Aberrant neural and cognitive response to emotional faces stimuli in healthy monozygotic twins at heritable risk of depression

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Background

- Negative bias in cognitive and neural processing of emotional information occurs in depressed patients and recovered depressives
- A few recent studies suggest that negative bias may also exist in healthy individuals at risk of depression
- If so, negative neurocognitive bias could be an endophenotype for depression; a disease-associated, state-independent and heritable trait
- We aimed to investigate this by exploring whether healthy monozygotic (MZ) twins with a co-twin history of depression show negative bias in cognitive and neural response to emotional faces

Methods

- 30 healthy, never-depressed MZ twins with a co-twin history of depression (high-risk) (n=13) or with no co-twin or family history of psychiatric illness (controls) (n=17) were enrolled in the study as part of a 6-8 year follow-up (for original study see [1])
- Neural responses to fearful and happy faces were assessed using functional magnetic resonance imaging (fMRI) during which time participants performed a gender discrimination task
- After the scan attention to and recognition of emotional facial expressions were assessed with a faces dot-probe task and facial expression recognition task from the Emotional Test Battery
- Mood and subjective state were assessed with the Beck Depression Inventory, State-Trait Anxiety Questionnaire and Visual Analogue Scales of relevant subjective states

Results

Neural response to emotion
- High-risk twins showed increased neural response to happy and fearful faces in the inferior, medial and superior prefrontal cortex (PFC), anterior cingulate cortex (ACC) and occipito-parietal cortex (green); a network partially overlapping with regions activated by faces in controls (red)
- Amygdala response showed no differences between groups (p-values>0.3)

Facial expression recognition
- High-risk twins were impaired on facial expression recognition across all emotions, as reflected by increased response latency (F(1,28)=5.6, p=0.03)

Conclusions

- The elevated fronto-parietal and ACC response to emotional faces and impaired gender discrimination in high-risk twins may reflect increased attention to the (irrelevant) emotionality of the faces and thus greater response conflict during gender discrimination
- This interpretation is supported by their increased vigilance towards fearful faces and impaired facial expression recognition
- Notably, the increased superior PFC response and absence of changes in amygdala response to emotional faces is similar to observations in recovered depressives [2] and may represent a compensatory mechanism
- In conclusion, the findings highlight negative bias in neurocognitive response to emotional faces as a key endophenotype for depression

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The authors of this poster have no conflicts of interests