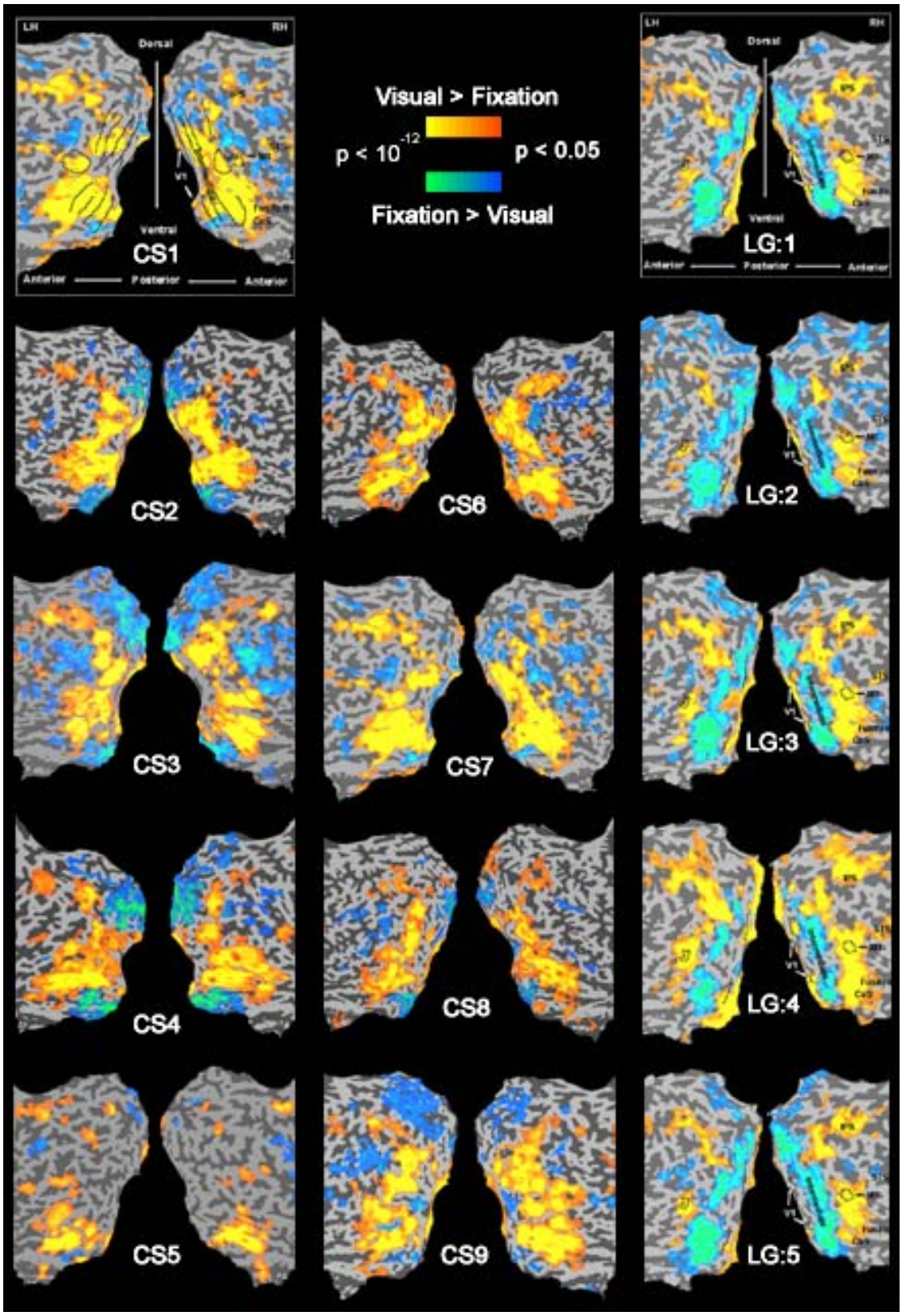
Supplementary Figure 1

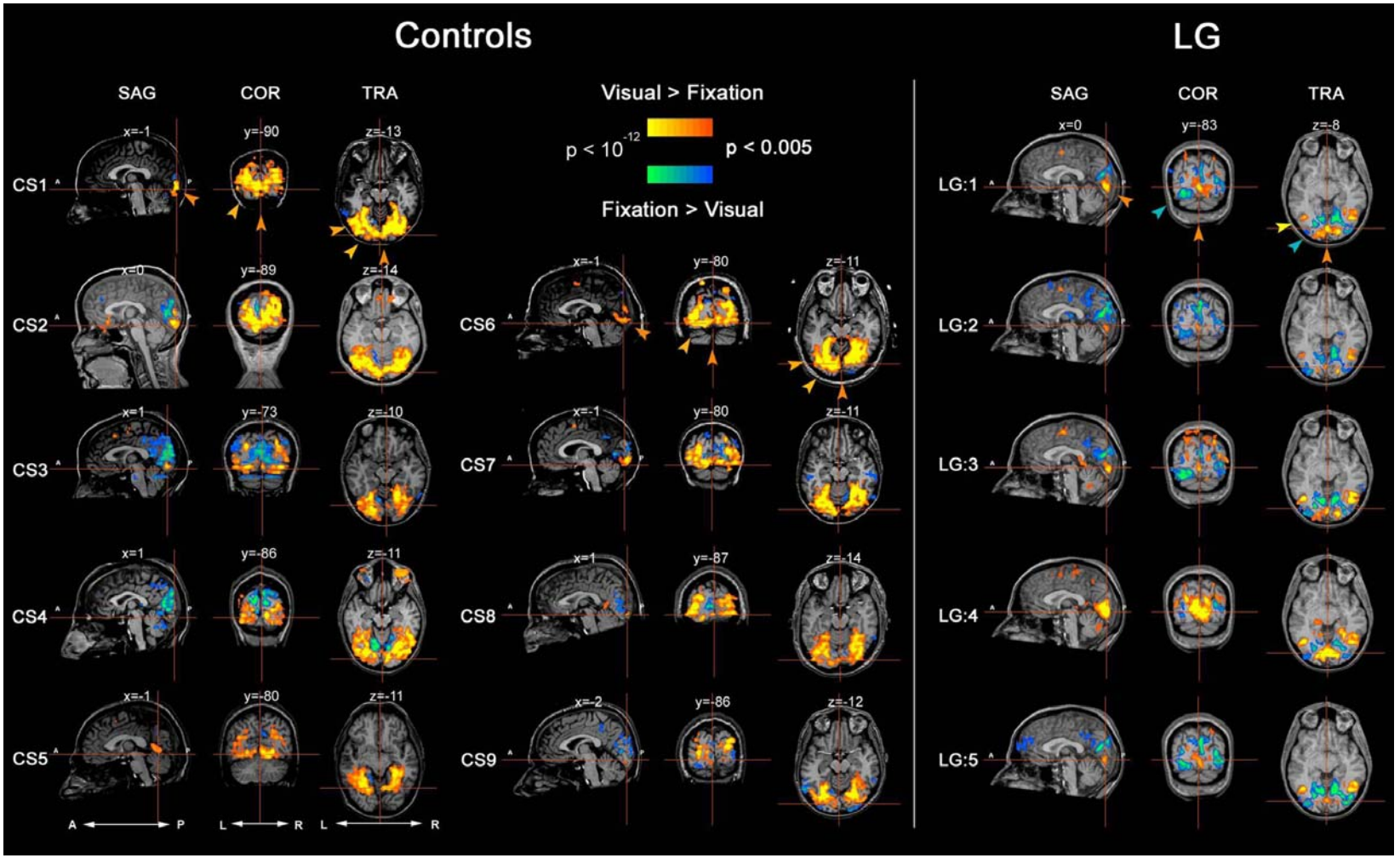
Visual inter- and intra-subject variability: flattened maps.



Individual activation maps of LG (right column, LG:1..5) and controls (left two columns, CS1..9). The controls' maps (CS1..CS9) and LG's (LG:1,2) are of the category localizer experiment (line drawings version, see Methods for more details). LG:3 map is of the grayscale version of the category localizer experiment, LG:4 is from the category related movie-clip experiment, and LG:5 is from the completion experiment (see Methods and Results for more details). LG's maps presented here are duplicates of the maps displayed in Fig. 2 and 3. Note the variation that exists in the above-baseline V1 activation extent among controls and in LG (V1 location is indicated in CS1 and LG:1), and that the variation observed in LG's V1 (across the different scans and between hemispheres) is not unique, and similar patterns can be detected among controls (cf. CS2 and CS5, right vs. left hemispheres in CS6 and CS8). It is important to mention that even though variation in visual activation extents exists in the visual cortex between individuals and within individuals (different scans), it is mainly manifested in low, absent or even negative fMRI signal measured in the vicinity of the occipital pole (corresponding to the foveal representation, and probably due (at least in part) to susceptibility effects originating from the vicinity of the occipital pole) and in the amount of deactivation observed in the peripheral visual field, but has never been reported to take the form seen in LG of spreading deactivation in the ventral-dorsal dimension throughout foveal and peripheral regions.

Supplementary Figure 2

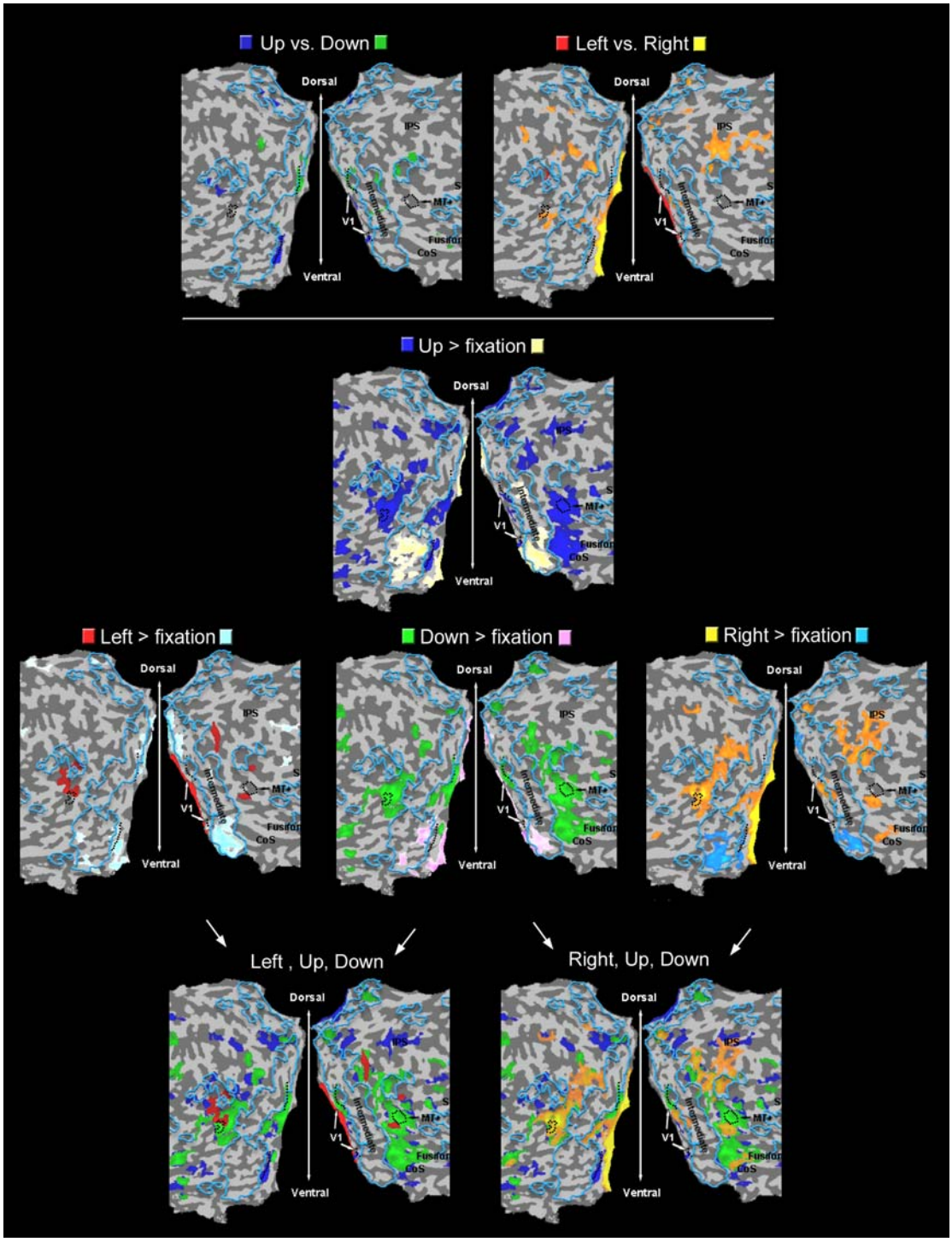
Visual inter- and subject variability: classical views.



Visual activation maps, corresponding to the ones displayed in Supplementary Figure 1, displayed on *classical anatomical views (*sagittal (SAG), coronal (COR) and transverse (TRA)), with $P < 0.005$. The Talairach coordinates of the planes are indicated at the top of each view for each of the control subjects' views and for LG on LG:1 display. Note the variation that exists in the above-baseline V1 activation extent among controls and in LG in the vicinity of the calcarine sulcus (indicated by the red cross in each view). The orange arrows in LG:1 depict V1 activation, the blue arrow depicts the intermediate-level deactivation (corresponding probably to V2/VP ventrally and V2/V3 dorsally), and the yellow arrow depicts high-order above-baseline activity in LG (corresponding anatomically to the lateral occipital complex (LOC)). In corresponding views of the controls the typical activation pattern exists with positive visual activations from V1 to high-order visual regions (see indicative arrows in CS1 and CS6). Deactivation patterns in controls (e.g. CS3, CS4, CS7) correspond to peripheral deactivations in the visual system influenced by the center-surround organization. For display purposes, arrows are only displayed on LG:1 (for LG) and CS1 and CS6. A - anterior, P - posterior, L – left, R – right.

Supplementary Figure 3

Retinotopic definitions in LG.



The maps presented above are based on two scans of the retinotopic mapping experiment LG underwent (see Methods for more details). The top 2 maps represent the classical statistical contrast used to define retinotopic borders (Up vs. Down;

Right vs. Left) and are taken at a liberal threshold ($P < 0.135$) to allow detection of weak retinotopic representations if those exist. Since these contrasts did not yield the expected response beyond V1, we went on to weaker contrasts in order to assess the retinotopy that could be detected reliably with fMRI in LG's visual cortex.

The 4 maps in the middle contrast each condition (direction) with fixation baseline (Up, Right, Left at $P < 0.05$, Down at $P > 0.135$). For each map the colors indicate either above baseline response or response below fixation baseline (e.g. blue indicates above baseline response for Up, off-white indicates below baseline responses during Up).

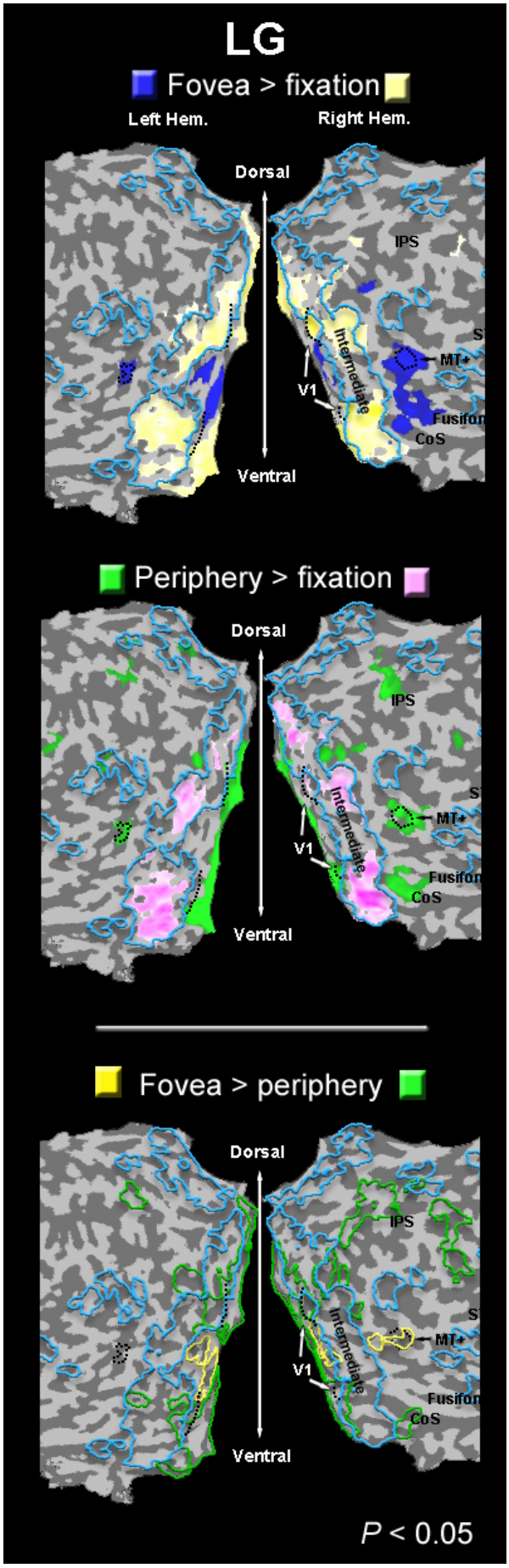
The two maps presented at the bottom are overlays of the middle maps (taking into consideration the above- baseline activation for each condition) that we used in order to define the retinotopic borders of LG. The right map (Right, Up, Down) was used to define LG's left hemisphere V1 borders (no other borders were evident), while the left map (including Left, Up, Down) was used to delineate the right hemisphere V1 borders (here too no other borders were evident).

The light blue borders appearing in all the maps outline the borders of LG's negative intermediate deactivation stripe as defined by contrasting visual activation over baseline in 3 scans of the localizer runs (twice the line drawing version, once the grayscale photographs version) with $P < 0.05$.

The black dotted line represents the assumed V1 border. Note that both of the expected meridian representations exist in V1 (horizontal meridian along the calcarine sulcus cut and the vertical meridian's ventral and dorsal sections anterior to that), while the horizontal meridian representation expected to be found in both V2 and V3 (from which the V2/V3 border can be deduced) is absent. No significant positive meridian-related activity was detected within the intermediate deactivated patch, and below-negative activation within this patch was more significant in the ventral aspect of the patch to all of the conditions. Anterior to the intermediate deactivation patch, meridian related activity is evident.

Supplementary Figure 4

Eccentricity mapping in LG.



Methods:

The eccentricity experiment that LG underwent was a block-designed experiment and included 2 conditions; fovea, periphery. Each condition was repeated 7 times. Each block lasted 18 s, and included presentation of 72 images, each displayed for 250 ms. Blocks were interleaved with 6 s fixation periods (a red fixation dot on black screen). Stimuli consisted of colored copies of objects superimposed on uniform colored backgrounds. A red fixation dot (peripheral stimuli) or cross (foveal stimuli) were superimposed on all stimuli. The foveal stimuli were circles subtending a visual angle of 1.5°x1.5°. The peripheral stimuli were rings with an inner diameter of 9° and outer diameter of 16°. LG was instructed to fixate throughout the experiment.

Results:

The top 2 maps contrast each condition with baseline and, as can be seen, the intermediate deactivated patch (indicated by blue borders, see below) is deactivated in either of the conditions (top: off white indicates deactivation during foveal stimuli, middle: pink indicates deactivation during peripheral stimuli). The bottom map is an overlay of 2 maps:

the yellow borders indicate fovea>periphery AND fovea > baseline, while the green borders indicate periphery>fovea AND periphery > baseline. All the contrasts seen in this figure reached statistical significance ($P < 0.05$).

The light blue borders appearing in all the maps are identical to the ones appearing in Supp. Fig. 3 and they outline the borders of LG's negative intermediate deactivation stripe as defined by contrasting visual activation over baseline in 3 scans of the localizer runs (twice the line drawing version, once the grayscale photographs version) with $P < 0.05$.

The eccentricity activation pattern found in LG's V1 is close to the expected center-surround organization. However, anterior to V1, in the intermediate deactivated patch, we found only below-baseline activity for either foveal or peripheral stimuli when contrasting either of them with fixation. From these data it is clear that, eccentricity-wise, the intermediate patch displays a much more prominent abnormal pattern than V1. Thus, LG's eccentricity results add additional support to the predominance of intermediate regions (V2/V3) in the abnormality found in LG’s visual cortex.