

Vergence and Vertical disparity signals in Human area V1

[Albert V van den Berg](#); [David M Arnoldussen](#)

Author Affiliations

- Albert V van den Berg

Radboud University Nijmegen Medical Centre, Donders Centre for Neuroscience, Donders Institute for Brain, Cognition, and Behaviour, Department of Cognitive Neuroscience, Section of Biophysics

- David M Arnoldussen

University of Nottingham, School of Psychology, Nottingham Visual Neuroscience

Journal of Vision August 2014, Vol.14, 975. doi:10.1167/14.10.975

Abstract

Last year we reported a dissociation between headcentric- and retinocentric disparity sensitivity in human cortical areas that respond to wide field (120 deg diameter) optic flow stimuli. Now we report a dissociation also between eye vergence response and horizontal retinal disparity processing in human area V1. We asked whether the vergence sensitivity in area V1 can be associated with non-visual and visual components. Exploiting the retinotopic organisation of area V1 voxels we show that the modulation strength of the BOLD signal by the horizontal eye vergence is dependent on eccentricity and meridional angle relative to the cyclopic eye, following a previously described relation between horizontal vergence and vertical disparity. This holds for eccentricities up to about 40 degrees, while beyond that eccentricity the modulation with eye vergence is not dependent on visual direction. This suggests that area V1 may carry signals for horizontal eye vergence both from non-visual sources and a visual source (vertical disparity) with partially non-overlapping representations. In contrast, no such dependency on visual direction was found for the modulation of the BOLD signal by horizontal stimulus disparity in area V1, ruling out a stimulus contrast effect of our wide field set-up.

Meeting abstract presented at VSS 2014