An fMRI Study Examining Inhibition and Threat Vigilance Among Adolescents with Severe Worry

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Background

Worry

Definition: Heavy burden of negative thoughts about future negative events; elicits to avoid a threat or a dangerous situation. Frequently onsets during adolescence.

Brain Regions: Medial Prefrontal Cortex (mPFC), Anterior Cingulate Cortex (ACC), & Anterior Insula

Inhibition

Definition: Increased attentional states regarding a perceived threat.

Brain Regions: Ventromedial Prefrontal Cortex (vmPFC), Amygdala, & Insula

Methods

Study Population

- 36 adolescents ages 13-18 (mean = 15.73, 75% female)
- Administered Penn State Worry Questionnaire-Child (PSWQ-C)

Neuroimaging

- 3.0 Tesla fMRI of entire cerebrum and part of the cerebellum

Experimental Task

- Mixed block/event-related design
- Go/No-Go paradigm (see Figure 1a)

Analysis

- Imaging data analyzed with MATLAB, CONN, SPM12, MarsBar, ROI: Insula, ACC, dIPFC, vmPFC, Amygdala
- Behavioral data analyzed using SPSS

Behavioral Results

Go/No-Go Paradigm

Vigilance

5 sec 60 sec 8 sec 10 sec 60 sec 60 sec 5 sec

INSTRUCTIONS (Go Fixation) NEGATIVE BLOCK 1 NEUTRAL BLOCK 1 FIXATION BLOCK 2 NEUTRAL BLOCK 2 FIXATION BLOCK 3 NEGATIVE BLOCK 3 END FIXATION

INSTRUCTIONS (Go Fixation) NEGATIVE BLOCK 1 NEUTRAL BLOCK 1 FIXATION BLOCK 2 NEUTRAL BLOCK 2 FIXATION BLOCK 3 NEGATIVE BLOCK 3 END FIXATION

Behavioral Results

Adolescents with severe worry exhibit impaired performance on a task of inhibitory control, relative to healthy peers.

Future Studies

- Examine the relationship between inhibition under negative and neutral contexts during both go and no-go trials by testing up four different contrasts.

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