



## Autism Spectrum Disorder: Differences Across Genders

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### Learning Objectives

- Identify core symptoms associated with autism spectrum disorder
- Learn global brain structure differences between biological males and females
- Learn why autism is diagnosed more often in males
- Understand varying presentations of autism among males and females
- Explore why clinicians may miss symptoms of autism in females



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### What is Autism?

- Disorder of social and behavioral functioning characterized by:
- Persistent deficits in social communication and interaction
- Restricted and repetitive behaviors, interest, and activities



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## Autism Diagnostic Criteria – DSM-5 TR (2022)

**A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by ALL OF the following**

1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions, or affect; to failure to initiate or respond to social interactions.
2. Deficits in nonverbal communicative behaviors used for social interaction (ex. reduced eye contact; deficits in understanding and use of gestures; lack of facial expressions and nonverbal communication)
3. Deficits in developing, maintaining, and understanding relationships (ex. difficulties adjusting behavior to suit various social contexts; difficulties in sharing imaginative play or in making friends; absence of interest in peers)



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## Autism Diagnostic Criteria – DSM-5 TR (2022)

**B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history:**

1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g., lining up toys or flipping objects, echolalia, hand flapping, idiosyncratic language)
2. Insistence on sameness, difficulty tolerating transitions, ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking patterns, greeting rituals, need to take same route to school or eat the same foods every day).
3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interest).
4. Hyper- or hyporeactivity to sensory input or unusual interests in sensory aspects of the environment



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## Autism Diagnostic Criteria – DSM-5 TR (2022)

▪ **C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities or may be masked by learned strategies in later life).**

▪ **D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.**



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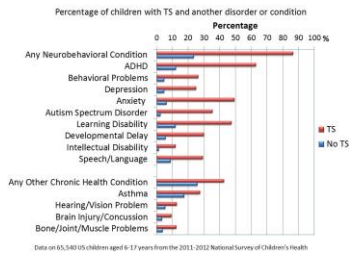
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## Comorbidity with Tourette's Syndrome



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7

## Common Symptoms Associated with Autism – *but remember...each child is unique*

- **Communication Deficits**
  - Speech Delay
  - Echoing others or things heard on tv/dialogue
  - Excessive repetition of words, phrases, and sounds
- **Difficulty with Reciprocal Social Interaction**
  - Lack of interest in others; preferring to play alone
  - Difficulty with reciprocal conversation
  - Limited play skills; Intense interests but in few items/topics
  - Trouble understanding other's feelings and perspectives
- **Cognitive Difficulties**
  - Problem solving
  - Perspective taking
  - Rigid thinking
- **Sensory Differences**
  - Over-sensitive or under-sensitive to sound, sight, taste, smell or touch

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8

## Recent Diagnostic Data

- Most recent data indicates about 1 in 36 children has been identified with ASD according to estimates from CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network
- The average age of being diagnosed with ASD Level 1 for boys (worldwide) is 8 years old, yet for girls the average age is 13 years old
- ASD disproportionately affects males; the over-representation of boys with respect to girls is one of the most replicated findings in the field of ASD.
- The gender ratio for the autism spectrum as a whole is consistently reported at around 4:1 males to females
- Ratio for younger children 5.5:1 (Rutherford et al, 2016)
- Ratio for adolescents 2.3:1 (Rutherford et al, 2016)
- The adult gender ratio was 1.8:1 (Rutherford et al, 2016)

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9

## Fact: Girls are Underdiagnosed

- These findings indicate not only that the true prevalence of ASD in women is far higher than once thought, but also highlights that females are being diagnosed much later.
- Girls are underrepresented in the literature and professionals less familiar with their profile



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## Why Are Girls Underdiagnosed?

- Autism is highly heterogeneous – individuals present with a wide range of strengths and weaknesses within social communication behavior
- This wide range of symptom variation has been a major impediment to creating effective diagnostic instruments
- Females present with somewhat different behavior characteristics, which can make it more complicated for the autism phenotype to be recognized and the diagnosis to be made in a timely manner
- Females require greater neurological "load" to show or manifest the same degree of impairments as males
- All of these factors lead to lower prevalence of autism in females



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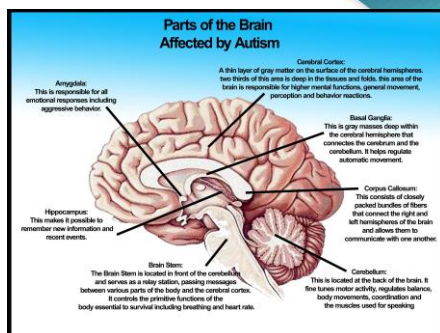
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## Brain Structure Differences

— among 530 individuals  
with ASD and 550 without (Supekar et al., 2022)

- Gray matter volume in the motor cortex, cerebellum, and in systems related to the social brain are different among girls compared to boys with ASD
- Children's language abilities were significantly correlated with the thickness of the gray matter and the gyrification of the cortical regions which are critically involved in speech production, including the frontal and temporal lobes.
- Among girls with autism, the differences in motor centers (e.g., cerebellum) were linked to the severity of their motor symptoms, meaning girls whose brain patterns were most similar to boys with autism tended to have the most pronounced motor symptoms.
- Language areas that differed between boys and girls with autism and identified greater language impairments in boys.
- Amygdala – more affected in autistic girls than in autistic boys; An enlarged amygdala is associated with more severe emotional problems

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13

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## Brain Structure Differences

- Some infants who are later diagnosed with autism have unusually fast growth in certain brain regions. Compared with their non-autistic peers, autistic children have significantly faster expansion of the surface area of their cortex from 6 to 12 months of age. In the second year of life, brain volume increases much faster in autistic children than in their non-autistic peers.
- This supports research that saw larger head circumference in a fraction of autistic people.
- Their cortex seems to expand too quickly in infancy and early childhood, even before autism traits can be detected behaviorally.

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14

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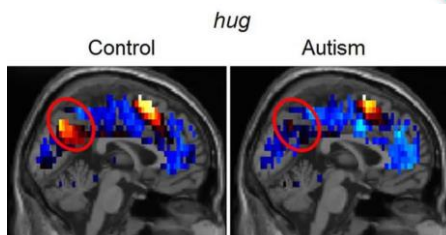
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## Brain Structure Differences – social concepts

(Just, Cherkassky, Buchweitz, Keller & Mitchell, 2014)



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15

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## Brain Structure Differences

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16

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## How do the sexes differ across the autism spectrum?

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|---|---|
| <p>▪ Boys:</p> <ul style="list-style-type: none"> <li>More likely to "stim" or spin in a circle/rock back and forth; display repetitive motor movements</li> <li>Intense interests seen as less similar to non-autistic children – memorizing facts, interest in maps, weather, math</li> <li>Limited or no pretend play; more lining up of toys/categorizing items</li> <li>IQ not as big a role regarding increased or decreased presentation of autistic traits</li> </ul> | <p>▪ Girls:</p> <ul style="list-style-type: none"> <li>Fewer, or less noticeable, repetitive behaviors. Ex. Re-enacting scenes from movies, listening to same songs</li> <li>Intense interests are prominent, but more similar to non-autistic children – dolls, Disney characters, horses, arts/crafts</li> <li>May appear to engage in pretend play, but more often this is setting up scenes (like the school lunchroom), and not creative or interactive</li> <li>Higher IQ tends to minimize or "mask" autistic characteristics</li> </ul> |
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17

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## How do the sexes differ across the autism spectrum?

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| <p>▪ Boys:</p> <ul style="list-style-type: none"> <li>Less likely to respond when their name is called or when someone tries to start a conversation</li> <li>Can be more aggressive/externalize/overactive</li> <li>Social communication issues become challenging very early in their lives</li> <li>Less susceptible to anxiety and depression</li> </ul> | <p>▪ Girls:</p> <ul style="list-style-type: none"> <li>More likely to respond to non-verbal cues like someone pointing or shifting their eye gaze</li> <li>More sensitive to sensory input, leading to overwhelm (sound, lights, being touched)</li> <li>More passive, withdrawn</li> <li>May appear socially "engaged" in preschool/elementary school but neglected or rejected by peers by middle school</li> <li>More likely to display anxiety and depression</li> </ul> |
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18

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## Social Motivation vs. Social Energy

*"My soul longs for connection, but my body longs for isolation. I crave community and connection, but my body doesn't hold up well to them. That is a really core part of the Autistic experience for a lot of people. There's a lot of grief in that, and I think that's misunderstood by many people, including Autistic people."*

—Autistic psychologist Megan Anna Neff, PsyD



19

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## How do the sexes differ across the autism spectrum?

### Boys:

- More likely to be "loners" or limit social interactions in teen years; lack sharing of info and emotional feelings

More likely to have ADHD

Less likely to have epilepsy

HIGHER likelihood of being bullied compared to non-autistic peers

### Girls:

- May appear more immature in pre-teen and teen years; play may be more with younger children; can be excessively chatty
- Strong sense of justice...may correct others; remind other to follow rules

Less likely to have ADHD

More likely to have epilepsy

HIGHER likelihood of being bullied compared to non-autistic peers



20

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## Real-World Differences - - what do we observe?

- Apologize and appease
- Chameleon
- Single friend who provides guidance and security
- Animals as friends



21

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## Real-World Differences - - what do we observe?

- Observation and absorption of the speech, mannerisms and character, even persona of someone who is socially successful.
- Becoming an expert mimic
- Creating a mask
- For a brief while, 'cured' of autism
- Surface sociability but a lack of social identity
- Masquerading: watch and imitate to conceal social confusion
- Socializing a source of anxiety and stress (performance anxiety)
- Inconspicuous in class so stress related mental health concerns are not noticed in school



22

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## What is Masking/Camouflaging?

- An effort to display **facial expressions of emotion or interest**, even if not felt inside.
- Keeping a **mental list** of how to behave depending where you are
- Spending time before an interaction to **prepare topics of conversation**, including questions to ask, anecdotes to relate, and potential responses to others



23

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## Consequences of Masking/Camouflaging

- **Anxiety**
- **Exhaustion:** mentally, physically, and emotionally draining
- Needing time **alone** to recover
- **Uncertain** how effective the camouflaging strategies were
- A delay or questioning of the ASD diagnosis.
- Failing to receive adequate support or allowances for the ASD difficulties
- Given more responsibilities or expectations than the person is comfortable with, because of a perceived level of capability



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## Discovering Autistic Females in Adolescence

**Secondary disorder** diagnosed in adolescence, such as:

- Anxiety disorder,
- Depression
- Borderline Personality Disorder
- Eating disorder
- Gender Dysphoria

Detailed developmental history indicates a diagnosis of ASD



25

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## Discovering Autistic Females in Adulthood

- Problems with employment or relationships leads to a search for an explanation for being different
- Having a child with ASD
- A peer, employer or mentor recognizes the symptom and brings up the concept
- Media articles and television documentaries, Tik Tok



26

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## Other Groups that are Under-Diagnosed

- Autistic children who were not identified were more likely to be non-White (Wiggins et al.)
- Lower diagnosis rates for Black children compared to White children, even with comparable autistic traits (Jo et al.)
- Children of color have more developmental delays, greater intellectual impairment, more behavior problems, and/or more autistic traits before they are recognized as autistic (Constantino et al., Maenner et al.)
- Other potentially under-identified groups
  - Under-identification of kids who may not align with their assigned gender (Warrier et al., Strang et al)
  - Intellectually gifted (Koehler and Buell)



27

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## Why Are We Missing These Individuals?

### ▪ Clinician issues

- Over-reliance on tests in general
- Over-reliance on one test in particular
- Diagnostic overshadowing
- Assumptions, e.g., "They'd be diagnosed already."
- "I don't diagnose autism"
- Our own low confidence about our knowledge (Lipinski et al)
- Our underlying feeling that autism is categorically bad
- Under-reliance on subjective experience



28

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## Why Are We Missing These Individuals?

### ▪ Bias in the general population

- Parents and teachers are more likely to refer boys
- And to refer them specifically for autism

### ▪ Issues with our diagnostic tools



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## How Can We Improve as Diagnosticians?

- Look for the totality of the individual
- Don't assume based on our own biases
- Dig deep – conduct a thorough interview
- Diagnostic tools continue to improve as research begins to include more biological females in studies
- There is no blood test, brain scan or any other objective test that can formally diagnose autism—although researchers are actively trying to develop such tests. Clinicians rely on observations of a person's behavior to diagnose the condition.



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## Resources

Learn the signs of autism in toddlers: [www.autismspeaks.org/signs-autism](http://www.autismspeaks.org/signs-autism)

### Books:

- a. *An Early Start for Your Child with Autism* by Sally Rogers, PhD, Geraldine Dawson, PhD, and Laurie Vismara, PhD (2012)
- b. *Outsmarting Autism: Build Healthy Foundations for Communication Socialization, and Behavior at All Ages* by Patricia Lemer, LPC (2019)
- c. *Growing Up on the Spectrum* by Lynn Kern Koegel, PhD (2010)
- d. *Social Skills Activities for Kids* by Natasha Daniels (2019)
- e. *The Sensory Sensitive Child: Practical Solutions for Out-of-Bounds Behavior* by Sam Smith, PhD, and Karen Gouze, PhD
- f. *The Explosive Child* by Ross Greene (2021)



31

## Resources

- *Social Skills for Teenagers and Adults with Asperger Syndrome: A Practical Guide to Day-to-day Life* by Nancy J. Patrick
- *The Hidden Curriculum for Understanding Unstated Rules in Social Situations for Adolescents and Young Adults 2nd Edition* by Brenda Smith Myles
- *Intimate Relationships and Sexual Health: A Curriculum for Teaching Adolescents/Adults With High-Functioning Autism Spectrum Disorders and Other Social Challenges* (Davies & Dubie, 2012)
- *Autism Breakthrough: The Groundbreaking Method That Has Helped Families All Over the World* Hardcover by Ruan Kaufman (2014)
- *The Spectrum Girl's Survival Guide* by Siena Castellon (2020)
- *Unmasking Autism* by Devon Price, PhD (2022)
- *What I Mean When I Say I'm Autistic* by Annie Kotowicz



32

## Resources

- NJ Children's System of Care
- The Children's System of Care (CSOC) is New Jersey's public behavioral health system. CSOC serves youth under age 21 with emotional and mental health care needs, and/or intellectual/developmental disabilities and their families. CSOC provides community-based, culturally competent services and supports based on the needs of the youth and family. 1-877-652-7624 or [www.nj.gov/dcf/about/divisions/dcsoc](http://www.nj.gov/dcf/about/divisions/dcsoc)

### SOCIAL SKILLS TRAINING- PEERS Program

- Various programs for preschoolers (ages 4-6) through adults age 35
- <https://www.semel.ucla.edu/peers>

### Job Training:

- *The Asperger / Autism Network (AANE)* - ([www.aane.org](http://www.aane.org))

Autistic Self-Advocacy Network – young adults [www.autisticadvocacy.org](http://www.autisticadvocacy.org)



33

## Resources

The organizations outlined below offer a variety of therapies, support groups, family resources, and other services to individuals with autism and their caregivers:

### *Autism NJ*

- An organization which offers information on resources regarding Autism Spectrum Disorders
- <http://www.autismnj.org/>

### *Autism Speaks*

- An organization that offers information and resources for individuals with Autism and their families.
- <http://www.autismspeaks.org>

### *POAC NJ (Parents of Autistic Children)*

- An organization connecting families with opportunities for events including training for parents and educators, recreational and support services to individuals with Autism and their families.
- <http://www.poac.net>

