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Authors

Hamamouche, Karina

Keefe, Maura

Jordan, Kerry

et al.

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Cognitive Load Affects Temporal and Numerical Judgments in Distinct Ways

Karina Hamamouche

Boston College, Chestnut Hill, Massachusetts, United States

Maura Keefe

Boston College, Chestnut Hill, Massachusetts, United States

Kerry Jordan

Utah State University, Logan, Utah, United States

Sara Cordes

Boston College, Chestnut Hill, Massachusetts, United States

Abstract

A prominent theory posits that time and number are processed by a common magnitude system (CMS). Yet, recent studies have revealed inconsistencies in quantity processing. For example, identical emotional stimuli evoke temporal overestimation, but numerical underestimation. These data discount the CMS and have led researchers to speculate about the distinct mechanisms that underlie these unique biases. In particular, differences in arousal have been posited to evoke temporal overestimation, whereas altered attention results in numerical underestimation. In the current study, we explored adult temporal and numerical processing under cognitive load, a task that compromises attention. Inconsistent with a CMS, baseline performance on the temporal and numerical tasks was not correlated. Similar to the work with emotional stimuli, cognitive load resulted in numerical underestimation, yet marginal temporal overestimation. Together, our data challenge the CMS, while also providing support for the role of attentional processes involved in numerical underestimation.