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  The influence of background oscillatory brain activity on evoked responses and motor behavior

  The electrical activity of millions of neurons in the brain can be recorded by placing electrodes on the scalp. In a healthy person, the recorded activity produces a dizzying array of seemingly random ongoing activity. The conventional assumption in cognitive electrophysiology is that the presentation of a particular event such as visual or auditory stimuli evokes a 'turning on' of additional brain activity on top of the ongoing background activity. Averaging multiple event-locked trials is thought to result in the cancellation of random background activity and leave the evoked response. The work that I will present challenges this conventional view and proposes: 1) that the brain's random fluctuations are not ever averaged out; 2) this ongoing activity has a fundamental role in how the brain's evoked responses are formed; 3) this ongoing activity can be used to predict behavioral responses and 3) this activity can be used as a powerful indicator of functional connectivity across different regions of the brain.

  All this taken together suggests a re-interpretation of the role the brain's intrinsic background activity plays in how we perceive the world every day. In such a reinterpretation the brain would be viewed as an active system where the spontaneous variability of neuronal activity does not represent noise but rather transient looking glasses through which we perceive the world.

  Ali Mazaheri
  Compuiter Science & Engineering, York