Is polarity in the multifocal VEP related to visual-cortex folding?
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The idiosyncratic folding of retinotopic visual cortex is believed to dictate the dependence of multifocal visual evoked potential (mfVEP) amplitude and polarity on stimulus location in the visual field. We assessed that relationship in four subjects by comparing mfVEPs with measures of corresponding fMRI-derived regions of interest (ROIs) in V1 and V2, i.e., their curvature, orientation and distance from electrode. Dartboard-shaped, polarity-sensitive mfVEP activity maps were obtained as Pearson's correlations of the local signals with the polarity-corrected mean for the whole field. Wedge and ring stimuli for fMRI-based retinotopic mapping matched the size and texture of mfVEP stimuli. ROI surface orientation, location, and curvature were determined by Matlab scripts processing BrainVoyager vertex data. Heuristic checks verified the validity of these measures. MfVEP polarity reversals seemed related to the extent of surface curvature. MfVEP activity was correlated with ROI orientation and distance-from-electrode for V1, with up to 25% explained variance. Activity was further correlated with ROI distance in V2 but not with the ROI's orientation. Polarity reversals between upper and lower hemifield might reflect surface orientation in V2. In summary, mfVEP polarity reversals depend on V1 and V2 folding but further unknown factors also contribute. [194 words]

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