

Research suggests people with autism may have an impaired predictive ability

7 October 2014, by Marcia Malory



Quinn, an autistic boy, and the line of toys he made before falling asleep. Repeatedly stacking or lining up objects is a behavior commonly associated with autism. Credit: Wikipedia.

(Medical Xpress)—People with autism might live in a "magical world" in which it's impossible to know what will happen next. Richard Held of the Massachusetts Institute of Technology and colleagues have hypothesized that people with autism have difficulty predicting future events, and that an impaired predictive ability would explain many of the symptoms of autism. The study appears in the *Proceedings of the National Academy of Sciences*.

Autistic traits are diverse and include restrictive and repetitive behaviors, hypersensitivity to stimuli, problems dealing with moving objects and difficulties with theory of mind. Because these traits appear unrelated, scientists have had trouble understanding what causes [autism](#) and how to treat it.

Held and his team wanted to see if these traits

could have a common cause. After looking at previous research and first hand accounts, they concluded that many traits associated with autism could be manifestations of an impaired ability to predict future events. For example, someone with autism might engage in ritualistic and [repetitive behaviors](#) to create a feeling of "sameness" in a world that, to them, is constantly changing.

Hypersensitivity to stimuli could also be a consequence of an impaired predictive ability. People with autism tend to be more sensitive to stimuli than others are, although they don't have enhanced senses. Held's team thinks people with autism never habituate themselves to stimuli. For example, they experience environmental sounds as though they are hearing these sounds for the first time, despite repeated exposure. The researchers say you must be able to predict a stimulus in order to habituate yourself to it. This is why torture usually involves making sure the victim can never predict what is going to happen.

An impaired predictive ability could also explain why people with autism have problems dealing with dynamic objects. Autistic children have difficulty with playground activities like catching and throwing balls, and most people on the autism spectrum can't drive. Held's team says that in order to interact successfully with a moving object, such as a ball or another car on the road, you must be able to predict where it will be in the future and plan your motor movements accordingly.

According to the researchers, problems with theory of mind could come from an inability to predict how other people will behave based on their past behaviors. People with autism can't understand what motivates others to behave in certain ways because they can't draw a connection between past events and future behaviors.

Held's team points out that people with autism are often good at subjects with strict, unchanging rules,

such as music and mathematics.

More information: Autism as a disorder of prediction, Pawan Sinha, *PNAS*, [DOI: 10.1073/pnas.1416797111](https://doi.org/10.1073/pnas.1416797111)

Abstract

A rich collection of empirical findings accumulated over the past three decades attests to the diversity of traits that constitute the autism phenotypes. It is unclear whether subsets of these traits share any underlying causality. This lack of a cohesive conceptualization of the disorder has complicated the search for broadly effective therapies, diagnostic markers, and neural/genetic correlates. In this paper, we describe how theoretical considerations and a review of empirical data lead to the hypothesis that some salient aspects of the autism phenotype may be manifestations of an underlying impairment in predictive abilities. With compromised prediction skills, an individual with autism inhabits a seemingly "magical" world wherein events occur unexpectedly and without cause. Immersion in such a capricious environment can prove overwhelming and compromise one's ability to effectively interact with it. If validated, this hypothesis has the potential of providing unifying insights into multiple aspects of autism, with attendant benefits for improving diagnosis and therapy.

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