

# Neuroanatomical phenotypes in mental illness: identifying convergent and divergent cortical phenotypes across autism, ADHD and schizophrenia.

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Abstract

## BACKGROUND:

There is evidence suggesting neuropsychiatric disorders share genomic, cognitive and clinical features. Here, we ask if autism-spectrum disorders (ASD), attention-deficit/hyperactivity disorder (ADHD) and schizophrenia share neuroanatomical variations.

## METHODS:

First, we used measures of cortical anatomy to estimate spatial overlap of neuroanatomical variation using univariate methods. Next, we developed a novel methodology to determine whether cortical deficits specifically target or are "enriched" within functional resting-state networks.

## RESULTS:

We found cortical anomalies were preferentially enriched across functional networks rather than clustering spatially. Specifically, cortical thickness showed significant enrichment between patients with ASD and those with ADHD in the default mode network, between patients with ASD and those with schizophrenia in the frontoparietal and limbic networks, and between patients with ADHD and those with schizophrenia in the ventral attention network. Networks enriched in cortical thickness anomalies were also strongly represented in functional MRI results (Neurosynth;  $r = 0.64$ ,  $p = 0.032$ ).

## LIMITATIONS:

We did not account for variable symptom dimensions and severity in patient populations, and our cross-sectional design prevented longitudinal analyses of developmental trajectories.

## CONCLUSION:

These findings suggest that common deficits across neuropsychiatric disorders cannot simply be characterized as arising out of local changes in cortical grey matter, but rather as entities of both local and systemic alterations targeting brain networks.