

Greater grey matter volume reductions are related to longer duration of Major Depressive Disorder P.4.008

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Background

- * A predominant pathophysiological model of Major Depressive Disorder (MDD) is based on the occurrence of neurotoxic and neurotrophic processes before and during the illness.
- * Changes of grey matter volume have been observed in some brain structures of MDD patients

However....

- * Specific areas involved remain unclear given :
 - Heterogeneity of samples used in previous studies
 - Different pre-processing procedures
 - Applying less restrictive statistical thresholds using predefined ROIs



Aim: To investigate the effect of illness characteristics on grey matter volumes in different stages of MDD by using recommended MRI parameters to perform a voxel-based morphometry (VBM) analysis.

Methods

Acquisition parameters

3-Tesla: 3D M-PRAGE images; whole-brain sequence. TR= 6.7 ms., TE= 3.1 ms., 170 slices.

Image processing

 to perform a VBM of grey matter volume among the 4 groups and its post-hoc comparison.
 to segment the cortical volume in brain areas in order to correlate them with clinical variables.

Sample


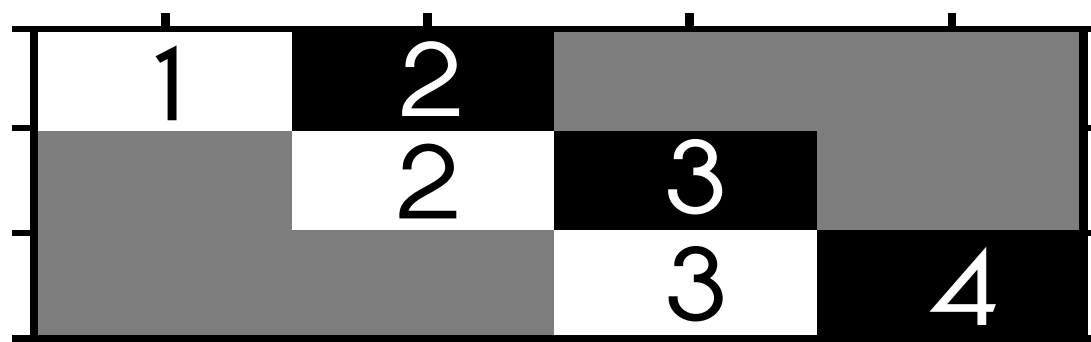
- 1 32 Healthy control subjects
- 2 22 First-episode patients
- 3 22 Remitted-recurrent patients
- 4 22 Treatment-resistant chronic patients

First analysis: VBM of gray matter volume among groups (A):

ANOVA

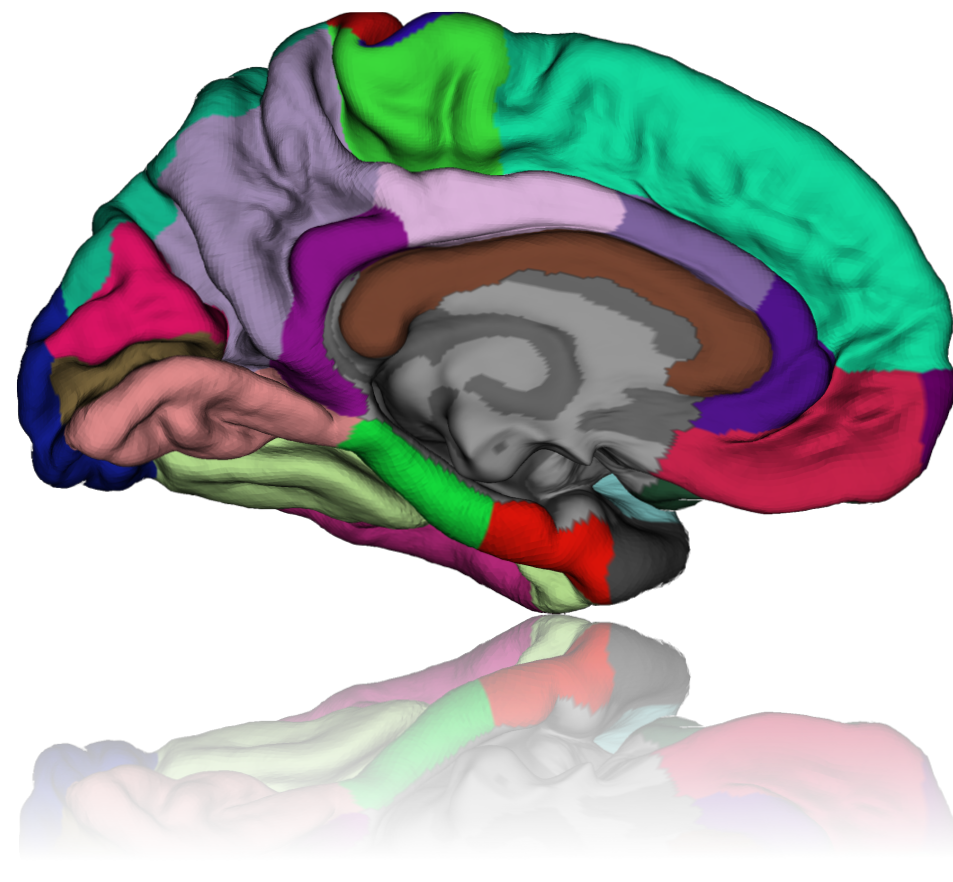
Post-hoc analysis

T-TEST



Second analysis: Correlation of

brain volume structures with clinical variables (B):



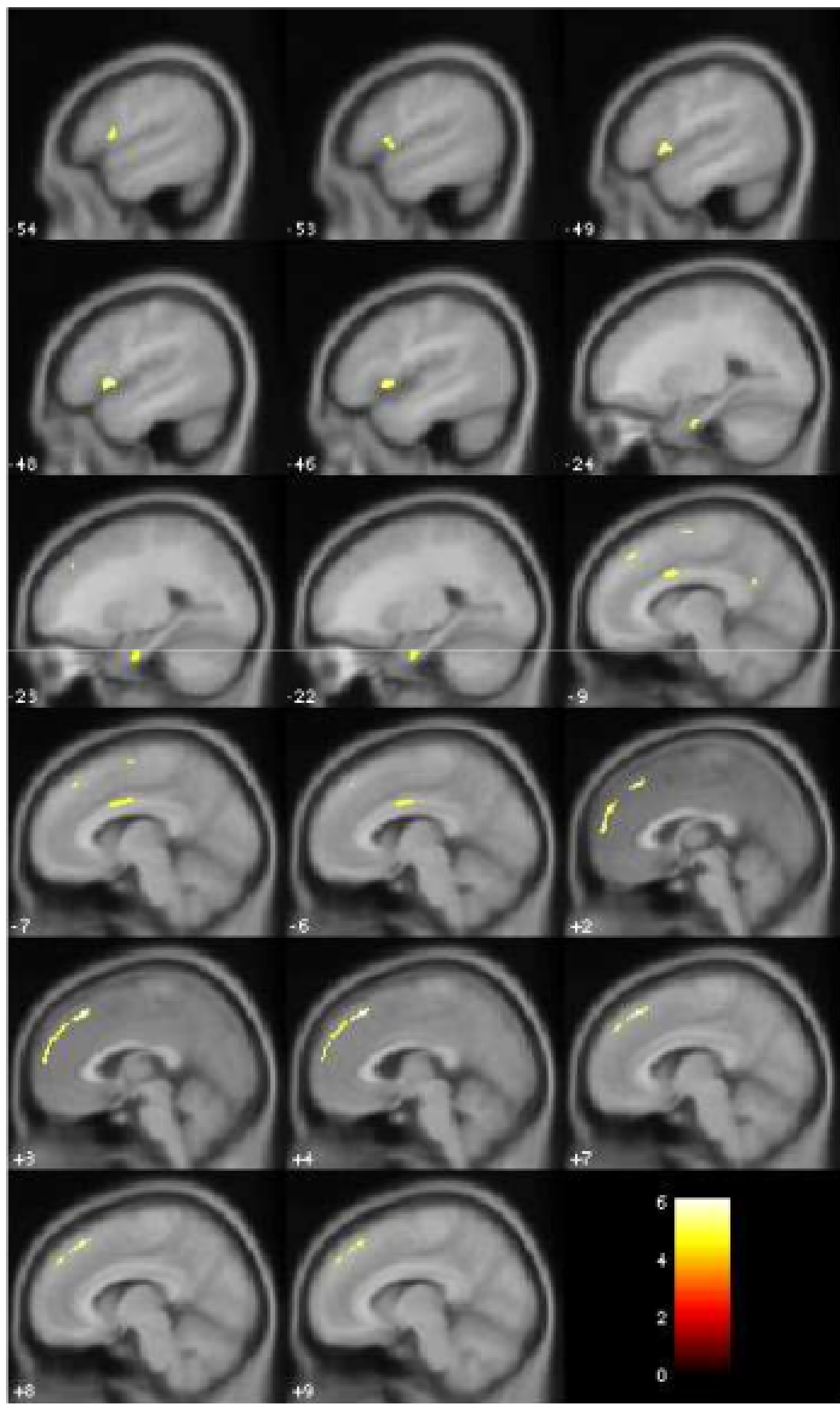
- Hamilton Depression Rating Scale
- Number of previous episodes
- Duration of illness
- Age at illness onset

Results

(A) VBM Post-hoc comparisons

Treatment-resistant chronic patients had fewer grey matter volume than healthy controls.

- * Corrected for multiple comparisons with family-wise error (p<0.05)

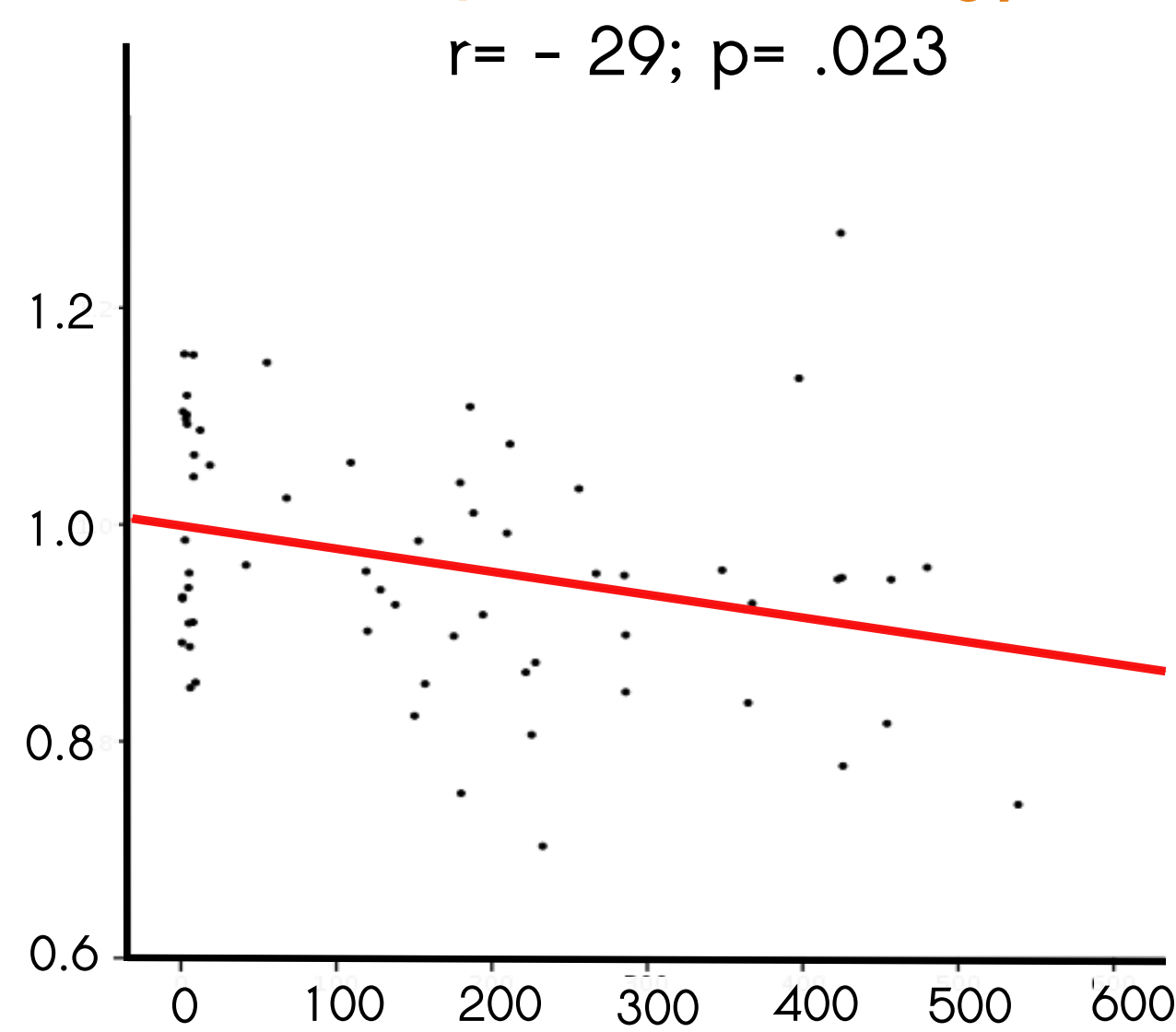


- Left transverse temporal gyrus BA 41
- Left insula BA 13
- Left parahippocampal gyrus BA 35
- Left cingulate gyrus BA 24
- Left medial frontal gryus BA 6/8
- Right superior frontal gyrus BA 8

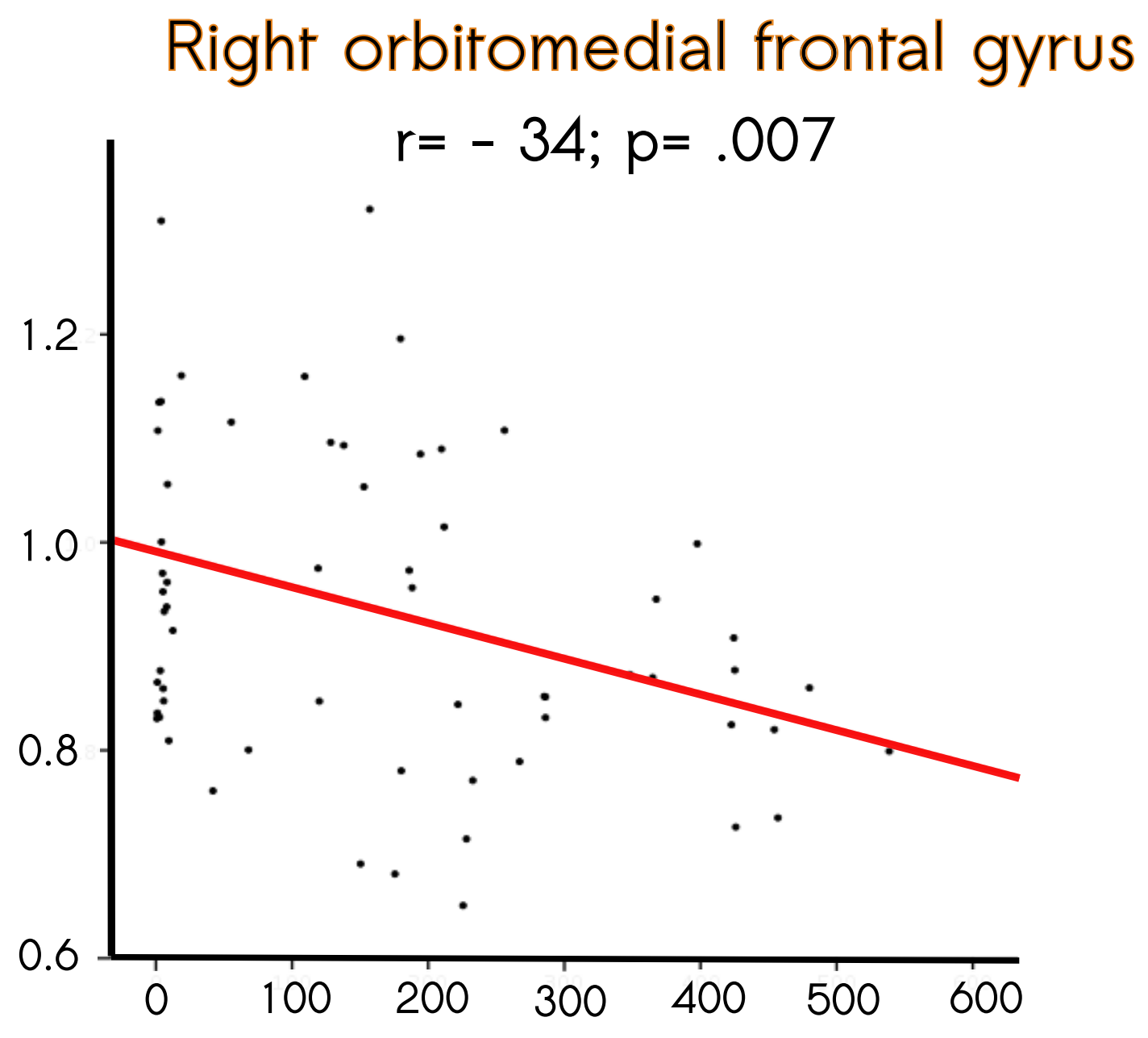
(B) Correlations of brain volumes with duration of illness (months)

Y axis = Normalized volumes in mm³

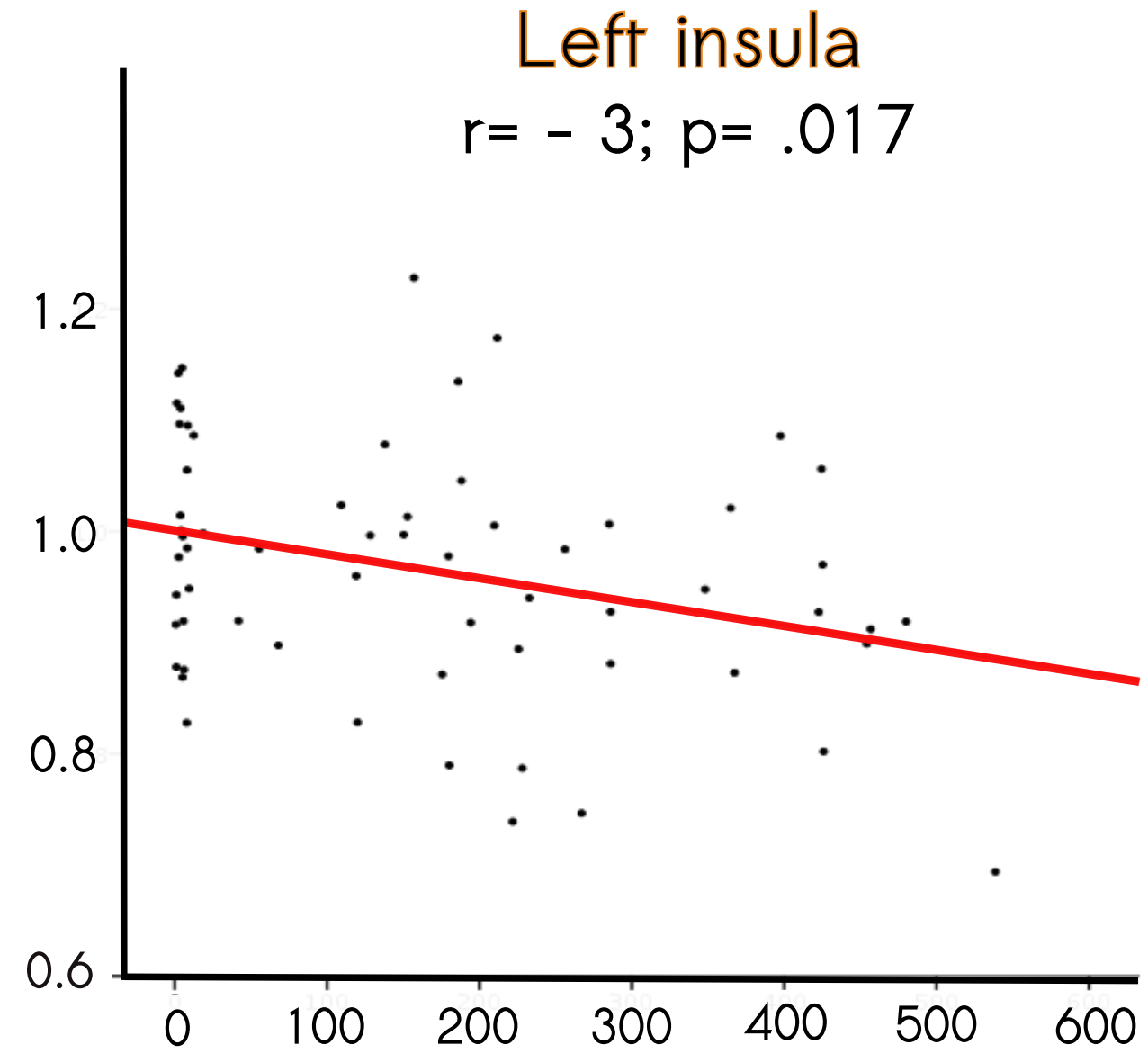
X axis = Duration of illness (months)



Left superior frontal gyrus
r= - .29; p= .023



Right orbitomedial frontal gyrus
r= - .34; p= .007



Left insula
r= - .3; p= .017

Discussion

Suffering a chronic MDD yields to deleterious GM changes in fronto-limbic regions

Taking into account clinical variables related to the severity of the disorder implied stronger differences between groups.

The duration of illness was the most associated variable with diminished grey matter volume.

Treatment-resistant chronic patients appeared to have a remarkable brain damage, indicating a possible neurotoxic effect of depression.

Grey matter volume losses may contribute to better understand the deleterious effects of long-lasting course of MDD.