Module 19: What Causes Autism?

Since the identification of the Autism Spectrum Disorder, scientists and psychologists have sought to identify its causes to gain a better understanding of both the nature of the disorder and its treatment options.

In this module, you'll study theories and studies that have contributed to finding the cause of ASD. You'll also learn about the signs and symptoms of autism, both in young children and adults. At the end of the module, we'll discuss the link between autism and gender.

19.1 Is autism caused by nature or nurture?

19.2 Identifying early signs of autism

19.3 Identifying autism in adults

19.4 How does autism affect genders differently?

19.1 Is autism caused by nature or nurture?

The cause of autism is still not definite, though scientific investigation is still ongoing and new theories continue to emerge from various schools of thought. We will begin by discussing the environmental approach, followed by the biological approach. Finally we will end the section by exploring the common ground between the approaches.

19.1.1 An environmental approach

Refrigerator Mother Theory, put forward by Kanner in light of his studies of autism in the 1940s, suggested autism was caused by a lack of maternal warmth and subsequent poor bonding between mother and child. He theorized children with autism withdrew from social interaction as a response to their parents' emotional indifference, seeking comfort in solitude. It was University of Chicago professor Bruno Bettelheim helped this theory gain widespread acceptance with medical authorities in the 1950s and 60s and founded the residential Orthogenic School at the University of Chicagoto give autistic children a 'parentectomy'.

Rhesus monkeys studied by Harlow and Harlow were found to have behavioural traits similar to autism after exposed to severe maternal deprivation. Rutter et al found that 12% of Romanian orphans who suffered depravation were found to exhibit autistic behaviours at age 4. These two studies support environmental factors in the development of autism.

The metals, toxins and chemicals contained in vaccinations, food and the water supply are thought by some to be a contributing factor to autism. Autism has been linked to exposures to thalidomide, misoprostol, valproic avid, chlorpyrifos and maternal rubella infection during early pregnancy.[1]Following a 1998 study by Wakefield, which found measles viruses in the guts of autistic children, it was thought that the MMR vaccine could be a contributing factor to autism. Despite extensive research, there have been no conclusions into whether vaccinations cause the disorder.

19.1.2 A biological approach

The biological approach is the emphasis on inherited genetics in the development of autism. About 15% of people on the autism spectrum have a genetic change that can be identified as the cause of their autism. As genetic technology improves and more individuals are given genetic testing, this number is expected to increase dramatically.

Other studies indicate that genetic abnormalities account for much more than 15% of autism incidences:

Bailey et al[2] compared identical and non-identical twins. They found that 60% of identical twins had extremely similar cases of autism compared with 5% of non-identical twins. 92% of identical twins were found to be both on the autism spectrum, but exhibit different symptoms, compared with 10% of

non-identical twins. These results suggest that autism is strongly influenced by genetics – the identical twins with the same genes were much more likely to show the same symptoms.

There are visible signs of autism that are thought to be related to genetics, too, such as extremely accelerated brain growth in early childhood.

It is not known yet, in the majority of cases, which genes are responsible for autism. It is thought that multiple interacting genetic factors, rather than a single gene, cause ASD. With the predicted advance in genetic technology, it is likely to become easier to identify complex the genetic interactions that could be a significant contributing factor in the development of autism.

19.1.3 A phenotypical approach

An individual's phenotype is 'the set of observable characteristics of an individual resulting from the interaction of its genotype with the environment' (Oxford Dictionary). The vast majority of scientists hold the view that autism is phenotypically caused i.e. both genetic and environmental factors are involved.

The Broader Autism Phenotype (known as BAP), acknowledges that parents, siblings and those related to those on the spectrum are likely to exhibit autistic characteristics, milder than the relative with the diagnosis, but stronger than the general population. This is undoubtedly because of genetics, but we must also recognize that a child brought up and socialized by parents with mild

autistic behaviours and emotional detachment is likely to be further affected by growing up in such an environment.

Examining all the evidence, we realise that in the debate of whether nature or nurture causes autism, we cannot come to a conclusion in the favour of either side. It is evident that autism has both biological and environmental causes. What is unclear at present is exactly what these causes are and to what extent each contributes to the development of autism. It is likely that the complexities of the biological and environmental causes and how they interact are unique to every diagnosed individual.

The study of the causes of autism is in its infancy. Though many studies have been carried out, we are far from a conclusive and comprehensive picture that explains autism spectrum disorder's origins and causes.

19.2 Identifying early signs of autism

The signs of autism in babies and toddlers can be divided into 6 categories – developmental delays, self-stimulating behaviours, inflexibility, social difficulties and communication difficulties. In this section we'll explore them all.

19.2.1 Developmental delays

Babies generally smile and laugh within their first month, and do so in response to others within their second or third month. If a baby doesn't smile or laugh within 6 months, or do so img-fluidly within 9 months, that may be a sign of autism.

Many babies recognize their own names by five months of age. If there is no response to the baby's name by 12 months, it may indicate autism.

Most babies will have been jabbering or making 'baby talk' for months by the time they complete their first year, and be speaking words by 16 months. By their second year, the majority of babies will speak two-word phrases in an attempt to communicate. Babies who don't communicate with words by this stage except when they imitate others may be exhibiting signs of autism.

Other early signs can be a lack of eye contact and a lack of response to a familiar voice. If a baby doesn't follow objects visually and doesn't point, wave or follow their parent or carer's gestures, these could be indicators of autism. Also common is a lack of interest in affection and shared play, ASD babies generally making less noise to get attention than other babies, refusing cuddles, or having no interest in being picked up or played with.

19.2.2 Self-stimulating behaviours (also known as stimming)

- Clicking fingers
- Flapping hands
- Repetitive blinking
- Staring at lights
- Moving fingers in front of the eyes
- Tapping or hitting the ears
- Scratching
- Rubbing the skin
- Making sounds, shouting wordlessly
- Rocking back and forth
- Rocking side to side
- Licking objects
- Smelling objects
- Spinning around
- Rocking on a chair
- Spinning objects
- Repeating words
- Flicking light switches
- Banging objects against a hard surface
- Rubbing against carpet, edges or other textures
- Banging head against objects
- Hand biting

- Peering out of corners of eyes
- Placing objects in the mouth
- Humming
- Shrieking

19.2.3 Inflexibility

- Insists on following a strict routine e.g. may want to be fed at the same time every day
- Dislikes unfamiliar environments or change to the living environment
- Spends a long time watching moving objects or focusing on small details of an object
- Has an unwillingness to change activities and can be engaged in one activity for unusually long periods of time
- Enjoys ordering pens, toys or other objects into lines
- Insistence on watching a particular TV show repeatedly
- Obsession with symbols, numbers or facts
- Repetition of heard material such as radio or TV broadcasts in place of real conversation or when feeling threatened

19.2.4 Social difficulties

Even by toddlerhood, signs of ASD can be very pronounced. While other children are beginning to become more social with their parents and peers, increasingly mastering speech and interpersonal interaction, children on the autism spectrum are likely to be much less verbal or even non-verbal, showing little or no interest in interacting with others. Enjoying solitary play for hours on end, they can find it extremely challenging to share or include others in their games.

Some other signs of autism in toddlers include:

- Doesn’t play pretend games
- Doesn’t join in group games
- Doesn’t use toys in creative or imaginary play
- Has difficulty in talking about feelings
- Ignores people when they talk
- Doesn’t show interest in making friends
- Appears unaware of what is going on in their immediate environment
- Prefers to play alone

19.2.5 Communication difficulties

- Repeats the same words and phrases out of context
- Responds to a question by repeating the question instead of answering
- Uses their own name or ‘you’ to talk about themselves, instead of ‘I’

- Finds complicated instructions confusing and cannot follow them
- Doesn't understand jokes or sarcasm
- Speaks with an unusual tone of voice, rhythm or pitch
- May be shocked by loud noises
- Uses facial expression that don't match what they're saying
- Makes few gestures when speaking

19.3 Identifying autism in adults

The symptoms of autism in babies and toddlers are continued into adulthood and will have different effects on the individual's life depending on their severity. These effects will be evident and can be used to identify cases of autism.

19.3.1 Effects on relationships

Many adults on the autism spectrum have limited social relationships, perhaps only with their parents and carers. This can be because they have no interest in social or romantic relationships, or because they lack the skills to maintain the relationships they seek.The difficulties adults on the autism spectrum face include:

- Holding eye contact
- Maintaining an appropriate body posture for conversation
- Showing their emotions with their facial expression and tone
- Seeing past their own interests to make their conversation relevant, interesting or understandable to others
- Knowing when to start or stop talking
- Being interested in what others have to say
- Being able to read when others are bored, angry, sad or insulted, and to adjust their conversation accordingly
- Enjoying social occasions
- Engaging in small talk
- Using their own words
- Understanding jokes, sarcasm and irony
- Discerning the motivations and intentions of others
- Maintaining stability and consistency in relationships

19.3.2 Effects at work

Some on the autism spectrum will not be able to work, particularly those who are non-verbal or have severe symptoms of ASD. Those on the autism spectrum who can work bring both challenges and strengths to the workplace.

Challenges

Along with the social difficulties that can affect relationships, those on the autism spectrum may have other limitations.It might be difficult for them to think in abstract or conceptual ways, so are likely to have problems in coming up with new ideas. They might also find it difficult to take on a large project without incremental steps being broken down and explained to them.It may also be problematic for them when processes or routines are broken.

Strengths

Those on the spectrum can often be particularly gifted in one area, mathematics being a particularly common strength. Memory skills can be phenomenally strong too, with some able to memorize full length movies word-for-word, or, like Stephen Wiltshire , to memorize a full city-scape and later draw it from only that memory. Another strength autism can bring is ability to see patterns and a great attention span. Able to retain focus during extremely repetitive tasks, and taking enjoyment from them, those with autism can be great at jobs that require precision and a long attention span.

Some companies, like SAP actively seek to employ those on the autism spectrum because of these strengths, focusing on roles in software testing, quality control and data analysis, as well as their punctuality and ability to stick to processes and deadlines.

19.3.3 Effects on interests

Many adults have hobbies or interests they are involved in outside of the workplace. These activities are often different, or take on a different level of significance, for those on the autism spectrum.

Collections are common. These might be traditional collectors' items, such as figurines, ornaments, coins, stamps or model trains, or they might be something more unusual like erasers or shoelaces. It is usual for those on the spectrum to enjoy pieces and parts of things, as well as whole objects, so these might well be subject to collection, too. Collections will often go on for years, perhaps even the span of the individual's life, and a great deal of effort will go into organising and rearranging the items. The collector will be well acquainted with each item and might spend many hours categorizing them.

Others might become preoccupied with video games, book or TV series or researching their favorite interests, which are all usually solitary in nature. This time spent immersed in their favorite activities might feel like a safe place for them emotionally. As they are able to make their own rules and are released from the pressure of navigating complex social situations, they feel in control and are likely to retreat into their interests when under stress or when tired. They might find it extremely difficult to disengage, having unusually long attention spans and extremely limited drive in cultivating a variety of interests.

Many people on the autism spectrum have difficulty with team sports because of the social element involved. Others find sports challenging because of poor motor coordination and dexterity, a symptom that some ASD people suffer with, but this is not always the case. Some people on the spectrum have well-developed coordination and a higher than usual ability to learn and follow rules, choosing to take up individual sports such as fishing or swimming.

19.4 How Does Autism Affect Genders Differently?

'Boys are more than five times more likely than girls to have autism'.

19.4.1 Boy to Girl Ratio

Autism has traditionally been thought of as a boy problem, with 4:1 or 5:1 being most commonly cited as the boy to girl autism ratio. It was previously assumed that the nature of the disorder accounted for this discrepancy and that girls were genetically protected from autism.

But if we look at the figures, we might find a different story. Statistics show that autism diagnoses increased from 1 in 2,000 children to 1 in 150 children between the 1960s and today[7]. It's a shocking figure until we realise it does not reflect the actual incidence of autism, but only the number of diagnoses. With knowledge about autism becoming more widespread and accurate in recent years, it is not surprising to find these levels have risen, as more parents seek out professional help and medical professionals are better informed about the disorder and its symptoms.

Perhaps this could also be the case with the gender issue. Maybe the disparity in the amount of boys and girls diagnosed with autism is not a reflection of the nature of the disorder, but rather of how symptoms present themselves differently across genders and whether our diagnostic tools are effective in understanding the symptoms of girls.

19.4.2 Gender Differences

In this section, we'll explore how symptoms of autism differ between genders.

- Girls on the autism spectrum with an IQ lower than 70 have more impairments in social skills and communication, as well as lower cognitive ability, than comparable boys.
- Girls on the autism spectrum tend to be more severely affected by the disorder than males. The higher functioning end of the spectrum, which includes Asperger's, sees the most dramatic difference between the sexes, illustrating that, of the small number of girls diagnosed, their cases are the most severe.
- Girls have a higher genetic threshold for autism than boys, according to one theory. If autism is caused by multiple mutations in genetic material, as some claim, this means that it takes significantly more genetic disruptions for a girl to suffer from symptoms of autism than it would take for a boy
- Girls on the autism spectrum are typically more irritable and disruptive than their male counterparts, regardless of their IQ

- Girls might exhibit less obvious autistic symptoms at a young age. Boys' symptoms are likely to be more pronounced when young
- Brain-imaging has shown different neural activity between girls and boys on the autism spectrum. The corpus callosum, a bundle of neural fibres that has been identified in autism in some way, was shown to be organized differently in girls compared with boys. Though the implications of this are not yet understood, it shows a clear neuroanatomical difference

19.4.3 Boy-Centric Criteria?

Here we'll discuss how the discourse around autism symptoms and their classification and measurement is changing.

Many researchers who've aimed to uncover the differences between girls and boys with autism diagnoses have found that one of the most pronounced differences relates to restricted interests. Where boys might spend hours involved in interests such as dinosaurs or coins, girls don't seem to have the same fixations. It was this discovery that sparked the debate on how autism is defined.

David Skuse, Professor of Behavioural and Brain Sciences at University College London, hit out at these results, stating that girls *do* have restricted interests, but they are more socially appropriate and thus go unrecognised. "The problem is that the way we have defined autism, conventionally, is a male stereotype," he says.

Girls on the spectrum are found to have similar social skills and awareness to neurotypical boys, significantly higher than boys on the spectrum, meaning that they are likely have more social success and may be less likely to be diagnosed.

Other researchers agree that female-specific obsessions may not be picked up in traditional data collection methods and diagnosis tools in the study of autism. An obsession with collecting makeup or shoes, or being fixated with a music or movie star is unlikely to be recognized as a symptom of autism as quickly as a train or stamp collection. This can lead to girls being misdiagnosed and missing out on the treatment and behavioural interventions they may need to improve their social skills.

EXAM LINK