mapped regions relevant to our task, we repeated the same classifications performed for the ROIs also at the whole brain level by means of the searchlight method (3 voxel radius) (Kriegeskorte et al., 2006).

Fig. 7a shows searchlight results for the within-illuminants analysis. Significant decoding was apparent throughout the occipital cortex including the calcarine gyrus, as well as in the fusiform gyrus primarily contralateral to the surface stimuli. Note that we left-right flipped searchlight maps for participants with even subject numbers to ensure that for all subjects contralateral stimulation was on the right side (positive values of x).

Fig. 7b shows the results from the searchlight analysis across illuminants (consistent-cue). It revealed a cluster of voxels in the fusiform gyrus where differences between local patterns of fMRI activity distinguishing the two surface colors generalized across illuminants. This cluster was located anterior to the ROIs we had examined, with the MNI coordinates of the peak voxel being x = 34, y = −54, z = −10 (Fig. 7b). This fusiform region overlaps with voxels that exhibit classification accuracies above chance in the within-illuminant searchlight analysis.

As expected from the null-findings in the ROI analyses, also the searchlight analysis on reduced-cue across-illuminant decoding did not reveal any significant results.

The functional properties of the anterior fusiform region thus resemble those of area V1. Both regions allowed predictions of surface colors from local brain activity within the same illuminant conditions as well as across different illuminants. The reduced-cue abolished generalizability across illuminants in both regions. Fig. 7c shows the location of this cluster in relation to the retinotopically defined ROIs in a cortical surface rendering.

Previous studies have already identified two separate color-responsive regions in the fusiform gyrus (Barbur and Spang, 2008; Bartels and Zeki, 2000; Beauchamp et al., 1999; Wade et al., 2008). This region has often been referred to as V4α. The peak voxel of the cluster in our searchlight analysis was located in close vicinity to the peak voxels listed for V4α in the review by Bartels and Zeki (2000).

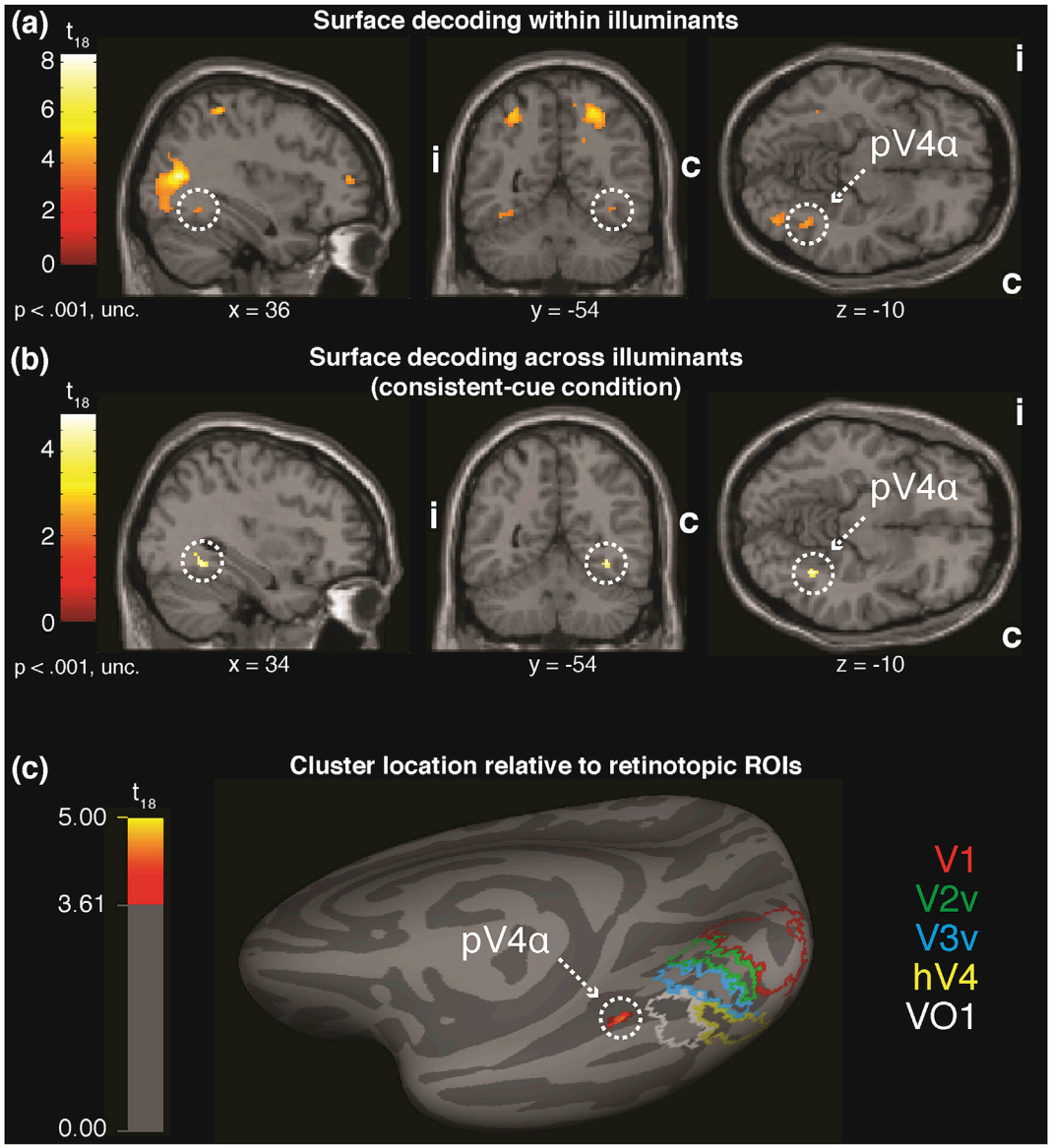

Fig. 7. Pattern Classification Results: Searchlight Analyses. Searchlight maps (3 voxel radius) for the classification analyses shown in Fig. 3 and 5. Letters "i" and "c" denote ipsilateral and contralateral hemispheres with respect to location of most stimuli. **(a)** Surface classification within illuminants. Circle marks the cluster defined as putative V4α using within-illuminant decoding. **(b)** Surface classification across illuminants. The searchlight map reveals a cluster coinciding with pV4α. **(c)** Illustration of relative location of the ventral regions. Medial posterior view of the pV4α cluster identified in the searchlight analysis (dotted circle) and retinotopic ROIs overlaid on a cortical surface rendering in MNI space. The pV4α cluster was located anteriorly to the ROIs. Colored labels denote surface area falling into individually defined ROIs in at least 25% of the participants.