

The neural dynamics of willed attention

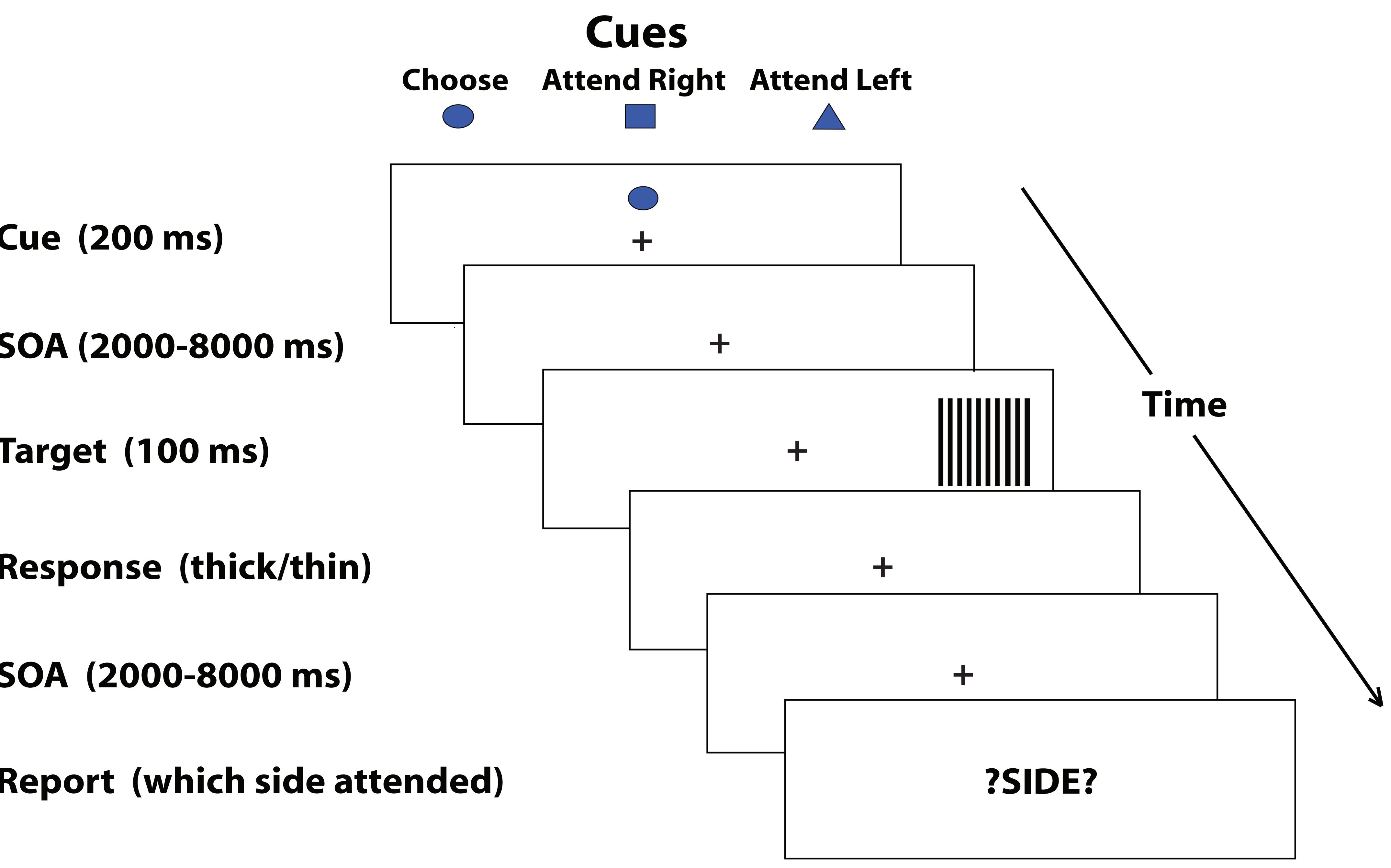
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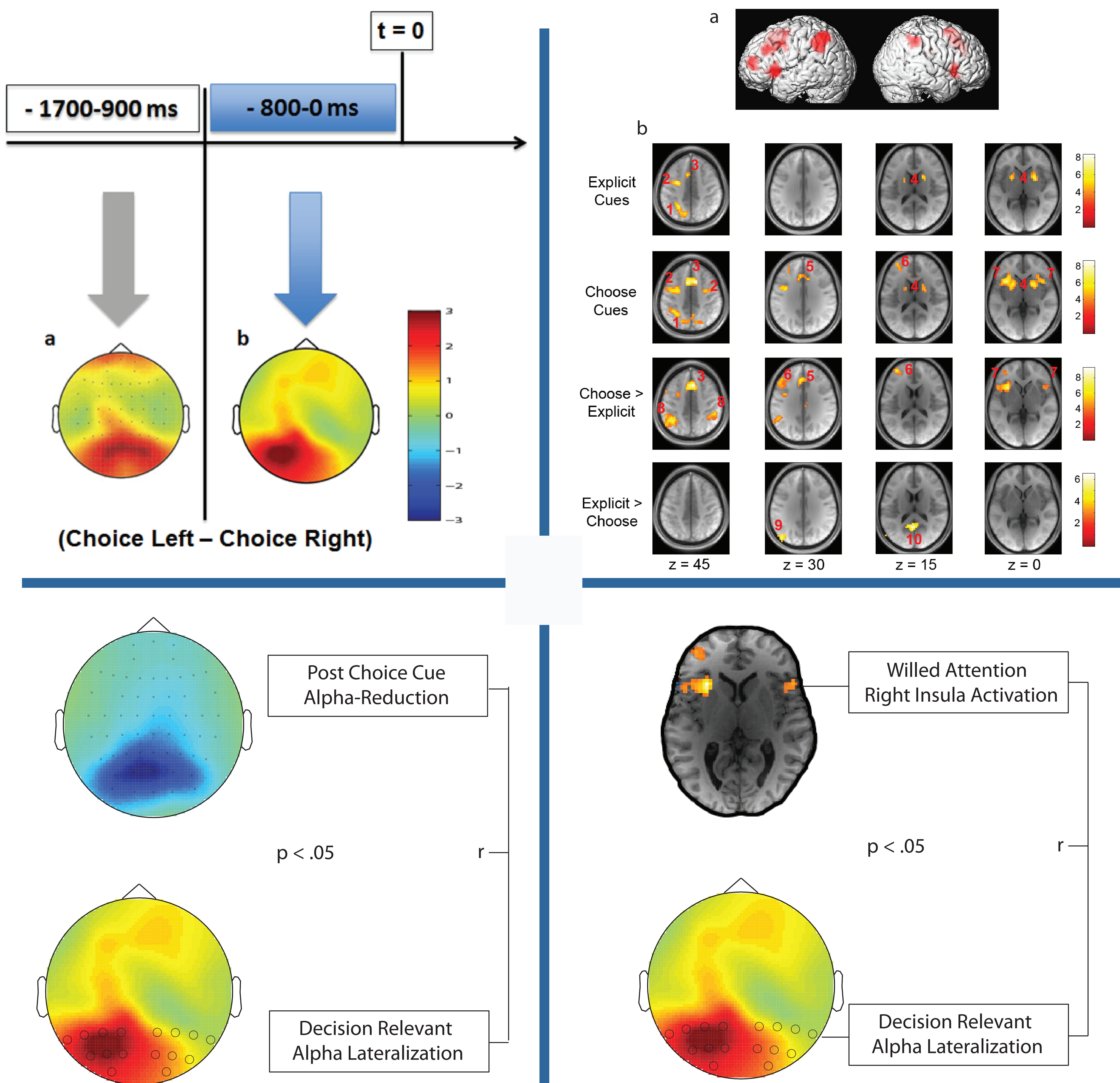


Introduction

Selective attention is a core cognitive ability that permits us to effectively process and act upon relevant information while ignoring distracting events. Elucidating the cognitive and neural mechanisms of human selective attention remains a key challenge for psychology and neuroscience, and is critical for both advancing our theoretical knowledge, and for developing new methods and approaches in education, human performance, and clinical practice. Attention mechanisms include those that control the focus of attention, as well as the influence of these control mechanisms on information processing in the brain. This research investigated the mechanisms that initiate the control of voluntary spatial attention; we refer to this as “willed spatial attention” (or simply willed attention) to distinguish it from voluntary spatial attention when the latter is triggered by an external instruction (i.e., by an instructive or predictive cue such as an arrow). Although investigations of “voluntary” attention comprise hundreds of behavioral and physiological studies, remarkably few studies have addressed the much more challenging question of how willed (uncued/uninstructed) attention is initiated and controlled. Here we recorded electroencephalographic (EEG) and fMRI data while participants engaged in a novel attention paradigm in order to investigate the anatomical and process-level dynamics that characterize willed attention.



Results



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