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# Dissociation of facilitatory and inhibitory mechanisms of auditory attention after damage of the lateral prefrontal cortex.

Aurélie Bidet-Caulet<sup>\*†1,2</sup>, Kelly Buchanan<sup>2</sup>, Humsini Viswanath<sup>2</sup>, Jessica Black<sup>2</sup>,  
Donatella Scabini<sup>2</sup>, Frédérique Bonnet-Brilhault<sup>3</sup>, and Robert Knight<sup>2,4</sup>

<sup>1</sup>Lyon Neuroscience Research Centre (LNRC) – Inserm : U1028, CNRS : UMR5292, Université Lyon 1  
– France

<sup>2</sup>Helen Wills Neuroscience Institute, University of California, Berkeley (HWNI) – United States

<sup>3</sup>UMR INSERM U930, Université François-Rabelais de Tours, CHRU de Tours, France – Inserm : U930  
– France

<sup>4</sup>Department of Psychology, University of California at Berkeley, Berkeley – United States

## Abstract

The lateral prefrontal cortex (LPFC) has been shown to be involved in executive control of goal-directed behaviour, including attention. More recently, some studies have provided evidence that selective attention relies on distinct facilitatory and inhibitory mechanisms. To better dissociate these facilitatory and inhibitory mechanisms, we investigated the role of the LPFC in auditory selective attention. We added to a classic dichotic paradigm a neutral condition in which attention was equally distributed to all sounds. Participants heard standard and deviant sounds in each ear, and had to detect deviants in the right or left ear, or binaural targets (neutral condition). We recorded scalp EEG signal in 9 patients with unilateral LPFC lesion and 9 matched controls. We compared event-related potentials (ERPs) to the same standard sounds when they were attended, ignored or in the neutral condition. In control subjects, we found that ERPs to attended sounds were enhanced from 150 ms to 250 ms relative to the neutral condition; whereas ERPs to ignored sounds were reduced from 250 ms up to 400 ms. In patients with unilateral LPFC lesions, we observed that the facilitatory component was reduced with the most prominent decreases when sounds were presented in the contra-lesional ear, over the lesioned hemisphere. On the contrary, the inhibitory ERP component was not altered. These results show that the lateral PFC is specifically involved in the control of facilitatory mechanisms and not late inhibitory processes during auditory attention selection, providing evidence that independent facilitatory and inhibitory mechanisms support auditory selective attention.

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\*Speaker

†Corresponding author: aurelie.bidet-caulet@inserm.fr