

## Regional cortical gray matter thickness reductions in first episode schizophrenia

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### Abstract:

**Introduction:** Cortical thickness changes are less studied in schizophrenia and may better isolate systems-level neuropathology present at first onset than volumetric analyses.

**Methods:** Computational cortical pattern matching methods were employed to compare gray matter thickness between 72 (51m/21f) first episode patients (mean age =  $25.1 \pm 4.7$  SD) and 78 (33m/44f) healthy comparison subjects (mean age =  $27.3 \pm 6.6$ ) using high-resolution MR images. Principal component analysis (PCA) reduced cortical thickness values, obtained with sub-voxel resolution from tissue-classified images at thousands of homologous cortical locations, into component scores for each subject. PCA scores were used as dependent variables in statistical analyses including diagnosis as an independent variable and sex, age and brain volume as covariates. To reveal regional changes in gray matter thickness, the same statistical model compared thickness values across the entire cortex in 3D.

**Results:** Only sex effects were present for overall brain volume. The first cortical thickness principal component, accounting for 33 percent of the total variance, revealed main effects of diagnosis ( $p < .01$ ); sex ( $p < .001$ ); and age ( $p < .001$ ). Effects of diagnosis and age remained significant after brain size correction. For other components accounting for  $> 5$  percent of the variance, only main effects of sex and/or age were observed. Statistical maps showed significant regional gray matter thinning in temporal, parietal and prefrontal regions bilaterally in first episode patients. Regional effects were more pronounced in the left hemisphere with slightly different spatial profiles in female than male patients.

**Conclusion:** Local reductions in cortical thickness are present at disease onset in brain regions linked with functional disturbances in schizophrenia.