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In Touch with Causation: Understanding the Impact of Kinesthetic Haptics on Causality

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Abstract

Humans rely on multimodal information to make judgements about events occurring in their environment. Haptic feedback, in particular, is essential to how people learn about and manipulate the objects they use daily. While much work has investigated how visual and auditory information affect the perception of causal events, little has explored how causal judgments change with the addition of haptic feedback. To begin addressing this question, we ran a psychophysical study based on the Michottean launching paradigm. We compared the use of visual and haptic with solely visual information during causally ambiguous collisions. We manipulated the offset between when the first object stops moving and the second object starts moving. Using a custom one degree-of-freedom haptic device, users in the vision and haptic condition received kinesthetic haptic feedback synchronized to the second object's motion. The results demonstrate that adding haptic information increases causal perception for events with larger temporal offsets.