Explicit strategies for sensorimotor learning depend on task complexity

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Abstract

Explicit strategies, drawing on working memory and executive function, play an important role in motor learning and adaptation. Here, using a visuomotor rotation task in which participants explicitly reported their aim angle, we examined the influence of task complexity on explicit learning, with an emphasis on capacity limitations that influence the number of unique solutions that observers are able to keep in memory. We found that increasing target set size (from 1 to 4 targets) resulted in slower learning and slower RTs, likely due to a combination of algorithmic simulation and memory retrieval strategies. However, when participants were required to learn four unique target-rotation pairs simultaneously, we observed constant RTs and a similar rate of learning across rotation magnitude, in line with participants explicitly memorizing and retrieving unique solutions for each target. These findings suggest that participants may adopt different explicit strategies depending on the complexity of the sensorimotor task.

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