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Authors

Denison, Stephanie

Attisano, Elizabeth

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Inferring physical cause from statistical anomalies

Stephanie Denison

University of Waterloo , Waterloo, Ontario, Canada

Elizabeth Attisano

University of Waterloo, Waterloo, Ontario, Canada

Abstract

People have an intuitive sense of probability beginning early in life, where they appreciate that samples should reflect populations in their statistical properties (e.g., Denison & Xu, 2019). We examined whether adult participants in two experiments (N=132; N=141, respectively) can use this intuitive sense to infer unseen properties that might be affecting the sampling process. In both experiments, adults saw boxes with different sized balls in varying proportions. They then saw sampling events, in which small numbers of balls were shaken from a hidden exit on the top of the box, that were either probable or improbable, based on box proportions. In general, adults appropriately inferred constraints on the size of the hidden exit by integrating information from the sizes of the balls that were sampled and the overall distribution of balls in the box. Ongoing work examines whether toddlers can make similar inferences.