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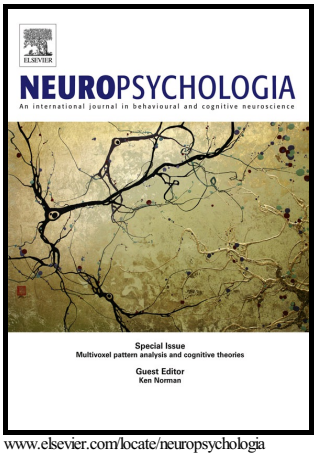

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A role for consolidation in cross-modal category learning

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Abstract

The ability to categorize objects and events is a fundamental human skill that depends upon the representation of multimodal conceptual knowledge. This study investigated the acquisition and consolidation of categorical information that required participants to integrate information across visual and auditory dimensions. The impact of wake- and sleep-dependent consolidation were investigated using a paradigm in which training and testing were separated by a delay spanning either an evening of sleep or daytime wakefulness, with a paired-associate episodic memory task used as a measure of classic sleep-dependent consolidation. Participants displayed good evidence of category learning, but did not show any wake- or sleep-dependent changes in memory for category information immediately following the delay. This is in contrast to paired-associate learning, where a sleep-dependent benefit was observed in memory recall. To replicate real-world concept learning, in which knowledge is acquired across multiple distinct episodes, participants were given a second opportunity for category learning following the consolidation delay. Here we found an interaction between consolidation and learning; with greater improvements in category knowledge as a result of the second session learning for those participants who had a sleep filled delay. These results suggest a role for sleep in the consolidation of recently acquired categorical knowledge; however this benefit does not emerge as an immediate benefit in memory recall, but by enhancing the effectiveness of future learning. This study therefore

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