

NEWS

Cognition and behavior: Autism brains have abnormal links

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The brains of boys with autism have a lower-than-normal rate of water diffusion across the inferior fronto-occipital fasciculus — a bundle of neurons that connects all four major lobes of the brain — according to a study published 28 July in the *American Journal of Neuroradiology*¹. The results support the **connectivity theory of autism**, which suggests that individuals with the disorder have impaired long-range brain connections.

The specific pattern of sensory deficits seen in individuals with autism suggests that they are capable of intense attention to detail, but struggle with seeing the bigger picture. For example, individuals with autism often have **enhanced visual skills**, but cannot quickly integrate information from **sounds and pictures**.

These observations have led to the theory that people with autism have enhanced short-range but impaired long-range brain connections, which is supported by **several brain imaging studies**.

One technique, called diffusion tensor imaging, or DTI, looks at the **flow of water across the brain**. Water in the brain diffuses preferentially along large bundles of axons, the transmitting bodies of neurons, that connect brain regions.

In the new study, researchers used DTI to measure connectivity across the brains of 15 boys with autism and 8 controls. Individuals with autism have reduced connectivity across several brain regions compared with controls, especially in the forceps minor, which connects regions in the frontal lobe, and the inferior fronto-occipital fasciculus.

The fronto-occipital fasciculus connects the main brain regions involved in higher-level cognition, sometimes referred to as the 'social brain.' A 2009 study found that lesions in the right inferior fronto-occipital fasciculus are associated with impairments in recognizing emotions².

Defects in connectivity in these regions could be an autism-specific neural phenotype, the researchers suggest.

References:

1: Jou R.J. *et al. Am. J. Neuroradiol.* Epub ahead of print (2011) **PubMed**

2: Philippi C.L. *et al. J. Neurosci.* **29**, 15089-15099 (2009) **PubMed**