Correlations Between Amygdala Activity During the Anticipation of Aversion and Trait Worry Symptoms in Generalized Anxiety Disorder

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Introduction

Generalized anxiety disorder (GAD) patients exhibit heightened anticipatory amygdala activity before presentations of affective pictures (Nitschke et al., 2009). Worrying (experienced chronically in GAD) is a future-oriented thought process (Denckova, 2002) that may similarly reflect anticipatory anxiety in GAD. GAD severity, indexed by the GAD-Q (Neuman et al., 2002) might also overlap significantly with anticipatory anxiety indexed by amygdala activity during the anticipation of aversion.

As a test of these hypotheses, we predicted a correlation between worry and anticipatory amygdala activity in GAD as well as between GAD severity and amygdala activity.

Methods

17 GAD patients (14 female, non-medicated, no other Axis I disorders; 16 Controls (10 female, no current or past Axis I disorders).

Participants were administered self-report questionnaires at each of 4 visits (clinical interview, mock scan, two MRI sessions). The GAD-Q was given at the 1st visit and the PSWQ was given at each visit. Data presented are for the average PSWQ over 4 visits - 1 week apart.

Event-related paradigm based on our previous work (Nitschke et al., 2009) provided a 1-sec warning cue (X or O), then 2-4s ITI, a 1-sec affective picture presentation (negative or neutral) from the IAPS set, 5-9s ITI, 5s affect rating period, then 1-5s ITI before the next trial.

Results

• Group T-tests revealed that GAD patients activated the Right Amygdala more than Control subjects during the anticipation of aversive pictures (X Cue; Figure 1).
• Follow up analyses on this amygdala cluster indicated that across periods and subjects, there was a significant valence effect, F=8.78, p<.014.
• The cluster also showed a Period x Group effect, F=8.38, p=.007 (see Figure 2; no interaction with gender). This effect is consistent with recent amygdala findings in GAD patients from our lab (Nitschke et al., 2009).

Pearson correlations (Table 1) correspond to linear trends in Figure 3. Partial correlations are for single measures while partialing out all others (except GAD-q and PSWQ, which are grouped together).

Table 1

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<th>GAD-Q</th>
<th>PSWQ</th>
<th>BDI</th>
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<tr>
<td>Pearson r</td>
<td>.476*</td>
<td>.475*</td>
<td>.740**</td>
<td>.543**</td>
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<tr>
<td>Partial</td>
<td>.402</td>
<td>.370</td>
<td>.624**</td>
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Conclusions

• We replicated our finding that GAD patients are characterized by heightened amygdala activity during the anticipation of emotional pictures (Nitschke et al., 2009).
• Anticipatory activity in the amygdala for GAD patients was correlated with a variety of symptom endorsements including worry, GAD severity, trait anxiety, and depression. The correlation with depression was especially robust.
• Thus, we support a theory that heightened anticipation is important for understanding GAD (and maybe other forms of anxiety; Nitschke et al., 2009; Barlow, 2001) and that anticipatory amygdala activity co-occurs with numerous symptom elevations commonly found in clinical anxiety.
• Future analyses will contrast data from GAD patients with clinically depressed (non-GAD) patients. Also, we plan to examine mechanisms of amygdala dampening in GAD patients between warning cues and picture presentations (functional connectivity).

References


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