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BrainLayer: the multilayer brain networks underlying cognitive decline

Cognitive deterioration in lesional brain disease, such as cerebrovascular accidents, multiple sclerosis and glioma, varies considerably: some patients suffer from progressive deterioration, while others do not, despite comparable disease parameters. Normal cognition is increasingly seen as a combination of segregation and integration occurring in the brain network, while cognitive status in disease depends on a combination of resilience in the form of maintained connectivity despite lesioning, but adaptivity, plasticity or even compensation in the context of continuing cognitive demands. In BrainLayer, multilayer network theory is used to synergize multimodal brain network characteristics into a marker of cognitive functioning. Notably, multilayer network characterization supersedes the summation of unilayer characteristics when trying to describe the behavior of the entire system, which may prove essential to sensitively and specifically pick up on individual variation in cognitive functioning. BrainLayer aims to elucidate individual resilience and adaptivity of the brain network in the context of lesional brain disease.

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