Feeling of agency predicts choice

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Introduction

The experiments address the question of whether **the feeling of agency effects choice behavior**, or whether choice is driven only by reward or outcome.

The feeling of agency refers to the feeling of being in control (Blakemore & Frith, 2003). Subjects played a "space pilot" game in which Xs and Os scroll down a screen, and they use the mouse to catch Xs and avoid Os. Xs explode to indicate they were successfully caught.

In experiment 1, individuals chose between a high agency or low agency version of the task. In experiment 2, participants chose among games with varying reward levels. In experiment 3, participants chose between a game that generated high agency or high reward.
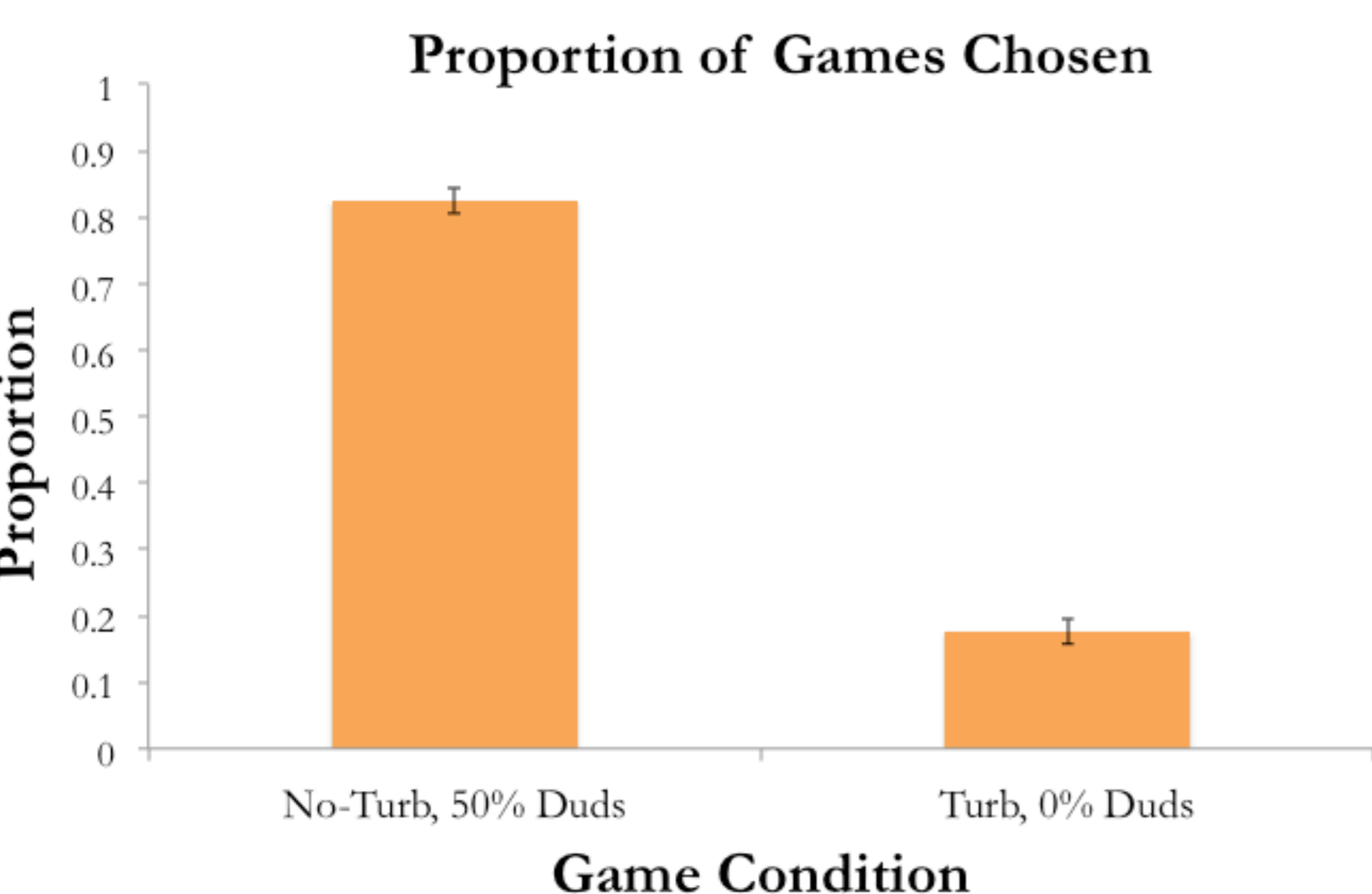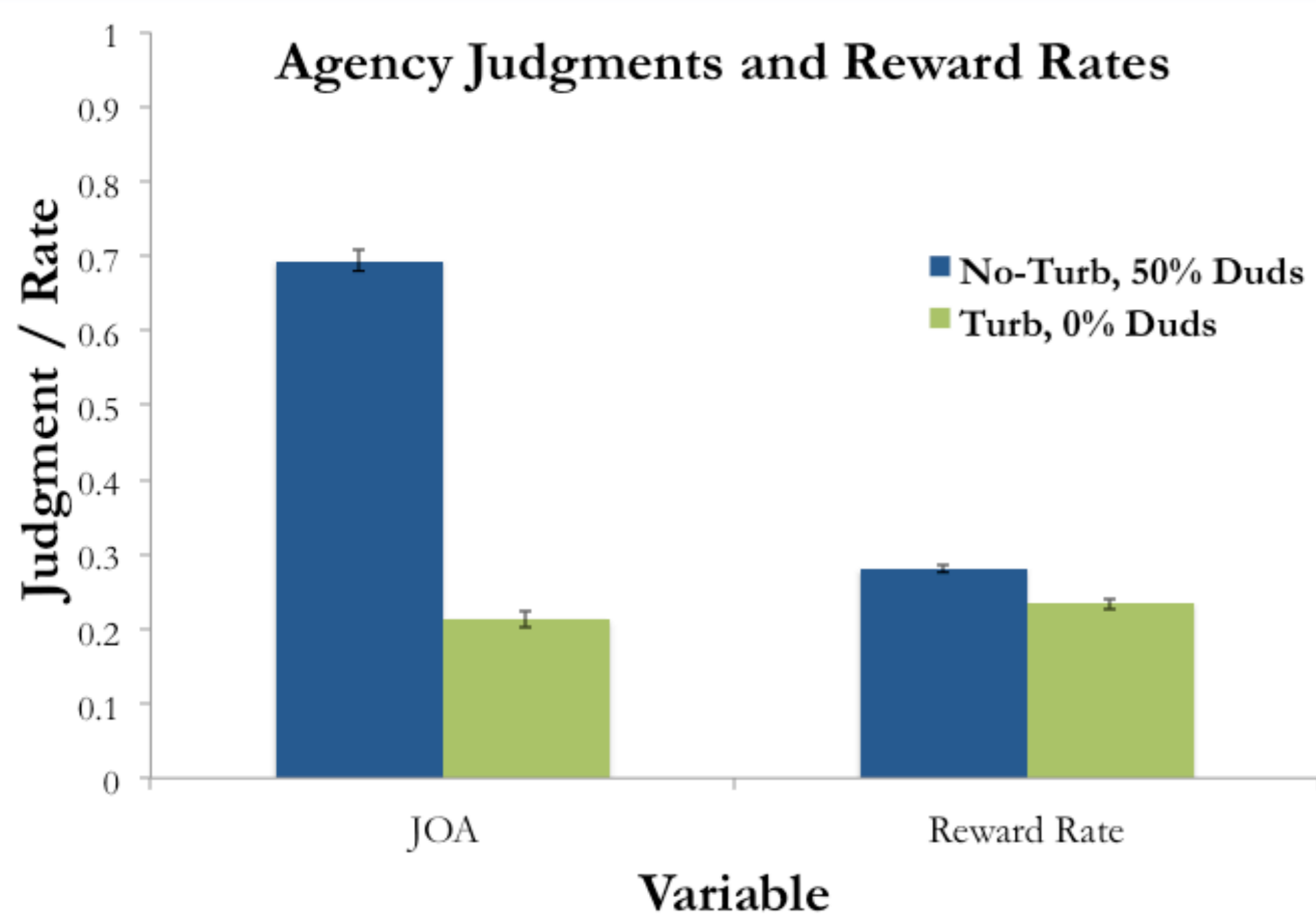
Experiment 1 Method

Space Pilot Screenshot

Space Pilot Game #1
Agency Judgment #1
Space Pilot Game #2
Agency Judgment #2
Choice
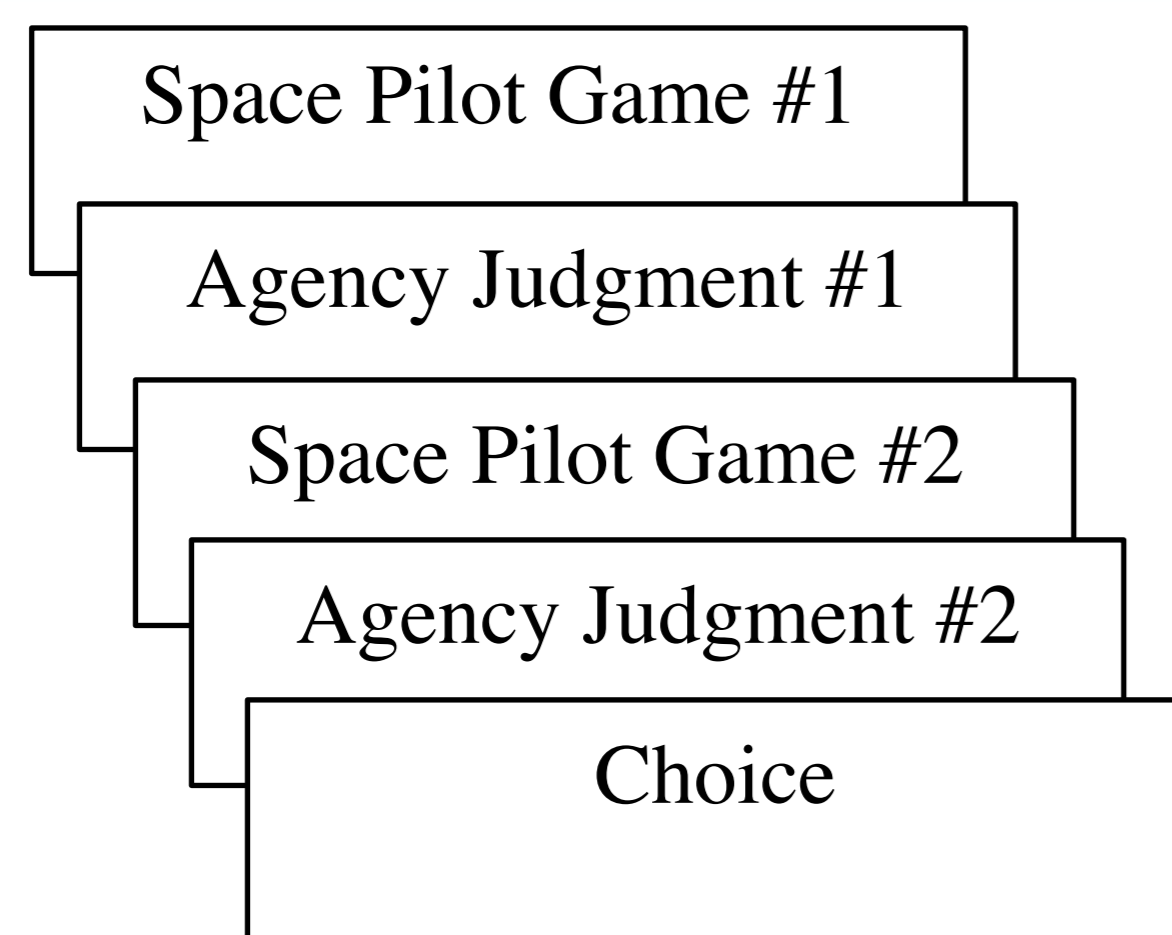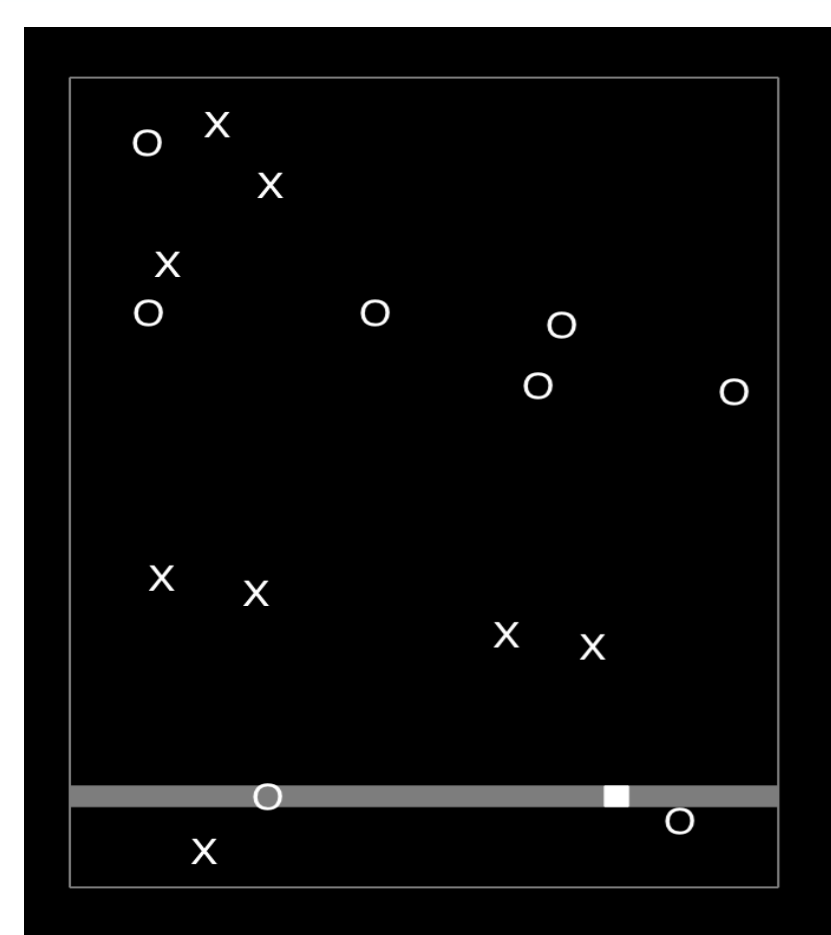
We manipulated control by introducing **turbulence** (noise in cursor movement) in one game condition. In the other, we introduced **duds** (Xs that don't explode) into 50% of the Xs. That allowed us to reduce reward in the no-turbulence condition to be close to reward in the turbulence condition in order to isolate the effect of the feeling of agency on choice. We define reward as the proportion of Xs that explode.
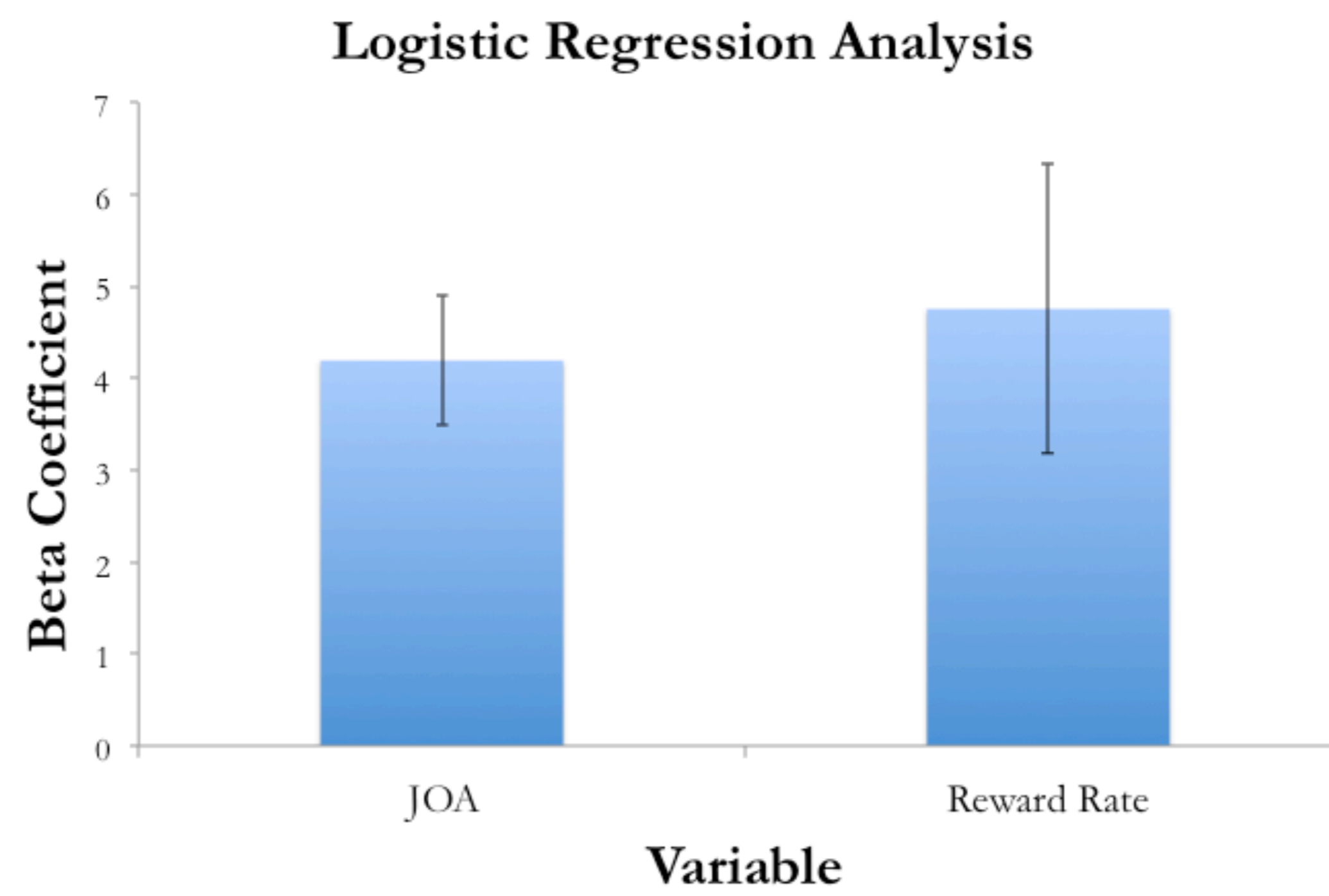
Thus, the two game conditions of interest were:
- Turbulence, no duds
- No turbulence, 50% duds

Experiment 1 Results

Experiment 1 Results (cont'd)

We conducted a second experiment to determine how reduced reward would affect choice behavior.
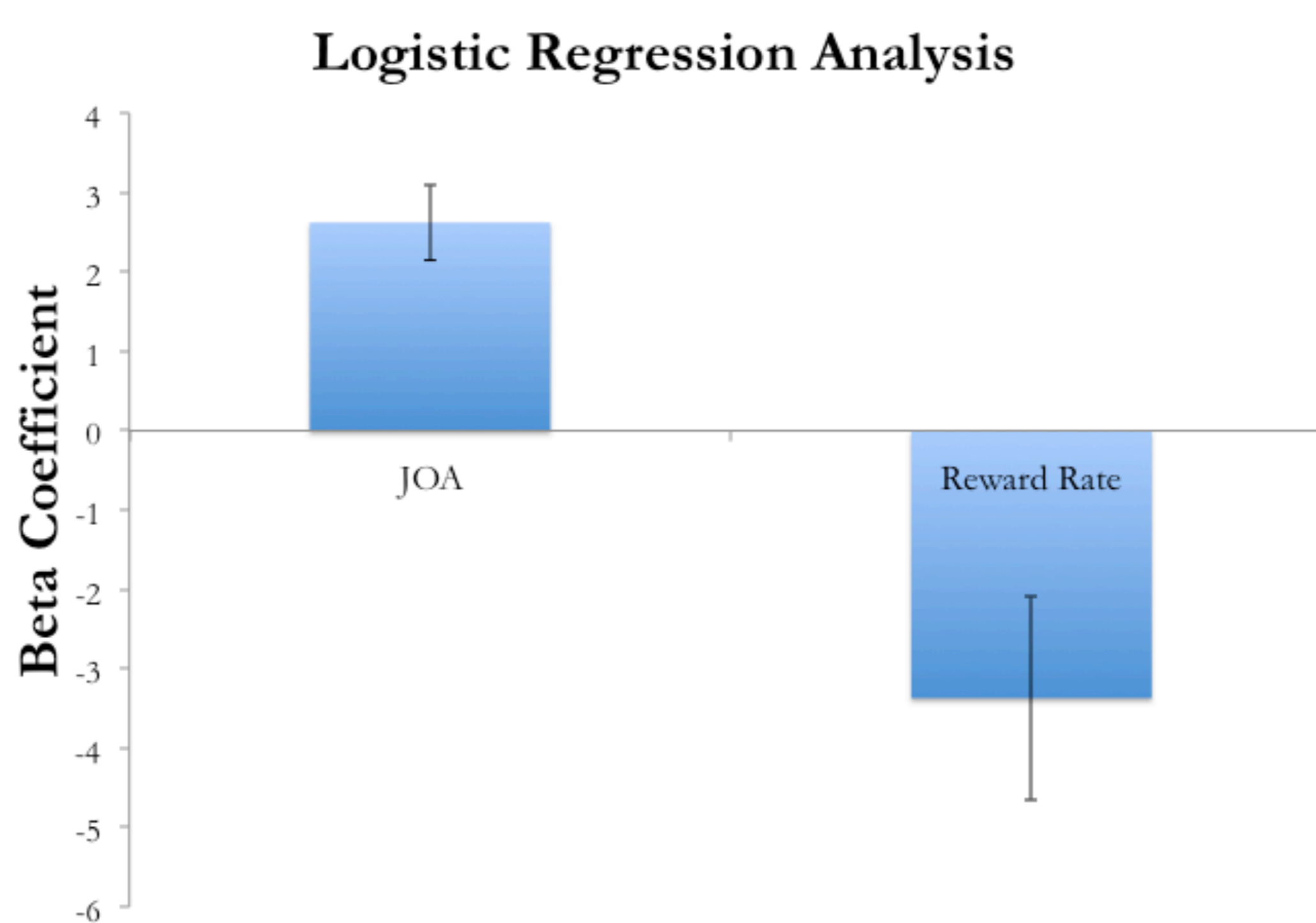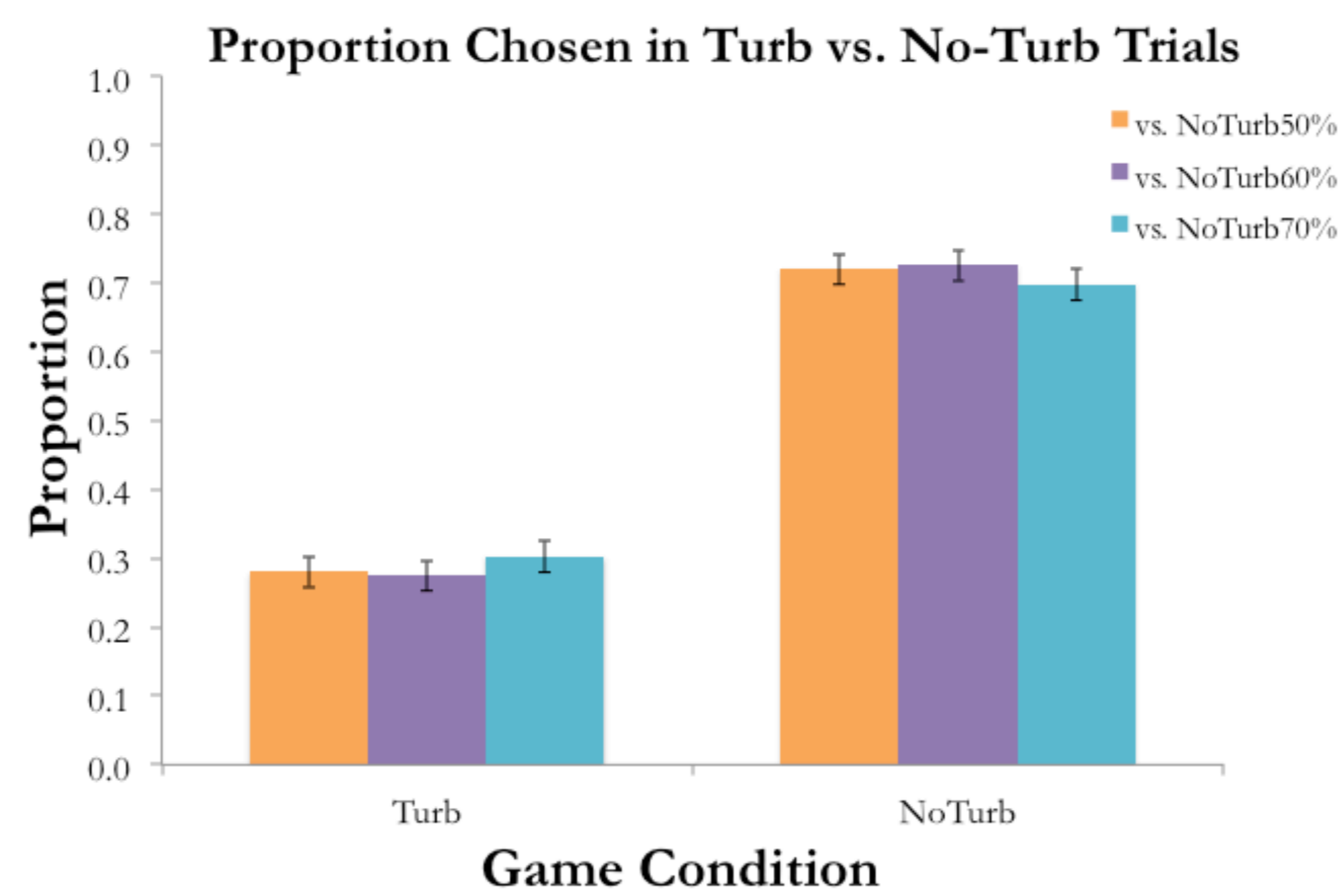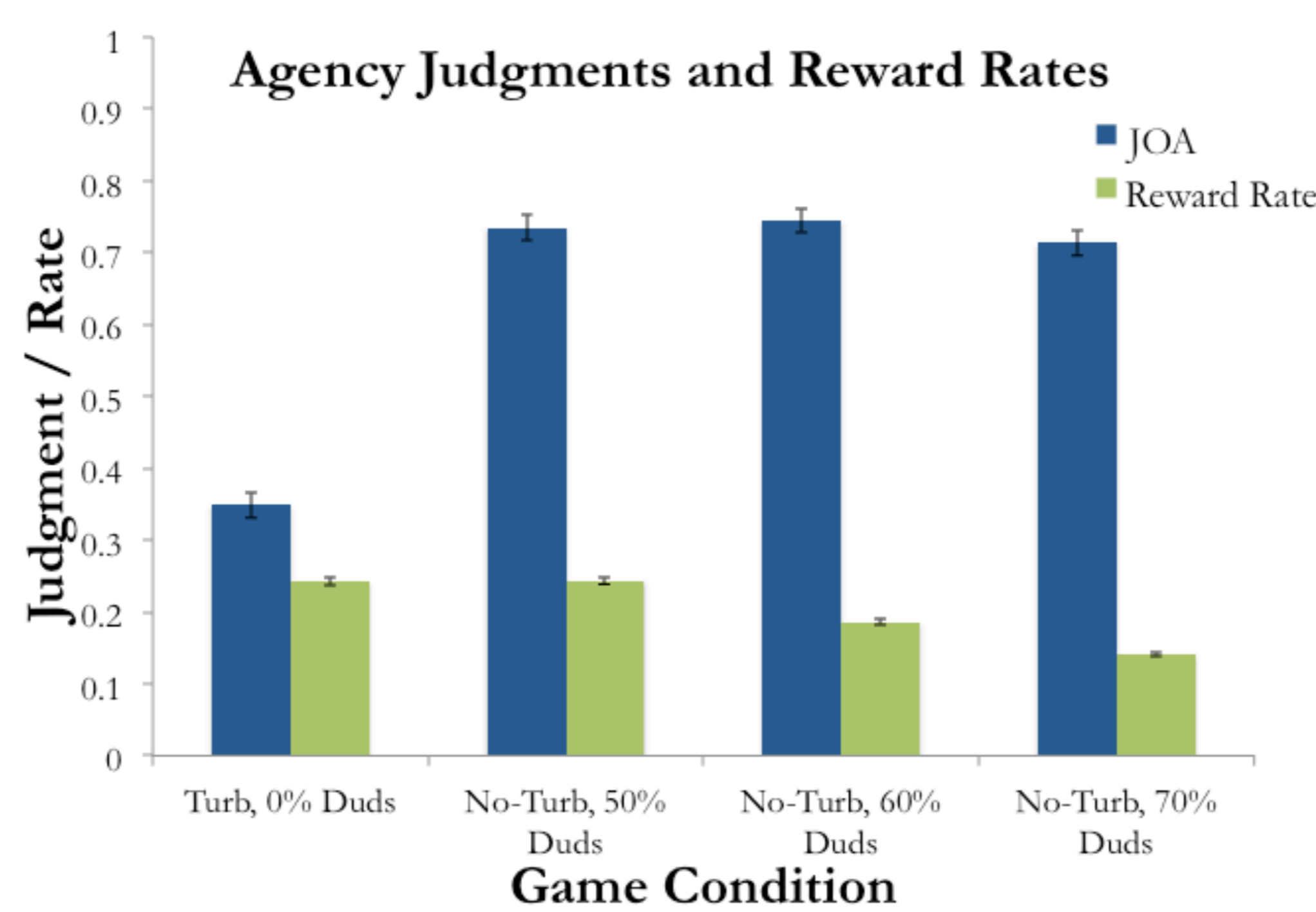
Experiment 2 Method

The four game conditions used were:
- No turbulence, 50% duds
- No turbulence, 60% duds
- No turbulence, 70% duds
- Turbulence, no duds

We paired each no-turbulence game with the turbulence game.

Experiment 2 Results

We conducted a third experiment to manipulate agency without introducing turbulence.

Experiment 3 Method

To manipulate JOA without introducing turbulence, we added **freebies** (Xs that explode without being struck). Xs exploded 75% of the time regardless of whether the player caught them. Thus, we decreased JOA by eliminating the contingency of the reward on the player's action while keeping reward high.

We paired the freebies condition with the standard version of space pilot without any agency manipulations. This condition was expected to produce high agency ratings and a moderate reward rate. Thus, individuals chose between a game that produced a high feeling of agency but moderate reward rate with a game that produced a moderate feeling of agency with a high reward rate.

Experiment 3 Results
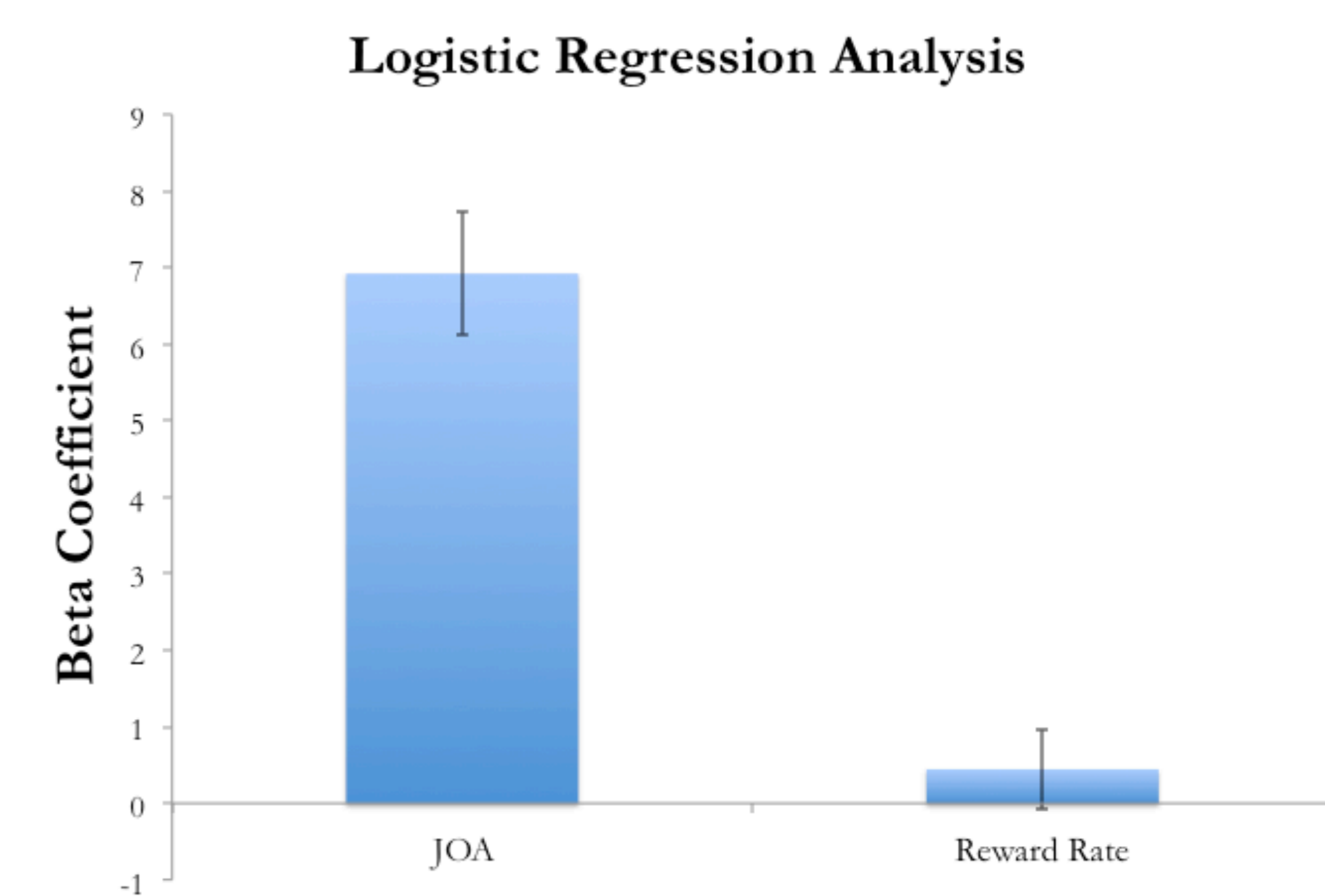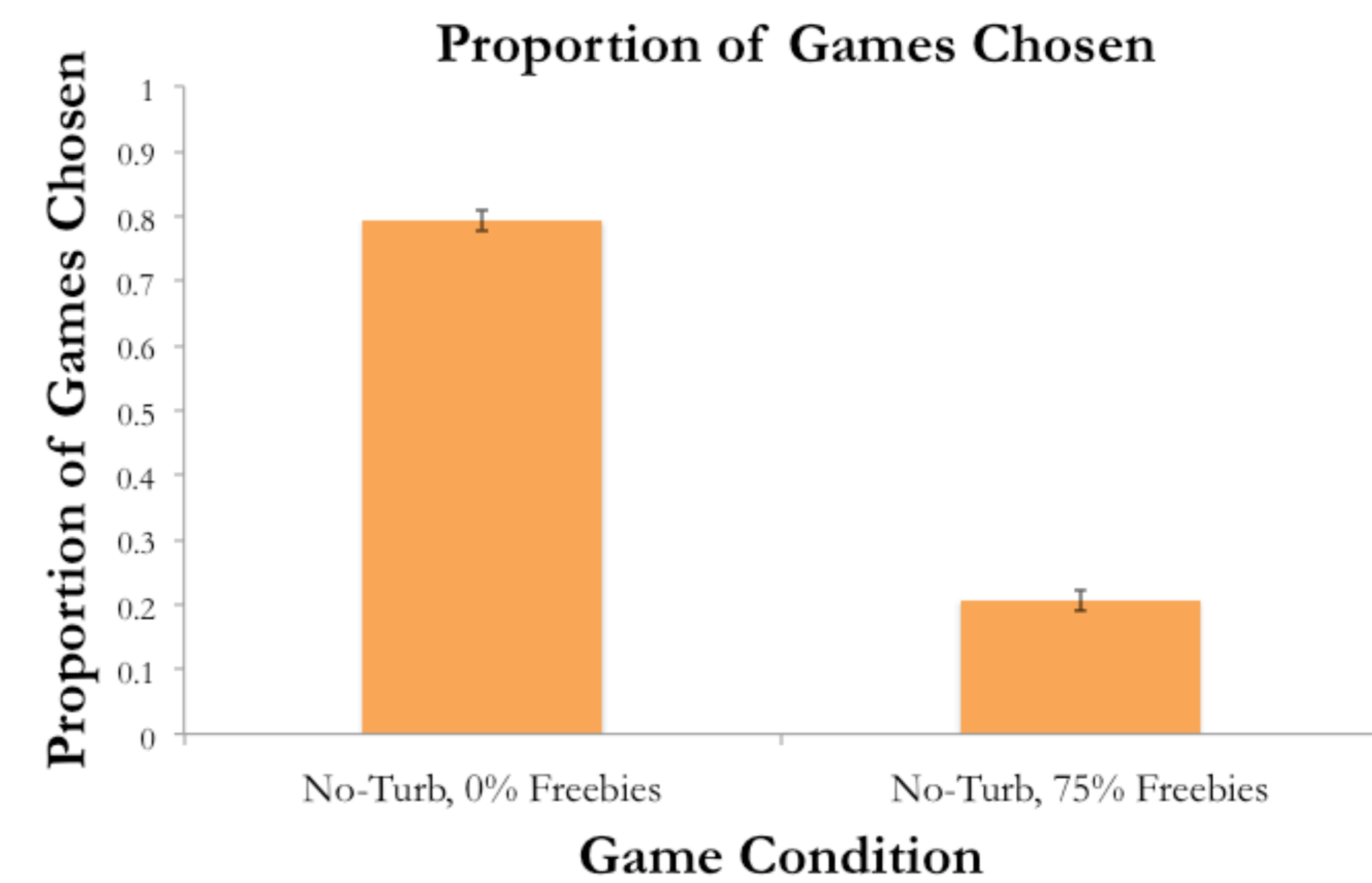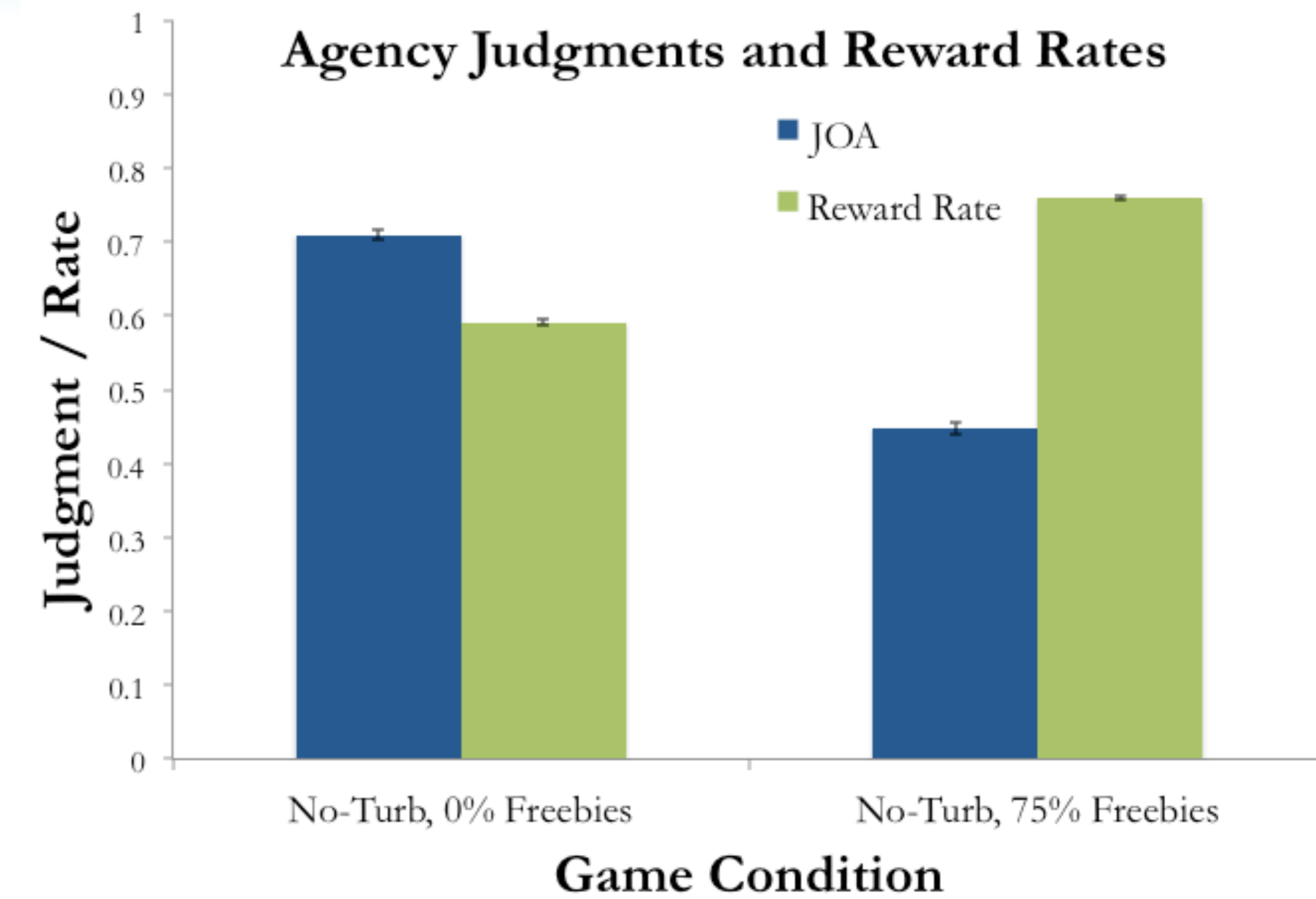
Summary

- Individuals prefer games that yield a high feeling agency.

- When given the choice between having a high feeling of agency or earning a high reward, individuals choose agency.

- A high reward rate only makes it more likely an individual will choose the game if the reward is contingent on their own action.

- Effect is more than turbulence aversion and occurs when the feeling of agency is reduced without turbulence.

References

Blakemore, S-J. & Frith, C. (2003). Self-awareness and action. *Current Opinion in Neurobiology, 23*, 219-224.

Metcalfe, J., Eich, T., & Miele, D. (2013). Metacognition of agency: proximal action and distal outcome. *Experimental Brain Research, 229*, 485-496.