

THE EMOTIONAL BRAIN IN AUTISM: CEREBRAL CORRELATES OF ABNORMAL EXPLICIT PROCESSING OF EMOTIONAL INFORMATION.

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Although high-functioning individuals with autistic disorder (i.e. autism and Asperger syndrom) are of normal intelligence, they have life-long abnormalities in social communication and emotional behavior. To date, the biological basis of these social difficulties is poorly understood. We investigated if high-functioning people with autistic disorder show neurobiological differences from controls when they explicitly or implicitly attributed hostile or friendly intentions to actors.

Using functional Magnetic Resonance Imaging (fMRI), 13 healthy subjects and 13 adults with high functioning autism or Asperger syndrom were scanned while viewing video sequences of actor's faces. In 2 conditions subjects were required to actively engage in interpreting emotions from the face whereas in 2 other conditions subjects had to judge the actor's age. Effective connectivity using Structural Equation Modeling (SEM) was then performed on the data of each population.

Although occipital, temporo-ventral and right posterior superior temporal cortex were found commonly activated in the two populations, subjects with autistic disorders differed from controls in the activity of dorso-medial prefrontal, and meso-limbic cortical areas when explicitly processing emotional expressions. Interestingly, modeling of the effective connectivity also revealed a distinct pattern of interactions between brain regions. Whereas controls specifically exhibit strong functional relations between right prefrontal cortex, dorso-medial prefrontal cortex and right superior temporal cortex, patients with autism do not. These results suggest that high-functioning people with autistic disorders have biological differences from controls when processing emotional informations, and that these differences are most likely due to abnormal functional relations between brain structures. Abnormal development of social and emotional skills in autism may originate from these biological differences present at birth. If an emotional expression is not adequately associated to its social valence, then the whole behavior and interpretation of the other's behavior will be affected. Our research team is now engaged in various studies which aim at identifying which level of emotion processing is affected in autism. This will enable a better understanding of the meaningful social information present in a face or in a person's movements. Using robots displaying these pertinent informations and reacting appropriately to it will be of great interest to teach children with autism early in development.