Motivational Influences on Intuitive Physical Judgments

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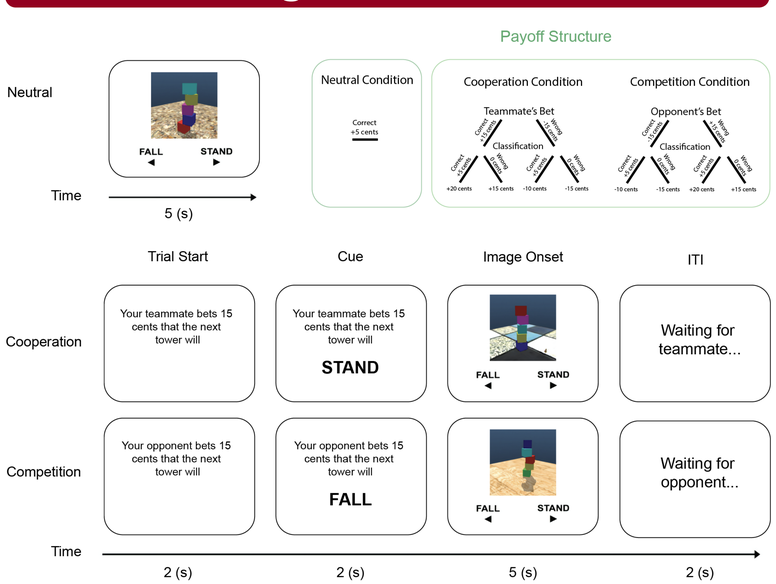
Introduction

How accurate are our intuitive physical judgments?

- People tend to see what they want to see, a phenomenon called *motivated seeing*
- Physical inference plays a crucial role in our daily lives, but people are prone to making flawed inferences (e.g., optical illusions)
- Here, we investigate whether motivation changes the way we perceive and reason about our physical environment

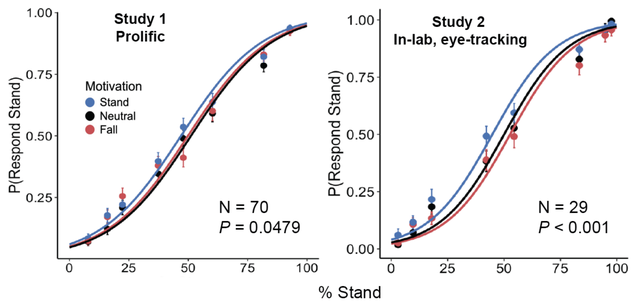
Categorization Task



- Participants were presented with a selection of 100 block tower images from the ShapeStacks dataset (Groth et al., 2018) and were rewarded for correctly judging whether each tower would fall or stand under the influence of gravity
- We motivated participants to judge the towers as either unstable or stable with a monetary bonus

Behavioral Results

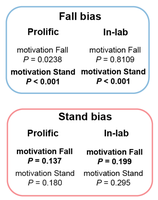
Motivation biases physical judgments



- Participants were more likely to judge the towers as the category they were motivated to see

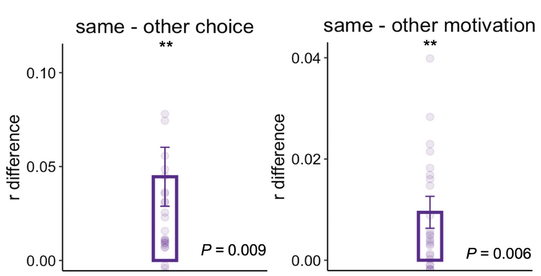
Motivation biases judgments against an intrinsic response bias

- Individual participants exhibited a bias towards responding either Fall or Stand
- The influence of motivation was stronger when participants were motivated to respond *against* their bias



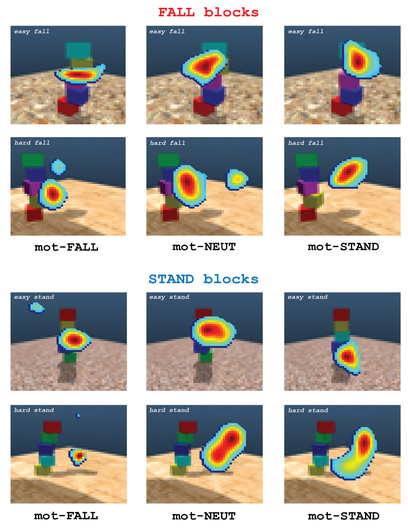
Eye-Tracking Results

Motivation biases information sampling

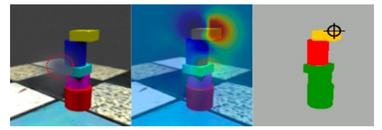


- Participants who made the *same choice*, as well as participants who had the *same motivation*, focused on similar aspects of the tower

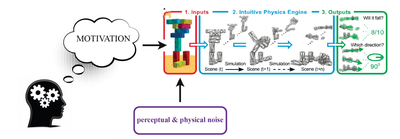
Future Directions



- Participants may fixate on certain blocks, depending on their motivation
- Participants may mentally simulate the scenario's potential outcomes, like how video game engines simulate rich physics and graphics



Groth et al., 2018



Battaglia et al., 2013

Do people attend to mechanical failure points identified by an Inception v4 CNN?

To what extent can human physical inference be instantiated with simulation-based computer models?

Conclusions

- People's intuitive physical judgments are biased by what they are motivated to see
- Specifically, motivation may bias judgments against an intrinsic response bias
- Eye-tracking may reflect information sampling, and motivation appears to affect *how* people sample information when making judgments