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Hippocampus Engagement Early in Learning Supports Concept Formation

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Abstract

Hippocampus (HPC) is a key structure in category learning, forming organized concepts from individual episodes to adaptively represent shared and distinct elements. Most of the evidence for the role of HPC in concept formation, however, relies on neural coding measured at the end of learning. Thus, it remains unclear how neural mechanisms early in learning support the formation of flexible knowledge. We explored this by combining human functional MRI with a computational model of learning, SUSTAIN. Participants learned to categorize complex visual objects with multiple features. A multidimensional rule linked features to categories with exception items in each category. We observed distinct HPC engagement along its primary axis for exception learning that also predicted learning outcomes. The model predicted that better learners use exceptions to update their knowledge, which was reflected in HPC activation. These findings suggest that HPC discriminates initial informative experiences during learning to support flexible knowledge formation.

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