

ADHD: Brains not recognizing an angry expression

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Happy face



Angry face

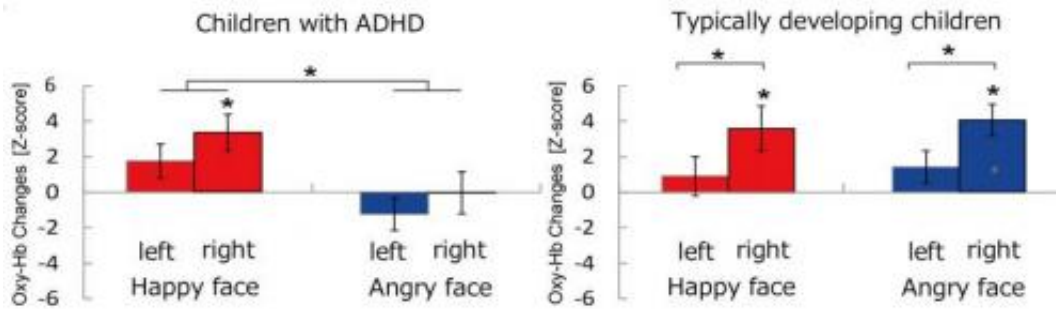
These two faces were presented to children. Credit: © National Institutes of Natural Sciences

Japanese researchers first identified the characteristics of facial expression recognition of children with ADHD by measuring hemodynamic response in the brain. They showed that children with ADHD showed significant hemodynamic response to the happy expression but not to the angry expression. This difference in the neural basis for the recognition of facial expression might be responsible for impairment in social recognition and the establishment of peer-relationships.

Inattention, hyperactivity, and impulsive behavior in [children](#) with ADHD can result in social problems and they tend to be excluded from

peer activities. They have been found to have impaired recognition of [emotional expression](#) from other faces. The research group of Professor Ryusuke Kakigi of the National Institute for Physiological Sciences, National Institutes of Natural Sciences, in collaboration with Professor Masami K. Yamaguchi and Assistant Professor Hiroko Ichikawa of Chuo University first identified the characteristics of facial expression recognition of children with ADHD by measuring hemodynamic response in the brain and showed the possibility that the neural basis for the recognition of facial expression is different from that of typically developing children. The findings are discussed in *Neuropsychologia* (available online on Aug. 23, 2014).

The research group showed images of a happy expression or an angry expression to 13 children with ADHD and 13 typically developing children and identified the location of the brain activated at that time. They used non-invasive near-infrared spectroscopy to measure brain activity. Near-infrared light, which is likely to go through the body, was projected through the skull and the absorbed or scattered light was measured. The strength of the light depends on the concentration in "oxyhemoglobin" which gives the oxygen to the nerve cells working actively. The result was that typically developing children showed significant hemodynamic response to both the happy expression and angry expression in the right hemisphere of the brain. On the other hand, children with ADHD showed significant hemodynamic response only to the happy expression but [brain](#) activity specific for the angry expression was not observed. This difference in the [neural basis](#) for the recognition of facial expression might be responsible for impairment in social recognition and the establishment of peer-relationships.



The right part of the brain of typically developing children responded to both happy and angry faces. On the other hand, the brain of children with ADHD did not respond to the angry face, while it responded to the happy face. Credit: © National Institutes of Natural Sciences

Provided by National Institutes of Health

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