

## **UC Merced**

### **Proceedings of the Annual Meeting of the Cognitive Science Society**

#### **Title**

The effects of object motion observations on physical prediction

#### **Permalink**

<https://escholarship.org/uc/item/5fd2w0jb>

#### **Journal**

Proceedings of the Annual Meeting of the Cognitive Science Society, 41(0)

#### **Authors**

Yamada, Moyuru

Smith, Kevin

Tenenbaum, Josh

#### **Publication Date**

2019

Peer reviewed

# **The effects of object motion observations on physical prediction**

**Moyuru Yamada**

Fujitsu Laboratories Ltd., Kanagawa, Japan

**Kevin Smith**

Massachusetts Institute of Technology, Cambridge, Massachusetts, United States

**Josh Tenenbaum**

MIT, Cambridge, Massachusetts, United States

## **Abstract**

People use knowledge about physical objects to predict and plan their actions, but this knowledge about objects can be directly perceived or simply inferred. In this experiment, participants chose the direction to shoot computerized cannons to hit targets. These cannons differed in how fast they shot the cannonball, but participants could learn this information either from observing the full trajectory of a prior shot, or just observing the outcome. While the cannonballs initial speed can be determined from the end state alone, additional information in the full trajectory might improve these estimates. We find that performance is only worse in the end-state trials if these trials were tried first; if participants judged the full trajectory trials first, their performance did not decline on the end-state trials. We explore this order effect using a model of noisy physical inference that assumes learning from prior trial blocks.