Emotional Responses in Patients with Disconnection of the Left and Right Brain Hemispheres

Results:

We examined the impact of disrupted brain connectivity on social cognition, by studying adults born with isolated agenesis of the corpus callosum (AgCC). 17 neutral and 17 negative images from the International Affective Picture System were shown to 15 adults with AgCC and 10 healthy controls (matched for age and intelligence). Images were presented for 6 seconds, during which eye-movements were recorded. After each image, participants rated emotional valence (negative = 1 to positive = 9) and arousal level (calm = 1 to exciting = 9).

On valence ratings, adults with AgCC tended to over-estimate the negativity in emotionally ambiguous images, but accurately recognized it in clearly negative scenes. On arousal ratings, the AgCC group tended to under-estimate emotional intensity of negative scenes. This pattern was most evident for images of people. Relative to matched controls, the adults with AgCC gave lower arousal ratings overall for slides containing people, with a significant bias toward under-appreciating arousal in negative slides containing people.

Eye-tracking results suggest that individuals with AgCC may spend less time focused on faces and eyes, particularly for negative images.

It is possible that the social deficits in AgCC are a direct result of impaired coordination of the hemispheres. For example, according to the 'valence hypothesis,' the right hemisphere is relatively more specialized for processing negative emotions. In which case, verbal labelling of those emotions would depend most heavily on intact callosal connections and, as we found, would be most impaired in AgCC.

Areas of interest:

corpus callosum, social cognition, social affective neuroscience

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