Convergence of visual and tactile shape processing in the human lateral occipital complex

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Abstract:

We have recently demonstrated using {fMRI} that a region within the human lateral occipital complex {(LOC)} is activated by objects when either seen or touched. We term this cortical region {LOtv} for the lateral occipital tactile-visual region. We report here that {LOtv} voxels tend to be located in sub-regions of {LOC} that show preference for graspable visual objects over faces or houses. We further examine the nature of object representation in {LOtv} by studying its response to stimuli in three modalities: auditory, somatosensory and visual. If objects activate {LOtv}, irrespective of the modality used, the activation is likely to reflect a highly abstract representation. In contrast, activation specific to vision and touch may reflect common and exclusive attributes shared by these senses. We show here that while object activation is robust in both the visual and the somatosensory modalities, auditory signals do not evoke substantial responses in this region. The lack of auditory activation in {LOtv} cannot be explained by differences in task performance or by an ineffective auditory stimulation. Unlike vision and touch, auditory information contributes little to the recovery of the precise shape of objects. We therefore suggest that {LOtv} is involved in recovering the geometrical shape of objects.

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