

Multisensory Context Warps Time Perception

Submission ID 3000071
Submission Type Poster
Topic Cognitive Science
Status Submitted
Submitter Lucy Lai
Affiliation Rice University/Baylor College of Medicine

SUBMISSION DETAILS

Presentation Type Either Poster or Oral Presentation

Presentation Abstract Summary How the brain processes timing information from multiple senses remains poorly understood. Here, we explore how audition and touch interact in the time domain. We tested how the duration of ignored sounds influences the perceived duration of co-occurring tactile events. Distractor sounds exerted systematic attractive and repulsive biasing effects on tactile duration judgments that were consistent across multiple timing ranges. We developed a two-step observer model to explain these results. First, the observer decides to bind or separate the auditory and tactile duration cues using causal inference. Subsequently, the observer computes a Bayesian estimate of duration using either a coupling or decoupling prior depending on the decision to bind or to separate cues, respectively. While existing cue combination models comparably predict attractive perceptual biases, the two-step model, owing to its conditional decoupling prior, is the only model that also accounts for large repulsive biases. Critically, the model predicts that increased sensory uncertainty shifts repulsive biases toward attraction, which we validated in separate experiments. These results imply multisensory computations are conditioned on probabilistic decisions to bind or to separate sensory cues. Our model provides a unified framework for understanding the extensive and flexible perceptual outcomes that result from multisensory cue interactions.

Co-author Information

* Presenting Author

First Name	Last Name	Affiliation	E-mail
Lucy *	Lai *	Rice University/Baylor College of Medicine	ll37@rice.edu
John	Magnotti	Baylor College of Medicine	john.magnotti@bcm.edu
Jeffrey	Yau	Baylor College of Medicine	Jeffrey.Yau@bcm.edu

Keywords

Keywords
Bayesian inference
Causal modeling
psychophysics
computational modelling
perception
multisensory
timing