Title

Intuitive psychophysics: Children's exploratory play quantitatively tracks thediscriminability of alternative hypotheses

Permalink

https://escholarship.org/uc/item/2k20b9bx

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 39(0)

Authors

Magid, Rachel
Siegel, Max
Tenenbaum, Josh
et al.

Publication Date

2017

Peer reviewed

Intuitive psychophysics: Children's exploratory play quantitatively tracks the discriminability of alternative hypotheses

Rachel Magid

Massachusetts Institute of Technology, Cambridge, Massachusetts, USA

Max Siegel

Massachusetts Institute of Technology

Josh Tenenbaum

Massachusetts Institute of Technology

Laura Schulz

Massachusetts Institute of Technology

Abstract: Studies suggest that children's exploratory behavior is sensitive to uncertainty; however, few have approached this with sufficient precision to model quantitatively. Across three experiments, children (mean age=70 months) were asked to shake a box to identify which of two sets of marbles, differing in numerosity, were hidden inside. The sets' numerosities varied in their discriminability indices – the degree to which listeners can distinguish the sets based on the acoustic information generated. The time children spent shaking the box varied systematically with the discriminability of the alternative hypotheses they were asked to distinguish, even though they heard only one set for each contrast. This suggests that children represent the uncertainty in their own perceptual discrimination abilities (an ability we refer to as an intuitive psychophysics) and their exploratory behavior is precisely calibrated to their degree of uncertainty about alternative hypotheses that might explain unobserved causes of perceptual data.