Supplementary Online Content

Lyoo IK, MD, Kim JE, Yoon SJ, Hwang J. Bae S, Kim DJ. The neurobiological role of the dorsolateral prefrontal cortex in recovery from trauma: longitudinal brain imaging study among survivors of the South Korean subway disaster. *Arch Gen Psychiatry*. 2011;68(7):701-713.

eFigure 1. T-Statistic maps of between-group differences in cortical thickness at time 1 in reduced data sets or with additional covariates.
eFigure 2. Relationship between adjusted cortical thickness of the dorsolateral prefrontal cortical region and the performance on the executive function tests in trauma-exposed subjects.
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This supplementary material has been provided by the authors to give readers additional information about their work.
eFigure 1. T-Statistic Maps of Between-Group Differences in Cortical Thickness at Time 1 in Reduced Data Sets or with Additional Covariates

A

Contrast of trauma-exposed and control subjects. The t statistics for the group effect for 29 trauma-exposed and 35 control subjects are visualized on a brain template. The t values were calculated using a general linear model adjusting for age and sex. This is the result from our main analysis scheme.

B

Contrast of trauma-exposed and control subjects, with an additional covariate of mean cortical thickness. The t statistics for the group effect for 29 trauma-exposed and 35 control subjects are visualized on a brain template. The t values were calculated using a general linear model adjusting for age, sex and mean cortical thickness in order to ensure that mean cortical thickness did not confound reported results.

C

Contrast of trauma-exposed and control subjects, with an additional covariate of intracranial volume (ICV). The t statistics for the group effect for 29 trauma-exposed and 35 control subjects are visualized on a brain template. The t values were calculated using a general linear model adjusting for age, sex and ICV in order to ensure that ICV did not confound reported results.

D

Contrast of trauma-exposed and control subjects, with an additional covariate of image quality rating scale scores. The t statistics for the group effect for 29 trauma-exposed and 35 control subjects are visualized on a brain template. The t values were calculated using a general linear model adjusting for age, sex and image quality rating scale scores in order to ensure that image quality did not confound reported results.

E

Contrast of trauma-exposed and control subjects, excluding trauma-exposed subjects who had a history of prior psychotropic medications. To ensure that the psychotropic medication history did not confound reported results, the group effect was tested again in a reduced data set. The t statistics for the group effect for the subgroup of 25 trauma-exposed and 35 control subjects are visualized on a brain template. The t values were calculated using a general linear model adjusting for age and sex.
Contrast of trauma-exposed and control subjects, excluding subjects who had prior life stressors.
To ensure that the experience of prior life stressors did not confound reported results, the group effect was tested again in a reduced data set. The t statistics for the group effect for a subgroup of 24 trauma-exposed and 30 control subjects are visualized on a brain template. The t values were calculated using a general linear model adjusting for age and sex.

Contrast of trauma-exposed and control subjects, excluding subjects who had comorbid psychiatric diagnosis.
To ensure that the comorbid psychiatric disorders did not confound reported results, the group effect was tested again in a reduced data set. The t statistics for the group effect for a subgroup of 21 trauma-exposed and 35 control subjects are visualized on a brain template. The t values were calculated using a general linear model adjusting for age and sex.

Contrast of trauma-exposed and control subjects, excluding subjects who did not complete all three waves of assessments.
To ensure that the attrition rate did not confound reported results, the group effect was additionally tested in a reduced data set. The t statistics for the group effect at time 1 for a subgroup of 16 trauma-exposed and 20 control subjects who completed all 3 waves of assessments are visualized on a brain template. The t values were calculated using a general linear model adjusting for age and sex.
eFigure 2. Relationship between Adjusted Cortical Thickness of the Dorsolateral Prefrontal Cortical Region\(^a\) and the Performance on the Executive Function Tests in Trauma-Exposed Subjects

Abbreviations: DLPFC, dorsolateral prefrontal cortex.

\(^a\) This figure demonstrates relationship between cortical thickness of the dorsolateral prefrontal region (Figure 2 and eFigure 3), where trauma-exposed subjects had greater cortical thickness relative to control subjects at time 1, and the performance on the executive function tests in trauma-exposed subjects adjusting for age, sex and educational level.

Scores of the neuropsychological tests were converted to \(z\) scores using group means and standard deviations of control subjects and then averaged to yield a single domain \(z\) score (composite score) that reflected overall performance level.

The solid black line in the scatter plot indicates the regression line (line of best fit).
eFigure 3. Dorsolateral Prefrontal Cortical Clusters Where Trauma-exposed Subjects Had Greater Cortical Thickness Than Control Subjects at Time 1

**Abbreviations:** BA, Brodmann area.

- **cluster a**
  - right superior, middle, and inferior frontal cortical regions (BAs 9, 45, 46)
  - Clusters corrected for multiple comparisons at $P<.01$

- **cluster b**
  - left superior frc

- **cluster c**
  - left inferior fron

**DLPFC region**
- calculated by cluster size-weighted averaging all th
eFigure 4. Relationships between Adjusted Cortical Thickness of Three Dorsolateral Prefrontal Clusters and Improvement in PTSD Symptoms of Trauma-Exposed Subjects

Adjusted cortical thickness at time 1

<table>
<thead>
<tr>
<th>Right PFC</th>
<th>Left SFC</th>
<th>Left IFC</th>
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Abbreviations: DLPFC, dorsolateral prefrontal cortex; SFC, superior frontal cortex; IFC, inferior frontal cortex; PTSD, posttraumatic stress disorder; CAPS, Clinician-Administered Posttraumatic Stress Disorder Scale.

Cortical thickness in clusters of group differences at time 1 was adjusted for age and sex.
Cortical thickness was compared between control subjects (n=35), trauma-exposed subjects with a Met/Val or a Met/Met genotype (n=19) and those with a Val/Val genotype (n=10). Control subjects did not differ in cortical thickness in any clusters by the BDNF genotype. There was a significant linear trend (all $P$ for trend $<.001$) toward greater cortical thickness in these clusters between 3 groups.

Error bars represent 95% confidence intervals. Cortical thickness is age- and sex-adjusted.