



## Presentation Abstract

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Title: Frontocentral EEG dissociates learning- and decision making-based expected value

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Abstract: Medial prefrontal cortical areas are implicated in valuing expected reward in a wide array of learning and decision making tasks. However, it remains unclear whether and how the expected value computation used in rewarded learning is modulated by the choice demands of decision making. We measured scalp EEG in thirteen healthy young adults while they performed a rewarded learning task. On reference trials, subjects were presented with one from a set of four abstract images with different, fixed reward contingencies. On pseudorandomly interleaved decision trials, subjects had to choose between two images, taken from the same set and with the same reward contingencies as in the reference trials. We used a temporal difference learning model fit to each subject's trial-by-trial choices to infer the mean expected value of the presented images. On both the reference and decision trials, image presentation evoked a positive frontocentral ERP deflection with about 200 ms latency. The event-related potential (ERP) amplitude was also sensitive to the expected value: on decision trials the ERP amplitude was proportional to the expected value, whereas on reference trials the ERP amplitude was inversely proportional to expected value. This interaction suggests that expected value computations used for rewarded learning involve cortical dynamics that are distinct for learning with and without decision making.

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