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  Contributions of world-centered and viewer-centered reference frames to spatial cognition: Insights from modelling

  Spatial memory is crucial to daily life, from finding a nearby object to planning a complex route through an environment. Although many brain regions have been implicated in different aspects of spatial and mnemonic processing, a comprehensive theory of the neural mechanisms underlying spatial memory is lacking. We propose a model of the interaction of long- and short-term memory in encoding, retrieval, imagery and planning. The model addresses data at the levels of single unit recording, the systems neuroscience of medial temporal, parietal and prefrontal cortices, and behaviour; and addresses cognitive issues such as the relative roles played by egocentric and allocentric representations and by visual and idiothetic information. Principles which underlie the learning of transformations between egocentric and allocentric representations will also be discussed, along with corresponding preliminary modeling results.

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