

SUBLIMINAL RISK INFLUENCES VALUATION PROCESSES IN VENTROMEDIAL PREFRONTAL CORTEX

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Background: Little is known about the relationship between conscious experience and value-based decision processes. Although conscious experience is not necessary for lower-level value processes in subcortical areas (e.g., subliminal reward values), it remains unclear to what extent subliminal information can influence intermediate valuation processes in anterior ventral striatum (aVS) and ventromedial prefrontal cortex (vmPFC).

Aims: Here we investigated whether subliminal risk can influence valuation processes by interacting with (conscious) reward processing (i) behaviorally in terms of reaction time, and (ii) neurally in terms of brain signal in aVS and vmPFC.

Method: Two sets of participants played a competitive game with risky choice to accumulate points across trials in a behavioral experiment or an fMRI experiment. The game was a modified attentional-blink paradigm that rendered a “probability cue” (one of two symbols indicating 100% or 0% probability to win a risky reward) unseen. Following the cue, a choice between a safe (1 point with 100% probability) or a risky (>1 or 0 points depending on probability cue) choice had to be made. The risky amount varied between 2 and 5 points across trials.

Preliminary results: In the behavioral experiment, when the probability cue was not seen, value-maximizing choice was not better than chance but faster than value-minimizing choice, and the reaction time showed a probability x reward cross-over interaction. In the fMRI experiment, choice was not better than chance and there was no reaction time interaction. However, it was possible to decode probability (and reward) from brain signal patterns across the whole brain, aVS, and vmPFC. Moreover, cross-decoding between reward and probability was possible in vmPFC. Taken together, these results suggest that subliminal risk can influence valuation processes in vmPFC, which has implications for theories of consciousness.

Keywords: Subliminal, Conscious experience, Risk, Valuation, Functional magnetic resonance imaging (fMRI)

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