Back to pupillometry: How cortical network state fluctuations tracked by pupil dynamics could explain neural signal variability in human cognitive neuroscience

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The mammalian thalamocortical system generates intrinsic activity reflecting different states of excitability, arising from changes in the membrane potentials of underlying neuronal networks. Fluctuations between these states occur spontaneously, regularly, and frequently throughout awake periods and influence stimulus encoding, information processing, and neuronal and behavioral responses. Changes of pupil size have recently been identified as a reliable marker of underlying neuronal membrane potential and thus can encode associated network state changes in rodent cortex. This suggests that pupillometry, a ubiquitous measure of pupil dilation in cognitive neuroscience, could be used as an index for network state fluctuations also for human brain signals. Considering this variable may explain task-independent variance in neuronal and behavioral signals that were previously disregarded as noise. © 2017 Schwalm and Rosales Jubal.

Network state changes

Pupil diameter

Pupillometry

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