Altered perceptual pseudoneglect in ADHD: Evidence for a functional disconnection from early visual activation.

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Abstract

Novel insights into the right-brain dominant functions of spatial attention and visual awareness may come from the peculiar observation that the attentional bias to the left in healthy individuals, called "pseudoneglect," increases with visual noise superimposed onto test stimuli. However, it is unclear if this effect originates from noise activating early visual areas or causing higher-level cognitive interference. Cognitive distraction and load are known to induce neglect-like rightward biases in attention deficit hyperactivity disorder (ADHD). Therefore, here we tested pseudoneglect in 21 adults with ADHD using a grating-scales task (GST) in a high (HI) and a low (LO) spatial-frequency condition with superimposed pixel noise. As expected, we found that healthy participants (n =32) displayed a "cross-over" of HI vs. LO biases that increased significantly with noise. However, the ADHD group exhibited no pseudoneglect or cross-over, and noise caused neither rightward nor leftward biases. Furthermore, ADHD individuals produced psychometric functions with normal slopes, indicating normal perceptual sensitivity. Our results show that pseudoneglect is altered in ADHD, but that pixel noise induces no neglect-like rightward biases as this would be expected if pixel noise caused cognitive interference. This suggests that pixel noise has a bottom-up perceptual effect on pseudoneglect. What is more, individuals with ADHD seem to lack activation of attentional functions via sensory stimulation despite intact visual processes. Our study adds to the growing literature of right hemisphere pathology in ADHD and the understanding of sensory noise as an activating factor of visuospatial attention and awareness.