

Deconstructing the transdiagnostic nature of language symptoms on frontotemporal lobar degeneration syndromes

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Introduction: Disorders in the frontotemporal lobar degeneration (FTLD) spectrum are categorised as distinct clinical entities, yet there is considerable overlap in cognitive and linguistic performance across diagnostic categories. To better understand the genesis of linguistic variations in FTLD, there is an urgent need to capture relationships between language deficits and brain structure changes. Using a transdiagnostic data-driven approach, we aimed to delineate patterns of language difficulties and their associated structural brain correlates across the FTLD spectrum.

Methodology: Seventy-three patients across the FTLD spectrum (13 semantic, 15 non-fluent, 22 logopenic, 10 progressive supranuclear palsy and 13 corticobasal syndrome) underwent an error-based language test battery and structural neuroimaging. We employed principal component analysis (PCA) to extract orthogonal components of language performance and brain atrophy across patients. We used multiple regression to obtain the brain-behaviour relationships.

Results: PCA on language and neuroimaging data revealed three language dimensions (phonology, semantic, and syntax); and seven non-overlapping brain atrophy dimensions including temporal, frontal and parietal regions, respectively. This multidimensional language and brain atrophy space showed a strong relationship between semantic deficits and atrophy in the temporal lobes but no obvious one-to-one mapping between other brain-behaviour dimensions. Samples from the other FTLD variants showed significant overlap across both language and brain-atrophy dimensions. Multiple regression analyses revealed that the phonology and syntax factors can be predicted using multiple lesion dimensions.

Conclusion: Language dysfunctions and brain atrophy cut across the FTLD spectrum, and the clinical category is not predictive of the specificity of language deficits, showing a brain-behaviour continuum.

Conflicts of interest

The authors report no competing interests