Neural response to Positive and Negative Interpersonal Feedback in Socially Anxious Adults

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Introduction

- Individuals with social anxiety are more particularly inclined to fixate upon ambiguous or negative social cues, especially in response to unwanted or unexpected feedback, criticism or embarrassment.
- Individuals with social anxiety exhibit cognitive biases related to hyper attentiveness and failure to disengage.
- Recent research has shown the involvement of anterior cingulate in identifying emotionally salient features of person, people, or situation regarding negative feedback association and self-reflectiveness (Bohme E., et al., 2007).
- High levels of SA showed significant differences in the PD task in activation of the anterior cingulate compared to controls in co-player’s response in association with negative feedback. (Peterburs et al., 2016)

Present Study

Model brain activity associated with cooperation and betrayal in individuals with high and low levels of SA.

Hypothesis: There will be significant elevated activity in the Anterior Cingulate of individuals with high levels of SA.

Participants

<table>
<thead>
<tr>
<th>Sample size</th>
<th>Social Anxiety</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Age, mean ± SD</td>
<td>19.8 ± 2.2</td>
<td>21.2 ± 4.7</td>
</tr>
<tr>
<td>No. Female (%)</td>
<td>8 (47.0)</td>
<td>9 (53.0)</td>
</tr>
<tr>
<td>No. Male (%)</td>
<td>3 (75.0)</td>
<td>1 (25.0)</td>
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</tbody>
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fMRI Data Acquisition

- Functional and structural images were acquired in a Siemens 3T scanner in 2008 (legacy data) and a Siemens Trio 3T scanner in 2016 (new data).
- Statistical Parametric Mapping (SPM8) software was used to preprocess and analyze fMRI data from 2008. Data Processing Assistant for Resting-State fMRI (DPARSF) was used to preprocess fMRI data from 2016.
- General Linear Modelling was used to estimate event-related response amplitudes at the individual subject and group levels.

Methods

Participant Selection

Liebowitz Social Anxiety Scale

Prisoner’s Dilemma

- In each 20 trial iterated (PD) game the individual chooses to cooperate or defect, and then waits for a “co-player” to make their decision.
- Each participant play 3 PD games in a randomized order—in two, they are deceived to believe that they are playing with a confederate (but actually play a computer algorithm) and in one they are told that they are playing the computer.
- PD measures the willingness to work together or to work for one’s own self interest by counting the number of times a participant cooperates or defects.
- To the right is a single trial in which both the subject and the co-player chose to cooperate (CC). Other

fMRI Results

Conclusions

- In the initial analysis, the anterior cingulate showed significant BOLD activation in response to DC and DD feedback conditions.
- Feedback Condition DC and DD represent presents of emotion salient; while Feedback Conditions CC and CD show no significant activation.
- The role of the anterior cingulate shows significant activation in association with negative feedback when subject displays initial betrayal response to co-player.
- The analysis of the combined datasets showed no significant difference in activation of anterior cingulate between low SA and high SA regarding negative feedback.
- The analysis revealed significant BOLD response in the anterior cingulate regardless of SA levels in association with initial betrayal which may be more emotional salient; however, these response could produce negative feelings that most SA people would like to avoid.

References


Kvaran, Trevor, Erin Tone, Kendrick King, Khalil Thompson, Anthony Molloy, Jessica A. Turner, Aral Ahmadi, Michelle Rattinger, Eddy Nahmias, Negar Fani, Trevor Kvaran, Erin Tone. (2016). The Role of the Anterior Cingulate in Socially Anxious Adults. Neuropsychology and Behavioral Neuroscience, Center for Advanced Brain Imaging, Georgia State University.