"Lack of Group to Individual Generalizability"

Lack of group-to-individual generalizability is a threat to human subjects research

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There are two important takeaways from these findings:

(i) **Aggregated estimates did not consistently agree with individual estimates […]** the present study provides an empirical demonstration of [*the implausibility of ergodicity in human subjects research*] across multiple settings and constructs.

(ii) even in the best-case scenario, **we should not think of a correlation in group data as an estimate that generalizes to any given individual in the population**. Only 68% of all individual correlational values fall within a range that would be predicted by group data to cover 99.7% of all possible correlations—a discrepancy of nearly 32%.

The worst-case scenario is clearly dire: It is plausible that **inattention to nonergodicity and a lack of group-to-individual generalizability threaten the veracity of countless studies, conclusions, and best-practice recommendations.**
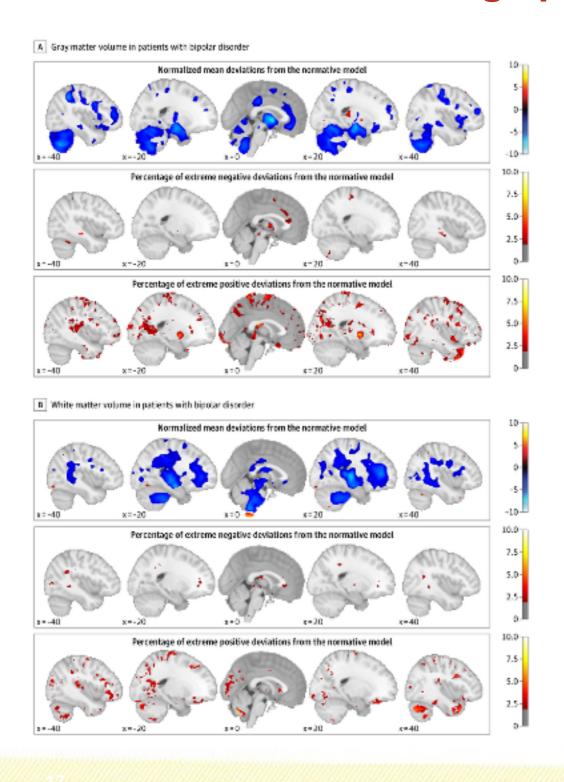
The idea of the average patient is a noninformative construct

A Gray matter volume in patients with bipolar disorder

Normalized mean deviations from the normative model

Percentage of extreme negative deviations from the normative model

Percentage of extreme positive deviations from the normative model

B White matter volume in patients with bipolar disorder

Normalized mean deviations from the normative model

Percentage of extreme negative deviations from the normative model

Percentage of extreme positive deviations from the normative model

Question: Is the **focus on the average patient disguising interindividual differences** among patients with mental disorders?

Findings: In this study of magnetic resonance imaging data from 218 patients with schizophrenia spectrum disorders and 256 healthy control individuals, mapping of interindividual differences in brain structure revealed that **only a few brain loci had the same abnormalities in more than 2% of patients with the same disorder despite robust group-level differences** in multiple brain regions between patients and control individuals.

Meaning: These findings suggest that **the idea of the average patient is a noninformative construct that falls apart when mapping interindividual differences** and provide a framework toward precision medicine in psychiatry.

https://www.ru.nl/donders/@1179539/very-few-similarities-between-brains-schizophrenia/

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Wolfers, T., Doan, N. T., Kaufmann, T., Alnæs, D., Moberget, T., Agartz, I., ... & Andreassen, O. A. (2018). Mapping the heterogeneous phenotype of schizophrenia and bipolar disorder using normative models. *JAMA psychiatry*.