 | 1.260 | 0.044 |      |  

Note. Rel: Relationship. Att: Attention Switching; Social: Social Relatedness; Circ: Circumscribed Interests; Sensory: Sensory Motor; Soc Anx: Social Anxiety. Reference category is single (N = 74).

The full ‘current relationship status’ model containing all 11 covariates was statistically significant, ($\chi^2 (36) = 94.05, p < 0.001$). $R^2$ was found to be 0.19, indicating 19% of variance was accounted for by inclusion of the covariates in the model. No significant relationship between being in a relationship, living separately or cohabitating were found. Significant contributions to relationship status were made by RAADS-R Social Relatedness and RAADS-R Social Anxiety. RAADS-R Social Relatedness had an odds ratio of 0.94, indicating that an individual was less likely to have a relationship status of married, or previously married, compared to single as Social Relatedness increased. RAADS-R Social Anxiety recorded an odds ratio of 1.12, indicating that as Social Anxiety increased, a person was 1.12 times more likely to be married, or previously married than single.
**Relationship experience.** Lastly, in an attempt to replicate the Byers et al.’s (2013) study, a one-way was undertaken evaluating the effect of gender, age, employment status and ASD symptomatology upon relationship experience. The relationship experience groups in the present study (N=80), modelled on Byers et al.’s (2013) study, included currently single adults with ASD only, delineated into groups of relationship experience (at least one prior relationship of three months or longer; N=40) and no relationship experience (no prior relationships of three months or longer; N=40). There was a statistically significant difference between relationship experience groups on the combined dependent variables, \( F_{(16, 370)} = 2.645, p = .001; \) Wilk’s Lambda = .805; \( \eta^2 = .103 \). See Table 5 for Results.
Table 5

Results of Univariate ANOVAs Investigating the Influence of Relationship Experience on ASD Symptomatology

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>p</th>
<th>η2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANOVA Result</td>
<td>2.645</td>
<td>16</td>
<td>370</td>
<td>0.001</td>
<td>0.103</td>
</tr>
</tbody>
</table>

**Between-subjects effects:**

- Gender: 2.355, df1=2, df2=192, p=0.098, η2=0.024
- Age: 10.910, df1=2, df2=192, p=0.001, η2=0.102
- Employment status: 0.024, df1=2, df2=192, p=0.976, η2=<0.001
- AQ Attention Switching: 0.426, df1=2, df2=192, p=0.654, η2=0.004
- AQ Communication: 0.119, df1=2, df2=192, p=0.888, η2=0.001
- AQ Detail: 2.434, df1=2, df2=192, p=0.090, η2=0.025
- AQ Imagination: 0.722, df1=2, df2=192, p=0.487, η2=0.007
- AQ Social Skill: 0.649, df1=2, df2=192, p=0.524, η2=0.007

As shown in Table 5, when the results for the dependent variables were considered separately as univariate analyses, age was the only variable to reach statistical significance. An inspection of the mean scores indicated that older participants were significantly more likely to have relationship experience.

**Discussion**

This study aimed to explore the link between ASD traits and intimate relationship development in a large sample of male and female adults with a professional ASD diagnosis. It was hypothesised that participants with higher severity of ASD symptomatology in the core social and communication domains,
would be more likely to: (1) report fewer previous intimate relationships, (2) report shorter duration of longest intimate relationship, (3) report current relationship status as single, and (4) have no intimate relationship experience (of three months or longer). Lastly, from a strengths-based perspective, our fifth hypothesis predicted that higher circumscribed interests would predict better relationship development.

In partial support of our first hypothesis and consistent with the nature of ASD, for the whole sample, higher severity of social skills deficits (as measured by AQ social skills and RAADS-R social relatedness) predicted fewer intimate relationships. This finding indirectly parallels the work of Jobe and White (2007), which found that TD individuals with higher ASD symptomatology reported fewer friendships. As such, it appears that both the development of friendships and intimate relationships are negatively impacted by severity of ASD traits. However, we must be cautious in drawing conclusions from relationship development abilities to overall relationship skills in adults with ASD. That is, in contrast to friendships, it may not be desirable to have multiple intimate relationships as opposed to fewer longer-term relationships. Rather, more intimate relationships may indicate poorer relationship skills with regard to the ability to build and maintain intimacy. Nevertheless, the current study at least found preliminary support to indicate that impairment in social skills associated with ASD poses a barrier to intimate relationship development. However, given the over-representation of female participants in the current study, we must be cautious in generalising these findings to the broader ASD population.

Moreover, these findings indirectly support expert clinical opinion (e.g., Attwood, 2007), that difficulty understanding and expressing emotions has a detrimental impact on the ability to develop relationships. Contrariwise, these results counter the work of Byers et al. (2013) which found that, in a sample of single adults with and without a clinical diagnosis of ASD, autistic symptomatology overall as
measured by AQ total did not predict the absence of relationship experience. However, as previously stated, given Byers et al.’s sample included participants without a professional diagnosis of ASD, the potential for sampling bias cannot be ruled out. Given the current study included only adults with a confirmed diagnosis of ASD who also met the RAADS-R and AQ criteria, the current findings may provide a more accurate indication of relationship development in adults with ASD.

Contrary to our first hypothesis, severity of communication impairment (as measured by AQ communication) was unrelated to number of prior intimate relationships. This suggests that development of intimate relationships is less dependent on verbal and nonverbal communicative behaviors than it is on adequate social skills necessary for joint attention and social reciprocity, appropriate social responding and social interaction.

However, we must be cautious in the interpretation of these results relating to the whole sample given the overrepresentation of females with ASD in the current sample. Together with our finding that the count of couple relationships was higher for females than males, these results may reflect the camouflage hypothesis of ASD which purports that relative to males, females may be better able to adapt to or compensate for characteristics of ASD symptomatology (Attwood, 2007). From this perspective, it may be that females with ASD are more likely to develop coping mechanisms to compensate for difficulties in relationship development, allowing them to conceal social impairments through imitating appropriate social behaviours. Additionally, in line with the extreme male brain theory of ASD (Baron-Cohen, 2002), it may be that empathising and social connection are more natural for females with ASD, further facilitating the ability to compensate for difficulties in the social realm. In other words, females may be better able to compensate or ‘mask’ their
limitations in communication, increasing the likelihood that others may overlook
difficulties in this area (Gould & Ashton-Smith, 2011).

Whilst exploratory, the analysis of gender differences in the total number of
couple relationships model revealed interesting results, providing a lead for further
research. When males and females were considered separately, we found that higher
AQ Communication scores predicted fewer intimate relationships for males yet not
females, whereas higher AQ Social Skills scores predicted fewer intimate
relationships for females but not males. Whilst we must be cautious in the
interpretation of these results given the exploratory nature of this analysis, the small
sub-group of males and limited design power to examine sex differences in the
current sample, several possible explanations are offered.

For males with ASD, it could be speculated that communication deficits
interfere with relationship development in light of a traditional social stereotype
typcasting men as relationship initiators (Byers et al., 2013). From this perspective,
males with ASD with greater communication impairments would have difficulty
using direct strategies to initiate relationships, such as by verbally requesting dates.
Consistent with this view, Attwood (2007) states that males who can ‘talk the talk’
and possess appropriate skills in pragmatic language and the art of initiating and
maintaining reciprocal conversation, would have greater success in developing
intimate relationships (Attwood). Further, this finding supports the view presented in
Chapter 3 that the ability to communicate, particularly with regard to reciprocal
sharing of emotions, is vital to the development of intimacy from the perspective of
female partners (e.g., Cordova et al., 2005). Therefore, males with ASD who have
greater difficulty communicating may discourage potential female partners. On the
other hand, limited social skills may be endearing to potential female partners, with
expert clinical opinion (Attwood, 2007) stating that there can be a strong maternal compassion for the limited social skills of men with ASD.

Given our relative lack of knowledge regarding the female profile of ASD, it is more difficult to interpret the finding that for females with ASD, higher severity of social skill deficit interferes with relationship development. Again, in light of the traditional gender role casting men as relationship initiators, this finding implies that females’ ability to develop relationships is less dependent on verbal and nonverbal communicative behaviors than it is on adequate social skills necessary for joint attention and social reciprocity, appropriate social responding and social interaction. It may be that females with better social skills are more likely to engage in social pursuits where the likelihood of meeting a partner is greater. Alternatively, females may be better able to compensate or ‘mask’ their limitations in social communication, increasing the likelihood that others may overlook difficulties in this area (Gould & Ashton-Smith, 2011).

Contrary to our second hypothesis, participants with higher severity of ASD symptoms in social and communication domains did not report shorter duration of their longest intimate relationship. These findings contradicted the work of Jobe and White (2007), which found that TD individuals with higher severity of autistic traits reported shorter duration of friendships. However, these results are in keeping with clinical opinion and anecdotal evidence purporting that individuals with ASD tend to be loyal partners, and often commit to a long-term relationship when one is developed (e.g., Attwood, 2007). It may therefore be that with increased symptomology, there is increased loyalty to the relationship where it does develop, reducing the risk of relationship failure, however this is speculative.

Results partially supported our third hypothesis, in that participants with higher severity of social skills deficits were more likely to be single than married or
previously married, lending further support to the notion that ASD traits pose a barrier to the development of intimate relationships. We also found that those who were married had higher social anxiety than those who were single. Not surprisingly, this suggests that difficulties in the social realm continue and may even be more pronounced for individuals in long-term relationships. This is in keeping with clinical (e.g., Attwood, 2007) and narrative accounts (e.g., Aston, 2003) indicating that when an individual with ASD is initiating a relationship, the problems that can develop later may not be apparent to their TD partner yet may later have a negative impact on relationship functioning. Further, together with our finding that individuals with higher ASD trait severity did not report shorter duration of their longest relationship, results of the present study may reflect Attwood’s (2007) view that individuals with ASD may stay in relationships despite difficulties, given associated difficulties with change. This view is further supported by our finding that those with higher scores on AQ Sensory Motor, a measure of restricted and repetitive behaviours, were more likely have had relationships of 3-5 years duration compared to 0 years. Alternatively, it could be that when individuals with higher social anxiety develop a relationship they are more likely to commit to that relationship, in relief and with the idea that developing another relationship would be difficult and anxiety-provoking.

Contrary to our fourth hypothesis, severity of ASD symptomatology in the social and communication domains did not differentiate those with relationship experience of three months or longer and those without, consistent with Byers et al.’s (2013) findings. Akin to Byers et al.’s interpretation, this suggests that lower level functioning and skills deficits associated with ASD do not impede the possibility of forming intimate relationships. However, given our findings regarding other measures of relationship development, this finding does not negate the view that
severity of autistic symptomatology in the social communication domain can have a detrimental impact on relationship development.

Consistent with our fifth hypothesis and in line with a strengths-based view, higher severity of circumscribed interests were associated with better relationship development. Specifically, participants with higher severity of circumscribed interests had a higher number of previous relationships. Expert clinical opinion suggests that special interests can assist adults with ASD in overcoming inadequate social competence, by shaping social behaviours and facilitating social interactions (Attwood, 2007; Frith, 1991). As Attwood (2007) asserts, people with ASD may meet and connect with a potential partner via a shared special interest. Further, as discussed in Chapter 2, circumscribed interests of people with ASD are associated with dedication and commitment to a particular area, both of which are linked with the development of successful careers, conceivably increasing their attractiveness to potential partners (Attwood, 2007; Frith, 1991). Overall, this information is of importance in attempting to develop strengths-based interventions for children and adults with high-functioning ASD.

Age, diagnosis age and gender differences in intimate relationship development apparent in the data warrant consideration. The results demonstrated that the likelihood of developing intimate relationships was associated with gender, with females reporting a higher number of previous intimate relationships than males. With regard to age, unsurprisingly, we found that older age predicted more and longer duration of intimate relationships. That the likelihood of developing intimate relationships increases with age is not surprising, particularly given research (e.g., Stokes & Kaur 2005) demonstrating a delayed developmental pattern of social behaviour in adolescents with ASD. Alternatively, it could also be that the diagnostic process for those diagnosed at a later age came about at the time of the relationship,
or was a result of a relationship, and thus interfered with the relationship. However, the data were not available to explore this potential association.

Interestingly, our results also demonstrated that both chronological age and diagnosis age are necessary to predict the number of couple relationships. Specifically, we found that earlier diagnoses resulted in an increased number of relationships with chronological age, while late diagnoses associated with fewer relationships as age increased. Thus, findings highlight that early detection and intervention may yield better outcomes with regard to relationship development.

Interpretation of the current findings must be tempered by several considerations. First, the sample was not nationally representative given recruitment was primarily online, and findings may not generalise to other samples with different clinical characteristics. Second, our sample comprised a large proportion of females and may not be generalisable to the wider ASD population. It is likely that we recruited a large number of female participants given the questionnaire was administered online and recruitment was largely via online support groups. Previous research in this area (Byers et al., 2013) that also had a large number of female participants noted that females are more likely to use the internet to seek support from others, use self-help resources and respond to requests to participate in research. However, previous research in this area (Lau & Peterson, 2011; Pollmann, Finkenauer & Begeer, 2010; Renty & Roeyers, 2007) has excluded females with ASD entirely, leading to a limited knowledge of the female profile of ASD with regard to relationship outcome. As such, our inclusion of females with ASD may be considered a strength.

In addition, the potential contribution of response bias to these findings cannot be ruled out given the AQ measures self-reported behaviours, thoughts and feelings. The potential for response bias may be particularly applicable to the ASD population, given an ASD diagnosis is often associated with limited insight into one’s own
behaviour (Bishop & Seltzer, 2012). However, the AQ does attempt to counteract response bias by wording items with an equal number of positive and negative response sets and asking for an individual’s preference rather than self-judgement of behaviour (Broadbent, Galic, & Stokes, 2013). Additionally, it must be noted that there is some speculation regarding the validity of the AQ in community samples (Brugha et al., 2011), thus findings require replication, preferably in a larger more equally representative sample of males and females. Nonetheless, the AQ was not relied upon in the current study as a measure of diagnosis, as all participants were required to verify that they had a diagnosis of ASD from a health professional via self-report and we included a second measure of ASD traits, the RAADS-R.

Despite these caveats, this study serves an important step in identifying key variables associated with the relationship development of adults with ASD. Our results demonstrate that whilst ASD traits in social and communication domains can interfere with relationship development outcome, ASD traits in non-social domains can assist individuals in compensating for these difficulties. These results challenge a deficit-focused understanding of ASD and suggest that interventions for children and adults with ASD that promote relationship development should do so in context of strengths related to ASD symptoms. An interesting next step would be to further investigate the potential gender differences in relationship development abilities of adults with ASD with an equally representative sample of male and females. In addition, future research should continue to investigate the potential compensatory mechanism of circumscribed interests for relationship development and other adult outcomes.
Chapter 5 – Study 2: A Comparison of Intimate Relationship Quality of Adults with ASD and TD Partners

Whilst research demonstrates that adults with ASD desire intimacy and social connection (Howlin et al., 2004; Stokes & Kaur, 2005), adult outcome studies (e.g., Howlin & Moss, 2012) consistently indicate that a relatively unique segment of this population form intimate relationships or marry (for a review see Chapter 1). This is not surprising given that the characteristics of ASD are primarily related to difficulties establishing and maintaining relationships. In particular, several lines of research suggest that communication, a core difficulty for individuals with ASD, is an essential component of healthy relationships (e.g., Boisvert et al., 2011). Together with the core social communication impairments of ASD, it is unsurprising that intimate relationships involving partners with ASD pose particular challenges. Specifically, narrative accounts authored by TD partners (e.g., Jacobs, 2006) and clinical experience (e.g., Attwood, 2007) indicate that ASD/TD couples are vulnerable to relationship difficulties, including break-downs in communication, impaired intimacy, and lower relationship satisfaction. Thus while the incidence of ASD/TD relationships may be uncommon, there is a need to understand how ASD traits impact on intimate relationships in order to intervene and promote positive outcomes for this group. To date, there have been few empirical studies on the relationship quality and functioning of ASD/TD dyads.

Research demonstrates that communication difficulties are a large source of relationship distress for TD couples. For instance, in a meta-analytic review of longitudinal studies (N=115) representing over 45,000 marriages, communication competencies were found to be the most important predictor of relationship satisfaction (Karney & Bradbury, 1995). Moreover, issues with communication are reported to be the most common complaint of couples seeking therapy (e.g., Geiss &
O'Leary, 1981). For instance, in a study using open-ended questions to explore problems in couples seeking therapy (N=108 dyads), Boisvert, Wright, Tremblay and McDuff (2011) found that general communication was the highest reported problem by both men (39.2%) and women (46.8%). Unsurprisingly, most programs for preventing relationship distress seek to help couples enhance their communication and problem-solving skills with the aim of improving the quality of their relationship (Bodenmann & Shantinath, 2004).

Many of the relationship problems emphasised by clinicians in the field (e.g., Attwood, 2007) and TD partners (e.g., Aston, 2003) relate to the core social communicative deficits of ASD. For instance, Attwood (2007) highlights the mismatched expectations and needs of ASD and TD partners with regard to communication and social interaction, both within and outside the relationship (e.g., socialising with other couples), and the negative impact on TD partners whose needs for emotional and social intimacy are unmet. For example, individuals with ASD are said to withdraw during conflict to find their thoughts and solutions given their minimum tolerance of intense emotions, whereas TD partners may prefer to discuss their emotions and expect their partners to be there in times of distress (Bentley, 2007; Boduryan, 2012). Jacobs (2006) informally questioned several partners of individuals with ASD and one of the biggest grievances reported was the ASD partner’s demand for their own space (i.e., detachment), suggesting that the tendency to withdraw rather than communicate is a major issue facing those in ASD/TD relationships. In narrative accounts of TD partners, this is often described as a lack of ‘togetherness’ in the relationship, and is reported to leave partners feeling unloved, negatively impacting TD partner’s perception of relationship satisfaction (e.g., Bentley, 2007; Boduryan, 2012).
The development of intimacy is theorised to rely upon communication between partners, involving several dyadic processes such as self-disclosure, reciprocity (i.e., sharing something similar with the other) and processing of emotional signals, all of which are impaired in ASD (Laurenceau et al., 2005; Olson, 1975; Perlman & Fehr, 1987; Travis & Sigman, 1998). Further, the interactional process model of intimacy (Reis & Patrick, 1996), which describes the progression of mutual intimacy as occurring across communication sequences of self-revealing disclosure, highlights the reciprocal importance of partner responsiveness and partner disclosure. Partner responsiveness refers to the belief that one’s partner is considerate, sensitive, and supportive of the self (Reis, 2007). However, ASD is associated with impairments in the ability to identify the beliefs, intentions and desires of others (i.e., Theory of Mind), conceivably posing a major barrier to the development of intimacy in ASD/TD relationships (Boduryan, 2012). Given these communication difficulties, TD partners within ASD/TD dyads may be less likely to feel understood, validated, accepted and cared for by their ASD partner, and therefore less satisfied in their relationship, compared to partners in TD/TD dyads. However, there is lack of empirical evidence to support this conjecture.

Through an extensive review of the literature, only four studies (Lau & Peterson, 2011; Pollmann et al., 2010; Renty & Roeyers, 2007; Stokes et al., 2007) addressing the impact of ASD traits on relationship outcome were found. Further, the focus of previous research has been on relationship satisfaction, to the exclusion of relationship communication and intimacy. In addition, only two of these studies (Lau & Peterson, 2011; Renty & Roeyers, 2007) used dyadic data and only two included a control sample (Lau & Peterson, 2011; Stokes & Kaur, 2005).

Lau and Peterson (2011) assessed romantic attachment processes and relationship satisfaction across four groups using Hazan and Shaver’s (1987) seminal
vignette instrument, Norton’s (1983) Quality Marriage Index. The groups were: a focal diagnostic group of adults with ASD and a child with ASD (N=22); TD partners whose spouse and child had an ASD diagnosis (N=11); TD participants whose child only had an ASD diagnosis (N=49); and TD controls (N=75). Findings revealed that ASD diagnosis of offspring only effected relationship satisfaction. Specifically, relationship satisfaction was significantly lower in those with a child and spouse with ASD, compared to controls (d=0.66), although further analyses indicated that the child’s rather than the spouse’s ASD diagnosis negatively impacted relationship satisfaction. However, various limitations were present in this study, such as power, in that a particularly small number of participants with a spouse and child with ASD were represented. Nevertheless, these findings may indicate that positive qualities (e.g., loyalty, intelligence) of high-functioning partners with ASD could conceivably compensate for difficulties that may arise within their interactions with TD partners (Lau & Peterson, 2011).

Renty and Roeyers (2007) explored self-reported relationship satisfaction in men with ASD and their spouses (N=21 dyads), as measured by Spanier’s (1976) Dyadic Adjustment Scale. Characteristics of ASD were assessed with the AQ (Baron-Cohen et al., 2001). In this study, there was no significant association between severity of ASD and relationship satisfaction in men with ASD. Conversely, severity of partner’s ASD traits was inversely related to relationship satisfaction of female TD partners ($R^2=0.20$), providing support for the view that TD partners in ASD/TD dyads are vulnerable to poor relationship outcome.

Pollmann et al. (2010) investigated the association between ASD traits (as measured by the AQ) and relationship satisfaction (as measured by Spanier’s 1976 Dyadic Adjustment Scale) in a non-clinical sample (N=195 dyads). The results demonstrated a negative association between ASD trait severity and relationship
satisfaction for the sample as a whole ($R^2=0.23$). However, separate analyses with wives and husbands revealed a significant negative but small association between ASD traits and relationship satisfaction for husbands only ($R^2=0.08$). Whilst initially surprising, such findings are to be expected given that, in this sample, fewer females had higher ASD traits than males ($d=0.45$). However, further investigation revealed that partners of both men and women with more ASD traits did not report lower relationship satisfaction than partners of people with fewer ASD traits. However, given this study relied on non-clinical data, findings are not directly generalisable to the clinical ASD population and their TD partners.

Stokes, Newton and Kaur (2007) examined the nature and predictors of parent-reported social and romantic functioning in adolescents and adults with ASD (N=25), compared to a sample of TD adolescents and adults (N=38), via a self-administered questionnaire designed by the researchers along with the Courting Behaviour Scale. In this study, adults with ASD reported lower romantic functioning compared to TD controls ($R^2=.28$), and social functioning of those with ASD predicted 53% of the variance in romantic functioning. Thus results indicated that social functioning plays an important role in the development of romantic functioning, and provided support for the view that an ASD diagnosis implies impaired functioning in intimate and romantic relationships.

Taken together, preliminary research exploring the relationship quality of adults with ASD and their TD partners has several shortcomings and findings have been mixed. In light of these inconsistencies, it is important to address the limitations of previous research in attempt to clearly elucidate the impact of ASD traits on the romantic relationship.

The primary question of interest in the current investigation was: are the conjectures presented in the non-empirical literature (e.g., Aston, 2003) with regard
to the potential impairments in ASD/TD relationships demonstrable in a large community sample of ASD adults in a relationship and TD partners in an ASD/TD relationship, relative to TD control partners. In particular, we aimed to explore the relationship quality and functioning of adults with ASD currently in an ASD/TD dyad, and of TD partners in an ASD/TD dyad. We sought to address gaps in the previous literature by including a large representative sample, a control sample (TD partners in a TD/TD dyad) and by representing the perspectives of both ASD and TD partners. We also aimed to measure relationship experience more broadly than previous studies, operationalised as relationship communication, satisfaction and five components of intimacy – emotional, social, recreational, intellectual and sexual.

Based on the limited empirical literature and the non-academic literature, this study hypothesised that: (1) TD partners in an ASD/TD dyad (Group 2) would score significantly lower than ASD partners in ASD/TD dyads (Group 1) and TD partners in a TD/TD dyad (Group 3) on measures of relationship satisfaction, communication and intimacy; (2) relative to Group 1, Group 3 would report significantly higher levels of relationship satisfaction, communication and intimacy.

**Method**

**Participants**

The current sample was part of a larger studied titled *Autism Spectrum Disorders and Intimate Relationships*, which aimed to recruit dyads (ASD/TD, and TD/TD controls; See Chapter 6 for more detail). However, given the inherent difficulties in recruiting both partners within a dyad and the need for more research in this area with a large representative sample of ASD and TD partners, we retained individual
partners. Therefore, for the present study, we included one person from each couple and all those cases in which only one partner completed the questionnaire.

The present sample comprised a total of 199 participants, 64 males and 130 females (five did not indicate their gender). A total of 11 participants were excluded from the overall sample on the basis of having excessive missing data (>2%). The majority of participants were living in Australia, the United States, Canada and New Zealand. The whole sample comprised three distinguishable partner groups: adults with ASD currently in a relationship with a TD partner (Group 1), TD adults currently in a relationship with an ASD partner (Group 2), and TD partners currently in a relationship with a TD partner (Group 3). Participant characteristics of these three groups are provided below.

**ASD partner within an ASD/TD dyad (group 1).** A total of 71 individuals participated, each who confirmed they had a clinical diagnosis of ASD from a registered health professional (self-reported) who was independent of this study, and were currently married or in a significant relationship with a TD individual; 28 males and 42 females, and one with gender unknown. Twenty-three participants from the ASD or TD partner sample were excluded. Of these, seven had missing data of more than 2% and the remaining 16 did not meet the AQ cut-off criterion of total AQ score at or above 32, as recommended by Baron-Cohen et al. (2001). Therefore, the final ASD of TD sample comprised 47 participants, 15 males, 31 females and one with gender unknown. Ages ranged from 19 to 57 ($M = 32.43$, $SD = 10.68$).

**TD partner within an ASD/TD dyad (group 2).** In total, 51 TD individuals currently married or in a significant relationship with a partner with a self-reported clinical diagnosis of ASD from a registered health professional who was independent
of this study, completed the questionnaire; 9 males and 42 females. Three TD participants from the TD/ASD dyads were excluded. Of these, two had missing data of more than 2% and one had an AQ score above the AQ criterion of total score of at or above 32 (Baron-Cohen et al., 2001). Therefore, the final TD partner of ASD sample comprised 48 participants, 40 females and 8 males. Ages ranged from 21 to 74 ($M = 44.96$, $SD = 13.68$).

**TD partner within a TD/TD dyad (group 3).** A total of 78 TD individuals married or in a significant relationship with a TD individual, completed the questionnaire, 28 males and 46 females, and four with gender unknown. Five were excluded from the sample. Of these, two had missing data of more than 2% and three had AQ scores at or above 32 (Baron-Cohen et al., 2001). Therefore, the final TD partner sample comprised 73 participants, 25 males, 44 females and four with gender unknown. Ages ranged from 18 to 67 ($M = 31.05$, $SD = 9.12$).

**Measures**

**Autism Spectrum Quotient (AQ: Baron-Cohen et al., 2001).** Severity of ASD traits were measured with the AQ (Baron-Cohen et al., 2001). The AQ was designed as a screening tool to identify autistic traits in adults. It comprises 50-items across five subscales: social skills, attention switching, attention to detail, communication and imagination. Scores on the total scale range from 0 to 50, with higher scores indicating a larger extent of ASD traits demonstrated by the person. A differentiation cut-off total AQ score of 32 or above is recommended by Baron-Cohen et al. (2001) for correctly identifying individuals with clinically significant levels of autistic traits. The questionnaire shows good psychometric properties (Baron-Cohen et al., 2001). The internal consistency of the AQ was shown to be satisfactory in the present
sample, with Cronbach’s Alpha coefficients as follows: \( \alpha = .64 \) for Group 1, \( \alpha = .86 \) for Group 2; \( \alpha = .85 \) for Group 3.

**Communication and Satisfaction Scales of the ENRICH Three Couples Scales (Olson & Larson, 2008).** Relationship quality was assessed using the Communication and Satisfaction sub-scales of the ENRICH Three Couples Scales (Olson & Larson, 2008), which comprise modified sub-scales of the original ENRICH Inventory (Fournier, Olson, & Druckman, 1983; Olson, Fournier, & Druckman, 1987). The construction and validation of the Three Couples Scales is described in detail in Olson, Olson-Sigg and Larson (2008). The Communication sub-scale measures the quality of a couple’s communication with ten items, e.g., “I can express my true feelings to my partner”, and “I am very satisfied with how my partner and I talk to each other”; scored on a five-point Likert scale ranging from ‘1 – strongly disagree’ to ‘5 – strongly agree’. The Satisfaction sub-scale measures how satisfied a person is with their couple relationship across ten items, e.g., “I feel good about how we have divided household chores” and “Our sexual relationship is satisfying and fulfilling to me”; also scored on a five-point Likert scale ranging from ‘1 – strongly disagree’ to ‘5 – strongly agree’. Scores on both sub-scales range from 0 to 50, with higher scores indicative of positive feelings regarding the quantity and quality of couple communication or greater satisfaction with most aspects of the couple relationship. The scale shows good psychometric properties. The internal consistency of both scales was shown to be satisfactory in the present sample: Satisfaction scale \( \alpha = .85 \) for Group 1, \( \alpha = .65 \) for Group 2, and \( \alpha = .75 \) for Group 3; Communication scale \( \alpha = .92 \) for Group 1, \( \alpha = .70 \) for Group 2, and \( \alpha = .78 \) for Group 3.
Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981). Current perceptions and experiences of relationship intimacy were assessed with the Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981). The construction and validation of the PAIR is described in detail in Schaefer and Olson (1981). The PAIR is a 36-item self-report inventory measuring five domains of intimacy across five sub-scales: emotional, e.g., “My partner listens to me when I need someone to talk to”; social, e.g., “Having time together with friends is an important part of our shared activities”; sexual, e.g., “I am satisfied with the level of affection in our relationship”; intellectual, e.g., “My partner helps me clarify my thoughts”; and recreational, e.g., “We like playing and having fun together.” Intimacy related sub-scale scores range from 0 to 96, with higher scores indicating higher intimacy. The scale shows good psychometric properties. The internal consistency of all sub-scales was shown to be satisfactory in the present sample, with Cronbach’s Alpha coefficients as follows: Emotional Intimacy \( \alpha = .85 \) for Group 1, \( \alpha = .70 \) for Group 2, \( \alpha = .80 \) for Group 3; Social Intimacy \( \alpha = .87 \) for Group 1, \( \alpha = .70 \) for Group 2, and \( \alpha = .80 \) for Group 3; Sexual Intimacy \( \alpha = .85 \) for Group 1, \( \alpha = .70 \) for Group 2, and \( \alpha = .78 \) for Group 3; Intellectual Intimacy \( \alpha = .87 \) for Group 1, \( \alpha = .87 \) for Group 2, and \( \alpha = .84 \) for Group 3; and Recreational Intimacy \( \alpha = .87 \) for Group 1, \( \alpha = .77 \) for Group 2, and \( \alpha = .76 \) for Group 3.

Procedure

Following ethical review by the Deakin University Human Research Ethics Committee (2012-297), approximately 50 national and international ASD organisations, online-ASD related message boards, Facebook groups and support groups were contacted to ask for their assistance in recruiting potential participants.
currently in a relationship with an ASD partner (TD partners) or with an ASD diagnosis and currently in a relationship with a TD partner. Approximately 30 organisations cooperated and were involved in recruitment. A flyer providing information on the study was provided to each organisation and online network. This flyer recruited participants for an online questionnaire titled *The Outcome of Autism Spectrum Disorder Diagnoses on Intimate Relationships*. Regarding recruitment of TD/TD dyads, a flyer providing information on the study which specified that a control group was sought was circulated throughout Deakin University and to colleagues, family and friends of the researcher.

Once participants accessed the website, they first read an informed consent page describing the purpose of the study, eligibility criteria, procedures, potential benefits and risks, confidentiality, and contact information for the researchers. Participants who agreed to participate were then linked to the online questionnaire. Therefore, all persons gave their informed consent prior to their inclusion in the study. The criteria for inclusion in this study were that: (1) individuals had to be 18 years old or above; and (2) individuals had to currently be in an intimate relationship (either married or in a significant relationship). Further, for the ASD/TD dyad group, individuals also were required to confirm (via self-report) that they had a formal ASD diagnosis (i.e., HFA or AS) from a registered health professional (i.e., Psychologist, Paediatrician, Neuropsychologist, Psychiatrist or specialist team involving a combination of the former) who was completely independent of this study, or were currently in a relationship with a partner who has an ASD diagnosis from a registered health professional who was independent of this study.

First, participants completed a demographic questionnaire assessing inclusion criteria and also obtaining participant characteristics of age and gender. Next, participants completed a measure of ASD traits, the Autism Spectrum Quotient (AQ;
Baron-Cohen et al., 2001). Following this, participants completed a measure of current relationship satisfaction and communication, the Enrich Couples Scales (Fowers & Olson, 1993). Next, participants completed a measure of current relationship intimacy, the Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981) Inventory.

Results

Data were screened for missing values and outliers. In total, 11 cases had more than 2% of values missing. Missing values analysis established each case’s proportion of missing values on variables: AQ items, Satisfaction and Communication items, PAIR Inventory items, age and gender. In attempt to estimate the missing gender of five cases, we first developed a model to predict the known cases of gender, permitting us to determine which variables were able to predict gender. Next, we applied that model to predict missing gender. We were able to predict gender with only 85.5% certainty, which was deemed inadequate. Therefore, we were unable to recover gender in these five missing cases with sufficient confidence.

Statistical Analyses

Descriptive analysis. To preliminarily explore group differences between the three respondent groups, mean scores on each relationship quality variable were inspected. Participants were divided into three groups according to respondent type (Group 1: ASD partner in ASD/TD dyad, Group 2: TD partner in ASD/TD dyad, and Group 3: TD partner in TD/TD dyad). See Figure 2 for Results.
As shown in Figure 2, a plot of the mean scores of respondents by group demonstrated that TD partners in an ASD/TD dyad consistently scored the lowest across all measures of relationship functioning assessed. In contrast, the relationship quality of TD partners in a TD/TD dyad and ASD partner in an ASD/TD dyad were similar.

**Group differences in relationship functioning.** To statistically investigate differences in relationship functioning between the three respondent groups, a one-way between-groups multivariate analysis of variance (MANOVA) was used. The dependant variables were Relationship Satisfaction and Communication as measured
by the ENRICH Scales, and intimacy across five areas as measured by the PAIR Inventory: Emotional, Social, Sexual, Intellectual and Recreational Intimacy. The independent variable was respondent type: ASD partner in an ASD/TD dyad (Group 1), TD partner in an ASD/TD dyad (Group 2), and TD partner in a TD/TD dyad (Group 3). First, preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no violations noted.

The homogeneity of variances were examined using Box’s M and Levene’s tests. Box’s M tests revealed homogeneity of the variance-covariance matrices (Box’s = 100.705, $F_{12, 55021.63} = 1.285$, $p = .27$). The Levene’s test revealed that the assumption of equality of variance for all univariate dependent variables was met. The alpha level of $p<0.01$ was used to protect from type I errors. See Table 1 for results.

Table 1

*Results of Levene’s Test for Sub-Scales Relating to Relationship Quality for Respondent Type: ASD partner in ASD/TD Dyad, TD Partner in TD/ASD Dyad, and TD Partner in TD/TD Dyad*

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction</td>
<td>1.077</td>
<td>2, 140</td>
<td>0.344</td>
</tr>
<tr>
<td>Communication</td>
<td>1.535</td>
<td>2, 140</td>
<td>0.219</td>
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<tr>
<td>PAIR Emotional Intimacy</td>
<td>3.133</td>
<td>2, 140</td>
<td>0.047</td>
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<tr>
<td>PAIR Social Intimacy</td>
<td>0.323</td>
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<td>0.724</td>
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<tr>
<td>PAIR Sexual Intimacy</td>
<td>0.411</td>
<td>2, 140</td>
<td>0.664</td>
</tr>
<tr>
<td>PAIR Intellectual Intimacy</td>
<td>1.950</td>
<td>2, 140</td>
<td>0.146</td>
</tr>
<tr>
<td>PAIR Recreational Intimacy</td>
<td>0.715</td>
<td>2, 140</td>
<td>0.491</td>
</tr>
</tbody>
</table>
The MANOVA revealed a statistically significant difference between respondent types on the combined dependant variables, $F (16, 266) = 6.35, p < .001$; Wilk’s Lambda = .52; partial eta squared = .28 (See Table 2 for Results).

Table 2  
**MANOVA Univariate Results Investigating the Influence of Respondent Type on Scores Relating to Relationship Quality**

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>df1</th>
<th>df2</th>
<th>p</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANOVA Result</td>
<td>6.35</td>
<td>16</td>
<td>266.00</td>
<td>&lt;.001</td>
<td>0.28</td>
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<tr>
<td>Univariate Results:</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td><em>Satisfaction</em></td>
<td>24.79</td>
<td>2</td>
<td>140.00</td>
<td>&lt;.001</td>
<td>0.26</td>
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<tr>
<td><em>Communication</em></td>
<td>25.25</td>
<td>2</td>
<td>140.00</td>
<td>&lt;.001</td>
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<tr>
<td><em>PAIR Emotional Intimacy</em></td>
<td>35.23</td>
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<td>140.00</td>
<td>&lt;.001</td>
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<td><em>PAIR Social Intimacy</em></td>
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<td>140.00</td>
<td>&lt;.001</td>
<td>0.13</td>
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<td><em>PAIR Sexual Intimacy</em></td>
<td>17.45</td>
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<td>140.00</td>
<td>&lt;.001</td>
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<td><em>PAIR Intellectual Intimacy</em></td>
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<td><em>PAIR Recreational Intimacy</em></td>
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<td>2</td>
<td>140.00</td>
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<td>0.26</td>
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</tbody>
</table>

As shown in Table 2, when the results for the univariate dependent variables were considered separately, groups differed over all dependent variables. Given the significance of the overall MANOVA test, and univariate analyses, post hoc comparisons (Tukey HSD) were used to further ascertain the group significant differences on each of the relationship functioning variables. See Table 3 for results demonstrating the impact of respondent type on relationship satisfaction,
communication, emotional intimacy, social intimacy, sexual intimacy, intellectual intimacy and recreational intimacy.
Table 3
*Post-hoc Tukey HSD Results Demonstrating Impact of Respondent Type on Relationship Satisfaction, Relationship Communication and Intimacy: Mean Differences, Standard Errors, and 95% Confidence Intervals*

<table>
<thead>
<tr>
<th>Partner Group</th>
<th>Comparison Group</th>
<th>$MD$</th>
<th>SE</th>
<th>$p$</th>
<th>+95% CI</th>
<th>-95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DV: Relationship Satisfaction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1: ASD partner of TD</td>
<td>v Group 2</td>
<td>9.10</td>
<td>1.51</td>
<td>&lt;.001</td>
<td>4.38</td>
<td>13.82</td>
</tr>
<tr>
<td></td>
<td>Group 3</td>
<td>1.79</td>
<td>1.38</td>
<td>.40</td>
<td>-2.51</td>
<td>6.09</td>
</tr>
<tr>
<td>Group 2: TD partner of ASD</td>
<td>v Group 1</td>
<td>-9.10</td>
<td>1.51</td>
<td>&lt;.001</td>
<td>-13.82</td>
<td>-4.38</td>
</tr>
<tr>
<td></td>
<td>Group 3</td>
<td>-7.31</td>
<td>1.37</td>
<td>&lt;.001</td>
<td>-11.59</td>
<td>-3.04</td>
</tr>
<tr>
<td>Group 3: TD partner of TD</td>
<td>v Group 1</td>
<td>-1.79</td>
<td>1.38</td>
<td>.40</td>
<td>-2.51</td>
<td>6.09</td>
</tr>
<tr>
<td></td>
<td>Group 2</td>
<td>7.31</td>
<td>1.37</td>
<td>&lt;.001</td>
<td>3.04</td>
<td>11.59</td>
</tr>
</tbody>
</table>

**DV: Relationship Communication**

| Group 1: ASD partner of TD | v Group 2 | 7.35 | 1.41 | <.001 | 2.96 | 11.74 |
| | Group 3 | -0.78 | 1.28 | .82 | -4.78 | 3.22 |
| Group 2: TD partner of ASD | v Group 1 | -7.35 | 1.41 | <.001 | -11.74 | -2.96 |
| | Group 3 | -8.13 | 1.27 | <.001 | -12.11 | -4.12 |
| Group 3: TD partner of TD | v Group 1 | 0.78 | 1.28 | .82 | -3.22 | 4.78 |
| | Group 2 | 8.13 | 1.27 | <.001 | 4.16 | 12.11 |

**DV: Emotional Intimacy**

| Group 1: ASD partner of TD | v Group 2 | 31.77 | 4.91 | <.001 | 16.44 | 47.10 |
| | Group 3 | -2.46 | 4.45 | .850 | -16.34 | 11.42 |
| Group 2: TD partner of ASD | v Group 1 | -31.77 | 4.91 | <.001 | -47.10 | -16.44 |
| | Group 3 | -34.23 | 4.63 | <.001 | -48.69 | -19.78 |
| Group 3: TD partner of TD | v Group 1 | 2.46 | 4.45 | .85 | -11.42 | 16.34 |
| | Group 2 | 34.23 | 4.63 | <.001 | 19.78 | 48.69 |

**DV: Social Intimacy**

| | Group 3 | -13.66 | 3.83 | <.001 | -25.61 | -1.70 |
| Group 2: TD partner of ASD | v Group 1 | -3.83 | 4.21 | .640 | -16.98 | 9.32 |
| | Group 3 | -17.49 | 3.83 | <.001 | -29.44 | -5.53 |
| Group 3: TD partner of TD | v Group 1 | 13.65 | 3.83 | <.001 | 1.70 | 25.61 |
| | Group 2 | 17.49 | 3.83 | <.001 | 5.53 | 29.44 |
As shown in Table 3, post-hoc comparisons using the Tukey HSD indicated there were no significant differences between the mean relationship outcome scores (satisfaction, communication and all domains of intimacy) between groups 1 and 3. Apart from social intimacy, all mean relationship outcome scores of group 2 differed from groups 1 and 3, while groups 1 and 3 did not differ except on social intimacy.

In summary, post-hoc analyses indicated that TD partners in an ASD/TD dyad reported the lowest relationship functioning across all variables assessed, relative to...
ASD partners in an ASD/TD dyad and TD partners in a TD/TD dyad. Predominantly, there were no significant differences in relationship functioning between ASD partners in an ASD/TD dyad and TD partners in a TD/TD dyad. However, ASD partners in an ASD/TD dyad scored significantly lower than TD partners in a TD/TD dyad on social intimacy. Thus, results indicated that an ASD diagnosis within a relationship is detrimental to the TD partner’s perspective of relationship functioning, yet largely does not influence the ASD partner, apart from in the domain of social intimacy.

**Discussion**

The present study aimed to assess whether clinical and anecdotal reports of poor relationship outcome in TD and ASD partners within an ASD/TD dyad were demonstrable in a sample of ASD/TD partners relative to controls. Based on the limited empirical literature and the non-academic literature, this study hypothesised that: (1) TD partners in an ASD/TD dyad (Group 2) would score significantly lower than ASD partners in ASD/TD dyads (Group 1) and TD partners in a TD/TD dyad (Group 3) on measures of relationship satisfaction, communication and intimacy; (2) relative to Group 1, Group 3 would report significantly higher levels of relationship satisfaction, communication and intimacy.

The results partially supported the first hypothesis. As predicted, scores on measures of relationship satisfaction, communication, and most areas of intimacy (emotional, sexual, intellectual and recreational) were lowest for TD partners within an ASD/TD dyad (Group 2), relative to ASD partners in an ASD/TD dyad (Group 1) and TD controls (Group 3). However, with regard to social intimacy, the scores of Group 2 were significantly lower than controls (Group 3), yet not significantly lower than adults with ASD in an ASD/TD dyad (Group 1).
It is not surprising that TD partners in an ASD/TD dyad demonstrated the lowest scores across most relationship outcome measures assessed. These findings complement the work of Renty and Roeyers (2007), which found that relationship satisfaction for TD female partners was inversely associated with her partner’s ASD trait severity. Thus, these findings concur with the view that an ASD diagnosis is associated with impaired intimate relationship functioning, from the perspective of the TD partner (Aston, 2001, 2003, 2012; Bentley, 2007; Hendrickx, 2008; Jacobs, 2006; Marshack, 2009; Weston, 2010). That one partner’s ASD diagnosis negatively predicted their TD partner’s relationship outcome, yet not their own, highlights the mismatched expectations and needs of ASD and TD partners (Attwood, 2007) and the vulnerability of TD partners within an ASD/TD dyad.

Contrary to our second hypothesis, there were no significant differences between ASD partners and TD control partners on relationship satisfaction, relationship communication, or intimacy in areas of emotional, sexual, intellectual or recreational intimacy. However, in support of our hypothesis, ASD partners scored significantly lower than TD controls on social intimacy. The negative impact of one’s own ASD diagnosis on their own perception of social intimacy, which refers to having common friends and a shared social network (Schaefer & Olson, 1981), is in keeping with the views of TD partners in the non-academic literature, which describe a lack of social interactions with other couples and friends (e.g., Aston, 2001, 2003, 2012; Bentley, 2007). However, our findings suggest that this lack of ‘togetherness’ does not negatively impact the ASD partner’s perception of relationship quality.

The finding that ASD partners relationship quality largely did not differ from TD controls counters a number of claims in the non-empirical literature suggesting that the ASD partner’s ASD traits negatively impact his or her own relationship quality. Specifically, this finding contradicted the work of Pollmann, Finkenauer and
Begeer (2010), which found that severity of ASD traits in a non-clinical sample of men was negatively associated with relationship satisfaction. However, these results were consistent with findings of studies that included individuals with a professional diagnosis of ASD (Lau & Peterson, 2011; Renty & Roeyers, 2007). Specifically, the work of both Lau and Peterson (2011) and Renty and Roeyers (2007) found that one’s own ASD diagnosis did not negatively impact their own relationship satisfaction. Therefore, it appears that poor relationship quality of ASD/TD dyads is largely experienced by the TD partner.

The provision of ASD and TD partners within an ASD/TD and TD controls in the current study, enabled us to investigate the unique relationship outcome of ASD/TD couples. According to our study, an ASD diagnosis is of limited importance to the prediction of relationship outcome for adults with ASD currently in an ASD/TD relationship. However, for TD partners within an ASD/TD dyad, our findings suggest that having a partner with a clinical diagnosis of ASD is associated with reduced relationship quality. As such, findings of the current study provide empirical support mirroring published accounts by TD partners based on individual experiences and observations of being in a relationship with an ASD partner (Aston, 2001, 2003, 2012; Bentley, 2007; Hendrickx, 2008; Jacobs, 2006; Marshack, 2009; Weston, 2010) and expert clinical opinion (e.g., Attwood, 2007).

It may also be that psychosocial outcomes of TD partners within an ASD/TD dyad that were not assessed in the current study correlated with this poor relationship outcome. As highlighted in the systematic review (Bostock-Ling et al., 2012) of non-scholarly work pertaining to TD partners within an ASD/TD dyad, clinician and expert views suggest that some TD females within an ASD/TD dyad experience a decline in psychosocial well-being (e.g., loneliness, isolation, mood disorders), which has been ascribed to the expression of ASD traits within the relationship.
However, we must exercise caution before inferring from these results that having a partner with ASD necessarily implies a negative outcome for TD partners. An interesting next step would be to assess both psychosocial outcomes and relationship outcome in a large sample of ASD and TD partners in an ASD/TD dyad relative to TD controls. In this way, it is hoped that future research will more fully clarify the extent and nature of the impact of ASD within the relational context. Such information may further assist in designing interventions to support the relationship functioning and well-being of ASD/TD couples.

We must also exercise caution in making inferences from the current findings that adults with ASD in relationships do not experience impaired relationship satisfaction, communication and intimacy. In particular, the potential for response bias may be particularly applicable to the ASD population, given an ASD diagnosis is often associated with limited insight into one’s own behaviour (Bishop & Seltzer, 2012). As such, it is possible that participants with ASD who characteristically experience difficulty with self-awareness of emotions found it difficult to understand and respond to the measures of relationship outcome validly. In line with this limitation, it is recommended that future research in this area conduct fieldwork with ASD participants in order to ensure validity of items and measures used. Additionally, it must be noted that there is some speculation regarding the validity of the AQ in community samples (Brugha et al. 2011), thus findings require replication. Nonetheless, the AQ was not relied upon in the current study as a measure of diagnosis, as all participants were required to verify (via self-report) that they had a diagnosis of ASD from a professional.

The present study was limited to analyses at the level of the individual, rather than the level of the dyad, as well use of self-report to assess ASD traits and relationship outcome. To further explore the relational nature of ASD, future
research should examine the relationship quality within ASD/TD dyads using appropriate dyadic data analysis techniques.
Chapter 6 – Study 3: ASD Traits and Dyadic Satisfaction, Communication and Intimacy: Analyses Using the Actor-Partner Interdependence Model

Research demonstrates that adults with ASD desire intimacy and social connection, with many forming intimate relationships and marrying (Howlin et al., 2004; Stokes & Kaur, 2005). However, the characteristics of ASD are primarily related to difficulties establishing and maintaining relationships. In particular, several lines of research suggest that communication, a core difficulty for individuals with ASD, is an essential component of healthy relationships (e.g., Boisvert et al., 2011). Together with the core social communication impairments of ASD, it is unsurprising that narrative accounts authored by TD partners (e.g., Jacobs, 2006) and clinical experience (e.g., Attwood, 2007) indicate that ASD/TD couples are vulnerable to relationship difficulties, including break-downs in communication, impaired intimacy, and lower relationship satisfaction.

Whilst narrative accounts of TD partners’ experiences and clinical opinion provide valuable insight, there is limited empirical evidence to inform the specific challenges faced in these relationships from the perspective of both ASD and TD partners. Given the lack of empirical evidence regarding this topic, we call for caution before concluding that an ASD diagnosis necessarily implies severely impaired couple relationships.

Only four studies (Lau & Peterson, 2011; Pollmann et al., 2010; Renty & Roeyers, 2007; Stokes et al., 2007) have explored relationship functioning in association with ASD, only two of which (Pollmann et al., 2010; Renty & Roeyers, 2007) have examined the perspectives of both ASD and TD partners in a dyad. Further, findings across these studies are discrepant. Renty and Roeyers (2007) found that ASD partners’ trait severity was negatively associated with their TD partners’ relationship satisfaction (i.e. partner effect), yet not inversely related to their own
ASD trait severity (i.e.: actor effect). In contrast, for a sample of non-clinical dyads (TD/TD), Pollmann et al. (2010) found that those with higher ASD trait severity reported lower relationship satisfaction, yet partners of those with higher ASD trait severity did not report lower relationship satisfaction.

In addition, findings across studies at the level of the individual have been mixed. For instance, Stokes et al. (2007) found that adults with ASD reported lower romantic functioning compared to TD controls (R2=.28), with their social functioning accounting for 53% of the variance in romantic functioning. In contrast, Lau and Peterson (2011) found no effect of ASD diagnosis on ASD partner’s own relationship satisfaction or the TD partner’s relationship satisfaction. As such, little is known about the impact of ASD traits on ASD/TD partners’ relationship outcome. In order to intervene to promote positive outcomes and strengthen ASD/TD relationships, it is essential that we gain a better understanding of how autistic traits impact on these relationships.

This study extends the existing literature in three ways. First, only two studies (Pollmann et al., 2010; Renty & Roeyers, 2007) have examined both partners of the ASD/TD dyad, one of which used a non-clinical sample (Pollmann et al., 2010). Further, the study by Renty and Roeyers (2007) did not use appropriate data analytic techniques for dyadic data. In the current study, the relational impact of ASD on both partners’ relationship outcome was assessed using methods designed for dyadic data. Second, prior research has narrowly measured relationship outcome as relationship satisfaction, to the exclusion of relationship communication and intimacy. We argue that to further understand the particular challenges faced by ASD/TD dyads, it is necessary to broaden the measure of relationship outcome, as we have done in the current study. Third, prior research has not yet closely investigated which ASD traits may interfere with relationship outcome (e.g., social and communication
impairments), but rather has focused on ASD trait severity overall or the presence of a diagnosis. Yet several lines of research suggest that communication, a core difficulty for individuals with ASD, is an essential component of healthy relationships (e.g., Boisvert et al., 2011) and that communication difficulties are a large source of relationship distress for TD couples (Boisvert et al., 2011; Geiss & O’Leary, 1981; Karney & Bradbury, 1995). In the current study, we examined the impact of specific ASD traits on both ASD and TD partners relationship outcomes. These three areas of our study will now be addressed in turn.

In order to truly investigate the relational impact of ASD, it is necessary to examine both partners of a dyad and to ensure the complexity of dyadic data is accounted for by use of appropriate data-analytic approaches (Eid & Boucher, 2012). Dyadic data are non-independent, meaning that measurement reflects the characteristics of both the partner who provides the score and the characteristics of his or her partner (Kenny & Cook, 1999). For example, when partners communicate with each other, one partner’s communication skills may not be independent of his or her partner’s communication skills. Therefore, the responses of the two partners are correlated, reflective of an interpersonal system (Kenny & Cook). Given the key statistical assumption of traditional analytic methods, such as regression analyses, is that scores of different units are independent or uncorrelated, use of these methods with dyads, as in the work of Renty and Roeyers (2007), violates the assumption of independence of observations (Kenny, Kashy, & Cook, 2006). Whilst the work of Pollmann, Finkenauer and Begeer (2010) took into account the non-independence of dyadic data and investigated the link between autistic traits and relationship satisfaction using hierarchical linear modelling, this was done so with a non-clinical sample of husbands and wives. Therefore, Pollmann et al.’s work requires replication with a sample of clinical ASD/TD dyads.
The Actor-Partner Interdependence Model (APIM; Kashy & Kenny, 2000; Kenny, 1996; Kenny & Cook, 1999) is a model of dyadic relationships that combines a theoretical view of interdependence with appropriate statistical techniques for assessing and measuring it. There is interdependence in interpersonal relationships when one partner’s emotions, thoughts or behaviour influence the emotions, thoughts or behaviour of their partner. From this perspective, observations of each partner are associated or correlated (Cook & Kenny, 2005).

The APIM was developed for the reliable analysis of dyadic data to examine outcomes of both dyad members, whilst assessing both actor and partner effects within the same model. Actor effects refer to the effect of one’s predictor (i.e., ASD traits) on their own outcome, whereas partner effects refer to the effect of one partner’s predictor on their partner’s outcome. Within the APIM, both actor and partner effects are measured while statistical allowances are made to accommodate the non-independence in the two partners’ responses. The APIM calculates a minimum of four estimates; two actor estimates and two partner estimates. The APIM has been widely utilised in relationship research (e.g., Campbell, Simpson, Kashy, & Fletcher, 2001; Cook & Snyder, 2005; Knobloch & Theiss, 2010; Ledermann, Bodenmann, Rudaz, & Bradbury, 2010; Riggs, Cusimano, & Benson, 2011; Stroud, Durbin, Saigal, & Knobloch-Fedders, 2010; Theiss & Knobloch, 2009). However, to date, the APIM has not been utilised in research investigating the relationship outcome of ASD/TD dyads.

As stated above, prior research on the relationship outcome of ASD/TD dyads has narrowly defined relationship outcome as relationship satisfaction, to the exclusion of relationship communication and intimacy. However, the non-scholarly, anecdotal literature (e.g., Aston, 2001, 2003; Aston, 2012; Bentley, 2007; Hendrickx, 2008; Weston, 2010) and clinical literature (e.g., Attwood, 2007) consistently
highlights the difficulties these couples face in communication and intimacy.

Attwood (2007) highlights the mismatched expectations and needs of ASD and TD partners with regard to communication and social interaction, both within and outside the relationship (e.g., socialising with other couples), and the negative impact on TD partners whose needs for emotional and social intimacy are unmet. For example, individuals with ASD are said to withdraw during conflict to find their thoughts and solutions given their minimum tolerance of intense emotions, whereas TD partners may prefer to discuss their emotions and expect their partners to be there in times of distress (Bentley, 2007; Boduryan, 2012). Jacobs (2006) informally questioned several partners of individuals with ASD and one of the biggest grievances reported was the ASD partner’s demand for their own space (i.e., detachment), suggesting that the tendency to withdraw rather than communicate is a major issue facing ASD/TD couples. In narrative accounts of TD partners, this is often described as a lack of ‘togetherness’ or intimacy in the relationship (e.g., Bentley, 2007; Boduryan, 2012).

The development of intimacy is theorised to rely upon communication between partners, involving several dyadic processes such as self-disclosure, reciprocity, and processing of emotional signals, all of which are impaired in ASD (Laurenceau et al., 2005; Olson, 1975; Perlman & Fehr, 1987; Travis & Sigman, 1998). Further, the interactional process model of intimacy (Reis & Patrick, 1996) highlights the reciprocal importance of partner disclosure and partner responsiveness, the belief that one’s partner is considerate, sensitive, and supportive of the self (Reis, 2007). However, ASD is associated with impairments in the ability to identify the beliefs, intentions and desires of others (i.e., Theory of Mind), conceivably posing a major barrier to communication and development of intimacy for ASD/TD couples (Boduryan, 2012).
As discussed, prior research has not yet closely investigated which ASD traits may interfere with relationship outcome, yet has focused on ASD trait severity overall or the presence of a diagnosis. However, as highlighted above, the available literature (e.g., Attwood, 2007; Hendrickx, 2008; Jacobs, 2006) typically emphasises the negative impact of social and communication impairments related to ASD on relationship functioning.

We now report our study of relationship satisfaction, intimacy and communication in a sample of ASD/TD dyads. This is the first study to examine whether one partner’s clinical ASD trait severity has crossover associations with relationship outcome of the other partner using the APIM. This study aims to replicate and extend the work of Pollmann et al. (2010) with a sample of adults with clinical ASD and their TD partners.

To clarify, we use the terminology presented in Table 1 to distinguish the four APIM estimates throughout this paper.
Table 1

**APIM Estimates Terminology: Actor and Partner Effects of ASD Traits on ASD and TD Partners’ Relationship Outcome**

<table>
<thead>
<tr>
<th>Estimate</th>
<th>Path</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD actor effect</td>
<td>$a_1 = X_1 \rightarrow Y_1$</td>
<td>Relationship of ASD partner's ASD traits (IV; $X_1$) on own relationship outcomes (DV; $Y_1$)</td>
</tr>
<tr>
<td>TD actor effect</td>
<td>$a_2 = X_2 \rightarrow Y_2$</td>
<td>Relationship of TD partner's ASD traits (IV; $X_2$) on own relationship outcomes (DV; $Y_2$)</td>
</tr>
<tr>
<td>ASD partner effect</td>
<td>$p_1 = X_1 \rightarrow Y_2$</td>
<td>Relationship of ASD partner's ASD traits (IV; $X_1$) on TD partner's relationship outcomes (DV; $Y_2$)</td>
</tr>
<tr>
<td>TD partner effect</td>
<td>$p_2 = X_2 \rightarrow Y_1$</td>
<td>Relationship of TD partner's ASD traits (IV; $X_2$) on ASD partner's relationship outcomes (DV; $Y_1$)</td>
</tr>
</tbody>
</table>

Concerning the ASD actor effect, we hypothesised that severity of ASD partners’ symptomatology overall (AQ Total) and in social and communication domains (AQ Social Skills, AQ Communication) would predict poorer relationship satisfaction, communication and intimacy (See path $a_1$, Figure 1). Next, it was hypothesised that the ASD partner’s severity of traits overall, and communication and social skills deficits, would predict lower relationship communication, satisfaction and intimacy for the TD partner (ASD partner effect; See path $p_1$, Figure 1). Our investigation of TD actor (See path $a_2$, Figure 1) and TD partner effects (See path $p_2$, Figure 1) was largely exploratory and therefore no predictions were made.
Figure 1. The standard Actor-Partner Interdependence Model (APIM). Variables $X_1$, $X_2$, $Y_1$ and $Y_2$ represent measured variables; $E_1$ and $E_2$ indicate errors. Specifically, $X_1 \rightarrow Y_1 (a_1)$ represents the ASD actor effect, and $X_1 \rightarrow Y_2 (p_1)$ represents the ASD partner effect; $X_2 \rightarrow Y_2 (a_2)$ represents the TD actor effect, and $X_2 \rightarrow Y_1 (p_2)$ represents the TD partner effect.

Method

Participants

Participants were 52 ASD/TD dyads from the sample collected as part of the overall study on The Outcome of Autism Spectrum Disorder Diagnoses on Intimate Relationships. All were either married or in a significant intimate relationship. Fifteen dyads were excluded. Of these, two of the ASD partners did not meet the criteria of having a clinical diagnosis of ASD from either a Psychologist, Psychiatrist, Paediatrician or Neuropsychologist. An additional 11 ASD partners did not meet the Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001) cut-off criterion of at or above 32, and in two cases the TD partners had an AQ score above the criterion of 32. No cases had excessive missing data (>2%). Therefore, the final sample comprised 37 ASD/TD dyads. For those with ASD, ages ranged from 20 to
The age of TD partners ranged from 21 to 74 (M = 41.19, SD = 14.44). The majority of participants were living in Australia, the United States, Canada and New Zealand.

Measures

**Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001).** The severity of ASD traits was measured with the AQ (Baron-Cohen et al., 2001). The AQ was designed as a screening tool to identify autistic traits in adults. It comprises 50-items across five subscales: social skills, attention switching, attention to detail, communication and imagination. Scores on the total scale range from 0 to 50, with higher scores indicating a larger extent of ASD traits demonstrated by the person. A differentiation cut-off total AQ score of 32 or above is recommended by Baron-Cohen et al. (2001) for correctly identifying individuals with clinically significant levels of autistic traits. The internal consistency of the AQ was shown to be satisfactory in the present sample, with Cronbach’s Alpha coefficients for AQ total of .77 for ASD partners and .87 for TD partners.

**Communication and Satisfaction Scales of the ENRICH Three Couples Scales (Olson & Larson, 2008).** Relationship quality was assessed using the Communication and Satisfaction sub-scales of the ENRICH Three Couples Scales (Olson & Larson, 2008), which comprise modified sub-scales of the original ENRICH Inventory (Fournier et al., 1983; Olson et al., 1987). The construction and validation of the Three Couples Scales is described in detail in Olson, Olson-Sigg and Larson (2008). The Communication sub-scale measures the quality of a couple’s communication with ten items, e.g., “I can express my true feelings to my partner”, and “I am very satisfied with how my partner and I talk to each other”; scored on a
five-point Likert scale ranging from ‘1 – strongly disagree’ to ‘5 – strongly agree’. The Satisfaction sub-scale measures how satisfied a person is with their couple relationship across ten items, e.g., “I feel good about how we have divided household chores’ and “Our sexual relationship is satisfying and fulfilling to me”; also scored on a five-point Likert scale ranging from ‘1 – strongly disagree’ to ‘5 – strongly agree’. Scores on both sub-scales range from 0 to 100, with higher scores indicative of positive feelings regarding the quantity and quality of couple communication or greater satisfaction with most aspects of the couple relationship. The internal consistency of both scales was satisfactory: Satisfaction scale $\alpha = .75$ for ASD partners and $\alpha = .85$ for TD partners; Communication scale $\alpha = .86$ for ASD partners; and $\alpha = .89$ for TD partners.

**Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981).** Current perceptions and experiences of relationship intimacy were assessed with the Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981). The construction and validation of the PAIR is described in detail in Schaefer and Olson (1981). The PAIR is a 36-item self-report inventory measuring five domains of intimacy across five sub-scales: emotional, e.g., “My partner listens to me when I need someone to talk to”; social, e.g., “Having time together with friends is an important part of our shared activities”; sexual, e.g., “I am satisfied with the level of affection in our relationship”; intellectual, e.g., “My partner helps me clarify my thoughts”; and recreational, e.g., “We like playing and having fun together.” Intimacy related sub-scale scores range from 0 to 96, with higher scores indicating higher intimacy. The scale shows good psychometric properties. The internal consistency of the PAIR was shown to be satisfactory in the present sample, with Cronbach’s Alpha coefficients of .89 for ASD partners and .92 for TD partners.
Procedure

Following ethical review with the Deakin University Human Research Ethics Committee (2012-297), approximately 50 national and international ASD organisations, online-ASD related message boards, Facebook groups and support groups were contacted to ask for their assistance in recruiting potential TD partners currently in an ASD/TD dyad, and ASD dyads currently in an ASD/TD dyad. To be eligible to participate, couples had to be either married or in a significant relationship and one partner had to have a diagnosis of ASD from a health professional. Dyadic data for the current study were collected as part of a larger study titled, The Outcome of Autism Spectrum Disorder Diagnoses on Intimate Relationships, which included data presented in Chapter 5.

Once participants accessed the website, they first read an informed consent page describing the purpose of the study, eligibility criteria, procedures, potential benefits and risks, confidentiality, and contact information for the researchers. Participants who agreed to participate were then linked to the online questionnaire. Therefore, all persons gave their informed consent prior to their inclusion in the study. Once the initial responding participant within a dyad completed the questionnaire, they were asked to include their partner’s email address. An email was then automatically sent to their partner, asking them to complete their section. Use of the unique link ensured confidentiality of responses between partners and participants’ and protection of participants’ privacy by not storing identifying information such as email addresses.

The criteria for inclusion in this study were that: (1) individuals had to be 18 years old or above; (2) individuals had to currently be in an intimate relationship (either married or in a significant relationship); (3) both partners had to complete the questionnaire; and (4) one partner had to have a diagnosis of ASD from a registered health professional who was independent of this study.
First, participants completed a demographic questionnaire assessing inclusion criteria and also obtaining participant characteristics of age and gender. Next, participants completed a measure of ASD traits, the Autism Spectrum Quotient (AQ; Baron-Cohen et al., 2001). Following this, participants completed a measure of current relationship satisfaction and communication, the Enrich Couples Scales (Fowers & Olson, 1993). Next, participants completed a measure of current relationship intimacy, the Personal Assessment of Intimacy in Relationships (PAIR; Schaefer & Olson, 1981) Inventory.

Results

Data were screened for missing values and outliers. Missing values analysis established each case’s proportion of missing values on variables: AQ items, Satisfaction and Communication items, PAIR Inventory items, age, gender and relationship status. In total, no cases had more than 0.02 percent of values missing, thus no cases were excluded on the basis of missing data.

Demographics

Table 2 summarises the demographic and background characteristics of the sample. Table 1 reveals that the sample consisted primarily of individuals in middle adulthood. For the ASD partners, the sex distribution was 22 men (59.50%) and 15 women (40.50%). Of the ASD partners, ages ranged from 20 to 73 with a mean age of 40.65 years (SD = 14.17). For the TD partners, the sex distribution was 13 men (35.10%) and 24 women (64.90%). Of the TD partners, ages from 21 to 74 with a mean age of 41.19 years (SD = 14.44). The majority of dyads were heterosexual couples (94.60%), with the remaining being homosexual (5.40 %).
As shown in Table 2, the majority of participants reported having a diagnosis of AS (94.60%). The remainder of the sample reported having a diagnosis of Autism (2.70%) or High Functioning Autism (2.70%). The age at time of diagnosis varied considerably. For the entire ASD sample, the average age at diagnosis was 37.19 (SD = 16.00). More specifically, five individuals (13.50%) were diagnosed as children or adolescents (1-20 years); Eighteen (48.60%) were diagnosed in adulthood (21-40 years); and 14 (37.80%) were diagnosed in older adulthood (41-71 years).

Specifically, two participants were diagnosed at age 71. All participants with ASD
retained in the sample received their diagnosis from a Psychologist (64.90%), Psychiatrist (21.60%) or Neuropsychologist (13.50%).

Statistical Analyses

Analysis proceeded across several steps. Firstly, descriptive analyses were computed to compare the results between ASD and TD partner’s on each of the seven indicators of relationship quality: relationship communication and satisfaction as measured by the ENRICH scale, and five domains of intimacy as measured by the PAIR Inventory. Table 3 displays the means and mean differences tested with paired-samples t-tests between ASD and TD partners for each scale and subscale in the study.

Table 3

Means and Mean Differences between ASD and TD Partners for Each Scale and Subscale: Tested with t-tests (N = 71 dyads)

<table>
<thead>
<tr>
<th></th>
<th>ASD partners</th>
<th>TD partners</th>
<th>ASD/TD Paired Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>ASD Traits:</td>
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<td></td>
</tr>
<tr>
<td>AQ Total</td>
<td>38.84</td>
<td>5.38</td>
<td>12.65</td>
</tr>
<tr>
<td>AQ Communication</td>
<td>12.65</td>
<td>7.40</td>
<td>1.67</td>
</tr>
<tr>
<td>AQ Social Skill</td>
<td>8.51</td>
<td>1.52</td>
<td>2.57</td>
</tr>
<tr>
<td>Relationship Outcome:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td>32.27</td>
<td>6.99</td>
<td>27.68</td>
</tr>
<tr>
<td>Communication</td>
<td>31.59</td>
<td>7.11</td>
<td>29.38</td>
</tr>
<tr>
<td>Emotional Intimacy</td>
<td>61.30</td>
<td>23.83</td>
<td>41.95</td>
</tr>
<tr>
<td>Social Intimacy</td>
<td>46.38</td>
<td>19.40</td>
<td>40.00</td>
</tr>
<tr>
<td>Sexual Intimacy</td>
<td>59.14</td>
<td>25.56</td>
<td>50.05</td>
</tr>
<tr>
<td>Intellectual Intimacy</td>
<td>63.03</td>
<td>21.73</td>
<td>46.92</td>
</tr>
<tr>
<td>Recreational Intimacy</td>
<td>57.62</td>
<td>21.98</td>
<td>52.43</td>
</tr>
</tbody>
</table>

Note. Att: Attention Switching; Detail: Attention to Detail.
As shown in Table 3, and as expected, results indicated that, relative to TD partners, partners with ASD scored significantly higher on the total AQ score as well as on the five sub-scales: Communication, Social Skill, Attention Switching, Imagination and Attention to Detail. Additionally, partners with ASD scored significantly higher than TD partners on most measures of relationship quality: Satisfaction, Communication, and the five levels of intimacy (Emotional, Sexual and Intellectual). Conversely, there were no significant differences between ASD and TD partners on measures of Social and Recreational intimacy.

We also assessed correlations of AQ scores between ASD and TD partners (See Table 4). Table 4 reveals that there were no significant associations between ASD and TD partners AQ scores.

Table 4

<table>
<thead>
<tr>
<th>Variables</th>
<th>AQTotalTD</th>
<th>AQCommunicationTD</th>
<th>AQSocialSkillTD</th>
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<tbody>
<tr>
<td>AQTotalASD</td>
<td>.268</td>
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<td></td>
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<tr>
<td>AQCommunicationASD</td>
<td></td>
<td>-.033</td>
<td></td>
</tr>
<tr>
<td>AQSocialSkillASD</td>
<td></td>
<td></td>
<td>.033</td>
</tr>
</tbody>
</table>

Next, to assess the nature of the dyadic data (i.e., independence versus non-independence), the associations between partners’ responses on all relationship outcome measures (relationship satisfaction and communication as measured by the ENRICH scale and intimacy as measured by the PAIR Inventory), were investigated using Pearson product-moment correlation coefficient (See Table 5 for the Results).
## Table 5

**Pearson's Correlation Results: Correlations of ASD and TD Partners’ Responses on Relationship Outcome Variables Measured**

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction ASD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication ASD</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Emotional Intimacy ASD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Intimacy ASD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Intimacy ASD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual Intimacy ASD</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Recreational Intimacy ASD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction TD</td>
<td>.720**</td>
<td></td>
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<tr>
<td>Communication TD</td>
<td>.647**</td>
<td>.547**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Intimacy TD</td>
<td>.662**</td>
<td>.473**</td>
<td>.537**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Intimacy TD</td>
<td>.427**</td>
<td>.284</td>
<td>.264</td>
<td>.469**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Intimacy TD</td>
<td>.524**</td>
<td>.367*</td>
<td>.386*</td>
<td>.167</td>
<td>.547**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual Intimacy TD</td>
<td>.610**</td>
<td>.419**</td>
<td>.483**</td>
<td>-.051</td>
<td>.574**</td>
<td>.612**</td>
<td></td>
</tr>
<tr>
<td>Recreational Intimacy TD</td>
<td>.571**</td>
<td>.350*</td>
<td>.456**</td>
<td>-.025</td>
<td>.700**</td>
<td>.596**</td>
<td>.596**</td>
</tr>
</tbody>
</table>

*Note.* * Correlation significant at the 0.05 level (2-tailed); ** Correlation significant at the 0.01 level (2-tailed).
As shown in Table 5, ASD and TD partners’ responses across all relationship quality scores, variables 1 – 14, were significantly positively correlated. This indicated that ASD and TD partner’s scores on outcome variables were similar, with high scores on each of the measures of relationship quality for ASD partners associated with high scores on the same measures for TD partners. These significant correlations indicate a dependence of the data between the ASD and TD partners (i.e., the interdependence of the dyadic data). Therefore, the data violate the assumption of non-independence. As such, the APIM was chosen as the suitable analytic strategy over traditional statistical techniques.

**Actor-Partner Interdependence Model (APIM) – Examining Actor and Partner Effects of ASD Traits on ASD/TD Relationship Quality Outcomes**

Next, to analyse data at the level of the dyad whilst controlling for interdependencies in the data, a series of structural equation models (SEM; Kenny et al., 2006; Kenny & Ledermann, 2010) using AMOS 22.0, informed by the APIM, were undertaken to estimate the actor and partner effects of ASD traits on relationship quality outcomes. Specifically, APIM models were estimated to link AQ Total and AQ Communication and Social Skills subscales to both ASD and TD partners’ scores on measures of relationship communication, relationship satisfaction, emotional intimacy, social intimacy, sexual intimacy, intellectual intimacy and recreational intimacy. In total, 21 APIM models were run to estimate the actor and partner effects of the AQ total and Communication and Social Skills subscales, on both ASD and TD partners’ relationship quality outcomes.
**APIM linking AQ total to relationship quality outcomes.** A summary of actor and partner effects for the APIM linking AQ total to relationship outcome variables measured are displayed in Table 6.

**Table 6**

*Actor-Partner Interdependence Model of the Association between AQ Total and Relationship Outcome (N = 37 ASD/TD dyads)*

<table>
<thead>
<tr>
<th></th>
<th>b</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASD actor effect:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalASD → SatisfactionASD</td>
<td>0.050</td>
<td>0.207</td>
<td>0.810</td>
</tr>
<tr>
<td><strong>ASD partner effect:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalASD → SatisfactionTD</td>
<td>0.349</td>
<td>0.214</td>
<td>0.104</td>
</tr>
<tr>
<td><strong>TD actor effect:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalTD → SatisfactionTD</td>
<td>0.614</td>
<td>0.155</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>TD partner effect:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalTD → SatisfactionASD</td>
<td>0.355</td>
<td>0.150</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td><strong>ASD actor effect:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalASD → CommunicationASD</td>
<td>-0.120</td>
<td>0.220</td>
<td>0.586</td>
</tr>
<tr>
<td><strong>ASD partner effect:</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>AQTotalASD → CommunicationTD</td>
<td>0.161</td>
<td>0.214</td>
<td>0.452</td>
</tr>
<tr>
<td><strong>TD actor effect:</strong></td>
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<tr>
<td>AQTotalTD → CommunicationTD</td>
<td>0.274</td>
<td>0.160</td>
<td>0.086</td>
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<tr>
<td><strong>TD partner effect:</strong></td>
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<tr>
<td>AQTotalTD → CommunicationASD</td>
<td>0.751</td>
<td>0.155</td>
<td>&lt;0.001</td>
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<tr>
<td><strong>ASD actor effect:</strong></td>
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<td></td>
</tr>
<tr>
<td>AQTotalASD → EmotionalIntimacyASD</td>
<td>-0.036</td>
<td>0.737</td>
<td>0.961</td>
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<tr>
<td><strong>ASD partner effect:</strong></td>
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<td></td>
<td></td>
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<tr>
<td>AQTotalASD → EmotionalIntimacyTD</td>
<td>0.503</td>
<td>0.739</td>
<td>0.496</td>
</tr>
<tr>
<td><strong>TD actor effect:</strong></td>
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<tr>
<td>AQTotalTD → EmotionalIntimacyTD</td>
<td>2.546</td>
<td>0.536</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>TD partner effect:</strong></td>
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<td></td>
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<tr>
<td>AQTotalTD → EmotionalIntimacyASD</td>
<td>0.888</td>
<td>0.535</td>
<td>0.097</td>
</tr>
<tr>
<td><strong>ASD actor effect:</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>AQTotalASD → SocialIntimacyASD</td>
<td>-0.685</td>
<td>0.176</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>ASD partner effect:</strong></td>
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</tr>
<tr>
<td>AQTotalASD → SocialIntimacyTD</td>
<td>-0.687</td>
<td>0.203</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>TD actor effect:</strong></td>
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</tr>
<tr>
<td>AQTotalTD → SocialIntimacyTD</td>
<td>0.231</td>
<td>0.302</td>
<td>0.444</td>
</tr>
<tr>
<td><strong>TD partner effect:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalTD → SocialIntimacyASD</td>
<td>-0.140</td>
<td>0.262</td>
<td>0.594</td>
</tr>
<tr>
<td><strong>ASD actor effect:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalASD → IntellectualIntimacyASD</td>
<td>0.159</td>
<td>0.659</td>
<td>0.810</td>
</tr>
<tr>
<td><strong>ASD partner effect:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalASD → IntellectualIntimacyTD</td>
<td>0.039</td>
<td>0.708</td>
<td>0.956</td>
</tr>
<tr>
<td><strong>TD actor effect:</strong></td>
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<td></td>
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<tr>
<td>AQTotalTD → IntellectualIntimacyTD</td>
<td>1.572</td>
<td>0.514</td>
<td>&lt;0.010</td>
</tr>
<tr>
<td><strong>TD partner effect:</strong></td>
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<tr>
<td>AQTotalTD → IntellectualIntimacyASD</td>
<td>0.938</td>
<td>0.479</td>
<td>&lt;0.050</td>
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<tr>
<td><strong>ASD actor effect:</strong></td>
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</tr>
<tr>
<td>AQTotalASD → RecreationalIntimacyASD</td>
<td>-0.026</td>
<td>0.668</td>
<td>0.970</td>
</tr>
<tr>
<td><strong>ASD partner effect:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AQTotalASD → RecreationalIntimacyTD</td>
<td>-0.243</td>
<td>0.801</td>
<td>0.761</td>
</tr>
<tr>
<td><strong>TD actor effect:</strong></td>
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<tr>
<td>AQTotalTD → RecreationalIntimacyTD</td>
<td>1.246</td>
<td>0.581</td>
<td>&lt;0.050</td>
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<tr>
<td><strong>TD partner effect:</strong></td>
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<tr>
<td>AQTotalTD → RecreationalIntimacyASD</td>
<td>0.698</td>
<td>0.499</td>
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<tr>
<td><strong>ASD actor effect:</strong></td>
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<tr>
<td>AQTotalASD → SexualIntimacyASD</td>
<td>-0.209</td>
<td>0.791</td>
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<tr>
<td><strong>ASD partner effect:</strong></td>
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<tr>
<td>AQTotalASD → SexualIntimacyTD</td>
<td>-0.042</td>
<td>0.909</td>
<td>0.963</td>
</tr>
<tr>
<td><strong>TD actor effect:</strong></td>
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<tr>
<td>AQTotalTD → SexualIntimacyTD</td>
<td>1.331</td>
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<tr>
<td><strong>TD partner effect:</strong></td>
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<tr>
<td>AQTotalTD → SexualIntimacyASD</td>
<td>0.968</td>
<td>0.574</td>
<td>0.092</td>
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</table>
As displayed in Table 6, ASD AQ total was related to social intimacy, with a significant actor and partner effect of ASD AQ total score on their own and their partner’s levels of social intimacy. The size and direction of these relationships indicated that as ASD AQ total increased, social intimacy for both actor and partner decreased. Table 5 also reveals that there were no significant actor or partner effects for ASD respondents on their own or their partners’ levels of relationship satisfaction, relationship communication and emotional, intellectual, recreational or sexual intimacy.

Table 6 reveals that among the many actor and partner effects, the level of AQ score in the TD partner was related to both actor and partner effects across several domains of relationship quality. Specifically, there was a significant actor effect from TD AQ total on the TD partner’s own relationship satisfaction, and emotional, intellectual, recreational and sexual intimacy, with increases in TD AQ total associated with an increase in their scores across these domains of relationship quality. Similarly, TD AQ scores were related to a number of significant positive TD partner effects on the ASD partner’s relationship satisfaction, relationship communication, and intellectual intimacy.

**APIM linking AQ communication to relationship quality outcome.** A summary of actor and partner effects for the APIM linking AQ communication to relationship outcome is displayed in Table 7.
Table 7
Actor-Partner Interdependence Model of the Association between AQ Communication and Relationship Outcome (N = 37 ASD/TD dyads)

<table>
<thead>
<tr>
<th>Effect Type</th>
<th>Path</th>
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<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD actor effect:</td>
<td>AQCommunicationASD → SatisfactionASD</td>
<td>0.328</td>
<td>0.628</td>
<td>0.602</td>
</tr>
<tr>
<td>ASD partner effect:</td>
<td>AQCommunicationASD → SatisfactionTD</td>
<td>1.215</td>
<td>0.705</td>
<td>0.085</td>
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<tr>
<td>TD actor effect:</td>
<td>AQCommunicationTD → SatisfactionTD</td>
<td>1.895</td>
<td>0.757</td>
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<td>TD partner effect:</td>
<td>AQCommunicationTD → SatisfactionASD</td>
<td>0.856</td>
<td>0.675</td>
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<td>ASD actor effect:</td>
<td>AQCommunicationASD → CommASD</td>
<td>-0.152</td>
<td>0.633</td>
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<tr>
<td>ASD partner effect:</td>
<td>AQCommunicationASD → CommTD</td>
<td>1.366</td>
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<td>TD actor effect:</td>
<td>AQCommunicationTD → CommTD</td>
<td>2.277</td>
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</tr>
<tr>
<td>TD partner effect:</td>
<td>AQCommunicationTD → CommASD</td>
<td>1.073</td>
<td>0.680</td>
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<tr>
<td>ASD actor effect:</td>
<td>AQCommunicationASD → EmlIntimacyASD</td>
<td>0.392</td>
<td>2.093</td>
<td>0.851</td>
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<tr>
<td>ASD partner effect:</td>
<td>AQCommunicationASD → EmlIntimacyTD</td>
<td>3.428</td>
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<td>0.164</td>
</tr>
<tr>
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<td>AQCommunicationTD → EmlIntimacyTD</td>
<td>7.755</td>
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</tr>
<tr>
<td>TD partner effect:</td>
<td>AQCommunicationTD → EmlIntimacyASD</td>
<td>4.280</td>
<td>2.249</td>
<td>0.057</td>
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<tr>
<td>ASD actor effect:</td>
<td>AQCommunicationASD → SocIntimacyASD</td>
<td>-2.044</td>
<td>1.752</td>
<td>0.243</td>
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<tr>
<td>ASD partner effect:</td>
<td>AQCommunicationASD → SocIntimacyTD</td>
<td>-0.108</td>
<td>1.848</td>
<td>0.953</td>
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<td>TD actor effect:</td>
<td>AQCommunicationTD → SocIntimacyTD</td>
<td>0.897</td>
<td>1.986</td>
<td>0.651</td>
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<td>TD partner effect:</td>
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<td>0.637</td>
<td>1.882</td>
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<td>ASD actor effect:</td>
<td>AQCommunicationASD → IntIntimacyASD</td>
<td>0.663</td>
<td>1.933</td>
<td>0.732</td>
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<tr>
<td>ASD partner effect:</td>
<td>AQCommunicationASD → IntIntimacyTD</td>
<td>1.896</td>
<td>2.153</td>
<td>0.378</td>
</tr>
<tr>
<td>TD actor effect:</td>
<td>AQCommunicationTD → IntIntimacyTD</td>
<td>1.896</td>
<td>2.153</td>
<td>0.378</td>
</tr>
<tr>
<td>TD partner effect:</td>
<td>AQCommunicationTD → IntIntimacyASD</td>
<td>3.317</td>
<td>2.077</td>
<td>0.110</td>
</tr>
<tr>
<td>ASD actor effect:</td>
<td>AQCommunicationASD → RecIntimacyASD</td>
<td>0.941</td>
<td>1.994</td>
<td>0.637</td>
</tr>
<tr>
<td>ASD partner effect:</td>
<td>AQCommunicationASD → RecIntimacyTD</td>
<td>0.091</td>
<td>2.366</td>
<td>0.969</td>
</tr>
<tr>
<td>TD actor effect:</td>
<td>AQCommunicationTD → RecIntimacyTD</td>
<td>3.815</td>
<td>2.542</td>
<td>0.133</td>
</tr>
<tr>
<td>TD partner effect:</td>
<td>AQCommunicationTD → RecIntimacyASD</td>
<td>2.015</td>
<td>2.142</td>
<td>0.326</td>
</tr>
<tr>
<td>ASD actor effect:</td>
<td>AQCommunicationASD → SexIntimacyASD</td>
<td>-0.121</td>
<td>2.334</td>
<td>0.959</td>
</tr>
<tr>
<td>ASD partner effect:</td>
<td>AQCommunicationASD → SexIntimacyTD</td>
<td>0.285</td>
<td>2.727</td>
<td>0.917</td>
</tr>
<tr>
<td>TD actor effect:</td>
<td>AQCommunicationTD → SexIntimacyTD</td>
<td>2.602</td>
<td>2.930</td>
<td>0.374</td>
</tr>
<tr>
<td>TD partner effect:</td>
<td>AQCommunicationTD → SexIntimacyASD</td>
<td>2.049</td>
<td>2.508</td>
<td>0.414</td>
</tr>
</tbody>
</table>

Note. Comm = communication; em = emotional; soci = social; intellect = intellectual; rec = recreational; sex = sexual.

As shown in Table 7, there were no actor or partner effects for ASD respondents on their own or their TD partner’s relationship outcome. Conversely, AQ
Communication had three actor effects for TD respondents – it positively influenced their satisfaction, relationship communication and emotional intimacy. This indicated that as the TD partner’s communication skills worsened, they experienced improved relationship satisfaction, relationship communication and emotional intimacy.

**APIM Linking AQ social skill to relationship outcome.** See Table 8 for a summary of pathways between AQ social skill and relationship outcome for ASD/TD dyads.
Table 8

*Actor-Partner Interdependence Model of the Association between AQ Social Skill and Relationship Outcome (N = 37 ASD/TD dyads)*

<table>
<thead>
<tr>
<th>Effect</th>
<th>Association</th>
<th>b</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASD actor effect:</td>
<td>AQSocialSkillASD → SatisfactionASD</td>
<td>0.699</td>
<td>0.699</td>
<td>0.318</td>
</tr>
<tr>
<td>ASD partner effect:</td>
<td>AQSocialSkillASD → SatisfactionTD</td>
<td>1.795</td>
<td>0.779</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>TD actor effect:</td>
<td>AQSocialSkillTD → SatisfactionASD</td>
<td>1.608</td>
<td>0.501</td>
<td>&lt;0.010</td>
</tr>
<tr>
<td>TD partner effect:</td>
<td>AQSocialSkillTD → SatisfactionASD</td>
<td>1.111</td>
<td>0.450</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>ASD actor effect:</td>
<td>AQSocialSkillASD → CommASD</td>
<td>0.117</td>
<td>0.757</td>
<td>0.877</td>
</tr>
<tr>
<td>ASD partner effect:</td>
<td>AQSocialSkillASD → CommTD</td>
<td>1.040</td>
<td>0.806</td>
<td>0.197</td>
</tr>
<tr>
<td>TD actor effect:</td>
<td>AQSocialSkillTD → CommTD</td>
<td>1.958</td>
<td>0.519</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TD partner effect:</td>
<td>AQSocialSkillTD → CommASD</td>
<td>0.706</td>
<td>0.487</td>
<td>0.147</td>
</tr>
<tr>
<td>ASD actor effect:</td>
<td>AQSocialSkillASD → EmIntimacyASD</td>
<td>0.034</td>
<td>2.498</td>
<td>0.989</td>
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<tr>
<td>ASD partner effect:</td>
<td>AQSocialSkillASD → EmIntimacyTD</td>
<td>2.671</td>
<td>2.771</td>
<td>0.335</td>
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<td>TD actor effect:</td>
<td>AQSocialSkillTD → EmIntimacyASD</td>
<td>6.803</td>
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<td>TD partner effect:</td>
<td>AQSocialSkillTD → EmIntimacyASD</td>
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<td>1.607</td>
<td>0.065</td>
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<td>ASD actor effect:</td>
<td>AQSocialSkillASD → SocIntimacyASD</td>
<td>-4.195</td>
<td>1.992</td>
<td>&lt;0.050</td>
</tr>
<tr>
<td>ASD partner effect:</td>
<td>AQSocialSkillASD → SocIntimacyTD</td>
<td>-0.581</td>
<td>2.203</td>
<td>0.792</td>
</tr>
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<td>TD actor effect:</td>
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<td>0.092</td>
<td>1.418</td>
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<td>ASD partner effect:</td>
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<td>2.660</td>
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<td>0.293</td>
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<td>TD actor effect:</td>
<td>AQSocialSkillTD → IntIntimacyASD</td>
<td>3.578</td>
<td>1.627</td>
<td>&lt;0.050</td>
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<tr>
<td>TD partner effect:</td>
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<td>2.776</td>
<td>1.460</td>
<td>0.057</td>
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<td>AQSocialSkillASD → RecIntimacyASD</td>
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<td>0.687</td>
</tr>
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<td>ASD partner effect:</td>
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<td>2.813</td>
<td>0.546</td>
</tr>
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<td>TD actor effect:</td>
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<td>1.810</td>
<td>0.170</td>
</tr>
<tr>
<td>TD partner effect:</td>
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<td>1.919</td>
<td>1.515</td>
<td>0.205</td>
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<td>ASD actor effect:</td>
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<td>ASD partner effect:</td>
<td>AQSocialSkillASD → SexIntimacyTD</td>
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<td>0.799</td>
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<td>TD actor effect:</td>
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<td>0.099</td>
</tr>
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<td>TD partner effect:</td>
<td>AQSocialSkillTD → SexIntimacyASD</td>
<td>2.678</td>
<td>1.744</td>
<td>0.125</td>
</tr>
</tbody>
</table>

*Note.* Comm = communication; em = emotional; soci = social; intellect = intellectual; rec = recreational; sex = sexual.

Table 8 reveals AQ social skills had only a single actor effect for ASD respondents – it negatively influenced their social intimacy. Further, AQ social skills had a single partner effect for ASD respondents – it influenced their TD partner’s
relationship satisfaction. Paradoxically, as the ASD partner’s social skills worsened, their TD partner experienced improved relationship satisfaction. AQ social skills had several actor effects for TD respondents, including relationship satisfaction, communication, emotional intimacy, and intellectual intimacy. AQ social skills had a single partner effect for TD respondents – it impacted significantly upon relationship satisfaction.

**Discussion**

The aim of the current study was to replicate and extend the work of Pollmann et al. (2010) by exploring the relational impact of ASD traits on the relationship outcome of a clinical sample of ASD/TD dyads. Further, relationship outcome was broadened to include relationship communication and intimacy, in addition to relationship satisfaction. It was hypothesised that: (1) severity of ASD partners’ symptoms overall (AQ Total), and severity of communication and social skills deficits (AQ Communication and AQ Social Skills), would predict their own poorer outcome across all relationship outcomes assessed (ASD actor effects); and (2) the severity of ASD partner’s symptoms overall, particularly ASD communication and social skills deficits, would predict poorer outcome for TD partners across all relationship outcomes assessed (ASD partner effects).

The results partially supported the first hypothesis regarding ASD actor effects. Specifically, the results demonstrated that with increased severity of ASD respondents’ overall symptomatology, and poorer social and communication skills, ASD respondents experienced poorer social intimacy. This apparent ASD actor effect of ASD traits on one’s own social intimacy, which refers to having common friends and a shared social network (Schaefer & Olson, 1981), is in keeping with the views of TD partners in the non-academic literature that their relationships lack
‘togetherness’, including an absence of social interactions with other couples and friends (e.g., Aston, 2001, 2003, 2012; Bentley, 2007).

However, our findings suggest that this lack of ‘togetherness’ does not negatively impact the ASD partner’s perception of relationship quality, given there was no ASD actor effect on relationship satisfaction, communication and all other domains of intimacy measured. This finding contradicted the work of Pollmann, Finkenauer and Begeer (2010), which found that severity of ASD traits of men in a non-clinical sample was inversely related to their self-reported relationship satisfaction. These discrepancies could be explained by sampling differences. For instance, the potential for response bias may have been more applicable to the current clinical ASD sample, given an ASD diagnosis is often associated with limited insight into one’s own behaviour in line with the executive dysfunction hypothesis (Frith, 2003), potentially confounding our measures of relationship outcome (Bishop & Seltzer, 2012). Whilst the AQ does attempt to counter response bias by wording items with an equal number of positive and negative response sets and asking for an individual’s preference rather than self-judgement of behaviour (Broadbent, Galic, & Stokes, 2013), the same cannot be said for measures of relationship outcome.

Nonetheless, the absence of an ASD actor effect in most relationship outcomes assessed in the current study was consistent with studies that included individuals with a professional diagnosis of ASD (Lau & Peterson, 2011; Renty & Roeyers, 2007). The work of both Lau and Peterson (2011) and Renty and Roeyers (2007) found that one’s own ASD diagnosis did not negatively impact the individual’s own relationship satisfaction. Thus together with previous findings, the current results may be taken as evidence favouring the view that, for ASD partners, autistic traits have minimal impact on their own perception of relationship outcome.
In partial support of our second hypothesis, as ASD partners’ overall symptomatology increased, and with increases in their social and communication deficits, TD partners’ experienced poorer social intimacy. Conceivably, adults with ASD with more severe communication and social skills impairment are more likely to withdraw into solitude, disengaging from their partner and shared social pursuits. It could be speculated that absence of communication within the relationship and few opportunities for connection with others outside the relationship, precipitates increased loneliness, isolation and impaired well-being in TD partners.

Yet, contrary to our predictions, for TD partners, there was no link between severity of ASD partners’ social and communication skills deficits and poorer relationship outcome in any other areas assessed: satisfaction, communication and other domains of intimacy. This finding was consistent with previous research with a non-clinical sample (Pollmann et al., 2010), which also found there was no partner-effect of autistic traits on the partners’ relationship outcome. However, this finding counters a number of claims in the clinical (e.g., Attwood, 2007) and non-academic literature (e.g., Aston, 2003) that ASD traits interfere with effective relationship communication, intimacy and satisfaction. Nonetheless, the current findings are consistent with views in clinical (Attwood) and narrative accounts (e.g., Aston) that ASD partners bring many strengths and positive qualities to a relationship. As such, it may be that these positive qualities offset challenges present in the relationship.

However, the finding that TD partners’ relationship outcome was largely uninfluenced by ASD partners’ autistic traits contradicted the work of Renty and Roeyer’s (2007), which suggested that for a clinical ASD sample and their TD partners, TD partners experienced poor relationship satisfaction. This could be explained by the fact that the Renty and Roeyer’s study did not use dyadic data analytic techniques to assess actor and partner effects, thus ignoring non-
independence (Kenny, 1996). As such, in the study by Renty and Roeyer’s, the test of significance may have been biased.

Paradoxically, we found that as ASD respondents’ social skills worsened, TD partners’ level of relationship satisfaction increased. This suggests that the TD partner may have had more social control in the relationship, potentially leading to increased relationship satisfaction. Alternatively, TD partners may receive satisfaction from providing support to their ASD partners. Interestingly, we also found that as TD respondents’ social skills worsened, ASD partners’ level of relationship satisfaction increased, possibly rendering the TD partner more dependent upon the ASD partner, and moving control back to the ASD partner. Together, these findings may suggest that when both partners’ possess limited social skills, there may be increased similarity of needs and expectations of each partner. For instance, if TD partners need for socialising is low, TD partners would be less demanding of their ASD partner and more accommodating to his or her difficulties in this area, bringing about greater harmony in the relationship.

In fact, whilst not pertinent to our hypotheses, we consistently found that as TD partners ASD trait severity increased, their own relationship outcomes in certain domains improved (i.e., TD actor effect) as did their partners to a lesser extent (i.e., TD partner effect). Specifically, the results revealed that higher severity of ASD traits (AQ total) in TD partners was associated with increases in own ratings of relationship satisfaction, emotional intimacy, intellectual intimacy, recreational intimacy and sexual intimacy. Similarly, higher severity of communication and social skill impairment (AQ Communication and AQ Social Skill) for TD partners was associated with increases in own relationship satisfaction, communication, and emotional intimacy. In addition, higher severity of social skill deficit was associated with improved intellectual intimacy. Further, we found that higher ASD traits in the
TD partner were associated with improved relationship outcome for ASD partners in some domains. Specifically, higher severity of TD ASD traits (AQ total) were associated with improved relationship satisfaction and intellectual intimacy for ASD partners, and higher severity of social skill impairment in TD partners was associated with increased satisfaction for ASD partners. Thus we found preliminary evidence to suggest that for ASD/TD dyads, higher severity of TD ASD traits predicts improved relationship outcome, especially for TD partners.

It may be that similarity between ASD and TD partners on ASD traits (i.e., assortative mating) is associated with comparable needs, expectations and priorities between partners and thus greater harmony within the relationship. As discussed in Chapter 4, non-scholarly literature authored by TD partners often discusses that ASD and TD partners come from different cultures, or different planets, with some TD partners describing their ASD partner as a ‘stranger’ (e.g., Aston, 2001, 2003, 2012). Thus it may be that when TD partners share at least some degree of autistic traits with their ASD partner, there may be greater mutual understanding of how the other works. In turn, TD partners may be less likely to hold unrealistic expectations for their ASD partner together with more acceptance and understanding of atypical behaviours.

Whilst such findings appear to support Baron-Cohen’s (2006a) assortative mating hypothesis of ASD, which speculates that ASD is the genetic result of two high systematisers mating with one another, we did not find evidence to suggest that ASD traits of ASD and TD partners were related, and there were statistically significant differences between all ASD and TD AQ scores. However, what our results suggest is that when there is assortative mating with regard to ASD traits for ASD/TD dyads, relationship outcome is improved. In order to assess the assortative mating theory of ASD together with relationship outcome, future research should
seek to replicate the current findings whilst also collecting information on offspring to determine whether such TD actor and partner effects are associated with an increased likelihood of having a child with ASD.

Results of this study should be interpreted with the following limitations in mind. First, the sample was not nationally representative given recruitment was primarily online. Thus, findings from this study may not generalise to other samples with different clinical characteristics. Second, sample size and power considerations may have hindered our ability to test more detailed mediating and moderating models that could shed further light on the mechanisms underlying the association between ASD traits and relationship outcome. Nonetheless, our dyadic analysis included a larger sample of ASD/TD couples than the previous research in this area (Lau & Peterson, 2011; Renty and Roeyers, 2006). Third, as stated above, the potential contribution of response bias to our findings cannot be ruled out given the AQ, PAIR, satisfaction and communication scales measure self-reported behaviours, thoughts and feelings. In particular, we must exercise caution in making inferences from the current findings that adults with ASD in relationships largely do not experience impaired relationship satisfaction, communication and intimacy. The potential for response bias may be particularly applicable to the ASD population, given an ASD diagnosis is often associated with limited insight into one’s own behaviour (Bishop & Seltzer, 2012). As such, it is possible that participants with ASD who characteristically experience difficulty with self-awareness of emotions found it difficult to understand and respond to the measures of relationship outcome validly. In line with this limitation, it is recommended that future research in this area conduct fieldwork with ASD participants in order to ensure validity of items and measures used. Additionally, it must be noted that there is some speculation regarding the validity of the AQ in community samples (Brugha et al. 2011), thus findings require replication.
Nonetheless, the AQ was not relied upon in the current study as a measure of diagnosis, as all participants were required to verify (via self-report) that they had a diagnosis of ASD from a health professional. Fourth, given that both partners in the dyad participated, it may be that the current study was limited to a unique portion of this population in which partners were likely to be accepting of the ASD diagnosis and open to discussing the impact on their relationship. Last, the current study focused on relationship outcome to the exclusion of psychosocial outcome. However, given the results of our second study indicated that TD partners in an ASD/TD experience poor relationship outcome relative to controls and ASD partners, it may be that the detrimental impact of ASD traits on social intimacy precipitates decline in TD partners’ psychosocial wellbeing.

Despite these caveats, findings of this study yield some important clinical implications. Specifically, results undermine the notion that ASD/TD couples are vulnerable to poor relationship outcome due to the manifestation of ASD traits within the relationship. However, results suggest that social intimacy is hindered in these relationships, which may be associated with poor outcome particularly for TD partners whose needs for connection within and outside the relationship are likely to outweigh their ASD partners’ needs. Therefore, interventions for ASD/TD dyads should seek to target social intimacy through promoting engagement in shared activities with the aim of developing a sense of teamwork and enhanced intimacy. This may act as a buffer against the potentially poor psychosocial outcome of TD partners, by increasing their sense of connectedness to their partner and others. Further, this study is the first to provide evidence that the relationship outcome of TD and ASD partners within an ASD/TD dyad is a function of TD ASD trait severity. It follows that interventions for ASD/TD couples should seek to enhance both partners understanding and tolerance of ASD traits within the relationship.
In sum, contrary to our hypotheses, when jointly examining ASD traits of both partners within an ASD/TD dyad in the one model (APIM; Kenny et al., 2006), there were limited direct negative links between the ASD partners’ ASD traits and TD partner’s relationship outcome. Specifically, we found that for TD partners in an ASD/TD dyad, ASD trait severity of one’s partner was not important to the prediction of self-reported TD relationship satisfaction, communication or all areas of intimacy albeit social intimacy. However, we found preliminary evidence to suggest that greater spousal similarity on ASD traits is associated with greater relationship outcome, especially for TD partners. Future research should further explore the relational impact of ASD by recruiting a larger sample of clinical ASD/TD dyads and utilising dyadic data analysis techniques, to permit the formal testing of other possible mediators of the link between ASD traits and relationship outcome. In particular, an interesting next step would be to simultaneously assess ASD traits, relationship outcome and psychosocial outcome in ASD and TD couples using a more complex APIM.
Chapter 7 - Overall Discussion

The three studies reported in this thesis contributed to the adult ASD literature by providing information about the influence of autistic traits on intimate relationship development and experiences. The first study, presented in Chapter 4, explored the association between ASD traits and intimate relationship development in a large sample of adults with a professional diagnosis of ASD. The second study, presented in Chapter 5, investigated the relationship quality and functioning of adults with a professional diagnosis of ASD currently in an ASD/TD dyad and of TD partners currently in an ASD/TD dyad, relative to TD controls. Last, the third study, presented in Chapter 6, expanded on previous research investigating relationship outcome of ASD/TD dyads (Lau & Peterson, 2011; Pollmann, Finkenauer & Begeer, 2010; Renty & Roeyers, 2007) by applying a model of dyadic relationships, the Actor-Partner Interdependence Model (APIM; Kashy & Kenny, 2000; Kenny, 1996; Kenny & Cook, 1999; Kenny et al., 2006; Kenny & Ledermann, 2010). Use of the APIM with ASD/TD dyads allowed us to measure the bidirectional influence of ASD and TD partner’s ASD trait severity on both partner’s relationship outcome, whilst accounting for the interdependence of dyadic data.

Taken together, the overall key findings of this thesis are fivefold. First, we found that the core features of ASD (social and communication deficits) appear to negatively impact the ability of adults with ASD to develop intimate relationships. Further, we found preliminary evidence to suggest that these traits impact the relationship development of males and females differently. Second, strengths associated with ASD (circumscribed interests) were associated with better relationship development in our large sample of adults with clinical ASD, suggesting that traits in non-social domains may compensate for difficulties in the social realm. Third, TD partners within ASD/TD dyads demonstrated the lowest scores on almost
all aspects of relationship outcome assessed in this study, relative to ASD partners and TD controls. Fourth, when assessing the relational impact of autistic traits using dyadic data (ASD/TD couples) and using the APIM as the analytic approach, autistic traits of the individual diagnosed with ASD had minimal impact on their own or their TD partner’s relationship outcome, with the exception of social intimacy. Fifth, we found preliminary evidence to suggest that for ASD/TD dyads, higher severity of TD ASD traits predicts improved relationship outcome for ASD/TD dyads, especially TD partners. We now turn to a discussion on the key findings in more detail.

**Relationship Development**

In sum, the findings of this thesis suggest that autistic symptomatology in the core social and communication domains are associated with impaired relationship development, yet characteristics in non-social domains may offset these challenges. Specifically, in reference to Study 1 (see Chapter 4), for our large sample of adults with ASD, higher severity of deficits in the social realm predicted fewer intimate relationships and an increased likelihood of being single. However, in line with a strengths-based perspective, we found that higher severity of circumscribed interests predicted a higher number of previous relationships.

Theory of Mind (ToM) impairment, a cognitive theoretical model of ASD, provides some explanation as to why adults with ASD may have difficulty developing intimate relationships (Baron-Cohen et al., 1985). Conceivably, given the reciprocal nature of intimate relationships and the complexity of interpreting social cues, impairments in ToM would pose several barriers to relationship development (Attwood, 2007). For instance, research demonstrates that individuals with ASD have difficulty reading the social and emotional messages in someone’s eyes (Baron-Cohen, Wheelwright, & Jolliffe, 1997). In addition, ToM impairment is associated
with a tendency towards literal interpretations (Attwood). In the non-academic literature, TD partners (e.g., Aston, 2001) have spoken of the misunderstandings that can occur given this and associated confusion or frustration that their ASD partner did not understand their intention. At times, difficulty noticing or interpreting social cues may be interpreted by potential partners as disrespectful or rude. For example, Attwood discusses that individuals with ASD may talk excessively about their special interest, with little awareness of subtle social cues of annoyance or boredom. Attwood also discusses how ToM impairment can precipitate anxiety in individuals with ASD, which may conceivably deter individuals from initiating intimate relationships. Further, individuals with ASD are said to withdraw into solitude to find a sense of calm and peace, given associated difficulties in the social realm, thus limiting their opportunities of meeting and connecting with potential partners.

However, our finding regarding the potential compensatory mechanism of non-social ASD characteristics, reminds us that individuals with ASD have many unique qualities and strengths that may facilitate good outcomes in relationship development. For instance, Attwood (2007) states that special interests can often play a positive role the individual’s life, such as by providing a sense of pleasure and facilitating social connections over shared interests. Frith’s (2003) weak central coherence theory of ASD provides some explanation for the potential compensatory role of circumscribed interests in relationship development. The weak central coherence theory describes a detail-focused cognitive style associated with superior perceptual processing abilities and associated restricted, fixated and circumscribed interests. From this perspective, circumscribed interests can be viewed as a strength that may assist individuals in achieving social success and admiration, increasing sense of identity and self-confidence (Attwood).
Interestingly, we also found that females may have better relationship development outcomes than males. Specifically, the finding that females with ASD had more relationship experience, may reflect the camouflage hypothesis of ASD (Attwood, 2007). From this perspective, it may be that females with ASD are more likely to develop coping mechanisms to compensate for difficulties in relationship development, allowing them to conceal social impairments through imitating appropriate social behaviours. Additionally, in line with the extreme male brain theory of ASD (Baron-Cohen, 2002), it may be that empathising and social connection are more natural for females with ASD, further facilitating the ability to compensate for difficulties in the social realm.

Further, whilst exploratory in nature, we found preliminary evidence to suggest that ASD traits differentially impact males and females with ASD with regard to relationship development. Specifically, we found that adequate social skills were more important for females with ASD, and adequate communication skills were more important for males. For males with ASD, it could be speculated that communication deficits interfere with relationship development in light of a traditional social stereotype typecasting men as relationship initiators (Byers et al., 2013). From this perspective, males with ASD with greater communication impairments would have difficulty using direct strategies to initiate relationships, such as by verbally requesting dates. Consistent with this view, Attwood (2007) states that males who can ‘talk the talk’ and possess appropriate skills in pragmatic language and the art of initiating and maintaining reciprocal conversation, would have greater success in developing intimate relationships (Attwood, 2007). Further, this finding supports the view presented in Chapter 3 that the ability to communicate, particularly with regard to reciprocal sharing of emotions, is vital to the development of intimacy from the perspective of female partners (e.g., Cordova et al., 2005).
Therefore, males with ASD who have greater difficulty communicating may discourage potential female partners. On the other hand, limited social skills may be endearing to potential female partners, with expert clinical opinion (Attwood, 2007) stating that there can be a strong maternal compassion for the limited social skills of men with ASD.

Given our relative lack of knowledge regarding the female profile of ASD, it is more difficult to interpret the finding that for females with ASD, higher severity of social skill deficit interferes with relationship development. Again, in light of the traditional gender role casting men as relationship initiators, this finding implies that females’ ability to develop relationships is less dependent on verbal and nonverbal communicative behaviors than it is on adequate social skills necessary for joint attention and social reciprocity, appropriate social responding and social interaction. It may be that females with better social skills are more likely to engage in social pursuits where the likelihood of meeting a partner is greater. Alternatively, as stated above, females may be better able to compensate or ‘mask’ their limitations in social communication, increasing the likelihood that others may overlook difficulties in this area (Gould & Ashton-Smith, 2011).

However, we should be cautious in inferring male and female differences from these results given the overrepresentation of female participants in our first study. Further, there is a lack of theoretical underpinning and empirical literature to explain these male and female differences in the adult autism profile, making it difficult to interpret such findings beyond speculation. As such, replication is needed in a sample equally representative of males and females with an ASD diagnosis.

Interestingly, results of our first study demonstrated that both chronological age and diagnosis age predict relationship development outcome. Specifically, we found that earlier diagnoses resulted in an increased number of relationships with
chronological age, while late diagnosis tended to be associated with fewer relationships as age increased. Thus, findings highlight that early detection and intervention may yield better outcomes with regard to relationship development. Together with our findings regarding the impact of ASD traits on relationship development, these early intervention programs should target social and communication skills, whilst enhancing strengths associated with ASD.

In sum, the results of the multiple ways of assessing relationship development in adults with ASD in our first study converged to underscore the importance of considering a strengths-based understanding in addition to a deficit-focused framework. Findings demonstrated that adults with ASD often have difficulties in developing intimate relationships particularly with regard to limited communication and social skills. However, they are also able to compensate for difficulties in social domains with non-social skills, including circumscribed interests, and many are able to develop long-term intimate relationships. These findings point to the importance of further developing strengths-based interventions for children and adults with high-functioning ASD. As such, future research should further investigate the potential compensatory mechanism of circumscribed interests for relationship development, perhaps in a longitudinal study of individuals with ASD.

**Relationship Functioning: ASD/TD Dyads**

A key finding of this thesis was that, in our second study, TD partners within an ASD/TD dyad reported the lowest scores on relationship satisfaction, communication, and all domains of intimacy assessed, relative to ASD partners and TD control partners. This finding concurred with clinical and personal accounts of life with an ASD partner (e.g., Attwood, 2007; Bentley, 2007; Weston, 2010) as well as the Renty and Roeyers (2007) study, which found that relationship satisfaction of
female TD partners was inversely associated with her partner’s ASD trait severity. However, unexpectedly, our dyadic analyses of ASD/TD dyads presented in Chapter 3 did not find evidence to suggest that TD partners experience poor relationship outcome as a function of their ASD partner’s traits. As such, findings of the present thesis remind us that there are many factors that may influence any relationship, including ASD/TD couples, and cautions against inferences that having ASD necessarily implies severely impaired couple relationships.

However, in light of the results of our second study, it is apparent that having a partner with a diagnosis of ASD is associated with impaired relationship outcomes for TD partners. Together with the absence of ASD partner effects on the TD partner in our third study, it could be speculated that relationship difficulties experienced by TD partners are associated with how ASD traits are managed by their partner rather than the severity of his or her traits. To clarify, Attwood (2007) emphasises that individuals with ASD employ many compensatory and adjustment strategies in order to cope with their symptomatology, some of which can be maladaptive and lead to poor outcomes. Maladaptive coping strategies include depression in response to continued failures in social ability and relationship skills, with associated social withdrawal. Conceivably, ASD partners in an ASD/TD dyad may experience this prior to the relationship (e.g., in childhood) and may also experience this in the relationship through difficulty meeting their TD partners’ needs, potentially maintaining depression and social withdrawal. In addition, some individuals are said to over-compensate for difficulties in social situations by denying a problem or externalising blame (Attwood). Conceivably, use of these strategies could be associated with poor outcomes for TD partners, particularly if partners with ASD are unable to see problems in the relationship noticed by their TD partner. However, given these strategies were not assessed in the current thesis, this interpretation is
merely speculative. Future research should seek to assess use of these strategies in
ASD partners and the impact on ASD/TD relationship outcomes.

Alternatively, our analysis of actor and partner effects of ASD traits in our third
study may have been limited by the self-report nature of questionnaires employed.
Drawing on the executive function theory of ASD (Frith, 2003), ASD is associated
with various executive problems, including impaired self-reflection and self-
monitoring. As a result, it may be that impaired insight in individuals with ASD
limited the clinical utility of self-report measures in the current thesis. However,
given we only included individuals who met the established differentiation cut-off
score of 32 or above, which is found to capture 80% of individuals with ASD
(Broadbent et al., 2013), and those who had received a professional diagnosis, it is
unlikely that ASD symptoms were underreported. Further, the AQ is a valid and
reliable measure that safeguards against response bias with half the items worded to
produce a ‘disagree’ response, and half an ‘agree’ response (Baron-Cohen et al.,
2001). Nevertheless, the AQ is a screening tool and it may be that a more
comprehensive diagnosis assessment tool would have permitted a clearer measure of
ASD symptomatology. Unfortunately, given the online nature of the studies
presented in this thesis, we were unable to use such measures. Future research should
seek to replicate our third study in a community setting by measuring ASD traits
with a diagnostic assessment tool.

Nevertheless, our dyadic analysis of relationship outcome in ASD/TD dyads was
the first to employ the APIM and therefore the first to account for interdependence in
clinical ASD/TD dyads when assessing the link between ASD traits and relationship
outcome. As such, our findings may accurately reflect that ASD traits have minimal
direct impact on TD partner’s relationship outcome. However, these findings may
not generalise to those couples where a diagnosis has not yet occurred or has recently
occurred. As such, the current findings do not deny the opinions and experience of experts in the field and TD partners. For instance, in the present thesis, we only captured the experiences of couples that have benefited from a professional diagnosis of ASD, given this was a requirement for inclusion. Attwood (2007) states that many ASD individuals within ASD/TD couples that he has encountered in clinical practice have not benefited from an early diagnosis. Further, the non-academic literature and expert views often highlight the benefits of a diagnosis for ASD/TD relationship outcome. It is likely that increased understanding and acceptance ensues for both partners following a diagnosis, and the couple may be able to work out effective strategies for problematic areas (Aston, 2001). As such, future research should investigate relationship duration and age at diagnosis as potential mediators of the link between ASD traits and relationship outcome, using a more complex APIM.

Further, it may be that TD partners experience poor psychosocial outcomes such as loneliness as a function of having a partner with ASD (Attwood, 2007; Bostock-Ling et al., 2012). Unfortunately, we did not measure psychosocial outcomes in the present thesis. However, in both our second and third studies, we found evidence to suggest that social intimacy (having common friends and a shared social network) is particularly poor for ASD/TD dyads (Schaefer & Olson, 1981). Further, results of our third study revealed that poor social intimacy in both ASD and TD partners was directly impacted by ASD partner’s severity of communication and social skill impairment. This is in keeping with the views of TD partners in the non-academic literature that their relationships lack ‘togetherness’, including an absence of social interactions with other couples and friends (e.g., Aston, 2001, 2003, 2012; Bentley, 2007). A lack of social intimacy may be particularly difficult for TD partners, whose needs for connection within and outside the relationship are likely to outweigh their
ASD partners’ needs. Thus, it may be that limited opportunities to socialise outside of the relationship precipitates a decline in TD partners’ psychosocial wellbeing.

Although not a primary aim of this thesis, our ASD/TD dyadic analyses revealed interesting findings with regard to the impact of TD partners’ ASD trait severity on their own relationship outcome (i.e., TD actor effect). That is, we consistently found that higher severity of ASD traits in TD partners were associated with their own better relationship outcome. These findings suggest that TD partners who share commonalities with their ASD partner and may be driven by similar needs, expectations and priorities, experience a more positive relationship outcome. As discussed in Chapter 4, ASD and TD partners are often described in the non-scholarly literature as coming from different cultures, or different planets, with some TD partners describing their ASD partner as a ‘stranger’ (e.g., Aston, 2001, 2003, 2012). In turn, these findings suggest that when TD partners share at least some degree of autistic traits with their ASD partner, there may be greater mutual understanding of how the other works. For example, TD individuals tend to be driven by a desire for social connectedness with this different relational need conceivably being a large source of conflict within ASD/TD dyads, and a particular source of dissatisfaction for TD partners within an ASD/TD dyad. Contrariwise, for ASD and TD partners who share characteristics of autistic traits, it is surmised that TD partners may hold less unrealistic expectations for their ASD partner together with more acceptance and understanding of atypical behaviours.

It may be that similarity between ASD and TD partners on ASD traits (i.e., assortative mating) is associated with comparable needs, expectations and priorities between partners and thus greater harmony within the relationship. As discussed in Chapter 4, non-scholarly literature authored by TD partners often discusses that ASD and TD partners come from different cultures, or different planets, with some TD
partners describing their ASD partner as a ‘stranger’ (e.g., Aston, 2001, 2003, 2012). Thus it may be that when TD partners share at least some degree of autistic traits with their ASD partner, there may be greater mutual understanding of how the other works. In turn, TD partners may be less likely to hold unrealistic expectations for their ASD partner together with more acceptance and understanding of atypical behaviours.

Whilst such findings appear to support Baron-Cohen’s (2006a) assortative mating hypothesis of ASD, which speculates that ASD is the genetic result of two high systematisers mating with one another, we did not find evidence to suggest that ASD traits of ASD and TD partners were related, and there were statistically significant differences between all ASD and TD AQ scores. However, what our results suggest is that when there is assortative mating with regard to ASD traits for ASD/TD dyads, relationship outcome is improved. In order to assess the assortative mating theory of ASD together with relationship outcome, an interesting next step would be to replicate the current findings whilst also collecting information on offspring to determine whether such TD actor and partner effects are associated with an increased likelihood of having a child with ASD.

These findings highlight the importance of mutual understanding within ASD/TD dyads and may help to guide interventions for this population. It therefore seems particularly important to further investigate the potential compensatory relational impact of TD partner autistic trait severity on ASD/TD relationship outcome. Indeed, these findings may illuminate strategies for achieving successful ASD/TD relationships, and for promoting increased mutual understanding. Future research should further explore the bidirectional influences of ASD and TD partner’s characteristics on relationship outcome by utilising dyadic data analysis and by formally testing other possible mediators of this process.
Limitations and Strengths

Interpretation of the overall findings of this thesis must be tempered by several considerations. First, samples across our three studies were not nationally representative given recruitment was primarily online. Thus, findings from this thesis may not generalise to other samples with different clinical characteristics. Second, the sample used in our first and second studies comprised a large proportion of females and may not be generalisable to the wider ASD population, given the mean male to female ratio is reported to be 1.65:1 (Zwaigenbaum et al., 2012). Contrariwise, previous research in this area (Lau & Peterson, 2011; Pollmann, Finkenauer & Begeer, 2010; Renty & Roeyers, 2007) has excluded females with ASD entirely, leading to a limited knowledge of the female profile of ASD with regard to relationship outcome. As such, our inclusion of females with ASD may be considered a strength. Third, our samples ranged considerably in age. Although this wide age range could also be considered a strength, some of the adults were diagnosed with an ASD before the \textit{DSM-IV} widened the autism diagnostic criteria. Further, this older cohort may not have benefited from the early intervention services available to families and young children with ASD today. Therefore, it is unclear to what extent findings from this cohort will generalise to subsequent cohorts. Last, the potential contribution of response bias to our findings cannot be ruled out given the AQ, PAIR, satisfaction and communication scales measure self-reported behaviours, thoughts and feelings. As discussed, the potential for response bias may be particularly applicable to individuals with ASD, given an ASD diagnosis is often associated with limited insight into one’s own behaviour (Bishop & Seltzer, 2012). Whilst the AQ does attempt to counteract response bias by wording items with an equal number of positive and negative response sets and asking for an individual’s preference rather than self-judgement of behaviour (Broadbent et al., 2013), the same
cannot be said for our measures of relationship outcome. Therefore, diminished insight may adversely influence the manner in which individuals with ASD evaluate their romantic relationship. As such, it may be that the measures used in the current study were poorly understand by participants with ASD, and we cannot therefore rule out that ASD traits negatively impact their own relationship development and intimate relationship experiences.

Despite these caveats, this thesis serves an important step in identifying key variables associated with relationship development of adults with ASD and the relationship outcome of individuals with ASD and their TD partners. Findings from this study, as well as future work in the area, may help inform interventions for individuals with ASD and ASD/TD couples. To our knowledge, this thesis comprises the first empirical investigation to examine multidimensional aspects of relationship development in a large sample of adults with a professional diagnosis of ASD. Moreover, a key strength of the present thesis is that we simultaneously investigated the links of ASD traits to both self and partner’s relationship satisfaction, communication and intimacy, in a sample of ASD/TD dyads using appropriate dyadic analyses. Specifically, this study expanded on previous work in this area by utilising the APIM and therefore reliably accounted for the nonindependence of dyadic data (Kenny et al., 2006).

**Clinical Implications**

With regard to relationship development, our findings suggest that strengths-based interventions for children and adults that promote relationship development should do so in context of strengths related to ASD symptoms. Our findings further suggest that it may be beneficial to target communication skills in males and social skills in females to promote relationship development.
With regard to relationship experiences, results of this thesis suggest that interventions for ASD/TD couples should target social intimacy, with the aim of increasing opportunities for socialising within and outside the relationship. It is hoped that such interventions would provide a buffer against the potential negative psychosocial outcomes for both ASD and TD partners. Further, interventions should seek to promote understanding and acceptance of ASD symptoms and their expression within the relationship, so that effective strategies can be developed.

**Directions for Future Research**

Our research gives a first indication why some individuals with ASD are better able to develop intimate relationships, and illuminates the specific challenges faced by ASD/TD dyads. It thereby contributes to a better understanding of how autistic traits may manifest in social relationships. An interesting next step in the investigation of ASD individuals’ ability to develop relationships would be to further investigate the potential gender differences. With regard to the relationship outcome of ASD/TD dyads, future research should further explore these issues by recruiting a larger sample and utilising dyadic data analyses techniques, to permit the formal testing of other possible mediators of the link between ASD traits and relationship outcome. Further, future research should simultaneously assess relationship and psychosocial outcome in ASD and TD couples.

**Conclusion**

Given the challenges individuals with ASD face in the social realm, it is essential that we understand what skills may assist or hinder their relationship development and relationship functioning so that we can develop appropriate
interventions. The scientific literature says little about the nature of intimate relationships of adults with ASD, with relatively less known about the impact of autistic symptoms on the ability to develop and function within intimate couple relationships. This thesis has provided important information on the lifespan developmental trajectory of male and female adults diagnosed with ASD, as well as the impact of autistic traits on ASD/TD dyads. These findings have illuminated ways to improve the relationship development and outcome of individuals with ASD by identifying both deficits and strengths impacting on these domains. It therefore seems particularly important to continue research in this area, to inform interventions for adults with ASD and their TD partners.
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Appendix A

DO YOU HAVE A DIAGNOSIS OF AUTISM OR ASPERGERS?
If you are 18 years or above and have an Autism Spectrum Disorder (ASD) diagnosis, researchers at Deakin University would like to invite you to participate in a study investigating the impact of an ASD diagnosis on the ability to develop intimate couple relationships.

What's involved if you choose to participate?
This anonymous online questionnaire will take approximately 15-20 minutes to complete.

You will be asked:

To complete a measure of ASD symptomatology
To answer some questions about yourself and your relationship history, and
To answer some questions regarding the impact of your ASD diagnosis on your relationships and your life in general

For more information and/or to complete this survey online, please visit the following web page:

If you have any questions, please contact:

Katherine Birt
Email: kvbi@deakin.edu.au

This project has been approved by the Deakin University Human Research Ethics Committee (2012-296).
Appendix B

Questionnaire:
Impact of your ASD diagnosis on intimate relationship development

1. Date of birth
2. Sex
   a. Male
   b. Female
3. Living status
   a. Independently
   b. At home, with parents
   c. With partner
   d. Other, please specify ___________
4. Employment status
   a. Currently employed full time
   b. Currently employed part time / casual
   c. Not currently employed
5. Age at diagnosis
6. Type of diagnosis
   a. Autism
   b. Asperger’s Syndrome
   c. Other, please specify ___________
7. What kind of registered health practitioner provided your diagnosis?
   a. Psychologist
   b. Peadiatrician
   c. Psychiatrist
   d. Other, please specify ___________
8. Please rate your understanding of your ASD traits
   1 (little understand) – 10 (high understanding)
9. How many couple relationships have you been in?
10. At what age did you have your first partner?
11. What was/is the duration of the longest relationship you have been in?
12. What is your current relationship status?
   a. Single
   b. In a committed relationship, living separately
c. In a committed relationship, co-habitating
d. Engaged
e. Married
f. Separated
g. Divorced
h. Other, please specify _______________

13. If you are currently in a relationship, could you please briefly characterise your present relationship (e.g., satisfaction, closeness, compatibility, etc.)?

______________________________________________________________

14. If you are currently in a relationship, have you and your partner ever been to couple’s therapy?
   a. Yes
   b. No

15. If yes, please briefly describe this experience (i.e., was it helpful, what did you gain? Was it unhelpful, and why)

______________________________________________________________

16. If you are currently in a relationship, please rate your partner’s understanding of your ASD traits
   1 (little understand) – 10 (high understanding)

17. Do you have any children?
   a. Yes
   b. No

18. If yes, how many? _____

19. Do you feel that your diagnosis has helped your ability to develop intimate relationships?
   a. Yes
   b. No
   c. Other, please specify _______

20. Were you in a relationship when you received your diagnosis?
21. If yes, briefly describe how your diagnosis impacted on your relationship? (i.e., any positive or negative changes, etc.)

________________________________________________________________________________________________________

22. If no, briefly describe how your diagnosis impacted on your ability to develop intimate relationships

________________________________________________________________________________________________________