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Literature Review: Possible Causes for the Recent Increase in Autism Prevalence

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In recent years, autism has received increasing attention from the media and the public. Once considered a rare disorder, autism has now become a normal part of our daily discourse. Much of this recent attention and awareness is due to reports of an increase in the prevalence of autism. Such reports have, in many cases, caused widespread fear and concern that we are experiencing an autism epidemic. Determining the cause, or causes, of an increase in the prevalence of autism is of tremendous importance because if, in fact, there is an ongoing autism epidemic, appropriate resources should be allocated to research on causes and prevention. However, while “epidemics solicit causes, false epidemics solicit false causes” and care should be taken to make sure this does not happen or continue to happen (Gernsbacher et al., 2005).

The recent increase in the prevalence of autism has been thoroughly documented. One reasonable estimate states that recent rates for Autism Spectrum Disorders and Autism Disorder are currently three or four times higher than they were 30 years ago (Fombonne, The prevalence of autism. , 2003). Another review states that current estimates of the rate of autism “vary from the original 4 to almost 60 per 10 000 children, depending on the place, time, country and population from which the estimate is derived” (Prior, 2003). However, a more conservative, consistent estimate would be around 13 per 10 000 children (Fombonne, The prevalence of autism. , 2003).

There are many plausible causes for this marked increase in autism rates. These possibilities include: increases in public awareness, particularly among parents and professionals, of the existence of autism (Gillberg, 1999; Wing, 2002; Prior, 2003; Gernsbacher, 2005) exposure to environmental causes (Taylor, 2006; Fombonne, 2008), improved recognition (Baker, 2002), diagnostic substitution (Coo et al., 2008), increased funding (Fombonne, 2003; Wing, 2002; Prior, 2003), true increase in prevalence (Fombonne, 2003; Wing, 2002; Charman, 2002), etc. It is most likely that the documented recent rise in the prevalence of autism is due to a combination of factors, namely widened diagnostic criteria, better diagnostic efficiency, and earlier age at diagnosis (Wazana et al., 2007).

The disorder now known as autism was first described by psychiatrist Leo Kanner in 1943. In his landmark paper “Autistic Disturbances of Affective Contact,” Kanner presented the case studies of eleven children who shared certain characteristics that Kanner believed formed a unique “syndrome” (Kanner, 1943). He described the main feature of the disorder as “the children’s inability to relate themselves in the ordinary way to people and situations from the beginning of life” (Kanner, 1943). Kanner also described delays in communication, including delayed language acquisition, excellent rote memory, echolalia, literalness, pronoun reversals, repetitive interests and behaviors, and an “anxiously obsessive desire for the maintenance of sameness” as features of the disorder (Kanner, 1943). Furthermore, Kanner concluded that the children were endowed with good cognitive potential and that they were physically normal (Kanner, 1943).

Another important part of Kanner’s observations was his conclusion that, while at the time many of these children had been considered feebleminded or schizophrenic, autism and childhood schizophrenia were fundamentally different (Kanner, 1943). Despite the similarities, one fundamental difference between the two was that children with childhood schizophrenia experienced a gradual change in behavior, while children with autism demonstrated their extreme aloneness from the beginning of life (Kanner, 1943). To sum up the difference, while schizophrenic children step out of a world they have been a part of to solve their problems, autistic children gradually compromise by becoming a reluctant part of the world “they have been total strangers to from the beginning” (Kanner, 1943).

This initial distinction made by Kanner is important because during the next few decades there was some disagreement in the field about whether or not there *was* a difference between autism and childhood schizophrenia (Dawson, 2008). Much of the reason for the disagreement within the field was due to the term “autism,” which was confused with descriptions of “autistic detachment from reality” in schizophrenic patients by researchers and clinicians (Dawson, 2008). Eventually, studies in the 1970’s confirmed the difference between autism and childhood schizophrenia Kanner had proposed years earlier. These studies found that the onset of autism was likely before 3 years of age while the onset of childhood schizophrenia was likely during early adolescence (Dawson, 2008). Also, they found differences in “parental social class, family history of schizophrenia, frequency of cerebral dysfunction, speech patterns, and intelligence quotient (IQ) level” between children with autism and childhood schizophrenia (Dawson, 2008). Finally, these studies found that remissions, relapses, delusions, and hallucinations were much more characteristic of childhood schizophrenia, further cementing the difference between the two (Dawson, 2008).

Autism was not included as a separate diagnostic category in the Diagnostic and Statistical Manual of Mental Disorders until the publication of the DSM-III in 1980. In the DSM-III, diagnostic criteria were specified for infantile autism, childhood-onset pervasive developmental disorder, residual infantile autism, residual childhood-onset pervasive developmental disorder, and atypical pervasive developmental disorder. (Volkmar et al., 1988). The diagnostic criteria for infantile autism in the DSM-III included early onset (before 30 months of age), a pervasive lack of social relationships, deficits in language and/or communication, and an absence of delusions and hallucinations (Volkmar et al., 1988).

The revision of the DSM-III, the DSM-III-R was released in 1987. It kept autism within the general category of pervasive developmental disorders, but the term “infantile autism” was discarded, since most autistic persons continue to be autistic after childhood (Volkmar et al.,1988). The concepts of childhood-onset pervasive developmental disorder, residual infantile autism, residual childhood-onset pervasive developmental disorder, and atypical pervasive developmental disorder were also discarded (Volkmar et al., 1988). Finally, 8 of 16 criteria grouped into the three overarching categories of social and communicative and/or symbolic dysfunction and a restricted range of activities or interests were deemed necessary for a diagnosis of autistic disorder (Volkmar et al., 1988).

The release of the DSM-IV in 1994 and the DSM-IV-TR in 2000 brought even more changes to the diagnostic criteria. The current criteria include impairments in *social interaction*: (a) impairment in the use of nonverbal behaviors to regulate social interaction, (b) failure to develop developmental-level appropriate peer relationships, (c) failure to share enjoyment, interests, or achievements with other people, (d) lack of social or emotional reciprocity; *communication*: (a) delay or lack of spoken language without compensation using gestures, (b) impairments in conversational ability, (c) use of stereotyped, repetitive, or idiosyncratic language, (d) lack of spontaneous make-believe play or developmentally-appropriate social imitative play; and *restricted repetitive behaviors and/or interests*: (a) preoccupation with stereotyped or restricted abnormal interests, (b) inflexible adherence to nonfunctional routines or rituals, (c) stereotyped and repetitive motor manners, and (d)persistent preoccupation with parts of objects (APA, 2000). An autistic disorder diagnosis requires 6 of the 16 aforementioned criteria and appearance of symptoms before age 3 (APA, 2000).

The DSM-IV-TR also began to recognize autism as a spectrum, rather than a single disorder, and thus, it included Asperger’s Disorder, a high functioning form of autism, and Pervasive Developmental Disorder, Not Otherwise Specified (PDD-NOS) under the autism spectrum disorders (Dawson, 2008). For a diagnosis of Asperger’s Disorder or PDD-NOS to be given, fewer symptoms need to be present or symptoms in only two of the three overarching categories need to be present (Dawson, 2008; APA, 2000). Taken together, all of these changes consist of a widening of the diagnostic criteria, especially since individuals with varying levels of severity of the symptoms of autism can now be diagnosed as having an Autism Spectrum Disorder (ASD).

This widening of diagnostic criteria is just one of the many possible reasons why the prevalence of autism has increased over the years. Media publicity and repeated stories about environmental toxins have led some to believe that the increase in the prevalence of autism is due to exposure to an environmental cause (Prior, 2003). One example of this is the claim that there is a relationship between the Measles, Mumps, and Rubella (MMR) vaccination and autism onset (Prior, 2003). However, there has been no epidemiological evidence to support a causal relationship between the MMR vaccine and the etiology or onset of autism (Taylor, 2006). Another proposed environmental cause was thimerosal, a mercury preservative contained in most childhood vaccines, but, once again, no scientific evidence confirms a causal link between thimerosal and autism (Taylor, 2006; Fombonne, 2008). Furthermore, widespread belief by parents of these supposed “causes” is dangerous since many parents have put their children’s health at risk by refusing to vaccinate them because of this supposed autism link (Fombonne, 2008).

Increased funding and availability of resources and services over time is another possible reason for the increase in autism prevalence. Clinicians are more likely to have a greater willingness to make an autism diagnosis if they know that it will lead the family and the individual with autism to appropriate help and resources (Wing & Potter, 2002). Also, this increasing availability of services due to increases in funding over time has made parents more aware of autism and more willing to consider the possibility of an autism spectrum disorder if they are worried about the development of their child and more willing to accept such a diagnosis (Wing & Potter, 2002).

Another possible reason there has been a reported increase in the prevalence of autism is diagnostic substitution, which occurs when “children with multiple diagnoses are categorized differently over time” (Coo et al., 2008). Coo et al. conducted a time trends study to test this hypothesis by examining trends in assignment of special education codes in British Columbia. The study found that diagnostic substitution accounted for at least one-third of the increase in the prevalence of autism during the study period (Coo et al., 2008).

Wazana, Bresnahan, and Kline (2007) tested three hypotheses that could possibly account for the increase in the prevalence of autism over time. They hypothesized that widening diagnostitic criteria, younger average age at diagnosis, and increased efficiency of ascertainment (the probability that a true case is identified) would account for the recent increase in autism prevalence (Wazana et al., 2007). The study used a prediction analysis to model autistic disorder time trends using a hypothetical population from 1950 to 2020. Wazana et al. (2007) used data from twelve studies which reported autistic disorder frequency during at least two points in time, within the same population, and using roughly constant data collection methods to create an informed hypothetical population with which to run their prediction analyses. The study found that all three methodological changes combined produced a marked increase in prevalence over time (Figure 1). Specifically, the “models indicate that changing the diagnostic criteria to reflect the broadening of the diagnosis of autistic disorder from DSM-III to DSM-IV and increasing the efficiency of ascertainment to reflect its improvement from 1970 to 2000 lead to increases in the predicted frequency of autistic disorder proportional to the changes modeled” (Wazana et al., 2007).

The most unexpected result of the study was that shifting the distribution of age at diagnosis to reflect “the younger age at diagnosis and narrower range of age at diagnosis over time” led to the most significant increase in the predicted prevalence of autistic disorder (Wazana et al., 2007). Another important aspect of this study is that focus was maintained on time trends for autistic disorder so that the other components of the autism spectrum, namely Asperger’s Disorder and PDD-NOS, were not included. Thus, Wazana et al. (2007) predict that the methodological factors discussed would have an even larger impact on the prevalence of Autism Spectrum Disorders as a whole.

In conclusion, there are many possible reasons for the recent increase in the prevalence of autistic disorder. The most likely reason is a combination of methodological factors including widened diagnostic criteria, younger average age at diagnosis, and better efficiency of ascertainment (Wazana et al., 2007). Other possible contributors are diagnostic substitution (Coo et al., 2008) and increased funding and awareness (Wing & Potter, 2002). Though it is very likely that these reasons account for the increase in prevalence, a “true” increase in the prevalence cannot be ruled out (Fombonne, 2003; Wing & Potter, 2002). Overestimating the prevalence of autism could have many undesired effects. Misdiagnosis could cloud the data in the search for possible causes and cures for autism, funding could be disproportionately given to autism research above other equally pressing disorders, parents undergo unnecessary distress (Holburn, 2008), parents could put their children’s health at risk due to beliefs in false causes (Fombonne, 2008), etc. Future research should follow Wazana, et al.’s (2007) lead and determine more ways to test hypotheses for the possible reasons for the recent increase in the prevalence of autism. Also, future research should attempt to determine why the least evidence-based claims, such as the autism-MMR vaccine claim, have achieved the most impressive changes in funding policy and the most increases in media and public attention (Fombonne, 2003).

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Appendix


Figure 1. Predicted impact of methodological factors on the 1-year prevalence of autistic disorder (AD) for children 0-18 years old.