

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

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

Permalink

<https://escholarship.org/uc/item/1903h6j7>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 43(43)

ISSN

1069-7977

Authors

Chase, Elyse D. Z.
Wolff, Phillip
Gerstenberg, Tobias
et al.

Publication Date

2021

Peer reviewed

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

Elyse Chase

Stanford University, Stanford, California, United States

Phillip Wolff

Emory University, Atlanta, Georgia, United States

Tobias Gerstenberg

Stanford University, Stanford, California, United States

Sean Follmer

Stanford University, Stanford, California, United States

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.