

Study reveals senses of sight and sound separated in children with autism

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Like watching a foreign movie that was badly dubbed, children with autism spectrum disorders (ASD) have trouble integrating simultaneous information from their eyes and their ears, according to a Vanderbilt study published today in *The Journal of Neuroscience*.

The study, led by Mark Wallace, Ph.D., director of the Vanderbilt Brain Institute, is the first to illustrate the link and strongly suggests that deficits in the sensory building blocks for language and communication can ultimately hamper social and communication skills in [children](#) with [autism](#).

"There is a huge amount of effort and energy going into the treatment of children with autism, virtually none of it is based on a strong empirical foundation tied to sensory function," Wallace said. "If we can fix this deficit in early sensory function then maybe we can see benefits in language and communication and social interactions."

And the findings could have much broader applications because sensory functioning is also changed in developmental disabilities such as dyslexia and schizophrenia, Wallace said.

In the study, Vanderbilt researchers compared 32 typically developing children ages 6-18 years old with 32 high-functioning children with autism, matching the groups in virtually every possible way including IQ.

Study participants worked through a battery of different tasks, largely all computer generated. Researchers used different types of audiovisual stimuli such as simple flashes and beeps, more complex environmental stimuli like a hammer hitting a nail, and speech stimuli, and asked the participants to tell them whether the visual and auditory events happened at the same time.

The study found that children with autism have an enlargement in something known as the temporal

binding window (TBW), meaning the brain has trouble associating visual and auditory events that happen within a certain period of time.

"Children with autism have difficulty processing simultaneous input from audio and visual channels. That is, they have trouble integrating simultaneous information from their eyes and their ears," said co-author Stephen Camarata, Ph.D., professor of Hearing and Speech Sciences. "It is like they are watching a foreign movie that was badly dubbed, the auditory and visual signals do not match in their brains."

A second part of the study found that children with autism also showed weaknesses in how strongly they "bound" or associated audiovisual speech stimuli.

"One of the classic pictures of children with autism is they have their hands over their ears," Wallace said. "We believe that one reason for this may be that they are trying to compensate for their changes in [sensory function](#) by simply looking at one sense at a time. This may be a strategy to minimize the confusion between the senses."

Wallace noted that the recently-released Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, (DSM-5), which serves as a universal authority for psychiatric diagnosis, now acknowledges sensory processing as a core deficit in autism.

Provided by Vanderbilt University Medical Center

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