



CENTRE FOR AUTISM
MIDDLETOWN

Autism Spectrum Disorder and Girls



RESEARCH BULLETIN ISSUE NO. 4

Supporting the promotion of excellence throughout Northern Ireland and Ireland
in the education of children and young people with autism spectrum disorders.



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The aim of the Research Bulletins produced by Middletown Centre for Autism is to provide accessible summaries of relevant peer-reviewed research articles and literature reviews for education staff working with children and young people with Autism Spectrum Disorders (ASD).

The focus of this, the fourth Bulletin, is on ASD and girls; there is a growing perception that ASD may present differently in girls than boys. Middletown Centre has received numerous requests for information on ASD and girls and this Bulletin is a response to the need for research based information in this area.

This Bulletin provides summaries of six peer review articles written over the period 2007-2010 and commences with an interview from Dr Jacqui Ashton Smith. Dr Ashton Smith's interview is based on an article soon to be published in Good Autism Practice which she has written in collaboration with Dr Judith Gould.

Dr Jacqui Ashton Smith has worked in the field of autism education for 30 years, including 20 years as Principal of the NAS Helen Allison School.

Please note that the views represented in this document do not necessarily reflect the views of Middletown Centre for Autism. Reviewers have, where possible, used the original language of the article which may differ from UK and Ireland usage and the usage of a range of terminologies for ASD.

INTERVIEW WITH DR JACQUI ASHTON-SMITH

In collaboration with Dr Judith Gould, Dr Jacqui Aston-Smith has written a paper entitled “Missed diagnosis or misdiagnosis? Girls and women on the autism spectrum”: Good Autism Practice, May 2011. The response to these questions is based on this paper.

1. Research indicates that girls with Autism Spectrum Disorder (ASD) are often detected and diagnosed later than their male peers. Why do you think this is the case?

The difficulties in the diagnosis of girls and women arise if clinicians continue to use the narrow definitions set out in the International Classification Systems. It cannot be stressed enough that diagnosis and full assessment of needs cannot be carried out by following a checklist. Proper assessment takes time and detailed evaluation is necessary to enable a clinician to systematically collect information which not only provides a diagnostic label, but more importantly, a detailed profile of the person.

2. Are there specific ‘red flags’ that would alert a parent or teacher to the possibility of ASD in girls or young women?

- Social immaturity
- Preservative interests – the intensity of them
- Different eye contact
- Poor handwriting
- Poor gross motor co-ordination
- Isolation or teasing by peers
- Lowering grades
- Viewed as ‘odd’ by teachers
- Disorganised
- Passive and lack of interest in classroom activities
- Lack of empathy
- Repetitive questioning

3. What are the main areas of difference between males and females with ASD?

Girls are more able to follow social actions by delayed imitation because they observe other children and copy them, perhaps masking the symptoms of Asperger’s Syndrome (Attwood, 2007).

Girls are often more aware of and feel a need to interact socially. They are involved in social play, but are often led by their peers rather than initiating social contact. Girls are more socially inclined and many have one special friend.

In our society girls are expected to be social in their communication. Girls on the spectrum do not ‘do social chit chat’ or make ‘meaningless’ comments in order to facilitate social communication. The idea of a social hierarchy and how one communicates with people of different status can be problematic and get girls into trouble with teachers.

Evidence suggests that girls have better imagination and more pretend play (Knickmeyer et al, 2008). Many have a very rich and elaborate fantasy world with imaginary friends. Girls escape into fiction, and some live in another world with, for example, fairies and witches.

The interests of girls in the spectrum are very often similar to those of other girls – animals, horses, classical literature - and therefore are not seen as unusual. It is not the special interests that differentiate them from their peers but it is the quality and intensity of these interests. Many obsessively watch soap operas and have an intense interest in celebrities.

The presence of repetitive behaviour and special interests is part of the diagnostic criteria for an autism spectrum disorder. This is a crucial area in which the male stereotype of autism has clouded the issue in diagnosing girls and women. (From Attwood, 1999; Kopp & Gillberg, 1992; Lord *et al.*, 1982; Smith, 1997).

4. Taking gender differences in ASD into consideration, how can schools and other services better meet the needs of girls and young women with ASD?

It is important in preparing girls for a life of quality as adult women. Schools need better trained staff to recognise and address the needs of students on the autism spectrum and especially the more 'subtle' presentation in girls. Schools need to be more 'girl friendly' with girl orientated personal, social skills classes. There needs to be a focus on the 'hidden curriculum which directly teaches the skills that typically developing girls learn indirectly and intuitively such as the unwritten rules of girls' social interactions. Girl orientated personal, social and health education should be part of the curriculum. Schools educating girls on the autism spectrum should focus on teaching independence and strategies to reduce vulnerability. They also need to address self-image, self-esteem and confidence building. Gender identity is a big issue for girls, as is emotional wellbeing and fostering mental health. Society has expectations of both men and women, but many women on the autism spectrum believe that these expectations are greater for women.

5. Are there any specific strategies or approaches that are particularly effective for working with girls with ASD?

Play to their strengths such as being able to observe others and emulate them. Enjoyment of drama and role play.

- Visual supports, schedules and routines (like boys).
- Modelling of people – point out what the model is doing and let her emulate this.
- Video modelling – video the behaviour you want her to learn and replay, rewind and pause to explain clearly what you want her to learn.
- Role play or drama – particularly good for social skills, dangerous events and situations that don't occur frequently or arise naturally.
- Write narratives about social situations – explain factually why.
- Social scripts – what to say and do in specific situations.
 - **To answer the phone, buy a bus ticket, how to respond to teenage chat.**
- Power cards – uses a girl's special interests to teach appropriate behaviour.
 - The card explains how a favourite character would behave or handle a situation.
 - Then encourages the girl to act in the same manner in a similar situation.
- Television and movies – an excellent teaching tool for girls.
 - Point things out and talk about them.
 - Ask what she thinks the character should do.

- Ask why the character is acting in a particular way.
- Books and the internet – many teenage girls with ASC like to read.
 - Prefer to read instructions rather than being told.
 - This applies strongly to personal hygiene, puberty issues and sex education.

(Nichols *et al*, 2009)

6. What are the main areas that that schools, services and parents should be mindful of as the girl with ASD grows up?

We wish to draw attention to the fact that many women with an autism spectrum condition are not being diagnosed and are therefore not receiving the help and support needed throughout their lives. Having a diagnosis is the starting point in providing appropriate support for girls and women in the spectrum. A timely diagnosis can avoid many of the difficulties women and girls with an autism spectrum disorder experience throughout their lives.

Autism Spectrum Disorders: Sex Differences in Autistic Behaviour and Coexisting Psychopathology

RESEARCH AIMS

The study used the Autism Diagnostic Interview –Revised (ADI-R), the Autism Diagnostic Observation Schedule (ADOS) and the Child Behaviour Checklist (CBC) to determine if there were differences in the profile of 23 males and 23 females with high functioning autism.

RESEARCH METHOD

The researchers compared the male and female profiles using data sets obtained from the ADI-R and the ADOS; the participants' parents or caregivers were also required to complete the Child Behaviour Checklist.

The ADI-R is a semi-structured interview used with parents / caregivers and is based on the diagnostic schedules for ASD provided in the DSM IV-TR and the ICD-10.

The ADOS is a standardised rating scale of social interaction, communication and imaginative play. It consists of a series of predetermined activities involving interaction; the rater then observes and codes the frequency and quality of particular behaviours.

The Child Behaviour Checklist is a questionnaire, which is completed by parents/ caregivers and is designed to identify a range of behavioural problems. The CBC consists of eight scales, these are: withdrawn, somatic (physical) complaints, anxious/ depressed, social problems, thought problems, attention problems, delinquent behaviour, and aggressive behaviour.

The test scores of the 23 males and 23 females were compared and statistical measures to determine the significance of any differences were

used to establish if the differences were notable and worthy of further examination and research.

RESEARCH FINDINGS

The researchers found no statistically significant differences in the ADI-R and ADOS scores. Significant differences were found on the CBC measures of social withdrawal, social problems, thought problems and attention problems; the female participants performing significantly worse than the males on these measures.

The measures reflected impairments in peer relations, social immaturity, social dependency, and immature, impulsive and unusual behaviours with the most significant difference between male and female being in social problems.

IMPLICATIONS FOR PRACTICE (by the reviewer)

The researchers indicate that there are methodological weaknesses in the study reviewed; the psychometric instruments used may not have been the most appropriate for the sample. The reviewer also notes that some of the sample was recruited from individuals who were receiving treatment, as inpatients, at a psychiatric hospital.

Notwithstanding the above there are still salient issues that can be taken from this study, which was one of the first to compare the performance of males and females on the core symptoms of ASD.

- Females with ASD may experience more social difficulties than males with ASD and services should be aware of their needs for social support.

Autism Spectrum Disorders: Sex Differences in Autistic Behaviour and Coexisting Psychopathology CONTINUED

- The researchers note that we may have higher social expectations for girls and expect more social behaviour from them and this may have impacted on the higher rates of social problems identified in the female participants.
- The presence of significant differences in attention and thinking in the female participants warrants further investigation with a much larger sample.

Full Reference

Holtman, M., Bolte, S., Poustka, F. (2007). Autism Spectrum Disorders: Sex Differences in Autistic Behaviour Domains and Coexisting Psychopathology. *Developmental and Child Neurology*, 49, p. 361-366.

The Childhood Autistic Spectrum Test: Sex Differences

RESEARCH AIM

To determine if typically developing boys and girls from a community based sample perform differently on a measure of social and communication skills.

RESEARCH METHOD

The Childhood Autism Spectrum Test (CAST) is used to identify Autism Spectrum Conditions (ASC) by measuring social and communication skills using a questionnaire, which is delivered by the parent / caregiver.

The researchers recorded CAST data from 3334 children aged 5-9 in England. The sample consisted of a broad range of children attending mainstream primary schools. The scores of children with ASC were removed from the overall analysis to establish if typically developing children present with significant differences in social and communication skills.

RESEARCH FINDINGS

Thirty-seven children in the sample (27 boys and 10 girls) had a diagnosis of ASC; these children's scores were removed from the overall analysis.

Boys presented with significantly higher scores on the CAST than girls in the sample. The researchers speculate that boys have a different profile in social and communication skills to girls and that this should be taken into consideration when assessing boys and girls in these areas.

IMPLICATIONS FOR PRACTICE

(by the reviewer)

The research was conducted to determine profiles in typically developing children however, there are still salient issues for professionals working with children with ASC.

- When assessing children for difficulties in social and communication skills it is worth bearing in mind that boys may have a different developmental profile in these areas than girls.
- Boys may have a higher prevalence of difficulties in social and communication issues than girls; however these difficulties may not be related to undiagnosed ASC.
- The presence of differences in typically developing children does have implications for the differing presentation of ASC in boys and girls and this in turn may have implications for the kinds of early interventions used with different genders.
- Much more research is required in this area.

Full Reference

Williams, J., Allison, C. Scott, F., Bolton, P., Baron-Cohen, S., Matthews, F., Brayne, C. (2008). The Childhood Autism Spectrum Test: Sex Differences. *Journal of Autism and Developmental Disorders*, 38, p. 1731-1739.

Sex Differences in Autism Spectrum Disorder: An Examination of Developmental Functioning, Autistic Symptoms, and Coexisting Behavior Problems in Toddlers

RESEARCH AIMS

To examine the presentation of any gender differences in young children (1.5-3.9 years) in particular developmental profiles, characteristics indicative of autism and behavioural difficulties to ascertain whether the current research meets the needs of all children, girls and boys. However, it must be noted that the greater volume of information has been derived from studies on boys and therefore this may be the basis of supportive interventions on offer yet not consider traits particular to females.

RESEARCH METHOD

The study involved 157 boys and 42 girls and focused on:

1. Developmental profiles using the Mullen Scales of Early Learning; a standardised measure of cognitive and motor development with validity for use with children up to 68 months.
2. Characteristics of autism derived as a result of ADOS-G assessment; a standardised play based assessment examining social interaction, communication and restricted/repetitive/stereotypical behaviours.
3. Coexisting behavioural difficulties ascertained through implementation of the Child Behaviour Checklist (CBC); a caregiver's evaluation of the behaviours demonstrated by their children the areas of:
 - Emotionally reactive
 - Anxious/depressed
 - Somatic complaints
 - Withdrawn
 - Sleep problems
 - Attention problems
 - Aggressive behaviour.

RESEARCH FINDINGS

The authors gave details of previous studies determined to demonstrate gender differences in children with ASD, yet none appeared to examine the three identified areas collectively in a group of similar age and cognitive ability. Thus, the findings will be broken into these key areas.

Developmental Functioning

The overall profile of each gender was similar in terms of strengths and difficulties with visual reception and fine motor skills being more appropriately developed than language skills, thus a corroboration of the previous studies examining this area.

Characteristics Indicative of Autism

Again there was very little difference in respect to gender in this area although girls displayed greater difficulty with communication than boys irrespective of cognitive ability, while boys displayed more stereotypical and repetitive behaviours and interests.

Coexisting Behaviour Difficulties

Although a similar pattern between the genders was noted, subtle differences emerged in relation to sleep difficulties and higher levels of anxiety and/or depression being noted in girls than boys.

IMPLICATIONS FOR PRACTICE (by the authors)

Girls may not present with the stereotypical behaviours as noted in boys and thus greater acknowledgement must be given to communication and social behaviour difficulties when assessing and educating girls through the formation of specific supportive interventions.

Close attention must be given to girls in light of the findings on coexisting behaviour difficulties, as it was suggested that girls may be more prone to challenging behaviour as they age and support must be designed and addressed to meet the needs of parents/families and educators.

Greater research is needed in the area of gender differences as well as examining the display of characteristics by girls, as this may determine the level and nature of the support needed and offered.

Full Reference

Hartley, S. L. and Sikora, D. M. (2009). Sex Differences in Autism Spectrum Disorder: An Examination of Developmental Functioning, Autistic Symptoms, and Coexisting Behavior Problems in Toddlers. *Journal of Autism and Developmental Disorders*, 39, p. 1715–1722.

Sex-typical Play: Masculinization/Defeminization in Girls with an Autism Spectrum Condition

RESEARCH AIMS

The authors examined the prevalence and types of anxiety exhibited by high functioning adolescents with autism spectrum disorders (ASD) and factors related to this anxiety. They had three key research questions:

1. To determine if females with an Autism Spectrum Condition (ASC) show a reduced interest in female-typical play activities over male-typical play activities in games which do not require pretend play.
2. To determine if males with an ASC show a preference for male-typical play activities over female-typical play activities in games which do not require pretend play.
3. To determine if children with an ASC have reduced interest in games which require pretend play.

RESEARCH METHOD

The play preferences of children with an ASC were compared to the play preferences of children without an ASC. The ASC group consisted of 66 children (20 female and 46 male) with a confirmed diagnosis of an ASC. The control group consisted of 55 typically developing children (24 female and 31 male). The age range of both groups was 4.58-14.17 and they were matched for sex, parental occupation, handedness, parental education level and ethnicity.

Play preferences were measured by the Children's Play Questionnaire (CPQ). This was completed by the parents with reference to their child's play preferences at the age of 5. The CPQ includes

10 masculine items, 10 feminine items and 8 neutral items. The parent rates their child's interest in each item using Likert scale (1 = "not at all interested"; 5 = "very interested"). The authors further classified the items into activities requiring pretence and not requiring pretence, as children with ASC do not often participate in pretend play, and this may then affect scores.

RESEARCH FINDINGS

The results supported the authors' hypotheses:

- Girls with an ASC did not show a preference for female-typical activities over male-typical play activities on CPQ items which did not require pretend play. In contrast, girls without an ASC showed a significant preference for female-typical activities in these same CPQ items.
- Boys with an ASC showed a strong preference for male-typical activities over female-typical activities on CPQ items which did not require pretend play.
- Boys and girls with an ASC had a strong preference for activities which did not involve pretend play.

These findings may support the fetal androgen theory which hypothesises that increased levels of prenatal androgens (male hormones e.g. testosterone) cause excessive masculinization of the brain and increase the risk of an ASC. The findings may also support the Extreme Male Brain Theory which proposes that autism is 'an exaggeration of typical sex differences in empathizing and systemizing' (p.1028). These theories refer to the concept that children with an ASC have an exaggerated masculine brain.

Sex-typical Play: Masculinization/Defeminization in Girls with an Autism Spectrum Condition CONTINUED

This would then explain why girls with an ASC in the study did not show a preference for female-typical play activities.

Previous research has shown that girls who have been exposed to elevated fetal testosterone levels have a reduced preference for female-typical play activities. The current study showed that girls with an ASC also have a reduced preference for female-typical play activities, and therefore the authors conclude that greater exposure or sensitivity to fetal testosterone may contribute to the development of an ASC.

The social interaction difficulties associated with autism may also explain the lack of sex-typical play. Children with an ASC have less social awareness than typically developing children and so do not observe and imitate the sex-typical play of other children. However, the authors state that this does not then explain why boys with an ASC do show a preference for male-typical play activities.

An additional and unexpected finding of this study was that girls with an ASC showed more interest in pretend play activities than boys with an ASC. In pretend play items, girls with an ASC did show a preference for female-typical activities, whereas in non-pretend play items, they did not show a preference for female-typical items. It is unclear if girls participate more in pretend play due to better imitation of others or whether it is due to a better capacity to pretend. The authors, however, suggest that this difference in pretend play between boys and girls may be because the boys in the study sample were more severely affected by ASC than the girls (i.e. more boys had classic autism, whereas more girls had high functioning autism, Asperger Syndrome and pervasive developmental disorder not otherwise specified). An alternative suggestion is that

mothers are more likely to engage in pretend play activities with their daughters, while boys are less exposed to pretend play.

The authors recognise that one limitation of the study is that the ASC group was significantly older, but parents had to report on play preferences when the child was five. There may be inaccuracy in parental recall which would then affect results.

IMPLICATIONS FOR PRACTICE (by the reviewer)

The study has implications for future research and contributes towards a greater understanding of the developmental neurobiology of ASC. Further research is required to determine if ASC is due to increased exposure or sensitivity to fetal androgens, which then cause masculinization of the brain and increases the risk of developing an ASC.

The authors do not discuss implications for practice but professionals may wish to consider the following points in their intervention with children with an ASC:

- Girls with an ASC are likely to prefer male-typical play activities and so these activities may be more motivating for them and lead to greater participation in play.
- Girls with an ASC appear to have a greater capacity for pretend play than boys with an ASC and so pretend play activities could be used successfully when working with girls.

Full Reference

Knickmeyer R. C., Wheelwright S., Baron-Cohen S. B. (2008). Sex-typical Play: Masculinization/Defeminization in Girls with an Autism Spectrum Condition. *Journal of Autism and Developmental Disorders*, 38, p. 1028-1035.

Review of Gender Differences in Core Symptomatology in Autism Spectrum Disorders

RESEARCH AIMS

The authors reviewed the literature base on the nature and aetiology of gender differences in ASD, as well as practical implications.

RESEARCH METHOD

The authors conducted a review of the literature.

RESEARCH FINDINGS

Existing research indicates that the male to female ratio of autism spectrum disorders is most frequently reported as 4:1; however, the authors draw attention to the results of Kopp and Gillberg (1992) who suggest that ASD is under diagnosed in girls because the diagnostic criteria and behavioural phenotype have been derived from typical male cases. Therefore, the phenotype in girls may differ. The authors highlight that gender differences in presentation have not been sufficiently addressed in studies of key instruments used in the field such as the ADI, ADOS and Pre-linguistic ADOS. Taylor-Rivet and Matson consider the possibility that symptom criteria or assessment items may be biased in that they are more typical of one gender, raising the issues of whether separate criteria content or requirements or different norms or cut-off scores based on gender are appropriate. As a result girls may receive vague diagnoses such as learning disorder, obsessive compulsive disorder, personality disorders and eating disorders.

Rivet and Matson highlight a study by McLennan et al (1993) who found that females showed less impairment in early social and communicative behaviour compared to males, but that this pattern is reversed when females reach adolescence and adulthood. They propose a number of reasons which may explain this; firstly for older females, peer activities are heavily dependent on social interests and communication, whereas males may have other social options, for example, spectator sports which are less verbal and interactive. Additionally, females in the study had often attended special schools predominantly with males, thus limiting opportunities to meet females with common interests

IMPLICATIONS FOR PRACTICE (by the authors)

Professionals should be aware that autism spectrum disorder symptomatology will be displayed differently in girls compared to boys. Whereas boys may display extreme aloneness, girls may tend to cling to others, imitate speech and movements without understanding the rules of social interaction and may treat people as objects.

Full Reference

Rivet, T. T. and Matson, J. L. (2010). Review of Gender Differences in Core Symptomatology in Autism Spectrum Disorders. *Research in Autism Spectrum Disorders* (in press), doi:10.1016/j.rasd.2010.12.003.

Sex Differences in Toddlers with Autism Spectrum Disorders

RESEARCH AIMS

The researchers detail a number of studies, dated back as far as 1982, which identify differences in cognitive functioning and developmental profiles in boys and girls with Autism Spectrum Disorder (ASD). Methodological differences in early gender difference studies are also identified and the researchers aim to clarify any gender differences in the areas of:

- Cognitive functioning
- Developmental profile
- Clinical presentation of ASD.

The researchers hypothesise that, based on previous research, girls would present as having lower developmental functioning than boys with ASD.

RESEARCH METHOD

The researchers identified a sample of 90 children between the ages of 18 and 33 months and administered the following assessments, either personally or through the caregiver.

- The Mullen Scales of Early Learning were used to assess cognitive and developmental functioning across the five domains of visual reception, fine motor, expressive language, receptive language and gross motor.
- The Vineland Adaptive Behaviour Scales were used to assess communication, daily living skills, socialisation and motor skills.
- The Infant-Toddler Social and Emotional Assessment was used to assess the level of social-emotional and behavioural problems and competencies for infants and toddlers.

- The Autism Diagnostic Interview Revised (ADI-R) was used to assess the presentation of ASD.

The results of the assessments were subject to a series of statistical measures in order to determine any gender differences in the toddlers' performance on the assessments.

RESEARCH FINDINGS

Cognitive and Developmental Assessments

The researchers' hypothesised gender differences in developmental assessments were not observed. Overall both boys and girls in the sample scored well on measures of fine motor skills and visual processing and both showed weakness in the areas of gross motor skills and expressive and receptive language; language was the weakest measure across both boys and girls. The only statistically significant difference between the boys and girls in the sample was in the area of communication, with boys outperforming girls. Boys also outperformed girls in all five of the Mullen Early Learning domains. In addition the boys in the sample were judged to have more advanced social functioning.

Presentation of ASD

The researchers note that there were no significant differences between boys and girls in the clinical presentation of ASD; this is noted as an important finding and congruent with previous research studies in the area.

IMPLICATIONS FOR PRACTICE

(by the reviewer)

The researchers note significant differences between boys and girls across a series of cognitive and developmental domains, these differences are judged not to be relevant or related to the presentation of ASD in the current study.

Professionals working with young children who have recently been diagnosed with ASD should note the developmental and cognitive differences observed in the current study. Girls and boys with ASD may well present with differing developmental and cognitive trajectories and this will have implications for programmes of interventions and also in the on-going assessment process that children are engaged in at this age. Previous studies, cited in the current research, also identified differing developmental and cognitive profiles across the domains of communication and social interaction. The current research adds to the small but growing body of research evidence suggesting differing profiles in boys and girls with the overall picture being that girls with ASD do not perform as well as boys on cognitive and developmental measures.

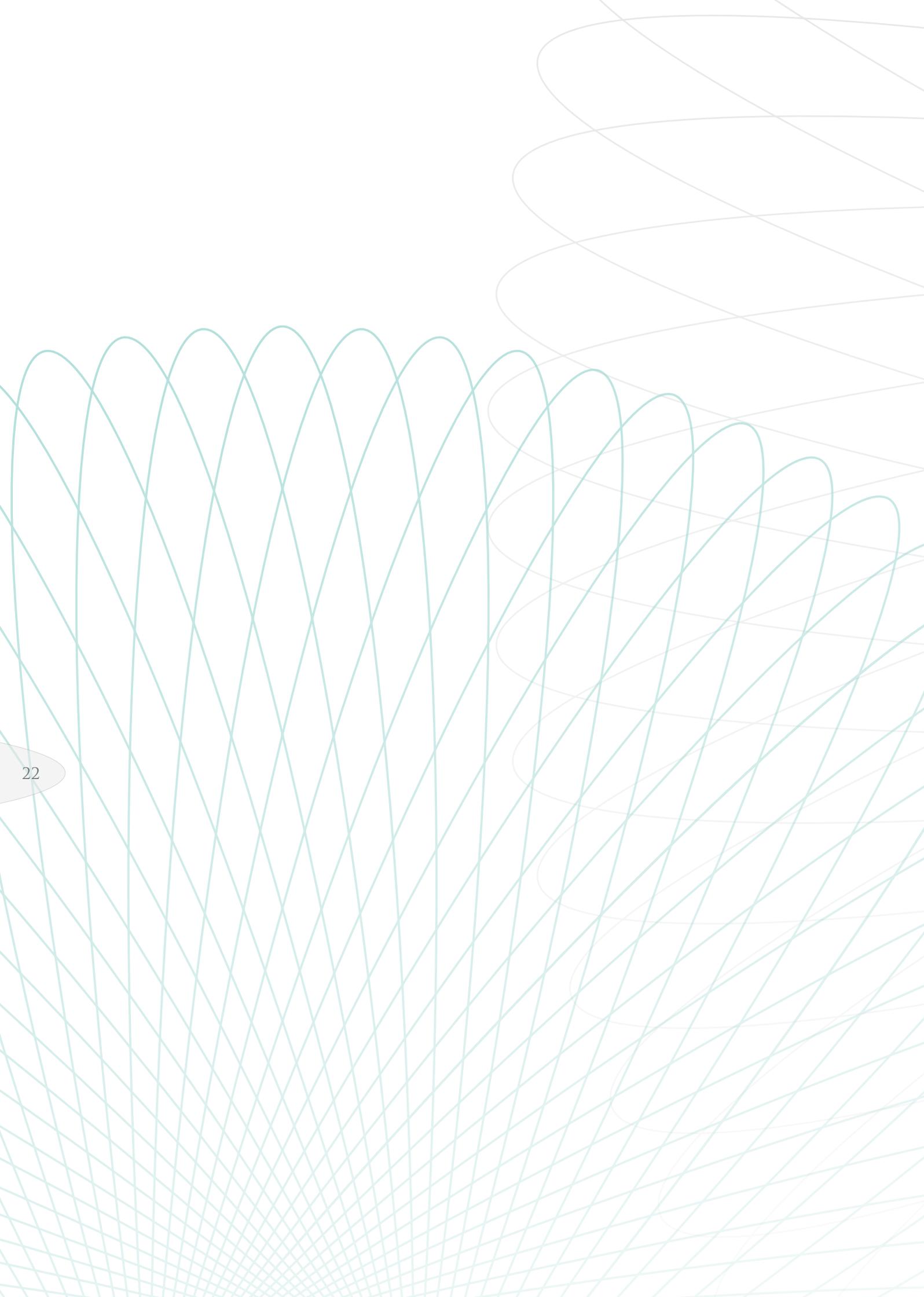
Full Reference

Carter, A., Black, D., Tewani, S., Connolly, C., Kadlec, M. B., Tager-Flusberg, H., (2007). Sex Differences in Toddlers with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders*, 37, 86-97.

The point of departure for every professional working with children and young people with ASD is the fact that every child is an individual. Dr Stephen Shore states this succinctly *'if you know one person with autism then you know one person with autism'*.

Understanding potential gender differences across ASD helps us in our understanding of the differing experiences of children and young people with ASD. The articles reviewed in this Bulletin reflect a range of perspectives on how girls with ASD may present initially, how they may develop cognitively and how, as they grow, they may present differently from boys. The articles summarised all have differing outcomes in terms of definitively identifying gender differences, illustrating that there is a distinct rationale for further research in this areas across age groups.

The outcome and implications for practice in the articles summarised in this Bulletin encourage us, as professionals, to be mindful that the experience of girls can be different across age groups and cognitive abilities and to build this awareness into our work and interactions with girls with ASD.



YOUR OPINION

We hope that you have found this Research Bulletin informative. We would appreciate if you would take a few minutes to give us feedback by simply clicking on the survey link below.

[Survey](#)

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The Centre's Research and Information
Service welcomes any correspondence
including suggestions for future Bulletins
to: research@middletownautism.com

MIDDLETOWN CENTRE FOR AUTISM

35 CHURCH STREET, MIDDLETOWN, CO. ARMAGH BT60 4HZ

T. +44 (0)28 3751 5750 E. RESEARCH@MIDDLETOWNAUTISM.COM W. WWW.MIDDLETOWNAUTISM.COM

J G COOPER: CHIEF EXECUTIVE REGISTERED IN NORTHERN IRELAND, NO. NI063661