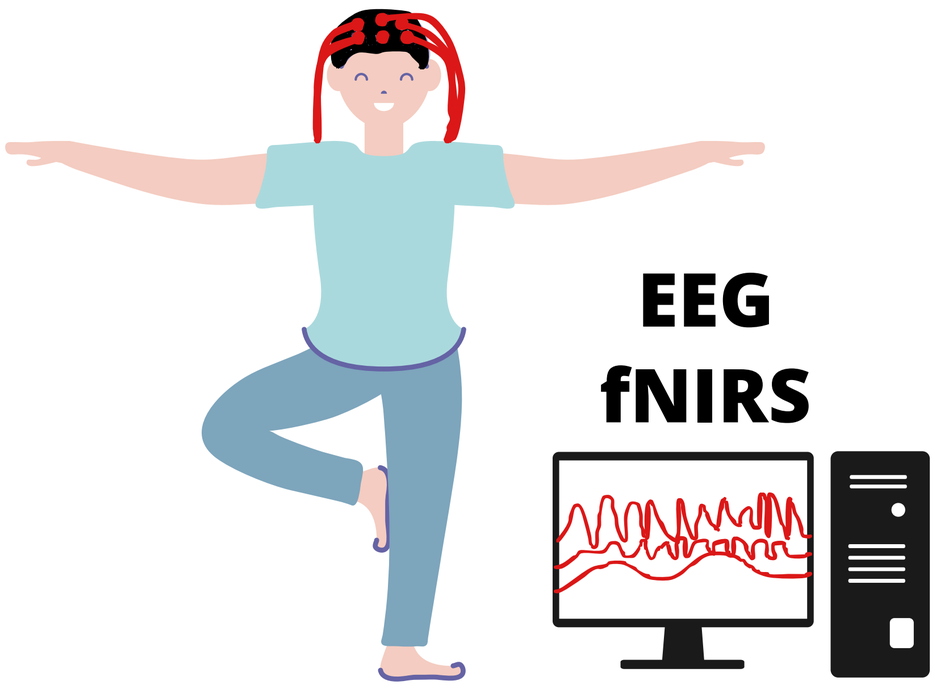
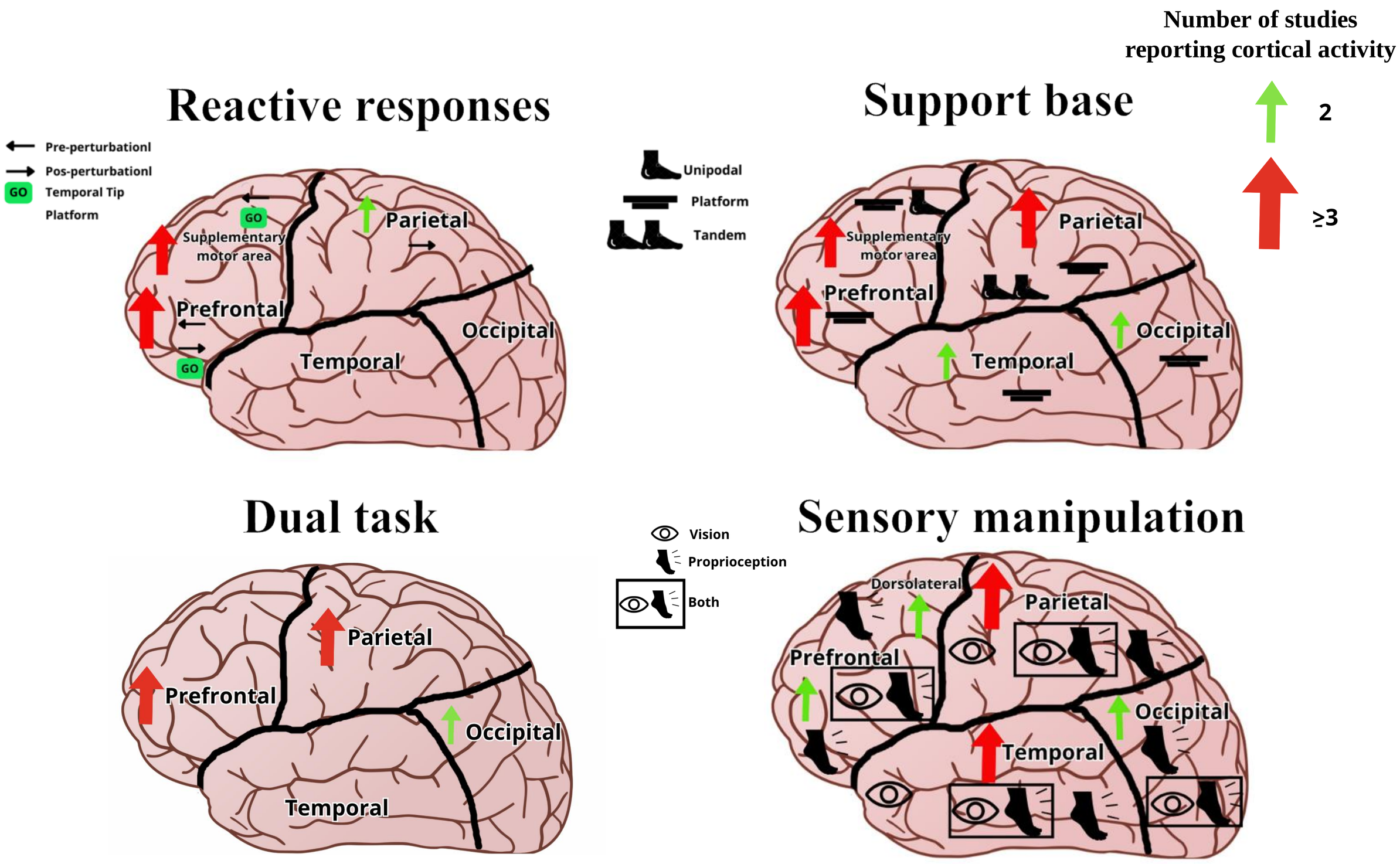
Body balance is not as automatic as we might think: insights from cortical activity in different balance tasks



Given the challenge to keep balance in the upright posture, an issue of scientific interest is knowing the participation of the different cortical areas in balance control.

Two main techniques have been used for measurement of cortical activity in balance tasks: functional near-infrared spectroscopy (fNIRS) and electroencephalography (EEG).

Participation of cortical sites have been shown to vary as a function of demands of balance control. Information on this issue has been summarized in systematic reviews by Wittenberg et al. (2017) and Monteiro et al. (2024). Main conclusions are represented below.



Findings

Task-specific cortical activation

Task manipulation		Main cortical areas activated
Somatosensory information	→	parietal, frontal and temporal regions
Vision and/or support base	→	parietal and frontal regions
Balance-cognitive dual-tasking	→	frontal and central (motor cortex and proximal sites) regions
Reactive responses	→	frontal and central (motor cortex and proximal sites) regions

Why are these findings relevant?

Findings presented in these systematic reviews support the formulation of accurate hypotheses on the cortical regions expected to be activated in response to challenges to balance control, with theoretical and clinical implications.

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