

Core Concept

Neuroscience and Psychology

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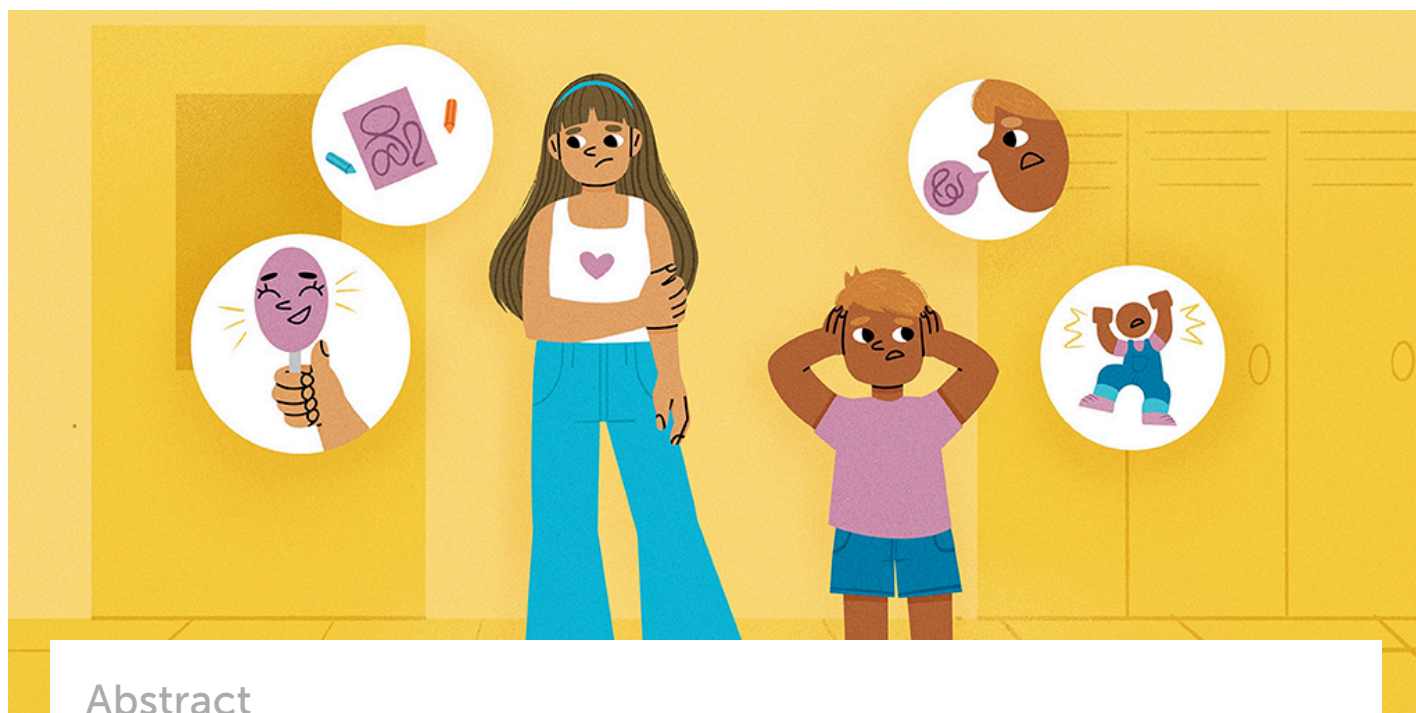
Is Autism Different for Girls and Boys?

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Abstract

Autism is a common condition that affects the way people think and interact with the world. Most of our knowledge about autism is from research done with autistic boys. This means that we do not know much about the ways that autistic girls may be different than autistic boys. Now, researchers are including more autistic girls in their studies to find out about these differences. However, not all researchers find the same results: some researchers find that autistic boys are better at some tasks and other researchers find that autistic girls are better at those same tasks. In this article, we review some of the

findings about differences between autistic girls and boys and talk about why it is important to understand these differences.

What is Autism?

Autism is a common condition that affects how people think (**Figure 1**)—you may even know someone who is on the autism **spectrum** or be on the spectrum yourself. Many autistic kids understand things differently than non-autistic kids. For example, autistic and non-autistic kids may express themselves differently, so they may have difficulty communicating with and understanding one another (learn more by reading **this Frontiers for Young Minds article**). We should learn about and celebrate **neurodiversity**, or differences in the ways people think, to help us all understand each other (**Figure 2**)!



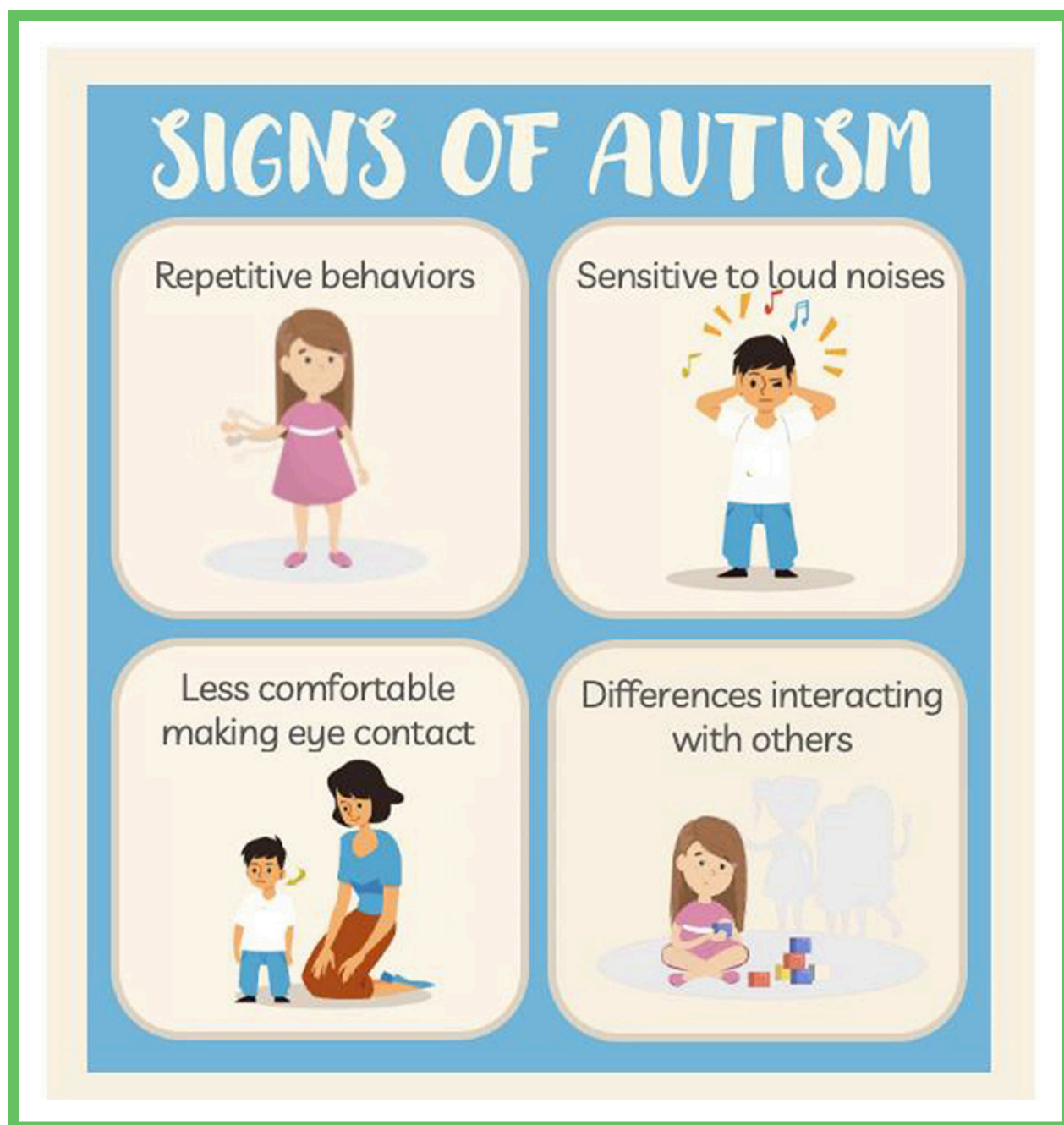


Figure 1 - Everyone's autism looks different! Some autistic children may have repetitive behaviors or movements such as rocking, spinning, or hand flapping. Some might also be sensitive to sights, sounds, smells, tastes, and touch. For instance, autistic children might feel uncomfortable around loud noises. Autistic children may also make less eye contact when talking to others. Finally, some autistic children may communicate and interact with others differently. For example, an autistic child might not respond to their name or appear to not hear you at times. An autistic child might also use a singsong voice or repeat some words.



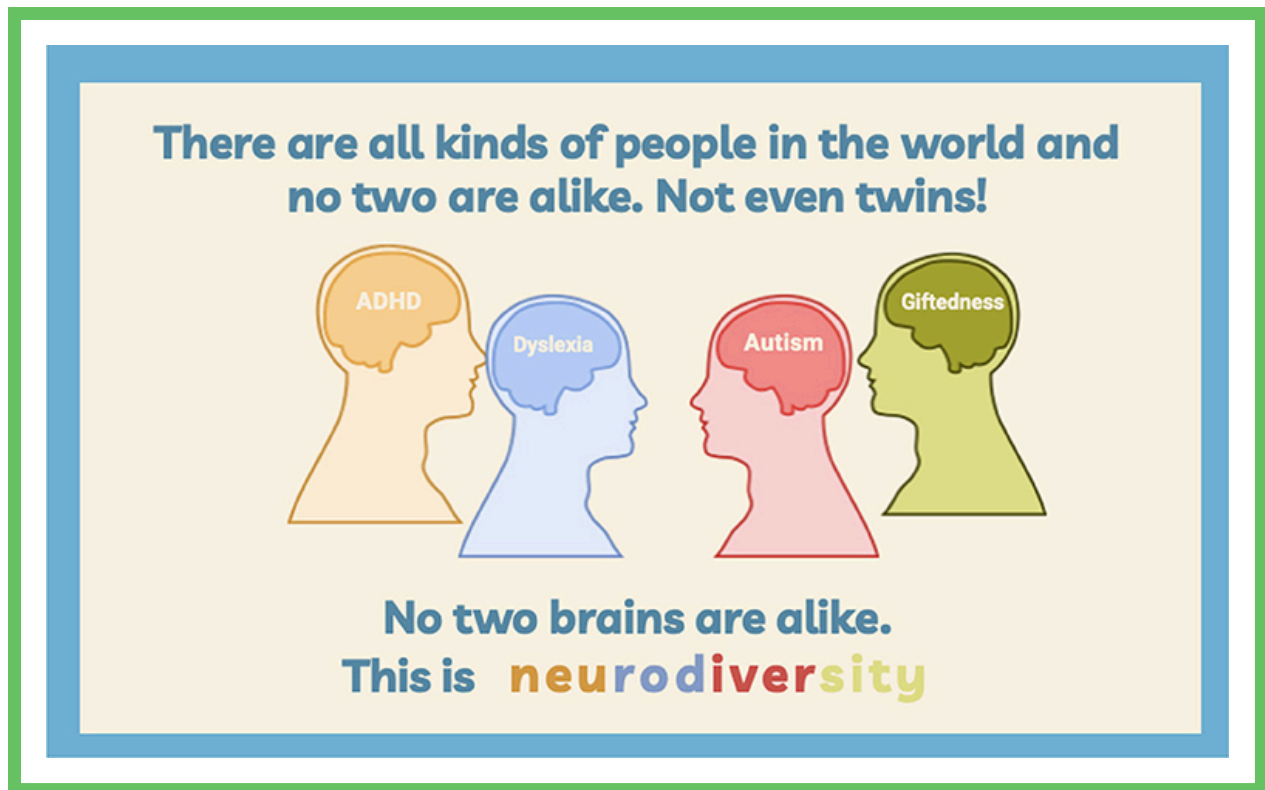


Figure 2 - Neurodiversity is a word for differences in the way people's brains work.

We all exist on a spectrum and have different skills and strengths. Some kids might have a hard time paying attention or sitting still. Other kids might struggle to read or break down words. Many kids are diagnosed with autism. Some kids might learn differently or more quickly than others. Everyone's brain works differently, meaning we are all neurodiverse!

Autistic kids may also process information from the senses, like sights and sounds, differently. For example, they may hear a firetruck in the distance that non-autistic kids might not notice, or be bothered by the texture of some clothes or foods. Experiencing senses more intensely can be stressful, so autistic kids might also repeat certain behaviors to stay calm, like flapping their hands or covering their ears.

Autism can also lead to unique skills and strengths. For example, autistic kids may do better at tasks that involve remembering small details and patterns or remembering important dates. Autistic kids may also have interests that they know a lot about, like trains, technology, or history.

Many scientists are doing research to better understand autism, because there is still much that we do not know. Part of what we do not know enough about is how autism is different for boys and girls on the spectrum. These differences often mean that girls are diagnosed with autism less often. If autistic girls do not receive a diagnosis of autism, they are missing crucial information that could help them and their families understand



the way they think and behave, and they are also missing out on services that can help them.

Are Autistic Girls and Boys Different From Each Other?

More boys than girls are diagnosed with autism (**Figure 3**), and there are many possible reasons for this. For instance, it is possible that there are biological differences between boys and girls that make it more likely for boys to be diagnosed with autism. Second, boys tend to have autism traits that are easier for teachers and parents to notice, like having trouble talking. Autistic boys are also more likely than autistic girls to have other disorders at the same time that are more easily seen, like **attention deficit hyperactivity disorder (ADHD)**. The easier the symptoms are to notice, the more likely a child is to be diagnosed.



Figure 3 - Autism is more common in boys than girls.

There are 4 times as many autistic boys as autistic girls. This can be because of biological differences between the sexes or the way that autism is defined and diagnosed. Although autism is diagnosed more often in boys, there may be autistic girls who do not have an autism diagnosis because it is easy for doctors to miss the signs of autism in girls. Some studies find that girls might show their autism symptoms differently than boys.

Another possible reason that more boys are diagnosed with autism is because initial descriptions and research studies about autism focused mainly on boys. This means that autism was defined based on what it looks like in boys, and doctors and scientists continue to look for those same traits when making an autism diagnosis for both boys and girls. This can make diagnosing autism in girls more difficult, since girls' autism traits often look different than boys' autism traits. For example, girls tend to repeat behaviors that are less obvious than boys' repetitive behaviors, like collecting stuffed animals or having a strong interest in drawing. Even though doctors and parents may notice these

behaviors and interests, they are seen as socially acceptable behaviors for girls, and so they are not thought of as signs of autism [1]. Many girls also hide or “mask” some of their autism symptoms to try to fit in. This leads to fewer symptoms being noticed by doctors and parents, and an even lower likelihood of girls receiving an autism diagnosis (see [this Frontiers for Young Minds article](#) to learn more about how some autistic kids hide aspects of their autism).

Even though autistic kids have autism for their whole lives, boys are usually diagnosed younger than girls. Many autistic boys get diagnosed when they are just 2–5 years old, while girls are more likely to be diagnosed with autism when they are older—sometimes not even until they are adults! We also know that when girls are diagnosed with autism early, those girls often have symptoms that are more similar to autistic boys, like difficulty learning to talk, and they may repeat more obvious behaviors, like lining up toys.

What Differences Have Scientists Found?

Because there are more boys diagnosed with autism than girls, there are not enough girls in most studies to look at how autism is different for girls and boys. Even when studies do look at these differences, scientists do not consistently find the same results as each other.

For example, scientists have compared **social communication** in autistic girls and boys. Social communication is what lets you share your thoughts and ideas with other people and listen to and understand others’ thoughts and ideas. Communication includes words, hand gestures, and facial expressions. Some scientists found that there were no differences in the social communication of autistic girls and boys [2]. Other scientists found that autistic boys scored better on a test of speaking and listening than autistic girls [3], meaning *boys* had better social communication. Still other scientists found that autistic *girls* had better social communication skills [4].

Scientists have also studied whether **executive function** abilities are different in autistic girls and boys. Executive functions help you focus and stay on task. You use executive functions to plan what you have to do, like the steps necessary to complete your homework. You also use executive functions to control your emotions and behaviors, like knowing to use words instead of hitting people, even when you are angry. Two groups of scientists studied executive function abilities and found the same thing: autistic girls have better executive function abilities than autistic boys [5, 6].

However, these same two groups of scientists studied whether autistic boys and girls process visual information differently. Some scientists found autistic boys are better at seeing visual details, like when they have to make a certain pattern out of blocks, or find



a shape hidden in a picture [5]. However, other scientists found the opposite: autistic girls are better at seeing visual details than autistic boys are [6].

Why All Scientists Might Not Agree

Scientists may get different results even when studying the same skill because autism is a spectrum. Autism looks different in every person, and each autistic person has unique abilities. This means that even when many scientists agree on findings, those findings may not be true for every autistic person. Different findings between studies could also be because of the IQs of autistic kids who participated in the studies. In many studies that found autistic girls did better on tasks than autistic boys, the girls had higher IQs. But in studies that found autistic girls did *worse* on tasks than autistic boys, the girls had *lower* IQs. So, findings may differ between studies because they include kids with different abilities.

Studies may also have different findings because of the ages of kids who are included. One study found that social communication differences change with age [7]. When autistic kids were 1–2 years old, boys were better at social communication, but when autistic kids were 3–6 years old, girls and boys had similar social communication levels. Since girls diagnosed at older ages often have different autism traits than girls diagnosed at younger ages, the differences found between autistic girls and boys at younger ages may not be the same differences found at older ages, when girls with different autism traits are included in studies.

The fact that scientists have not all found the same results tells us that we should do more research to understand autism in girls, and there is still so much to learn! Today, there are many scientists who include autistic girls in their research so that we can better understand what autism is like for girls. If you or someone in your family is autistic, you can get involved in science by signing up for studies, such as **SPARK**, to help scientists learn more about autism.

Why Are Differences Between Autistic Girls and Boys Important?

Scientists' findings on differences between autistic girls and boys could be very useful for doctors, parents, and autistic kids. If scientists understand how autistic girls are different from autistic boys, then doctors may be able to diagnose girls more easily. Getting diagnosed at younger ages means autistic kids have more time to use any services they need, like getting help in school. For example, if a child is autistic and sensitive to noise, taking a test in a noisy classroom may be too distracting. Instead, noise-sensitive kids could take the test in a quiet room where there are no distractions. Many schools require specific diagnoses to give kids special accommodations like a quiet room, getting extra time to complete schoolwork, sitting in a less distracting area of the classroom, or being

warned about schedule changes or loud noises like fire drills. Without an autism diagnosis, a child may not get the special accommodations that allow them to do their best in school.

Getting diagnosed with autism at a younger age may also help children make friends and learn to communicate better. Because autistic kids may express themselves differently than non-autistic kids, interactions with classmates and other kids may be more difficult. Difficulty with spoken language can also make it hard to make friends. However, if autistic kids are diagnosed at younger ages, they can get speech therapy that helps them with spoken communication, which can make talking to classmates and making friends easier.

Conclusion

Overall, autistic girls and boys seem to experience autism differently. However, scientists have not all found the same thing, and there is still much to learn about autism and how it may be different for girls and boys. Different findings between scientists could be because of the abilities, IQs, or ages of study participants. Scientists should keep studying differences between autistic girls and boys to find out how autistic girls may think and act differently than autistic boys. Such research will be beneficial for autistic girls, helping them to get diagnosed at a younger age, so they and their families can receive any support they might need to be successful.

Glossary

Autism: ↑ A condition that affects the way people think, and often involves specific interests, difficulties with communication, and differences in processing sensory information. Symptoms vary greatly between individuals.

Spectrum: ↑ A way to classify something that has a broad range. When talking about autism, spectrum means that there are many different symptoms, and each person experiences autism differently.

Neurodiversity: ↑ Differences in the way people think and the way brains work.

Attention Deficit Hyperactivity Disorder (ADHD): ↑ A condition that affects people by making it harder to pay attention and control behaviors.

Social Communication: ↑ Talking and interacting with others to share our thoughts and understand other people. Talking can be verbal (through words) or nonverbal (through hand gestures like pointing).

Executive Function: ↑ A set of abilities that are used to help us stay on task, plan our actions, and control our emotions and behaviors.

Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



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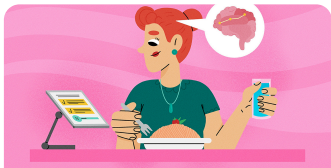
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