

# **NEURAL SUBSTRATES OF BLINDSIGHT IN HEMISPHERECTOMIZED SUBJECTS**

Alain Ptito and Sandra E. Leh

Cognitive Neuroscience Unit, Montreal Neurological Institute and Hospital, McGill  
University, Montreal, Canada

## **Abstract**

Blindsight is a visual phenomenon whereby hemianopic subjects are able to process visual information in their blind visual field without awareness. Previous research demonstrating the existence of blindsight in hemianopic subjects has been criticised for the nature of the paradigms used, for the presence of methodological artefacts as well as for the possibility that spared islands of visual cortex may have sustained the phenomenon since the subjects generally had small circumscribed lesions. In order to respond to these criticisms, we have been investigating for several years now, residual visual abilities in the blind field of hemispherectomized subjects in whom a whole cerebral hemisphere has been removed or disconnected from the rest of the brain. These subjects have offered a unique opportunity to establish the existence of blindsight and to investigate its underlying neuronal mechanisms since in these cases spared islands of visual cortex cannot be evoked to explain the presence of visual abilities in the blind field. In addition, we have been using precise behavioural paradigms, strict control for potential methodological artefacts such as light scatter, fixation, criterion effects and macular sparing and we have utilized new neuroimaging techniques such as Diffusion Tensor Imaging Tractography to enhance our understanding of the phenomenon. The following article is a review of our research on the involvement of the superior colliculi in blindsight in hemispherectomized subjects.