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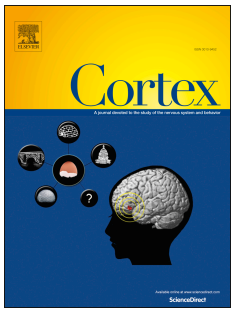

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On the low dimensionality of behavioral deficits and alterations of brain network connectivity after focal injury

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Abstract
Traditional neuropsychological approaches emphasize the specificity of behavioral deficits and the modular organization of the brain. At the population level, however, there is emerging evidence that deficits are correlated resulting in a low dimensional structure of post-stroke neurological impairments. Here we consider the implications of low dimensionality for the three-way mapping between structural damage, altered physiology, and behavioral deficits. Understanding this mapping will be aided by large-sample studies that apply multivariate models and focus on explained percentage of variance, as opposed to univariate lesion-symptom techniques that report statistical significance. The low dimensionality of behavioral deficits following stroke is paralleled by widespread changes in functional connectivity (FC), including a reduction in modularity. Both are related to the structural damage to white matter and subcortical grey commonly produced by stroke. We suggest that large-scale physiological abnormalities following a stroke reduce the variety of neural states visited during task processing and at rest, resulting in a limited repertoire of behavioral states.