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Title
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Permalink
https://escholarship.org/uc/item/30p2d194

Journal

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Publication Date
2018

Modeling dynamics of suspense and surprise

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Abstract

Activities such as watching a sports match and reading a novel often provoke suspense and surprise (S&S). Computationally, we hypothesize that these feelings derive from the dynamics of our beliefs. In our experiment, participants watch real videotaped volleyball games or play a card game, where their belief dynamics (e.g. chance of winning) can be affected by both the stimuli and background information (e.g. game rules and prior beliefs about the teams / the card deck). Following Ely et al (2015) we formalize instantaneous suspense as a function of expected variance in future belief, and surprise as related to the magnitude of belief changes. Through probabilistic model we generate point-by-point predictions of S&S. We find that ratings of S&S for the same games depend on experimentally manipulated in qualitative agreement with our model, but we also identify several situations where the model fails.