

# A role for the occipital place area in navigating the local visual environment

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## Abstract

Neuroimaging studies have identified multiple scene-selective regions in human cortex, but the precise role each of these regions plays in scene processing is not yet clear. A recent hypothesis, with some empirical support, is that two scene-selective regions – the occipital place area (OPA) and the retrosplenial complex (RSC) – are involved in navigation, while another region – the parahippocampal place area (PPA) is involved in scene categorization (i.e., recognizing a scene as a kitchen versus a beach). Here we directly test this hypothesis by measuring the magnitude of response in each of these regions to both dynamic (i.e., video clips of first-person perspective navigation through a scene) and static (i.e., still images taken from these same movies, rearranged such that motion through the scene cannot be inferred) stimuli. If a region is involved in navigation, then it should respond more to dynamic scene stimuli than to static scene stimuli, since the dynamic stimuli mimic actual navigation. By contrast, if a region is involved in categorization, then it should respond similarly to both the dynamic and static stimuli, since dynamic information does not help to categorize a scene (e.g., a kitchen is a kitchen whether one is moving through it or standing still within it). Indeed, we found that OPA responded significantly more to dynamic than static stimuli, relative to PPA, consistent with OPA's role in navigation and PPA's role in scene categorization. However, RSC also responded less to dynamic than static stimuli, relative to OPA, suggesting a division of labor even within the navigation stream, with OPA, not RSC, involved in navigating one's local visual environment. Taken together, these findings i) are consistent with the two streams for visual scene processing hypothesis (i.e., navigation and categorization), and ii) suggest a novel division of labor within the navigation stream.