

Flexible retrieval of abstract decision boundaries

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The dynamic representation of physical boundaries during navigation is well-investigated. Yet, whether abstract boundaries used during value-guided decision-making can be flexibly represented in the same way is unclear. Here, we tested implicit learning and retrieval of ‘boundary’ goods, whose price and freshness values lie on the extreme coordinates of those decision variable dimensions. Crucially, the same boundary goods changed to form two distinct 2D shapes depending on the session of a forced-choice decision-making task that involved comparing boundary goods to other goods along one of two decision attributes. Following the decision-making task, participants performed a drag-and-drop placement task on a 2D map. Participants were able to accurately place boundary goods in the correct sequence on a 2D map, placing them in between their corresponding coordinates in either shape context. Finding evidence for an internal model of the task space, we observed a positive correlation between participant task performance and the degree of alignment between the landmark and boundaries on the same diagonal on the 2D map. Notably, the landmark’s angles in relation to the horizontal axis of the map also predicted performance, thereby providing evidence of both relational memory of boundary good locations and ‘spatial’ precision on the map being contributing factors to participants’ abstract map retrieval. These behavioral results provide preliminary evidence for the 2D representation of abstract boundaries during a multi-attribute economic decision-making task.