

Program Number: 331.9

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Spatial attention in the lateral geniculate nucleus (LGN) : Are effects across hemifields the same as within a hemifield?

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Although it is generally agreed that the LGN with its many extraretinal inputs is in the ideal position to modulate spatial attention, attentional effects have been difficult to demonstrate at this level. In this study we examined the effects of attention at the level of the LGN using three simple tests that differed in their demands on spatial attention. Two monkeys were trained to produce a visually-guided saccade to one of two identical targets presented simultaneously - one target inside the receptive field (RF) and the other target outside the RF (nonRF) but at an equivalent eccentricity in either the same or opposite hemifield. Reward indicated the correct target for each block of 10-20 trials. In a third task the monkey was cued via a change in the fixation point color either to remain fixated (NOGO) or produce a visually-guided saccade (GO) to the single target that was always presented in the RF. A total of 77 LGN cells (M, P and K) were recorded in both the intra-hemifield (N = 60) and inter-hemifield (N = 17) tasks and a total of 54 were recorded in the GO-NOGO task. A significant increase (mean = 26%) in the magnitude of the cell's response occurred in 60% of our population when the target of the visually-guided saccade was the RF, regardless of the location of the nonRF target. No significant differences were observed in the GO-NOGO task suggesting that either attention never shifted from the fovea to the target or that the two target task produced attentional differences due to task difficulty. Regardless, these experiments lend strong support to the view that attention impacts visual signals very early in the visual pathway.

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