Brain-Wide Mapping of Stimulus Induced Variability Quenching Reveals Modularity of Cortical Network

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Presentation Abstract Summary Recent studies have revealed that neurons not directly activated by a given sensory stimulus can nevertheless “respond” to the stimulus by showing reduction of trial-to-trial variability in neural activity (“variability quenching”). Determining the extent of cortical neural circuit that responds to a sensory stimulus is important for understanding how cortical network as a whole process sensory information. Here we used mesoscopic brain activity mapping to find that variability quenching occurred in widespread, bilaterally symmetric, cortical network-module. Each network-module showed variability quenching to particular sensory modality. The network-modules identified by variability quenching closely resembled cortical networks identified by spontaneous activity correlation (a.k.a. resting-state functional connectivity). Thus, although only a subset of neurons is activated, sensory stimulation recruits an entire cortical network-module that share correlated spontaneous activity.

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