Supplementary Figures

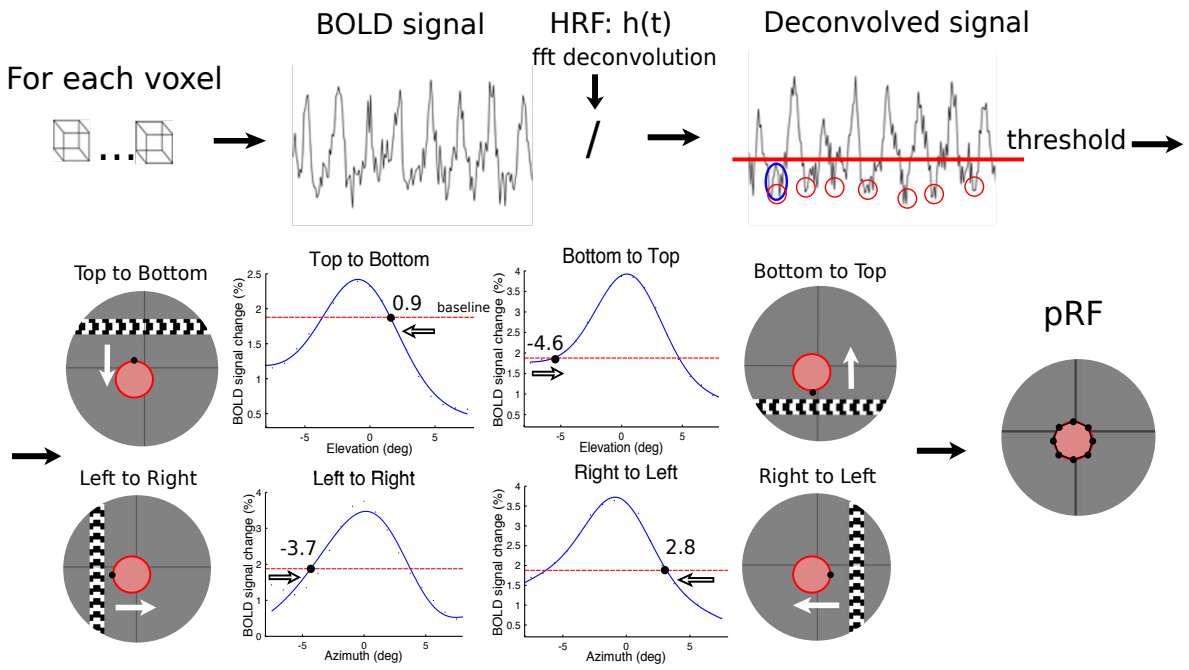

Figure S1: Schematic illustration of the pRF mapping method. We estimated the boundaries of the pRF directly from the BOLD time series of each voxel in the visual cortex by marking the location in the visual field when BOLD activity starts to rise above a visual response threshold separately for each bar direction. For each voxel, a Fourier deconvolution method (fft deconvolution) is applied to the BOLD time series in order to estimate the actual response of the voxel as the stimulus is presented at each visual field location (see methods). Then a visual response threshold (top right, red line) is calculated from the deconvolved signal as the average of the troughs of the BOLD signal (red circles) plus 3 standard deviations above the noise level defined as the standard deviation of the signal when the bar stimulus is located in non-visually responsive locations of the visual field (blue circle; Methods). The deconvolved BOLD signal is then separated for each bar direction and a Gaussian model is fit to the data. For illustration purposes only four out of the eight directions are shown (BOLD signal change as a function of the visual field location of the bar; bottom left). The blue line represents the fitted model and the red dotted line the threshold. The pRF is estimated by marking the location in the visual space at the time when the fitted signal rises above threshold for each bar direction (black dot, the numbers in the graph indicate the visual field location). This forms an octagon (since there are 8 different bar directions) in visual space, which represents an estimate of the pRF (bottom right). Since this method takes into account only the activity rise when the stimulus approaches the border of the receptive field, hysteresis phenomena in the BOLD signal arising when the bar moves from seeing to non-seeing locations of the visual field are eliminated.

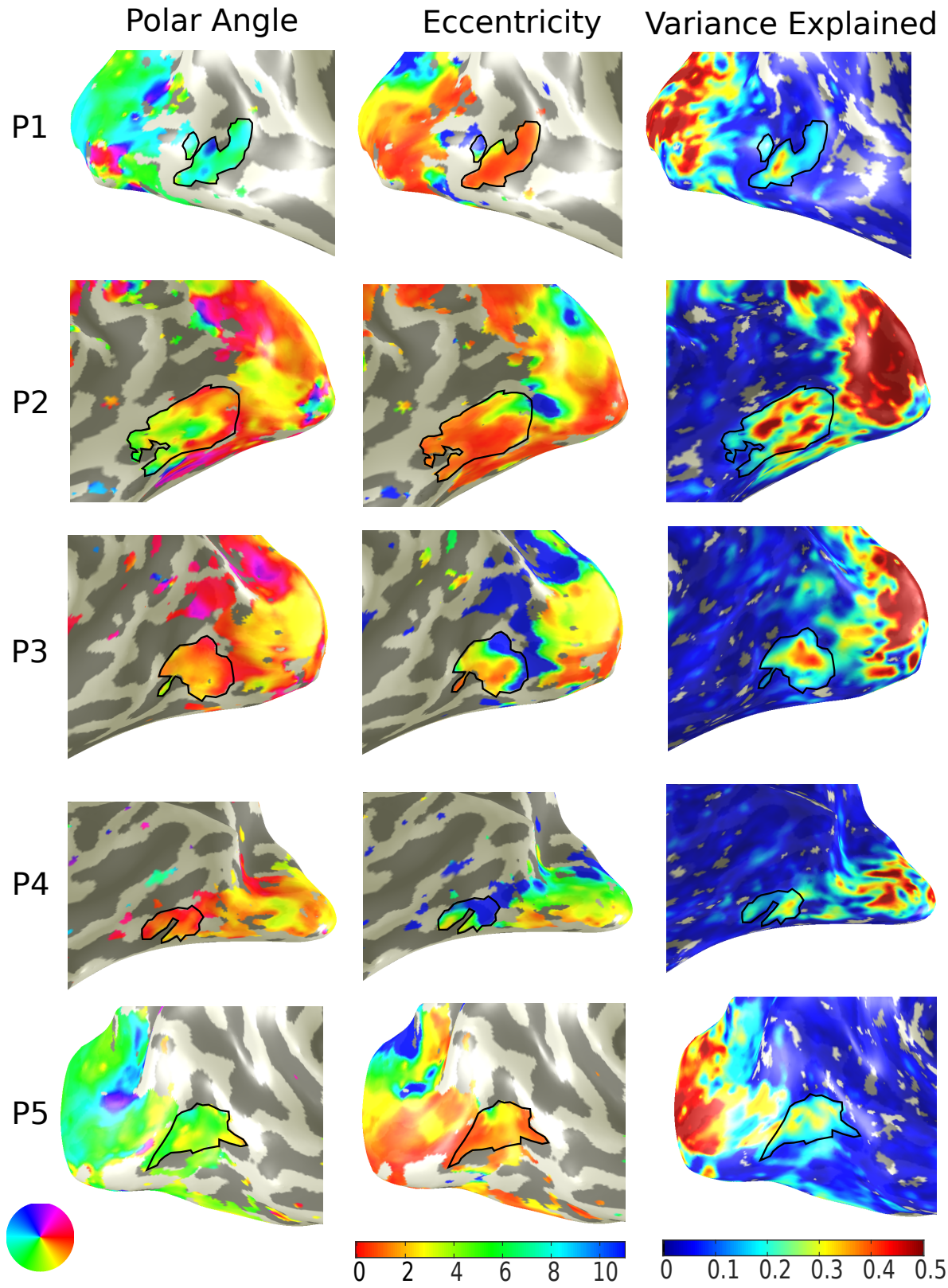

Figure S2: Retinotopic mapping of hV5/MT+. The polar angle (left), eccentricity (middle) and variance explained (right) maps are overlaid on the inflated occipito-temporal region of the lesioned hemisphere of all patients. Retinotopic maps were derived using a direct-fit pRF method (Dumoulin and Wandell, 2008). The identified hV5/MT+ (Amano et al., 2009) is overlaid on the maps as a black-bordered ROI.

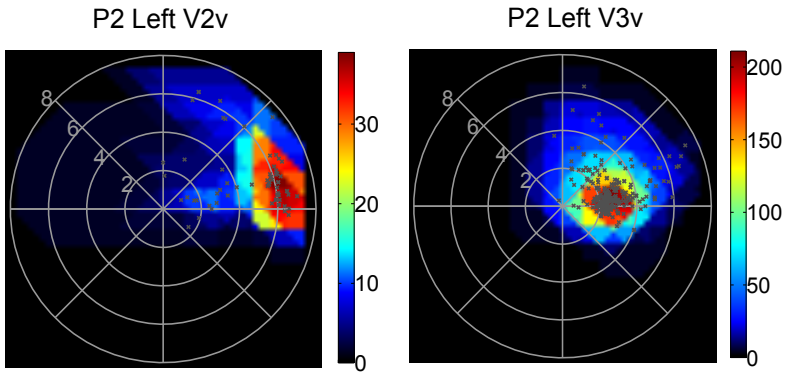

Figure S3: Visual field coverage density maps of ventral areas V2 and V3 of patient P2. The visual field coverage density maps of areas V2v (left) and V3v (right) from the left hemisphere of patient P2. The color map indicates the number of pRFs that cover each visual field location. The pRF centers across all voxels within each area are plotted as grey dots.

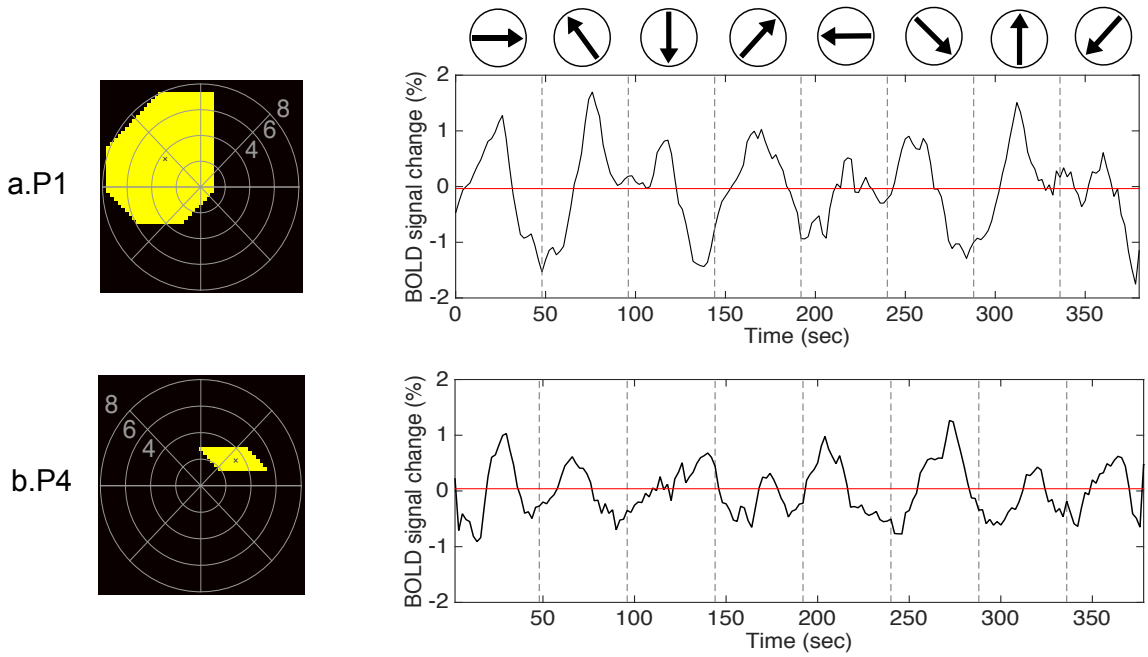

Figure S4: hV5/MT+ BOLD responses within the scotoma of patients P1 and P4. The pRF profile and BOLD response of a hV5/MT+ voxel located within the scotoma for patient P1 (a) and P4 (b). Both patients show responses in hV5/MT+ originated from stimulus presented within the scotoma that are not present in area V1.

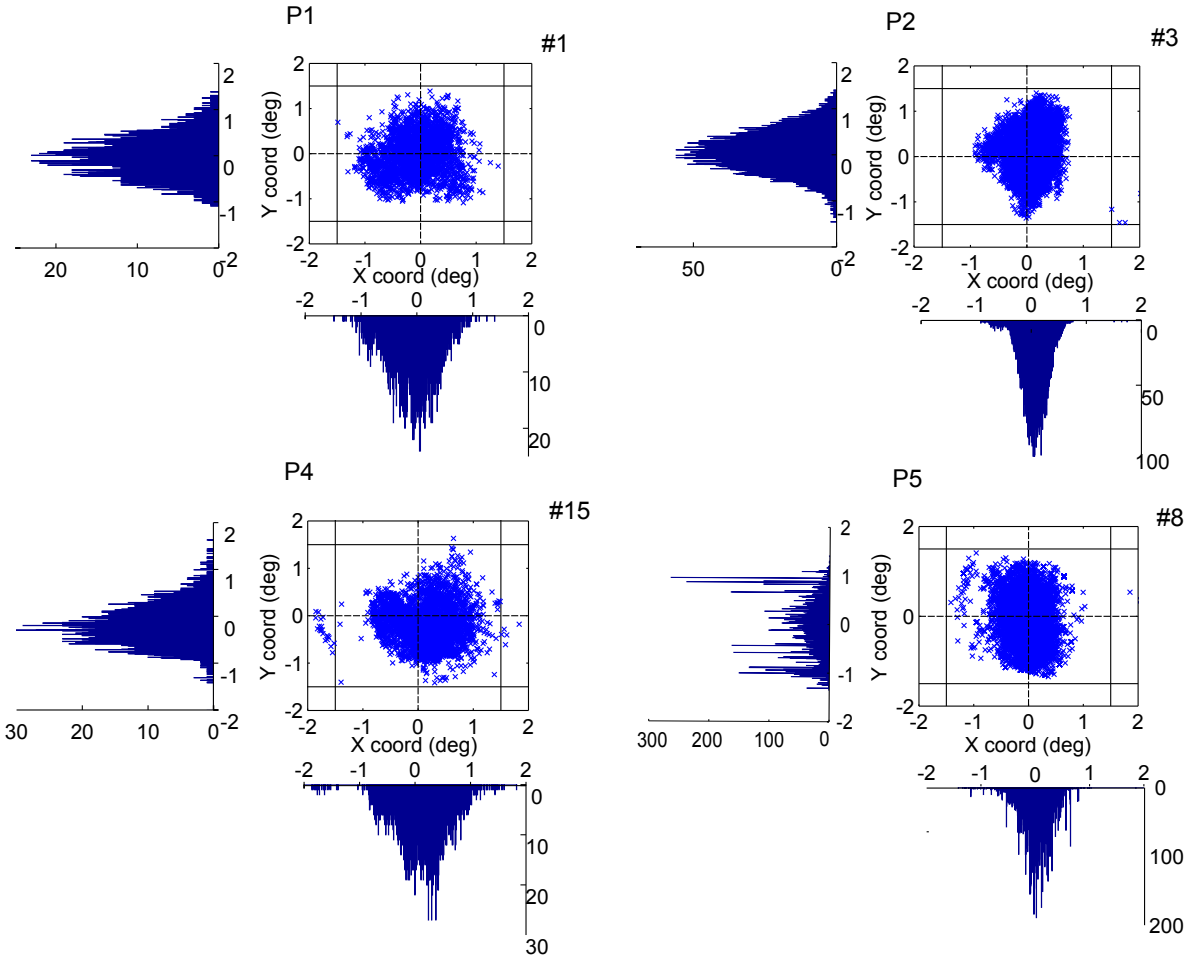

Figure S5: Eye movements for patients P1, P2, P4 and P5. Eye positions are plotted at 60Hz for each subject for one whole session (6.4 min). The number of eye deviations, defined as excursions > 1.50 from the fixation point is indicated next to the graphs with the number sign (#).

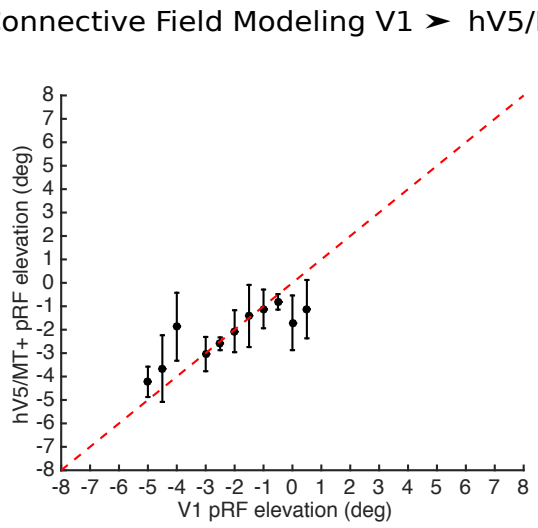

Figure S6: Cortico-cortical connectivity between hV5/MT+ and V1 in AS controls. The pRF center elevation of each voxel in hV5/MT+ is plotted as a function of the pRF center elevation of the corresponding CF center in V1 (as found using the CF modeling method, see methods) averaged over all 5 subjects. The error bars indicate the standard deviation across subjects.