
Title: **Pinwheel cartography: New visual field map cluster in the human posterior parahippocampal complex**

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Abstract: **INTRODUCTION:** Parahippocampal regions of human visual cortex directly anterior to the VO cluster (Brewer et al., 2005) have been identified as having two retinotopically defined visual field maps, PHC-1 and PHC-2 (Acaro et al., 2009). These maps have been implicated in visual scene processing and likely fall within the parahippocampal place area (PPA; Epstein et al., 1998). Recently, Barton and Brewer (under review) have proposed that pinwheel clusters of visual field maps represent a general organizing principle across human visual cortex. In this model, sets of radially orthogonal visual field maps are organized into clusters around a discrete, concentric fovea and subserve similar visual computations. Following this new pinwheel cluster paradigm, we have identified additional maps within the posterior parahippocampal complex (PHC), anterior to the VO cluster. Here we discuss the organization and properties of the maps within this PHC cluster.

METHODS: We measured angular and eccentric retinotopic organization and population receptive fields across visual cortex using fMRI and population receptive field (pRF) modeling (Dumoulin & Wandell, 2008). We model pRFs as 2-dimensional differences of Gaussians with preferred centers (x, y) and spreads (sigma), convolve the predicted response to the stimuli with the haemodynamic response function, and fit the best population receptive field independently to each voxel via a least-squares method. Retinotopic stimuli consisted of black and white, drifting bar apertures comprised of flickering checkerboards, 11° in radius.

RESULTS/DISCUSSION: Our measurements span the previously defined hemifield maps PHC-1 and PHC-2 (Acaro et al, 2009). The data now reveal four maps within this region, which we are calling PHC-1, PHC-2, PHC-3, and PHC-4. These four maps combine into a radially orthogonal set of hemifield representations, reversing from one map to the next around the central, discrete fovea. These results suggest that the PPA may consist of a set of four full hemifield representations of visual space. In addition, these measurements support the proposal of pinwheel clusters as an organizing principle spanning human visual cortex.

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