Risky Behavior Implies Privileged Information

Emory Richardson & Julian Jara–Ettinger

Department of Psychology, Yale University

Background

People assume that agents maximize rewards and minimize costs. This rationality assumption enables a rich set of inferences about mental states.
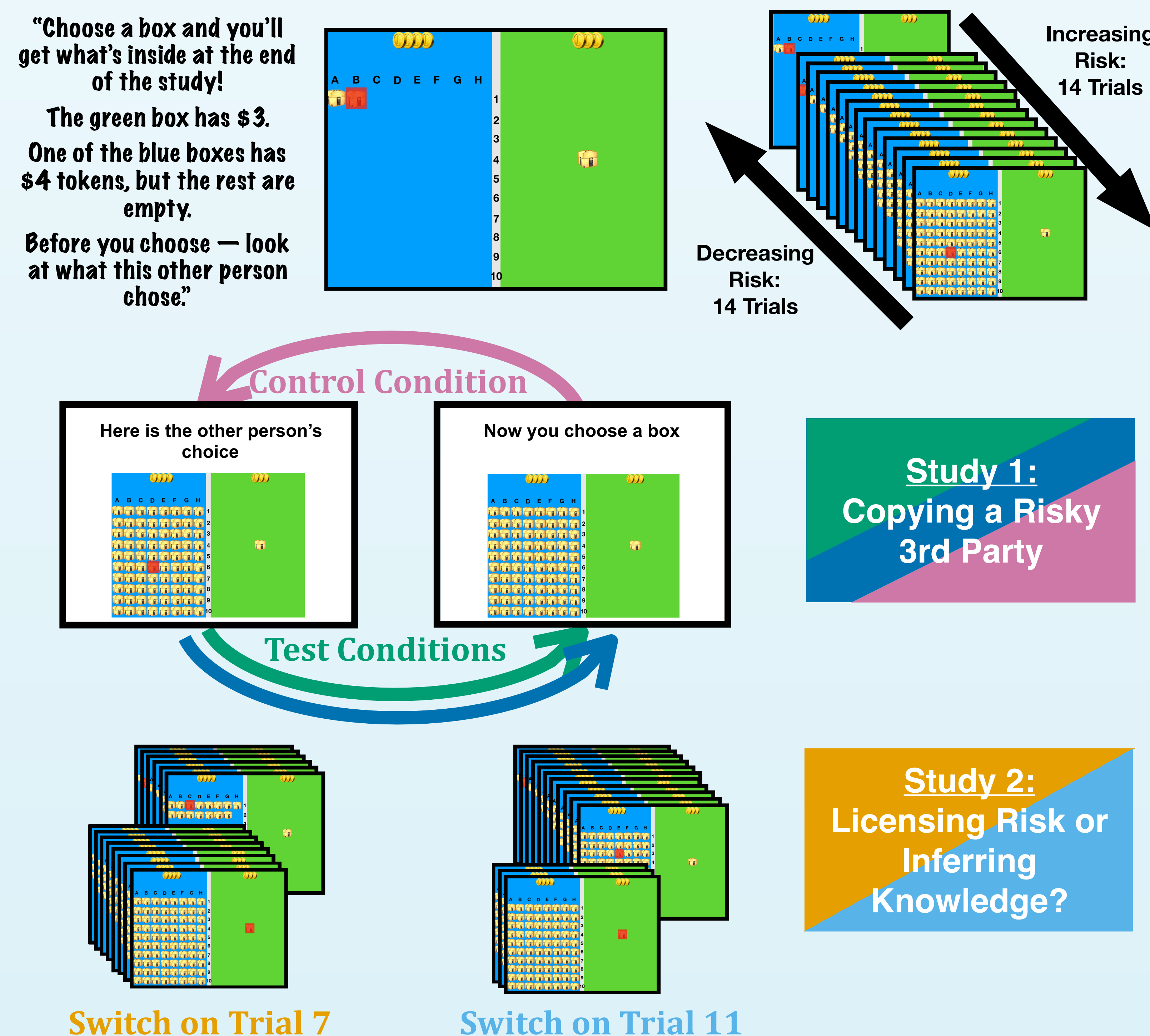
Beyond costs and rewards, actions can also be risky. Rational agents must account for risk when making choices.

Critically risk can vary across knowledge states: an action may be high-risk for an ignorant agent but low-risk for a knowledgeable agent.
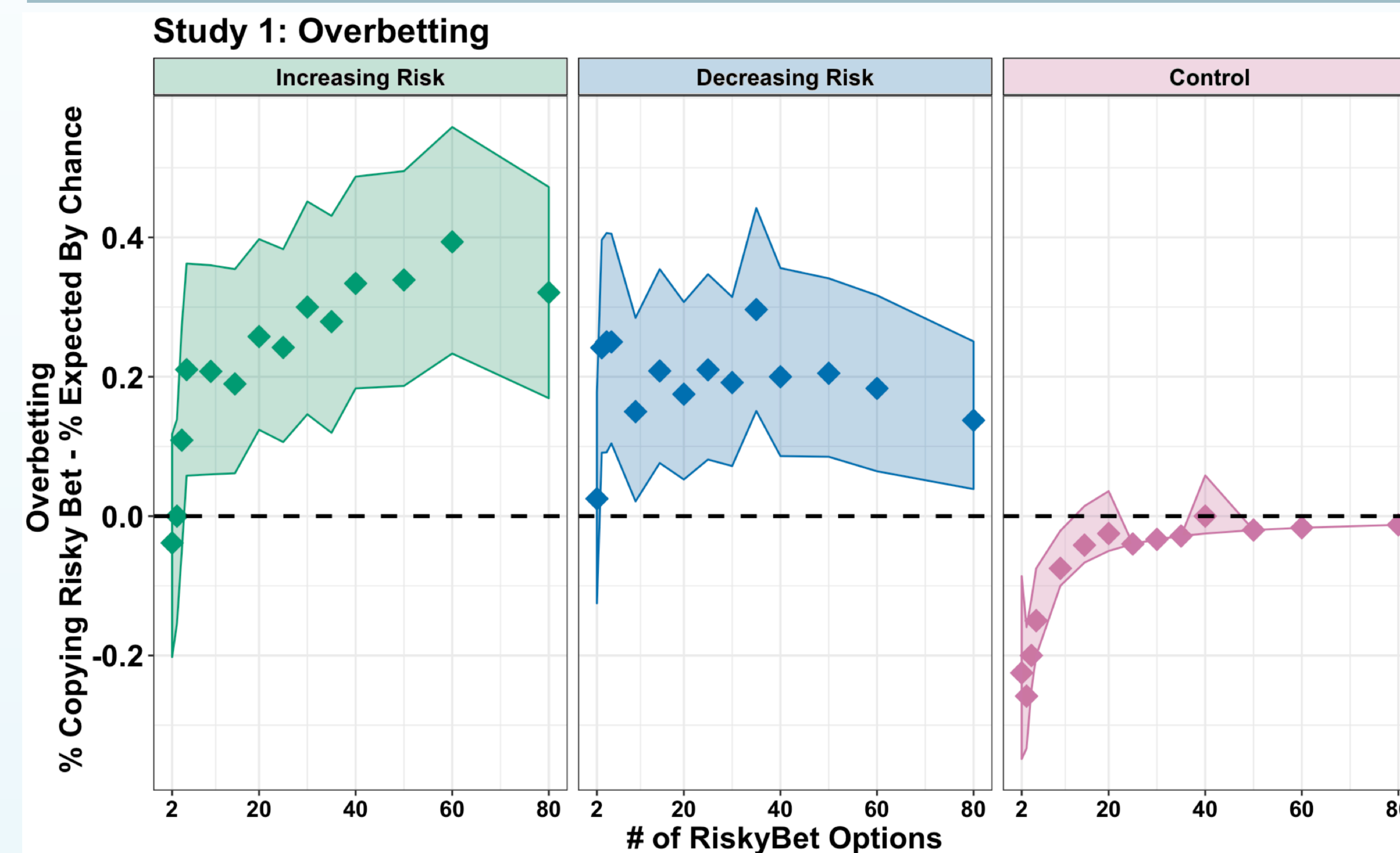
If mental state inferences are enabled by assuming agents maximize expected values, then observers may assume that agents who accept high degrees of risk have privileged information that "rationalizes" their decisions.

Do observers infer that agents who choose high-risk options over low-risk options have privileged information?
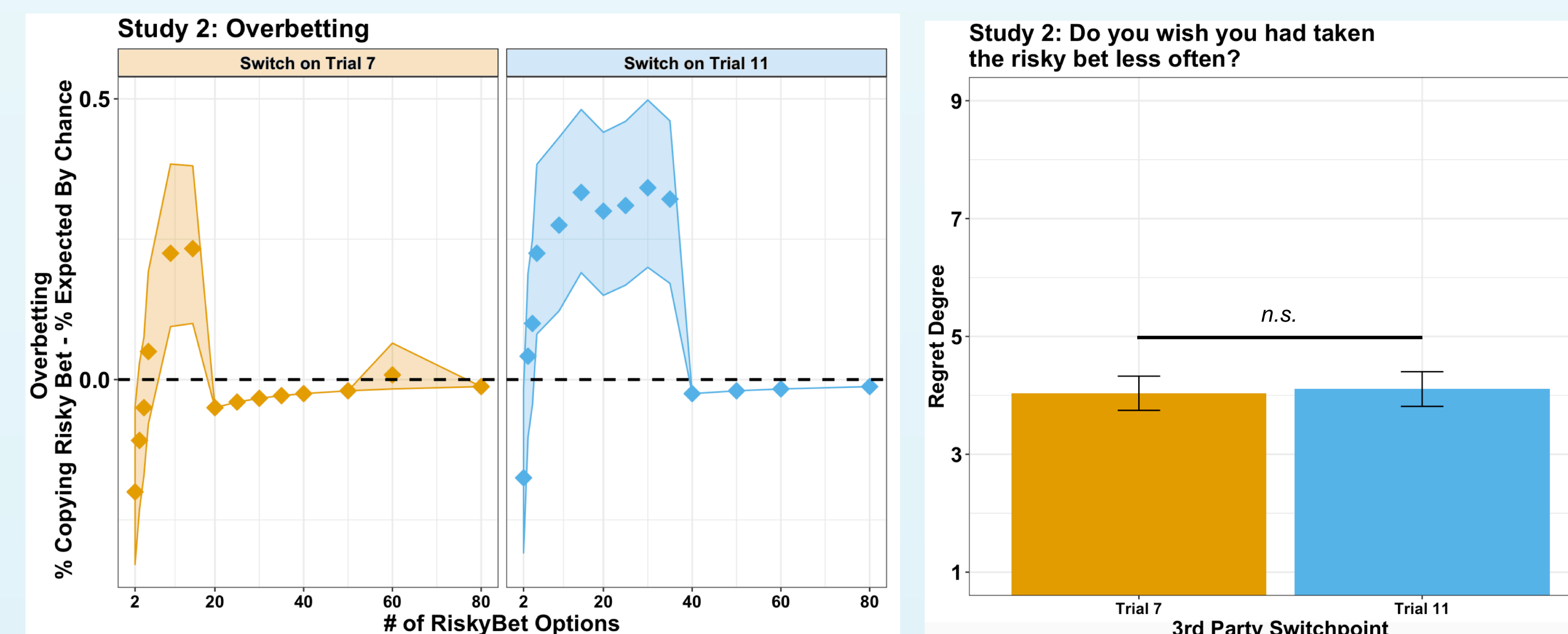
Design

"Choose a box and you'll get what's inside at the end of the study!

The green box has $3.

One of the blue boxes has $4 tokens, but the rest are empty.

Before you choose — look at what this other person chose."

Increasing Risk: 14 Trials

Decreasing Risk: 14 Trials

Control Condition

Here is the other person's choice

Now you choose a box

Test Conditions

Study 1: Copying a Risky 3rd Party

Study 2: Licensing Risk or Inferring Knowledge?

Switch on Trial 7

Switch on Trial 11

Results: Study 1

Study 1: Overbetting

Increasing Risk | Decreasing Risk | Control

Overbetting % Copying Risky Bet - % Expected By Chance

# of RiskyBet Options

Participants rarely took *any* risks when they had to choose *before* the other person (Control), but when they saw the other person choose first, participants frequently copied that choice. The strong r (.947, p<.001) in IR Condition & null r (.176, p=.547) in DR Condition suggest that participants inferred that an agent who made **high**-risk decisions had privileged information.

Results: Study 2

Study 2: Overbetting

Switch on Trial 7 | Switch on Trial 11

Overbetting % Copying Risky Bet - % Expected By Chance

# of RiskyBet Options

Study 2: Do you wish you had taken the risky bet less often?

Regret Degree

n.s.

Trial 7 | Trial 11

3rd Party Switchpoint

⊛ Participants switch back to safe choices when the 3rd party does, suggesting that they were attempting to take advantage of 3rd party knowledge, not feeling licensed to take unwise risks independently.

⊛ Participants did *not* regret their decisions more when they had taken more risky bets

Conclusions & Future Research

Past work has focused on observers' inferences about agents' mental states on the basis of costs and rewards. The influence of risk has not been explored in this context.

Agents frequently have privileged access to valuable information. Our results suggest that **high-risk choices may cue privileged information for agents that are assumed to rationally pursue goals.** Observers able to track agents' high-risk choices have opportunity to take advantage of those agents' privileged information.

Participants in our studies inferred that an agent had privileged access to the location of a reward, and **when given the chance to benefit from the agent's knowledge, participants took otherwise unacceptable risks**.

Further Questions:

(1) Do apparent violations of rational behavior prompt mental state inferences, or are mental state inferences used to "rationalize" apparent violations of rational behavior?
(2) What about agents who are not expected to be risk averse?
(3) How do people interpret risky "near misses"?
(4) Risk in other domains?

References

Baker, C. L., Jara-Ettinger, J., Saxe, R., & Tenenbaum, J. B. (2017). Rational quantitative attribution of beliefs, desires and percepts in human mentalizing. Nature Human Behaviour, 1(4), 0064

Gergely, G., & Csibra, G. (2003). Teleological reasoning in infancy: The naïve theory of rational action. Trends in cognitive sciences, 7(7), 287-292.

Kahneman, D., & Tversky, A. (1979). "Prospect Theory: An Analysis of Decision Under Risk," Econometrica 47, 263-291.

Jara-Ettinger, J., Gweon, H., Schulz, L. E., & Tenenbaum, J. B. (2016). The Naïve Utility Calculus: Computational Principles Underlying Commonsense Psychology. Trends in Cognitive Sciences , 20 (8), 589–604.

Switch on Trial 7 Switch on Trial 11