The social cognition of attachment:

Preliminary results from functional imaging of Capgras delusion

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Discussion:
The results of this first fMRI study in a patient with Capgras delusion are an initial step in understanding the neural circuitry of attachment and also those of face processing. The model of face processing proposed by Burton et al. (1999), Breit et al. (2000) and Ellis and Lewis (2000) is shown in figure 5. The existence of two separate pathways is supported by observations that Capgras patients have decreased skin conductance responses (SCR) as compared to controls when looking at familiar faces. On the other hand, patients with prosopagnosia retain an intact SCR to familiar faces. The question remains: where is the affective response to familiar faces processed? The fMRI reliably activates bilaterally more facial than object areas, an observation of greatest relevance when one looks at the spouse. However, prior studies suggest some asymmetry of the FFA. The left FFA has been shown to be superior to the right FFA in processing facial features rather than holistic processing of faces, a property of the right FFA. The left FFA has also been implicated in recognition memory associated with stimuli classes other than faces. However, many individuals show greater facial recognition accuracy for faces than for visual field stimuli to the right FFA? Correspondingly the right FFA tends to activate more than the left FFA to faces, especially in subjects who show a more pronounced left field recognition advantage. In addition, patients with prosopagnosia who retain an intact right fMRI were found to retain the recognition of emotionally charged faces as opposed to neutral faces. Our study finds that the right FFA is markedly less activated in the patient with Capgras delusion, whereas the left FFA was relatively spared. The spared left FFA may drive the sense that the ‘imperson’ can be recognized as a ‘look-alike’, corresponding to spared visual expertise. The impairment in right FFA may underlie the failure to recollect the appropriate emotional memory essential to recognizing a highly attached and familiar person. Thus the two FFAs may subserve the two pathways for face processing shown in figure 5.

The decreased activation in right fMRI cannot be accounted for by an overall decrease in brain activation, as might result from dementia or methodological issues. Figure 2C and Figure 4 show markedly greater brain activity in amygdala and in both social (medial) and non-social (lateral) frontal areas when the Capgras patient is shown the missidentified companion.

The amygdala is significant because patients with bilateral lesions in amygdala show similar face recognition as those with right amygdala lesions. The right amygdala, on the other hand, is more likely to show changes in prosopagnosia patients. However, bilateral amygdala lesions did not significantly affect face processing in healthy participants, even though the amygdala was activated in healthy participants.

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