Feedback Modulation of Visual Processing by Limbic Circuits: a functional connectivity approach to visual face processing

Results:

We have examined the specificity of face and emotion recognition networks in relation to other object recognition modules in normal subjects and disease models of impaired perception/limbic processing, using Event-Related Potential and fMRI measures and techniques to study causality in face processing networks. Response invariance properties of face processing networks, in particular 3D abstract control objects and faces were also tested. Perceptual correlates of holistic object processing in normal subjects and neurodevelopmental conditions were also studied using "Mooney" abstract faces and hierarchical stimuli. We have proven that the basal ganglia structures are crucial for emotional processing of central vs. peripheral faces irrespective of oculomotor processing demands. We were also able to separate automatic from conscious aspects of emotional processing of faces, and have shown that the human amygdala has an important foveal bias for face processing of threat content. We have also used a novel paradigm that allowed for an explicit separation of the neural correlates of the sensory, perceptual and motor components in holistic face perceptual decision. This strategy was anchored on a well-defined neurochronometry of cognitive processes and helped elucidate the contribution of different regions in the visual stream and insular networks in perceptual decision-making and social cognition. We have also found Gamma band neural activity is related to perceptual "Eureka" effects when observing ambiguous dynamic faces. In sum our work elucidated the dynamics of low and high level affective face processing along the visual ventral stream, the amygdala and basal ganglia.

Published Work:

Full papers that resulted from the project:

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Areas of interest:

Visual and Cognitive Neuroscience, Face processing, Affective processing

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