



## Mental Health in Young Adults with Autism Spectrum Disorders

By **Nikki Scheman**

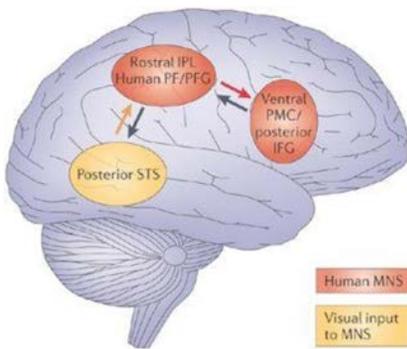
The rate of psychiatric disorders in young adults with Autism Spectrum Disorders (ASD) is extremely high.<sup>1</sup> But, even though mental illness can be more common for people on the autism spectrum than the general population, the mental health of individuals with ASD is often overlooked. Co-occurring mental illness can come in the form of depression, ADHD, bipolar disorder, and others. One of the most common disorders co-occurring with ASD is anxiety disorder.<sup>1</sup> In fact, individuals with ASD experience anxiety at rates exceeding both the general population and other neurodevelopmental disor-

ders.<sup>2</sup> The common co-occurrence of anxiety in ASD has been confirmed in over forty studies before 2014.<sup>3</sup> Managing multiple conditions can make the transition into young adulthood especially difficult for youth with ASD. Being able to recognize comorbid, or co-occurring, psychiatric disorders may identify targets for specific intervention that could reduce overall impairment and improve quality of life. Recognizing that the symptoms of mental illnesses, like anxiety, could look different in those with ASD than in those without could help individualize care for youth on the spectrum.<sup>4</sup> When these needs are not met,

there is a social cost.

Autism advocate and co-founder of Autism Goggles, a website dedicated to expressing the experience of being autistic, Daniel Share-Strom, talks about the anxieties that come from living on the spectrum. Not surprisingly, difficulties in communication can contribute to the layers of anxiety individuals on the spectrum experience on a daily basis. In a blog post to his site, he writes that “the feeling of living on edge... of waiting to mess up... can cause tremendous anxiety.”<sup>5</sup> Parents and teachers would benefit youth with ASD if they increased awareness, acceptance, and knowledge about

**Figure 1** Imitation/Mirror Neuron Circuit. This includes the rostral inferior parietal lobule (IPL) and inferior parietal cortex (PFG) as well as the posterior inferior frontal gyrus (IFG).<sup>25</sup>



autism spectrum disorders and the common anxieties and mental health disorders that can often co-occur. This can lead to better strategies for support and reduce misunderstanding of youth with ASD both at home and in the classroom. This has the potential to help children with ASD become less anxious and more likely to be open to learning about how to improve their communication skills.

### What are Autism Spectrum Disorders?

Autism spectrum disorders are increasingly common, with 1 in 48 children affected.<sup>6</sup> They are characterized by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) as persistent deficits in social interactions and communication as well as restricted, repetitive patterns of behavior, interests, or activities.<sup>7</sup> Early indications of ASD include deficits in social skills such as mentalizing and face processing. Specifically, a lack of interest in the human face and voice and a pref-

erence for inanimate objects is an indication of ASD.<sup>8</sup>

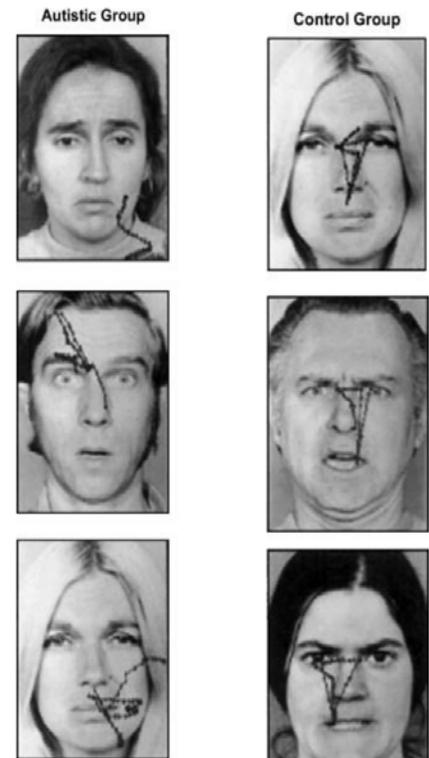
Individuals with ASD sometimes struggle to connect with others in typical ways. Specifically, the ability to think about another person's perspective is essential for meaningful connections. Studies show that there may be atypical development of the neural circuitry that underlies mentalizing and self-appraisal.<sup>9</sup> Mentalizing is this ability to understand that others have different desires and perspectives than one's own. There is evidence for a whole system of the brain that co-activates to the actions, intentions, and emotions of the self and others. This system, called the mirror neuron system (MNS), is comprised of regions in the inferior frontal gyrus (IFG) and inferior parietal lobule (IPL) that are active during the perception and execution of actions (Figure 1).<sup>9</sup> In a study done by Dapretto et al., children with autism and controls both imitate facial expressions showing basic emotions. The children with ASD showed less MNS activation than healthy controls, and the extent of activation in the MNS was correlated with the severity of their autism symptoms.<sup>10</sup>

Children with ASD also show deficits in face processing that are due to issues in skills like eye gaze, face identification, and emotional recognition. Much of how we gather social information is from looking at other people's eyes. Individuals with ASD show significant impairment in gaze fixation to the eyes and erratic gaze patterns (Figure 2).<sup>11</sup> It is possible

that the difficulty remembering faces that individuals with ASD also experience is because of this eye-gaze deficit. Dysfunction of the fusiform face area (FFA) also leads to this difficulty in people with ASD (Figure 3).<sup>9</sup> Individuals with ASD also focus on other features of the face besides emotional expressions, like accessories, suggesting that there is a difference in the salience in emotional expressions. Studies have shown dysfunction in the amygdala, a somewhat almond shaped structure that is a key part of the emotional circuit, in response to emotional faces.<sup>12</sup>

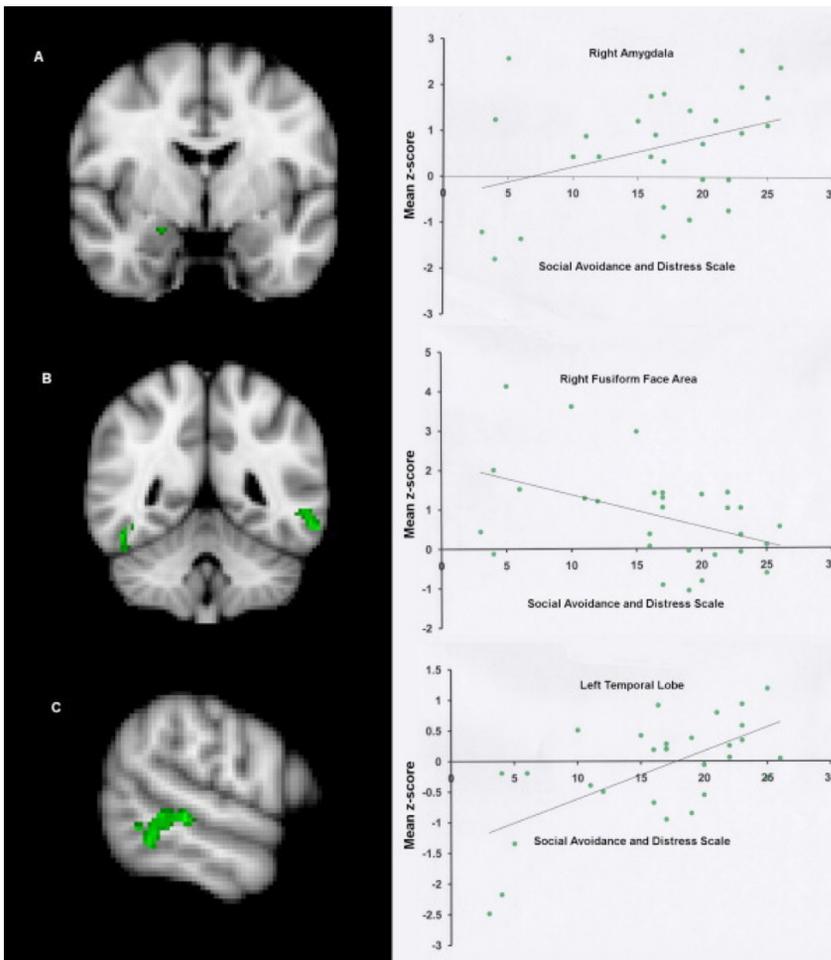
### Emotions and the Amygdala

We know dysfunction has been



**Figure 2** Abnormal eye-gaze patterns in patients with ASD. Eye gaze of ASD group shown on the left, and a control group with a typical inverted triangle pattern of visual gaze on the right.<sup>11</sup>

**Figure 3** Results from an fMRI study presenting participants with either fearful or angry faces. In the ASD group, there was decreased fusiform face area and increased amygdala activation in as anxiety levels increased.<sup>9</sup>



shown in the amygdala of patients with ASD, but what is the amygdala and what role does it play in emotion? The amygdala is a collection of nuclei at the front end of the hippocampus that receives sensory input in a highly processed form from all types of senses (Figure 4).<sup>13</sup> While many types of input go to the amygdala, the most common emotion (but not the only emotion) following amygdala activation, is fear.<sup>13</sup> There are three main regions of the amygdala: the basolateral nuclei, centromedial nuclei and the peripheral nuclei. The basolateral group in particular has been implicated in both decision-making

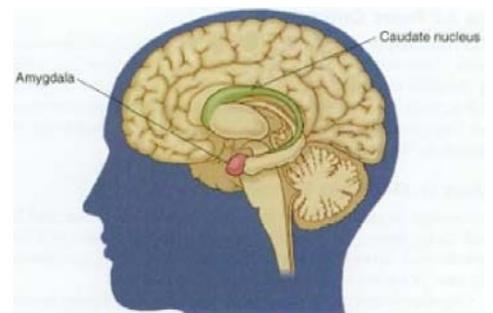
and social perception.<sup>14</sup> In fact, in one study, researchers looked at the role of the primate amygdala in decision-making with respect to others. Chang et al. found that the basolateral amygdala neuron activation seemed to mirror the value of the reward both to themselves and to a recipient primate. Their findings support the idea that the amygdala, specifically the basolateral region, is a critical area for regulating social decisions.<sup>14</sup>

However, the amygdala is associated with more than reward and decision-making. Interestingly, the function of the amygdala in emotional processing can be associated with anxiety, too. The

main hormone associated with stress and anxiety is called cortisol. More cortisol is released from the adrenal glands in stressful situations. Researchers looked at the effect of cortisol levels on the connectivity of the amygdala to other face regions during emotional face perception. More cortisol was correlated with increased connectivity of the amygdala with many different parts of the brain, including the cerebellum. This connectivity has also been reported in anxiety disorder patients.<sup>15</sup>

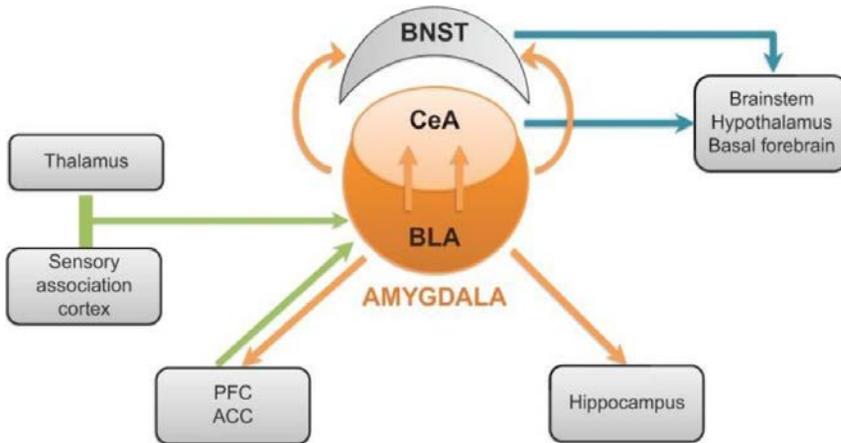
### A Brief Look at Anxiety Disorders

Before talking about the struggle that individuals with ASD face when they experience comorbid psychiatric disorders, particularly anxiety disorders, a brief description of the latter is required. Anxiety disorders are characterized by maladaptive anxiety symptoms that cause distress and impair function.<sup>16</sup> Many brain regions appear to be involved in the recognition and regulation of negative emotional stimuli and response to these stimuli. The principal neural circuits thought to be related to anxiety are presented in Figure 5.<sup>17</sup> While many structures seem to be



**Figure 4** Location of the amygdala in the brain attached to the hippocampus.

**Figure 5** Main neural circuits associated with anxiety. This includes the thalamus, prefrontal cortex (PFC), anterior cingulate cortex (ACC), hippocampus, hypothalamus, brainstem, and the basolateral (BLA) and central (CeA) nuclei of the amygdala.



critical for the regulation of negative emotion in anxiety, the amygdala, in particular, appears to play a crucial role.<sup>17</sup>

Researchers have shown that patients with anxiety disorders exhibit hyperactivation of the amygdala in response to faces than controls.<sup>17</sup> The basolateral nucleus of the amygdala receives information on potentially negative emotional stimuli from both the senses and the thalamus, the relay station for sensory input. This, in turn, activates the central nucleus of the amygdala, its main output pathway (Figure 6). Projections from the central nucleus send information to the hypothalamus and brainstem via inhibitory GABAergic neurons. GABA is a neurotransmitter that silences signals between neurons. Its levels may be linked to these feelings of anxiety and also to anxiety disorders.

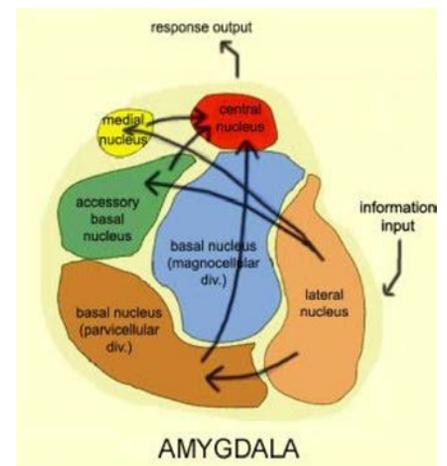
### The Amygdala in ASD and Anxiety

While it has been shown that the amygdala is hyperactive in indi-

viduals with anxiety disorders, evidence of amygdala abnormality in ASD is conflicting. Some studies have found that the amygdala is hypoactive and fails to process social stimuli as meaningful (Figure 7), while others say that the amygdala is hyperactive. In those cases, the avoidance of social stimuli seen in patients with ASD could be the result of an aversive over-arousal.<sup>18</sup> The abundance of inconsistent findings in the published literature on ASD may reflect differences between study populations regarding age, level of symptom severity within ASD groups, and not accounting for underlying anxiety level in the study groups.<sup>19</sup> Many studies have investigated the relationship between anxiety and ASD and the effect of their co-occurrence on the amygdala, since the rate of comorbidity is so high.

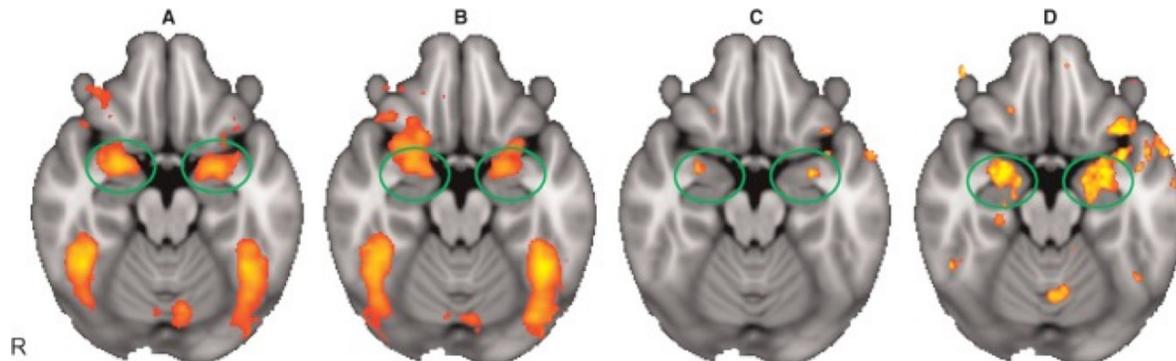
When looking at the relationship between self-reported anxiety and fMRI activation to emotional faces, Kleinhans et al. found that ASD individuals with higher anxiety showed increased amygdala activation (Figure 3).<sup>9</sup>

They had participants look at angry or fearful faces and match the emotions seen to a target face. Interestingly, the area of the brain associated with face processing, the fusiform face area, was less activated the more anxious an individual rated themselves. This would suggest that more anxious participants avoided the face area entirely to avoid the negative feelings of anxiety. On the other hand, low-anxiety ASD groups have been shown to have decreased amygdala activity compared to controls.<sup>20</sup> So, maybe all the conflicting data on amygdala activity in people with ASD comes down to their anxiety levels. If this is the case, researchers and doctors could predict the level of social impairment that an individual with ASD might face. One study looked at the relationship between social impairments and amygdala habituation, the diminishing of a response to a stimulus after repeated exposure. They found that in the ASD group,



**Figure 6** Different nuclei of the amygdala. This primary three nuclei are the lateral nucleus that receives input, the basal nucleus and the central nucleus that sends output information to other brain regions.

**Figure 7** Decreased amygdala activation in ASD individuals with low anxiety. Amygdala activation is circled in green. (A) Control group only. (B) ASD group only. (C) Control vs a low-anxiety ASD group, measured by the SCARED total score. (D) Controls vs ASD patients with low anxiety, measured by the SCARED Separation Anxiety Score.<sup>20</sup>



lower amygdala habituation was associated with more severe social impairments.<sup>9</sup> This supports the idea that social impairment can be predicted in the lab, but evidence on the effects of anxiety could provide insight into how to target interventions to help with the increased ASD symptom severity that results.

### Co-occurrence of ASD and Anxiety

Anxiety interventions would be especially important for individuals with ASD because children with anxiety disorders actually experience increased ASD-like traits.<sup>2</sup> In a parent rating of ASD severity, the children with the highest levels of anxiety were rated the highest for ASD symptoms as well.<sup>2</sup> However, the challenge comes in recognizing this anxiety, because youth with ASD express it in ways both similar and dissimilar to DSM definitions.<sup>21</sup> There is also the presence of unusual fears, worries, compulsive behaviors, etc., that appear to be associated with ASD-related traits that may be a

distinct manifestation of anxiety symptoms and the increased risk of anxiety disorders. This provides an avenue for future research, but in the meantime requires more awareness from parents and teachers of youth with ASD in order to best provide support.

### Challenges of ASD During Adolescence

While it is evident that co-occurring anxiety makes already existing ASD symptoms worse and provides added challenges, plenty of challenges exist already. The neural underpinnings discussed earlier, as well as other factors, have far reaching impacts on the daily lives of youth with ASD. These differences in brain function can manifest themselves in many different ways. To get a sense of what the daily challenges are for people with ASD, a blog post from the writers of Autism Goggles describes what individuals with ASD wish the people in their lives knew about their experience. Most of their focus was on communication. Despite this being the case,

research has shown that social involvement with peers improves the behavioral skills essential for everyday life in people with ASD. However, making these social connections is tricky for a number of reasons.

To start, individuals with ASD can have trouble coming up with the words they want to say in a timely manner during interactions, despite having large vocabularies.<sup>5</sup> This can lead to deficits in their social interactions with people who do not understand why this occurs. It can also be hard for people with ASD to understand the main point of a request or reading topic, but they don't always know that they have misunderstood.<sup>5</sup> When others point out the error, it can cause shock and embarrassment. This was a common theme: the embarrassment that comes from mistakes that were completely unintentional. It can be very anxiety producing when you unexpectedly get negative feedback for your actions without always knowing why. However, individuals with ASD can also have a hard time finding the words to de-

find themselves when they believe someone is angry or disappointed with them. Because of this, selectively going silent can be a coping method. In fact, it is not uncommon for children with ASD to be very quiet or even not speak at all in the school setting. Awareness of this is essential for teachers to be able to provide the right kind of support for their children on the spectrum.

Awareness from teachers, family, and society is not always the reality, though. Regardless of a diagnosis on the autism spectrum, adolescence is, in general, a time of increased demands on our youth. For example, adolescents are expected to begin following multistep directions, keep their school materials organized, begin to socialize outside of their families, and gain independence. However, studies show that the cognitive abilities of youth with ASD might not be improving fast enough during adolescence to keep up with these increased demands.<sup>22</sup> The gap between expectations and the abilities of adolescents with ASD widens over time. In particular, working memory (the ability to hold a memory for a short amount of time for processing), imitation, and organization become increasingly problematic over time.<sup>22</sup> Data in this area emphasizes the need for continuing intervention and support throughout later adolescence, when typically school and clinical resources become less available.

### **ASD and Mental Illness: Broader Impacts**

Individuals with ASD experience challenges during adolescence that make life even harder than it already is during this time of growth and development. At the same time, the rate of comorbid mental health issues, like anxiety, is high. Environmental factors seem to play a major role in this. Daniel Share-Strom, from Autism Goggles, believes that “people with autism aren’t immediately born anxious or with depression,” but that “the world is fundamentally not built for us, and people are always judging and trying to change you, whether they have the best intentions or not.”<sup>5</sup> Because of these added challenges, providing support and resources for young adults with ASD is extremely important.

However, many children with ASD are not getting the mental health services they need. Compared to children with other disabilities or mental illnesses, children with ASD have more unmet healthcare needs and more difficulty accessing mental health services.<sup>6</sup> Although inadequacies in mental health services affect many Americans, the problem is more severe for individuals and families affected by ASD. At least 15% of children with ASD who needed mental health services did not have access.<sup>23</sup> This is especially problematic when mental illness brings its own challenges and also exacerbates the already present challenges associated with ASD. Consequently, improving access to quality mental health services and other health care is necessary.

However, this will require both insurance reform and improved training in medical school and healthcare systems.

Mental illness can inadvertently go untreated if it is believed to be just another characteristic of ASD. But it is, in fact, a misconception that some symptoms cannot be from other mental health disorders. In reality, mental health symptoms can still be treated or helped in individuals with ASD. This can come in the form of both medication, which can improve mood and reduce impulsivity and Cognitive Behavioral Therapy. This therapy involves changing the young adults’ patterns of behaving and thinking by making them aware of why their patterns are not productive.

In addition, further training on working with youth with ASD should be required for teachers. This would help teachers to provide the kind of in-class environment that would support rather than add to the already existing anxieties and struggles that people with ASD face on a daily basis. However, training should focus on both ASD symptoms as well as signs of co-occurring mental illness. This way, the people who need extra help can get the support they should be receiving for mental illness disorders such as depression, anxiety disorders, ADHD, and others.

The occurrence of autism spectrum disorders has only grown over the years. Now, approximately 1 in 48 children are diagnosed with ASD.<sup>6</sup> This is an incredibly high statistic that is continuing to

rise. Within this population, the prevalence of co-occurring anxiety disorders and other mental illnesses is widespread but also widely overlooked. Parents, teachers, and communities all need to be more aware of the specific challenges individuals with ASD face, and the possibility for other mental health issues that could be occurring at the same time. But, while awareness is a great step, that awareness must turn to both acceptance and changes in the way teachers and health practitioners are trained with regard to people with ASD in order to really improve their quality of life.

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