Gaze-centered decision making

ABSTRACT:

In economic decision-making, alternative options are often evaluated sequentially before a final choice is made. However, models of neuroeconomics generally do not exploit the rich, dynamic nature of the evaluation process, overlooking important simultaneous indicators like eye gaze behavior. In this project we used neural and eye gaze data from two male macaque subjects trained to perform a value-based decision-making task in which two risky choices were sequentially presented at opposite sides of the visual screen. Each offer was followed by a delay during which the offer visual cues were no longer visible. Strikingly, during such delay intervals, the subjects tended to fixate on the empty locations where the offers had been previously displayed, with longer fixation durations increasing the likelihood of selecting the corresponding option. While this tendency was previously only approached at the behavioral level, we extended the investigation of its effects on the simultaneous offer value encoding at the neural level in the orbitofrontal cortex (OFC). We found that gazing at given screen side corresponds to the dynamical gating of the gaze-centered offer value encoding at the neural level. Intriguingly, a reactivation of such gaze-centered value encoding was also found during delay times when the gaze reached back to the side of the offer previously displayed - though empty at delay time -, even if it was not the most recent. This reactivation suggests a process of gaze-centered neural evaluation, with neural activity fluctuations correlating with the choice preference of the subjects.

Keywords

Decision-making, Look-at-nothing, Gaze modulation, Neural encoding of value

Published Work:

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Researcher's Contacts:

Rubén Moreno-Bote
Center for Brain and Cognition, Universitat Pompeu Fabra
08002, Barcelona
Spain
E-mail: ruben.moreno@upf.edu