**Supplementary Material**

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**Supplementary Material Section 1: Exclusion Criteria**

Exclusion criteria were autism spectrum disorders, Tourette syndrome, lifetime history of psychosis, depression, bipolar disorder, generalized, social or separation anxiety disorder, posttraumatic stress disorder (PTSD), neurologic disorder including seizure or epilepsy, history of major head trauma including skull fracture, substance dependence, major medical illness, and IQ of <80.

**Supplementary Material Section 2: Mean valence and arousal values by stimulus class of the IAPS pictures used for the Affective Stroop (aST) Task**

The emotional stimuli consisted of 48 positive, 48 negative, and 48 neutral pictures selected from the International Affective Picture System (IAPS; Lang PJ, 2005). Normative mean image valence and arousal values on a 9-point scale were 3.35 (SD: 0.77) and 5.97 (SD: 1.07) for negative pictures, 7.43 (SD: 0.52) and 4.99 (SD: 1.10) for positive pictures, and 4.87 (SD: 0.28) and 2.66 (SD: 0.54) for neutral pictures.

**Supplementary Material Section 3: Main Analysis – main effect of task, main effect of emotion, and task-by-emotion interaction.**

*Main effect of task*

In line with previous work with this task, areas showing a significant main effect of task included right middle frontal gyrus, right medial frontal gyrus, bilateral inferior frontal gyrii, bilateral paracentral lobules, left inferior parietal lobule, bilateral anterior cingulate gyrii, right superior temporal gyrus, left middle temporal gyrus, and bilateral cerebellums; see Table S2.

In case of right middle frontal gyrus, left inferior parietal lobule and bilateral cerebellums, BOLD responses were greater for task (incongruent and congruent) trials relative to view trials [t=2.27-9.60 p=0.000-0.007]. For the rest of the regions including bilateral paracentral lobules and bilateral anterior cingulate gyrii, BOLD responses were greater for view trials relative to task (incongruent and congruent) trials [t=2.27-5.57, p=0.000-0.027].

*Main effect of emotion*

Areas showing a significant main effect of emotion included right superior frontal gyrus, right inferior frontal gyrus, left superior temporal gyrus, right fusiform gyrus, left caudate, right parahippocampal gyrus, and right amygdala; see Table S2.

For most of the regions including right amygdala, BOLD responses were greater for emotional (negative and positive) trials relative to neutral trials [t=2.28-5.55, p=0.000-0.026], with the exception of right superior frontal gyrus and left superior temporal gyrus, in which BOLD responses were greater for neutral trials relative to emotion trials [t=2.80 and 2.71, p=0.007 and 0.009, respectively]; see Figure S1.

*Task-by-Emotion Interaction*

Areas showing a significant task-by-emotion interaction included bilateral medial frontal gyrii, right middle frontal gyrus, and left anterior cingulate gyrus; see Table S2. In all cases except right middle frontal gyrus, BOLD responses were greater to negative incongruent relative to neutral incongruent trials [t=1.93-2.49, p=0.016-0.059]. Within right middle frontal gyrus, BOLD responses were significantly greater to positive congruent relative to neutral congruent [t=2.60, p=0.012] and negative congruent trials [t=3.986, p=0.000].

**Supplementary Material Section 4: 2 (group: healthy youths, youths with DBD) by 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANOVA**

An initial, exploratory 2 (group: healthy youths, youths with DBD) by 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANOVA was conducted on the BOLD response data to examine atypical neural responses that might be common to youth with DBD irrespective of CU trait level. This ANOVA did not reveal the group-by-emotion or group-by-task-by-emotion interactions seen in the main 3-group analysis presented in the paper. This is presumably because the impairments shown by patients with HCU are opposite to those seen in patients with LCU. However, this analysis yielded two regions showing significant group-by-task interactions that survived multiple comparison correction: right insula and left inferior parietal lobule; see Table S3. For both areas, youths with DBD showed significantly decreased activation in response to incongruent task trials relative to view trials [t=4.20 & 3.78, p’s < 0.001] and in response to incongruent relative to congruent task trials [t=3.54 & 4.00, p’s<0.001], compared to the healthy youths. There was no group differences in differential response to congruent relative to view trials [t=0.012 & 0.296, p=0.990 & 0.768].

**Supplementary Material Section 5: 3 (group: youths with DBD-LCU with no current treatment, youths with DBD-HCU with no current treatment, and healthy youths) by 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANOVA**

To address the potential confounding factor of treatment status, we repeated the main ANOVA excluding youths on psychotropic medications. This revealed:

1. Replicating the main analysis, there was a significant group-by-emotion within both left ventromedial prefrontal cortex and right amygdala. Replicating the main analysis, there was also a significant group-by-task interaction within left insula. In addition, there were significant group-by-task interactions within right medial frontal gyrus and left fusiform gyrus.
2. Replicating the main analysis, there was a significant group-by-task-by-emotion interaction within right caudate. In addition, there were significant group-by-task-by-emotion interactions within right medial frontal gyrus, left middle temporal gyrus and left posterior cingulate gyrus; see Table S4.

**Supplementary Data Section 6:** **3 (group: youths with DBD-LCU with no substance abuse comorbidity, youths with DBD-HCU with no substance abuse comorbidity, and healthy youths) by 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANOVA**

To address the potential confounding factor of comorbidity with substance abuse, we conducted analyses of ANOVA same as the main analysis, excluding youths with comorbidity of substance abuse. This revealed:

1. Replicating the main analysis, there was a significant group-by-emotion within left ventro-medial prefrontal cortex. In addition, there were significant group-by-emotion interactions within left inferior parietal lobule, right anterior cingulate gyrus, right parahippocampal gyrus, right cerebellar tonsil, and left declive.
2. Replicating the main analysis, there was a significant group-by-task interaction within bilateral insula. In addition, there was a significant group-by-task interaction within left inferior parietal lobule.
3. Replicating the main analysis, there were significant group-by-task-by-emotion interactions within superior frontal gyrus and bilateral caudate. In addition, there were significant group-by-task-by-emotion interactions within bilateral middle frontal gyri and bilateral anterior cingulate gyri; see Table S5.

**Supplementary Material Section 7: Relationships between functions in healthy youth and patients with DBD**

To investigate the relation between each functionality of emotional responding and response inhibition, exploratory analyses on the relationships between functional systems focused on those regions shown to be dysfunctional in patients with DBD in this study; i.e., vmPFC/amygdala with respect to emotional responding and anterior insula cortex with respect to response control/inhibition. All three groups showed a positive relationship between vmPFC and amygdala responsiveness to negative relative to neutral stimuli [healthy youth: r=0.371, p=0.052; DBD-LCU: r=0.628, p=0.007; DBD-HCU: r=0.418, p=0.084] and the strength of these correlations did not differ across groups [p=0.214-0.865]. VMPFC and amygdala responsiveness to negative-neutral stimuli and left insula responsiveness to incongruent-view trials was also positively correlated for healthy youth [r=0.471, p=0.011] but negatively correlated for youths with DBD-LCU [r=-0.461, p=0.062]. There was no significant relationship between these variables in the youth with DBD-HCU; see Table S6.

**Supplementary Material Section 8: 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANCOVA with ICU score as a covariate**

To assess the impact of CU trait on BOLD responses across all of the youths with DBD, we conducted a 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANCOVA with ICU score a as a covariate. This revealed;

1. Replicating the main analysis, there was a significant CU trait by emotion interaction within right vmPFC. In addition, there were significant CU trait by emotion interaction within left precuneus and left lingual gyrus; see Table S7.
2. There was no CU trait by task interaction within anterior insula consistent with the suggestion that this dysfunction is prevalent in patients with DBD but unrelated to severity of CU traits. However, there was a significant CU trait by task interaction within right inferior parietal lobule; see Table S7.
3. There was a significant CU trait by emotion by task interaction in left fusiform gyrus; see Table S7.

**Supplementary Material Section 9. 2 (group: youths with DBD-LCU and youths with DBD-HCU) by 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANOVA**

To examine differences in reactivity between youths with DBD and LCU versus HCU further, we conducted a 2 (group: youths with DBD-LCU and youths with DBD-HCU) by 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANOVA. This revealed;

1. Replicating the main analysis, there was a significant group-by-emotion interaction in left ventro-medial prefrontal cortex; see Table S8. In addition, the bilateral ROI amygdalae at p=0.05 showed significantly decreased BOLD responses in youths with DBD-HCU compared to youths with DBD-LCU, in response to negative relative to neutral emotional stimuli [t=2.746, p=0.010 for left ROI amygdala; t=2.451, p=0.020 for right ROI amygdala]
2. There was no significant group-by-task interaction.
3. Replicating the main analysis, there was a significant group-by-emotion-by-task interaction in right caudate; see Table S8.

**Supplementary Data Section 10:** **3 (group: youths with DBD-LCU, youths with DBD-HCU, and healthy youths) by 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANCOVA with Conner Parent Rating Score as a covariate**

To assess the impact of the symptom severity of ADHD on BOLD responses across all three groups, we conducted a 3 (emotion: negative, positive, neutral) by 3 (task: congruent, incongruent, view) ANCOVA with Conner Parent Rating Scale Score as a covariate. This revealed;

1. Replicating the main analysis, there was a significant group-by-emotion interaction in right ventro-medial prefrontal cortex. In addition to this, there was a significant group-by-emotion interaction in left lingual gyrus; see Table S9.
2. Replicating the main analysis, there was a significant group-by-task interaction in left insula. In addition to this, there was significant group-by-task interaction in right inferior parietal lobule and left cuneus; see Table S9.
3. Also there was a significant task interaction-by-ADHD symptom severity interaction in left insula and left precentral gyrus; see Table S9.
4. There was significant group-by-emotion-by-task interaction inbilateral medial frontal gyrus. However, there was no replication of the main analysis; see Table S9.

Table S1. Behavioral Data (standard deviations in brackets)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Healthy  Youths | Youths with DBD and LCU | Youths with DBD and HCU |  |
| **RT (milliseconds)** |  |  |  |  |
| Negative Congruent | 740.30 (37.79) | 776.35 (48.50) | 870.02 (47.13) |  |
| Negative Incongruent | 837.88 (40.45) | 881.76 (51.92) | 933.87 (50.45) |  |
| Neutral Congruent | 731.79 (39.71) | 782.79 (50.97) | 848.16 (49.53) |  |
| Neutral Incongruent | 832.24 (37.59) | 826.83 (48.24) | 936.36 (46.88) |  |
| Positive Congruent | 738.09 (37.76) | 806.32 (48.46) | 857.53 (47.10) |  |
| Positive Incongruent | 825.21 (38.01) | 880.22 (48.78) | 932.72 (47.41) |  |
| Congruent | 737.73 (37.59) | 788.48 (48.24) | 858.57 (46.88) |  |
| Incongruent  Group | 831.78 (37.81)  784.25 (36.78) | 862.94 (48.53)  825.71 (47.20) | 934.32 (47.16)  896.44 (45.88) |  |
| **Accuracy (percent)** |  |  |  |  |
| Negative Congruent | 69.6 (2.9) | 63.2 (3.8) | 74.3 (3.6) |  |
| Negative Incongruent | 63.5 (3.4) | 55.5 (4.4) | 69.4 (4.3) |  |
| Neutral Congruent | 72.1 (2.6) | 62.7 (3.4) | 76.4 (3.3) |  |
| Neutral Incongruent | 65.6 (2.9) | 55.0 (3.8) | 68.6 (3.7) |  |
| Positive Congruent | 71.0 (2.7) | 62.5 (3.5) | 76.9 (3.4) |  |
| Positive Incongruent | 62.6 (3.2) | 57.9 (4.1) | 71.7 (4.0) |  |
| Group\* | 67.4 (2.5)b | 59.5 (3.2) a | 72.9 (3.1) b |  |

\*p<0.05 (difference between a and b)

Table S2. Brain areas showing main effect of task and main effect of emotion

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Coordinates of Peak Activation** | | | |  |  |
| **Regiona** | **Left/Right** | **BA** | **x** | **y** | **z** | **F** | **Voxels** |
| **Main effect of task** |  |  |  |  |  |  |  |
| Medial frontal gyrus | Right | 9 | 7.5 | 49.5 | 23.5 | 10.09 | 220 |
| Middle frontal gyrus | Right | 10 | 40.5 | 37.5 | 20.5 | 19.85 | 99 |
| Middle frontal gyrus | Right | 11 | 25.5 | 49.5 | -9.5 | 9.83 | 30 |
| Inferior frontal gyrus | Left | 45 | -49.5 | 22.5 | 8.5 | 15.86 | 180 |
| Inferior frontal gyrus | Right | 45 | 49.5 | 16.5 | 14.5 | 18.01 | 81 |
| Paracentral lobule | Right | 6 | 10.5 | -31.5 | 56.5 | 11.68 | 52 |
| Paracentral lobule | Left | 6 | -7.5 | -31.5 | 53.5 | 13.19 | 50 |
| Inferior parietal lobule | Left | 40 | -37.5 | -34.5 | 41.5 | 100.00 | 11874 |
| Anterior cingulate gyrus | Left | 24 | -4.5 | 31.5 | 5.5 | 10.87 | 41 |
| Anterior cingulate gyrus | Right | 32 | 1.5 | 43.5 | -3.5 | 8.56 | 29 |
| Superior temporal gyrus | Right | 22 | 46.5 | -55.5 | 14.5 | 14.74 | 321 |
| Middle temporal gyrus | Left | 39 | -40.5 | -70.5 | 29.5 | 11.92 | 96 |
| Middle temporal gyrus | Left | 21 | -46.5 | -46.5 | 8.5 | 7.50 | 24 |
| Cerebellum | Right |  | 10.5 | -73.5 | -42.5 | 16.59 | 72 |
| Cerebellum | Left |  | -19.5 | -64.5 | -42.5 | 9.15 | 23 |
| **Main effect of emotion** |  |  |  |  |  |  |  |
| Superior frontal gyrus | Right | 10 | 16.5 | 49.5 | -9.5 | 10.78 | 27 |
| Inferior frontal gyrus | Right | 9 | 52.5 | 13.5 | 26.5 | 9.80 | 42 |
| Inferior frontal gyrus | Right | 45 | 52.5 | 19.5 | 5.5 | 7.33 | 27 |
| Superior temporal gyrus | Left | 22 | -52.5 | -10.5 | 8.5 | 8.01 | 24 |
| Fusiform gyrus | Right | 37 | 37.5 | -46.5 | -15.5 | 43.28 | 316 |
| Caudate | Left |  | -19.5 | -37.5 | 17.5 | 9.12 | 24 |
| Parahippocampal gyrus | Right | 30 | 13.5 | -37.5 | 5.5 | 8.15 | 29 |
| Amygdala | Right |  | 25.5 | -1.5 | -12.5 | 10.51 | 23 |
| **Task by Emotion** |  |  |  |  |  |  |  |
| Medial frontal gyrus | Right | 8 | 10.5 | 34.5 | 38.5 | 6.38 | 97 |
| Medial frontal gyrus | Left | 9 | -13.5 | 40.5 | 29.5 | 5.40 | 98 |
| Medial frontal gyrus | Right | 10 | 7.5 | 52.5 | 14.5 | 4.94 | 39 |
| Middle frontal gyrus | Right | 10 | 37.5 | 55.5 | -3.5 | 4.59 | 22 |
| Anterior cingulate gyrus | Left | 32 | -25.5 | 34.5 | 8.5 | 5.52 | 53 |
| Anterior cingulate gyrus | Left | 24 | -10.5 | 7.5 | 32.5 | 5.21 | 24 |

aAccording to the Talairach Daemon Atlas (<http://www.nitrc.org/projects/tal-daemon>).

Table S3. Brain Regions showing a significant interaction in comparison between healthy youths and youths with DBD

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Coordinates of Peak Activation** | | | |  |  |
| **Regiona** | **Left/Right** | **BA** | **x** | **y** | **z** | **F** | **Voxels** |
| **Group-by-Task** |  |  |  |  |  |  |  |
| Insula | Right | 21 | 37.5 | -13.5 | -6.5 | 8.51 | 57 |
| Inferior parietal lobule | Left | 40 | -40.5 | -31.5 | 29.5 | 7.75 | 28 |
|  |  |  |  |  |  |  |  |

aAccording to the Talairach Daemon Atlas (<http://www.nitrc.org/projects/tal-daemon>).

Table S4. Brain Regions showing a significant interaction in comparison between youths with DBD-LCU with no current treatment, youths with DBD-HCU with no current treatment, and healthy youths

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Coordinates of Peak Activation** | | | |  |  |
| **Regiona** | **Left/Right** | **BA** | **x** | **y** | **z** | **F** | **Voxels** |
| **Group-by-Emotion** |  |  |  |  |  |  |  |
| Ventromedial prefrontal cortex\* | Left | 11 | -1.5 | 43.5 | -3.5 | 5.33 | 18 |
| Amygdala\* | Right |  | 25.5 | -1.5 | -21.5 | 4.82 | 12 |
| **Group-by-Task** |  |  |  |  |  |  |  |
| Medial frontal gyrus | Right | 10 | 22.5 | 46.5 | 8.5 | 5.08 | 19 |
| Insula\* | Left | 13 | -37.5 | 4.5 | -0.5 | 5.56 | 11 |
| Fusiform gyrus | Left | 18 | -25.5 | -85.5 | -12.5 | 6.24 | 18 |
| **Group-by-Task-by-Emotion** | |  |  |  |  |  |  |
| Medial frontal gyrus | Right | 6 | 7.5 | 28.5 | 35.5 | 3.81 | 26 |
| Middle temporal gyrus | Left | 21 | -40.5 | -4.5 | -27.5 | 3.78 | 32 |
| Posterior cingulate gyrus | Left | 24 | -22.5 | -19.5 | 44.5 | 4.56 | 22 |
| Caudate\* | Right |  | 10.5 | 1.5 | 20.5 | 3.96 | 32 |
|  |  |  |  |  |  |  |  |

aAccording to the Talairach Daemon Atlas (<http://www.nitrc.org/projects/tal-daemon>).

\* regions replicating the main analysis

Table S5. Brain Regions showing a significant interaction in comparison between youths with DBD-LCU with no substance abuse comorbidity, youths with DBD-HCU with no substance abuse comorbidity, and healthy youths

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Coordinates of Peak Activation** | | | |  |  |
| **Regiona** | **Left/Right** | **BA** | **x** | **y** | **z** | **F** | **Voxels** |
| **Group-by-Emotion** |  |  |  |  |  |  |  |
| Ventromedial prefrontal cortex\* | Left | 11 | -4.5 | 43.5 | -12.5 | 7.54 | 41 |
| Inferior parietal lobule | Left | 40 | -52.5 | -31.5 | 41.5 | 6.33 | 24 |
| Anterior cingulate gyrus | Right | 32 | 19.5 | 37.5 | 8.5 | 5.81 | 27 |
| Parahippocampla gyrus | Right |  | 28.5 | -25.5 | -24.5 | 8.10 | 98 |
| Cerebellar tonsil | Right |  | 31.5 | -43.5 | -36.5 | 6.99 | 28 |
| Declive | Left |  | -34.5 | -64.5 | -21.5 | 7.07 | 25 |
| **Group-by-Task** |  |  |  |  |  |  |  |
| Inferior parietal lobule | Left | 40 | -49.5 | -55.5 | 41.5 | 5.26 | 24 |
| Insula\* | Right | 13 | 34.5 | -13.5 | 2.5 | 5.20 | 22 |
| Insula\* | Left | 13 | -37.5 | 7.5 | -0.5 | 5.96 | 11 |
| **Group-by-Task-by-Emotion** | |  |  |  |  |  |  |
| Superior frontal gyrus\* | Right | 9 | 22.5 | 37.5 | 29.5 | 5.04 | 186 |
| Medial frontal gyrus | Left | 8 | -13.5 | 31.5 | 41.5 | 4.13 | 73 |
| Middle frontal gyrus | Right | 9 | 37.5 | 16.5 | 38.5 | 3.86 | 66 |
| Middle frontal gyrus | Left | 6 | -19.5 | 7.5 | 59.5 | 4.60 | 51 |
| Middle frontal gyrus | Left | 6 | -28.5 | 7.5 | 41.5 | 5.76 | 35 |
| Anterior cingulate gyrus | Right | 32 | 13.5 | 40.5 | 5.5 | 4.02 | 31 |
| Anterior cingulate gyrus | Left | 32 | -1.5 | 40.5 | 17.5 | 3.47 | 23 |
| Anterior cingulate gyrus | Left | 24 | -4.5 | -1.5 | 32.5 | 3.80 | 40 |
| Caudate\* | Right |  | 10.5 | -1.5 | 20.5 | 4.79 | 112 |
| Caudate\* | Left |  | -4.5 | 19.5 | 2.5 | 4.08 | 23 |
|  |  |  |  |  |  |  |  |

aAccording to the Talairach Daemon Atlas (<http://www.nitrc.org/projects/tal-daemon>).

\* regions replicating the main analysis

Table S6. Correlations (and p values) among BOLD response parameters implicated in emotional responding and response inhibition

|  |  |  |  |
| --- | --- | --- | --- |
|  | Healthy | LCU | HCU |
| vmPFC-amygdala  (Neg\_Neu-Neg\_Neu) | 0.371 (0.052) | **0.628 (0.007)** | 0.418 (0.084) |
| vmPFC-Insula  (Neg\_Neu-Incong\_View) | **0.471 (0.011)** | -0.461 (0.062) | -0.018 (0.944) |
| Amygdala-Insula  (Neg\_NeuIncong\_View) | **0.509 (0.006)** | **-0.545 (0.024)** | 0.104 (0.681) |

Pearson correlation/p value

Key to Supplement Data Table 5: vmPFC: left ventro-medial prefrontal cortex; Neg: Negative; Neu: Neutral; Pos: Positive; Incong: Incongruent trial; View: View trial; Healthy: healthy youths; LCU: youths with DBD-LCU; HCU: youths with DBD-HCU.

Table S7. Brain Regions showing a significant interaction in comparison between youths with DBD-LCU and youths with DBD-HCU, with their CU trait as a covariate

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Coordinates of Peak Activation** | | | |  |  |
| **Regiona** | **Left/Right** | **BA** | **x** | **y** | **z** | **F** | **Voxels** |
| **CU-by-Emotion** |  |  |  |  |  |  |  |
| Ventromedial prefrontal cortex\* | Right | 11 | -4.5 | 40.5 | -9.5 | 4.68 | 10\* |
| Precuneus | Left | 31 | -10.5 | -43.5 | 44.5 | 8.65 | 34 |
| Lingual gyrus | Left | 19 | -10.5 | -58.5 | 2.5 | 11.02 | 21 |
| **CU-by-Task** |  |  |  |  |  |  |  |
| Inferior parietal lobule | Right | 40 | 46.5 | -58.5 | 44.5 | 13.37 | 38 |
| **CU-by-Task-by-Emotion** | |  |  |  |  |  |  |
| Fusiform gyrus | Left | 20 | -43.5 | -4.5 | -24.5 | 6.82 | 24 |
|  |  |  |  |  |  |  |  |

aAccording to the Talairach Daemon Atlas (<http://www.nitrc.org/projects/tal-daemon>).

\* below the ClusterSim cluster size (22 voxels); region replicating the main analysis

Table S8. Brain Regions showing a significant interaction in comparison between youths with DBD-LCU and youths with DBD-HCU

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Coordinates of Peak Activation** | | | |  |  |
| **Regiona** | **Left/Right** | **BA** | **x** | **y** | **z** | **F** | **Voxels** |
| **Group-by-Emotion** |  |  |  |  |  |  |  |
| Ventro-medial prefrontal cortex\* | Left | 10 | -1.5 | -43.5 | -9.5 | 9.457 | 15 |
| Amygdala ROI | Left |  | 20.5 | -1.5 | -19.5 | 4.053 | 15 |
| Amygdala ROI | Right |  | 22.5 | -1.5 | -16.5 | 4.822 | 11 |
| **Group-by-Emotion-by-Task** |  |  |  |  |  |  |  |
| Caudate\* | Bilateral |  | 10.5 | 1.5 | 20.5 | 5.770 | 48 |
|  |  |  |  |  |  |  |  |

aAccording to the Talairach Daemon Atlas (<http://www.nitrc.org/projects/tal-daemon>).

\* replicating the main analysis

Table S9. Brain Regions showing a significant interaction in comparison between youths with DBD-LCU, youths with DBD-HCU, and healthy youths with their ADHD symptom severity as a covariate

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Coordinates of Peak Activation** | | | |  |  |
| **Regiona** | **Left/Right** | **BA** | **x** | **y** | **z** | **F** | **Voxels** |
| **Group-by-Emotion** |  |  |  |  |  |  |  |
| Ventro-medial prefrontal cortex\* | Right | 11 | 4.5 | -40.5 | -12.5 | 6.145 | 11 |
| Lingual gyrus | Left | 19 | -13.5 | -64.5 | 2.5 | 5.404 | 14 |
| **Group-by-Task** |  |  |  |  |  |  |  |
| Inferior parietal lobule | Right | 40 | 52.5 | -52.5 | 38.5 | 7.323 | 34 |
| Insula\* | Left | 13 | -40.5 | -4.5 | 11.5 | 6.319 | 18 |
| ADHD symptom severity-by-Task |  |  |  |  |  |  |  |
| Insula | Left | 13 | -40.5 | -7.5 | 14.5 | 9.086 | 71 |
| Precentral gyrus | Left | 4 | -19.5 | -22.5 | 62.5 | 8.553 | 31 |
| **Group-by-Emotion-by-Task** |  |  |  |  |  |  |  |
| Medial frontal gyrus | Right | 6 | 7.5 | -22.5 | 53.5 | 4.415 | 36 |
| Medial frontal gyrus | Left | 6 | -7.5 | -22.5 | 53.5 | 4.255 | 25 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |

aAccording to the Talairach Daemon Atlas (<http://www.nitrc.org/projects/tal-daemon>).

\* regions replicating the main analysis

**Reference**

**Lang PJ, B. M., Cuthbert BN** (2005). International affective picture system (IAPS): Affetive ratings of pictures and instruction manual. University of Florida: Gainesville, FL.