Causal inference and visual-haptic integration

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Many perceptual cue combination studies have shown that humans integrate information across modalities as well as within a modality in a manner that is close to optimal. While cues are combined efficiently for perception, we would like to know if they are equally well combined in the context of movement. We thus implemented a targeted pointing task where information about the target location was provided both by haptic and by visual information during the movement. We could well account for this data after extending the popular maximum a posteriori model for cue combination with motor noise. As synchronicity is known to influence the way the nervous system combines cues we also analyzed situations in which visual and haptic information was presented with temporal disparity. We find that for our sensorimotor task this temporal disparity had no effect. Sensorimotor learning appears to converge to the same near optimal rules for cue combination that are used by perception and to use all the available information.