Researchers study attention mechanisms of autistic children

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Two-year-olds with autism lack an important building block of social interaction that prompts newborn babies to pay attention to other people. Instead, these children pay attention to physical relationships between movement and sound and miss critical social information. Researchers at the Yale School of Medicine report their results in the March 29 online issue of *Nature*.

"Human infants are born in a fragile state. They are entirely dependent on their caregivers for survival, and so it makes sense that infants would possess very early-emerging predispositions to seek their caregivers, to pay special attention to movements in the environment that are associated with human actions and gestures," said Ami Klin, director of the Autism Program at Yale and the Harris Associate Professor of Child Psychology at the Yale Child Study Center.

Klin, who conducted the study with research scientist Warren Jones and colleagues at Yale, said that two-year-olds with autism showed no signs of this selective attention to these types of human movements. Instead, the children with autism focused on a different environmental cue: they paid attention only to movements that were physically synchronous with sounds.

"Rather than attending to human biological motion, and the social cues in that motion," said Klin, "children with autism were very sensitive to non-social information: to synchronies between sounds and motion in what they were watching."

Klin, Jones and colleagues tracked the eye movements of two-year-olds with and without autism while they watched cartoon animations. The animations were created with a technique borrowed from the video game industry in which movements of real people are recorded and then used to animate characters. In this case, the body movements were recreated as points of light on a black background, with one point of light at each joint in the body.

"The eye-tracking data revealed that typically-developing two-year-olds perceived human motion in these moving points of light. They saw people," said Jones. "But children with autism were insensitive to the socially relevant cues in that motion, and they focused instead on physical cues that typically-developing children disregarded."

Previous studies by the Yale team have shown that when looking at other people, toddlers with autism looked less at eyes and more at mouths. "The current results suggest something very important about that earlier research," said Klin. "Rather than looking at the social cues expressed in people's eyes, two-year-olds with autism may be paying attention, as in the current study, to synchronies between sound and motion. So rather than the eyes, they are focusing on the synchrony between lip motion and speech sounds."

"This suggests that from very early in life, children with autism are seeking experiences in the physical rather than the social world, and this in turn has far-reaching implications for the development of social mind and brain," said Jones.

The Yale group is now using this finding in their work with infant siblings of children with autism who are at greater genetic risk of also developing autism. "Because this mechanism emerges in the first days of life for typical children, we hope to use similar techniques to identify early signs of vulnerability in autism. This could be an aid for early diagnosis, which in turn allows for early intervention to maximize positive outcomes for these children," said Klin.

The next step is to study this phenomenon at earlier stages of development, and to combine the behavioral work with simultaneous neuroimaging through collaboration with another Yale colleague, Kevin Pelphrey.

Source: Yale University (news : web)