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14. ABSTRACT Camouflage represents an extreme case of figure-ground segregation whereby a target object is effectively disguised against its background even when in 'plain view'. While it is possible to learn to break camouflage with training, the mechanisms that underlie this camouflage learning remain poorly understood. We carried out an in-scanner learning experiment, in which subjects learned to break the camouflage of up to three different target objects (counter-rotated across subjects) in randomly interleaved trials. We created					
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## Report Title

Learning-Dependent Changes in Brain Responses While Learning to Break Camouflage: A Human fMRI Study

### ABSTRACT

Camouflage represents an extreme case of figure-ground segregation whereby a target object is effectively disguised against its background even when in 'plain view'. While it is possible to learn to break camouflage with training, the mechanisms that underlie this camouflage learning remain poorly understood.

We carried out an in-scanner learning experiment, in which subjects learned to break the camouflage of up to three different target objects (counter-rotated across subjects) in randomly interleaved trials. We created camouflaged scenes each of which contained a single novel foreground 'digital embryo' target camouflaged against a background of additional novel digital embryos (Hegd  et al, JOV 6:677, 2006). Subjects performed a bootstrapped learning task in which they reported, with feedback, whether or not a given camouflaged scene contained a target.

In early phases of the scan, subjects performed at chance levels (binomial proportions test,  $p < 0.05$ ), indicating that the targets were effectively camouflaged. As expected, each subject ( $N=3$ ) achieved significant learning ( $p < 0.05$ ) for at least one target object ('learned target'), and failed to learn at least one other object ('non-learned target'). We found three different regions in either hemisphere in which the responses increased significantly across the scans for learned targets ( $p < 0.05$ , corrected for multiple comparisons), but not for non-learned targets ( $p > 0.05$ ). In the intra-occipital gyrus (IOG), responses showed a larger decrease below baseline levels for the non-learned target than for the learned target throughout the scan. By contrast, responses in the superior temporal sulcus (STS) and the lateral occipital complex (LOC) increased from baseline levels during learning for learned targets, but not for non-learned targets. Together, these results indicate that camouflage learning results in systematic changes in the responses of these three regions, each previously known to play a major role in object recognition.



# Learning-Dependent Changes in Brain Responses While Learning to Break Camouflage: A Human fMRI Study

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