The left hemisphere learns what is right: Hemispatial reward learning depends on reinforcement learning processes in the contralateral hemisphere

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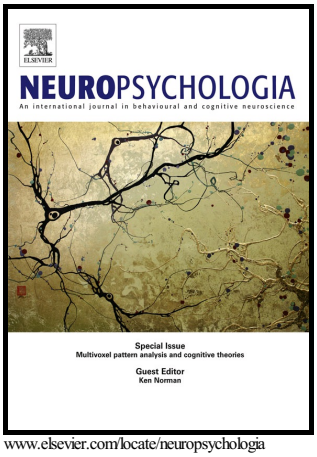

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Abstract

Orienting biases refer to consistent, trait-like direction of attention or locomotion toward one side of space. Recent studies suggest that such hemispatial biases may determine how well people memorize information presented in the left or right hemifield. Moreover, lesion studies indicate that learning rewarded stimuli in one hemispace depends on the integrity of the contralateral striatum. However, the exact neural and computational mechanisms underlying the influence of individual orienting biases on reward learning remain unclear. Because reward-based behavioral adaptation depends on the dopaminergic system and prediction error (PE) encoding in the ventral striatum, we hypothesized that hemispheric asymmetries in dopamine (DA) function may determine individual spatial biases in reward learning. To test this prediction, we acquired fMRI in 33 healthy human