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### What causes Autism?

One in 68 children. 1 in 42 boys. These are the most recent numbers for cases of autism in our country per AutismSpeaks.org, and they are troubling. These numbers have been consistently on the rise for the last 20 years and are likely to continue to increase. What exactly is this disorder that is plaguing our children? What is the cause(s)? Can anything be done? There are many questions that need answers, and although through research new discoveries are always being made, many theories continue to be debated amongst scientists, doctors, and parents alike.

The word autism was first used by Dr. Leo Kanner in 1943 to describe the withdrawn behavior of children he studied at Johns Hopkins University. It comes from the Greek word “autos” meaning “self”. Though it was previously associated with schizophrenia and retardation, it has taken on a much different and more complex meaning throughout the years. Because of the variety and severity of symptoms, autism is classified as a spectrum disorder.

Early indicators of autism include poor eye contact, loss of previously demonstrated (albeit limited) language, unresponsiveness to name, lack of social interaction, lining up or spinning toys or other objects, and preoccupation with and/or abnormal fascination with

particular objects, to name a few. Typical age at diagnosis is 3, but that, too, varies because of the difficulty in recognizing symptoms. Parents may mistake symptoms for something different, such as the child being behind developmentally and thus slower at reaching the milestone markers established by pediatricians. Some say that the rise in autism is due to changes in diagnostic criteria, others say it is because of the ability to diagnose more effectively at an earlier age, and others say the increase in numbers is actually due to *over*-diagnosis. Regardless, the continual increase is concerning, as is autism's tendency toward expressing itself more among males.

Dr. Leo Kanner was one of the first to attribute autism to bad parenting or failure of the mother to bond with her baby. Autism had also been linked to early childhood trauma and even stress. As more funding has become available, however, and "evidence began to accumulate of family inheritance separate from upbringing", (Berg) these theories mercifully lost credibility. In recent years research has been more intense and productive, but something specific has yet to be proven to conclusively cause autism. Given the wide range of symptoms, Dr. Rebecca Berg, PHD, suspects that "ASDs (Autism Spectrum Disorders) are probably not 'one disease'", meaning that although disorders classified along the spectrum have similar attributes, they are not all likely caused by the same thing. The majority of researchers agree that autism is caused by both genetic and environmental factors, but have not yet been able to pinpoint a specific gene or toxin, if indeed it could be narrowed to just one. The "environmental factors don't necessarily mean 'Environment' with a 'big E'", writes Dr. Berg. "They would consist of exposure in the intra uterine environment such as hormonal variations, immune modulation, or infection." It is

during pregnancy and early infancy that “the brain is developing...and when it’s most sensitive to insult from an environmental agent.”

This leads to another theory. Some researchers, such as Dr. Eric Courchesne, are actively investigating abnormal and rapid brain overgrowth in the first year of life as a possible cause for autism. What triggers this growth is as yet unknown, but it is followed by a rapid *arrest* of growth. “By the age of two or three, autistic children have brains about 10% larger than normal. One study based on autopsies has found that the extra volume comprises a layer of the cerebral cortex called ‘minicolumns’, which perform the most basic level of information processing.” (Berg) An unusual number of these could possibly “lead to ‘sensory overload’, causing autistic children to withdraw.” It can also have the opposite effect. There are autistic persons who have extraordinary abilities. Both can be attributed to an over-responsive brain, which is the result of the extra layer of cerebral cortex. Environmental triggers are suspected to be a potential cause of the formation of this extra layer.

Some have argued that this environmental toxin is actually one that, until 1999, was given routinely in the first few years of life in the immunizations that are part of “well child care” checkups. The vaccine debate created a great deal of confusion and fear for parents who could not decide if it was safer to inoculate their children and risk autism or if it was safer to leave them vulnerable to potential infectious, acute diseases. Until 1999, mercury, well known for its toxicity, was used in thimerosal, “a compound used as a preservative in some vaccines.” (Berg). However, since its removal, cases of autism have still been on the rise. This issue has

since been somewhat laid to rest, though there are still some who believe in its relevance and significance.

Still others offer more speculative hypotheses for potential causes of autism. Dr. John Cannell, a psychiatrist at Atascadero State Hospital in California, has “suggested that the primary environmental trigger for autism is not vaccination, toxins or infections, but gestational and early childhood vitamin D deficiency.” It is not the vitamin D deficiency itself that causes autism, but rather it allows “the genetic tendency for autism to express itself.” So, in a manner of speaking, lack of vitamin D puts the body in a weakened state, thus allowing the autism that has been lying dormant to become active. Dr. Cannell is of the same mind regarding the genetic origins of autism, but believes the lack of vitamin D is the trigger that actually causes the behavior. This explanation is difficult for me to accept, mostly because from the time my autistic son was very small, he spent each day out frolicking in the sun anytime he could get, usually in nothing but a diaper (if that much!), and he *still* does. We all know that the sun provides ample amounts of vitamin D. Dr. Cannell needs to provide something more concrete to prove to me that this is actually the case.

A more far-fetched theory has been presented by Cambridge University psychologist Simon Baron-Cohen, who offers his own definition of autism: “an imbalance between two kinds of intelligence: the kind used to understand people (he calls it ‘empathizing’) and the kind used to understand things (‘systemizing’).” Clearly he does not believe in any of the more substantiated etiological causes I have presented here, rather he is of the belief that “autism is

just an exaggerated version of the male profile”, which I suppose is why boys are diagnosed more than girls, by a ratio of 5:1? In his writings, Dr. Baron-Cohen claims that autism is more demonstrative of the differences in personality and behavior between males and females rather than an actual disorder. He has yet to gain much support for his theory. It seems to oversimplify this very complex disorder.

The authors of an article titled “Immunity, Neuroglia and Neuroinflammation in Autism”, present evidence that immunological factors contribute to autism, along with genetic, environmental, and neurological components, based on their clinical studies and the “different types of pathological abnormalities” they have found in the cerebellum and central nervous system. Dr. Carlos Pardo, and Assistant Professor of Neurology at Johns Hopkins University School of Medicine and Pathology, has spent many years conducting autism research. His hypothesis is that during gestation, exposure via the mother to viral infections may somehow “damage the immature immune system” of the fetus. More important than the viral exposure itself is the “location of the pathology and the neural networks affected”, which can impact fetal brain development. With the intricacies of body anatomy, particularly of the brain and central nervous system, and given that they function cohesively albeit somewhat independently from one another, makes each vulnerable when one part is damaged.

Given all these theories, it is of course, hard to know which one is *right*, if there is a “right one”, if there is *one*. The difficulty is that it has been impossible to prove any *one* theory conclusively. There may indeed be *many* causes, and given the exact, specific conditions, autism springs from dormancy. What I do know is that as a parent of a child with autism, I want, I need,

more answers, but I am beyond grateful that we are making such significant strides in the research being done. Reading the theory proposed by Dr. Leo Kanner back in 1943 broke my heart, and I am so glad we have moved on from what he suggested. For my own peace of mind, I need to know that it is not because of me that my son has autism. I second guess myself about so many things that I did, things that happened when I was pregnant with him, and wonder if I did something that inadvertently or unknowingly contributed somehow to his autism. But he's such a great kid! Surely he has his moments of ickiness (who doesn't), but he is the happiest 14 year old I've come across in all my years. When he was very young he would bang his head on the wall and would repeat anything that was said to him (referred to as echolalia). He has since grown out of that, and is high functioning, can communicate and go to school, and he even has some mainstream classes. I believe in my heart that autism is in fact caused by a precise combination of genetics, environmental factors (whatever those may be, the possibilities are endless), and immunological weaknesses that somehow affect the brain during critical developmental periods, causing it to grow faster than it otherwise would under normal conditions. Research on theories such as these has been well documented through longitudinal studies and careful scientific examination. With more time, the brilliant people in the world that conduct this research will continue to find answers.

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## Reflection

In the discussion presentation forum, most people that responded to my post admitted that they did not know much about autism, and were confused regarding the plethora of suggestions regarding possible causes. What I tried to do, specifically in my paper to address any confusion or uncertainty, was first of all to elaborate a bit more on the subject itself, autism, and discuss symptoms, diagnosis, and behavior right after my introduction. Then my intention was to present each theory that I discovered in my research and address them separately from one another. I tried to tie together the ones that I think shared commonalities. By doing that, my thought was that the naysayer arguments would (hopefully) come across naturally and consecutively in my paper as I introduced each different opinion.

I didn't get much feedback on my rough draft. Just one peer review by Braeden Davis, who I think suggested that I offer more of a *why* there are differences of opinion on causes of autism. Why do researchers disagree? I'm of the opinion that that is demonstrated by the fact that there are so many theories regarding the cause(s) of autism: it is not only because researchers disagree on autism's origins, but also because it is difficult to do any real anatomical/biological studies that can also be considered ethical. No one wants to have their child studied for science. I know I don't. That's one of the many challenges to finding a conclusive cause for this disorder. I also tried to show that by discussing my own son and the guilt I have felt over the years regarding his diagnosis. It's always been important to me to know I didn't do anything to hurt him.

I think I did ok meeting the criteria required for this paper. I think I did my best, but after the fact I can always think of things I could have done better. It's kind of like leaving an argument and all the good things you wish you would have said in the heat of the moment start to form in your head as your emotions are swirling. My biggest issue is always using transitions. I think I did well on the organization, and, even though I presented several theories, that I was able to tie the ones together that were somewhat similar. I think with medical issues that sometimes it's hard to get your point across without quoting a bit more because medical terminology can be difficult to understand, interpret, and re-word. I think I did a good job using my own voice and giving my opinion at the end. I wanted to present all the views I found to be most relevant in my research first, and then offer my own view. I hope I did a good job and my paper flows well, is easy to read and understand, and tackles the complexity and urgency of this issue. It was kind of therapeutic to write because of my own experience with my sweet son. Thank you for giving me the opportunity.