

Deficits in probabilistic inference in patients with neglect and potential implications for rehabilitation

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The exact cognitive mechanisms that contribute to the emergence or persistence of spatial neglect remain poorly understood. While deficits in spatial attention are well established, it is debated whether neglect is also associated with impairments in the generation and updating of predictive models. It is particularly unclear if such impairments occur more generally after right-hemispheric (RH) brain damage, or if they are specifically related to neglect. To address these questions, I will present findings from a modified version of a Posner-type location-cueing paradigm in RH and left-hemispheric (LH) stroke patients, as well as in healthy elderly controls. In this task, the probability of the spatial cue being valid (i.e. the cue's predictive value) was manipulated during the task. A Rescorla Wagner learning model combined with a response model based on reaction time (RT) was employed to quantify the participants' inference about the predictive value of the cue and its impact on behaviour. Additionally, participants were asked to provide explicit ratings of the cue's predictive value after each block of the task. The RT modelling results suggested that LH and RH patients - including patients showing signs of neglect - were able to infer the cue's predictive value. However, in the group of RH patients, symptoms of neglect were associated with a hypersensitivity of RTs to the predictive value of ipsilesional cues. Irrespective of the presence of neglect, the explicit estimates of the cue's predictive value deviated more from the actual probabilities in RH patients. I will discuss the implications of these findings for the mechanisms underlying neglect and its rehabilitation.