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Reciprocal Cooperation in Rats

Malory Wodka

Illinois Wesleyan University

Teresa Banks

Illinois Wesleyan University

Benjamin Becker

Illinois Wesleyan University

Josephine Fairall

Illinois Wesleyan University

Sarah Hartman

Illinois Wesleyan University

See next page for additional authors

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Presenter Information

Malory Wodka; Teresa Banks; Benjamin Becker; Josephine Fairall; Sarah Hartman; Elise Haury; Kelli Sloan; Scott Tesler; Kathryn Thomas; and Gregory Tinkler, Faculty Advisor

Reciprocal Cooperation in Rats

Department of Psychology, Illinois Wesleyan University

Malory Wodka, Teresa Banks, Benjamin Becker, Josephine Fairall, Sarah Hartman, Elise Haury, Kelli Sloan, Scott Tesler, Kathryn Thomas, and Gregory P. Tinkler, Ph.D*.



Introduction

- Cooperation is a valid evolutionary strategy.
- Previous studies have demonstrated that rats have the capability to cooperate reciprocally in a variety of tasks.
- Rats are capable of discriminating between different types of cooperators.
- Cooperation is dependent upon a rat's motivational state; food deprived rats are poorer cooperators compared to satiated rats.
- Some neurohormones, such as oxytocin and vasopressin, have been shown to have an effect of social behavior relevant to cooperation.

Hypothesis

- Rats will be more likely to cooperate with rats they live with compared to rats that they have never met before.
- Rats given the neurohormone Allopregnanolone will cooperate to a different degree than rats that are given a placebo.

Methods

- 15 pairs of Sprague Dawley rats
- 3 rats eliminated for not eating reinforcements

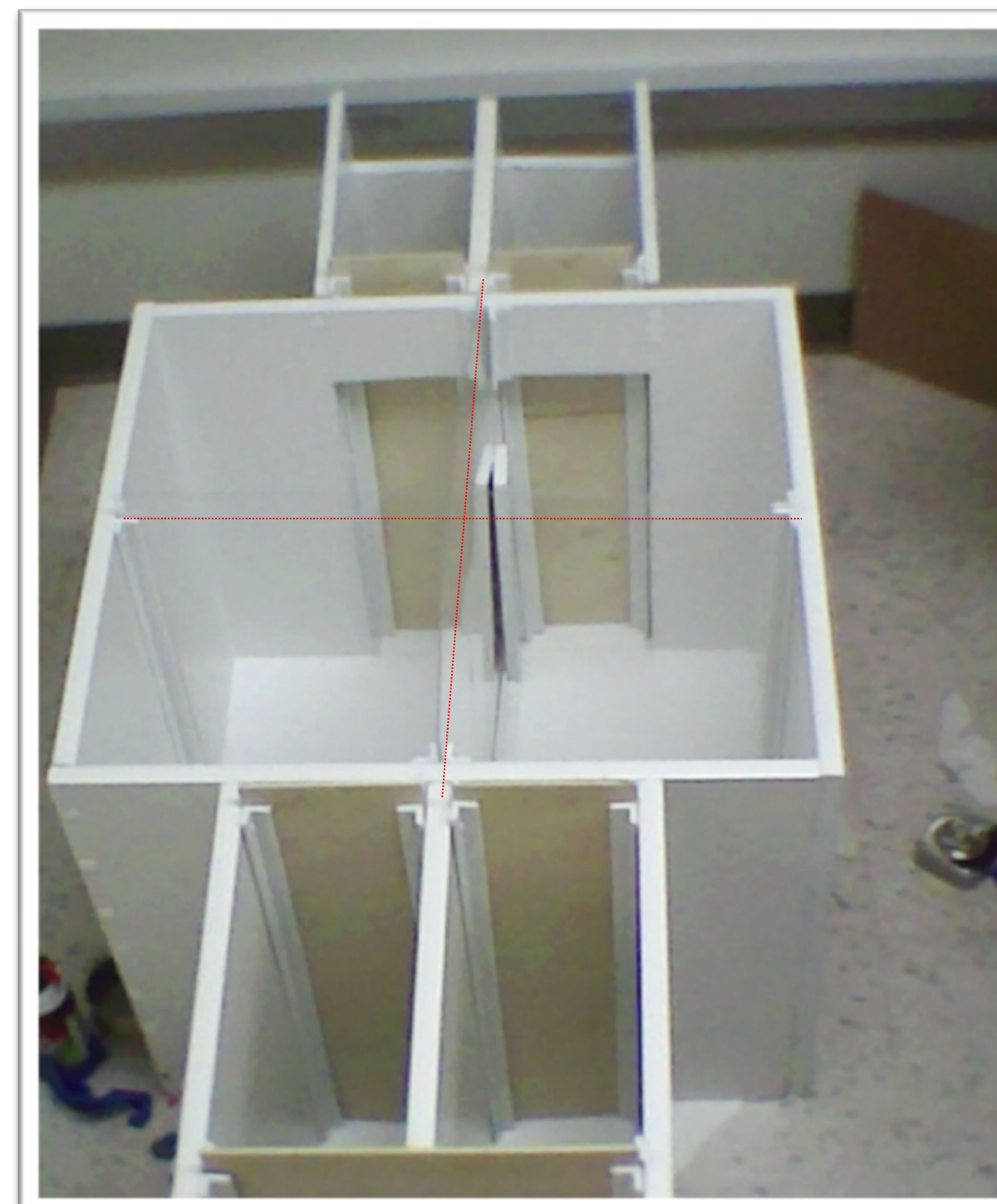
Part 1: 2 groups: cagemate pairs vs non-cagemate pairs

After pretraining, 8 days of 20 trials per day per test rat

Part 2: Group 1: drug day one, placebo day two

Group 2: placebo day one, drug day two

	Test Rat Cooperate	Test Rat Defect
Dummy Rat Cooperate	Test Rat 2 Fruit Loops Dummy Rat 2 Fruit Loops	Test Rat 3 Fruit Loops Dummy Rat 3 Puffs of Air
Dummy Rat Defect	Test Rat 3 Puffs of Air Dummy Rat 3 Fruit Loops	Test Rat 1 Puff of Air Dummy Rat 1 Puff of Air



Results

Mean Cagemate and Non-Cagemate Cooperation

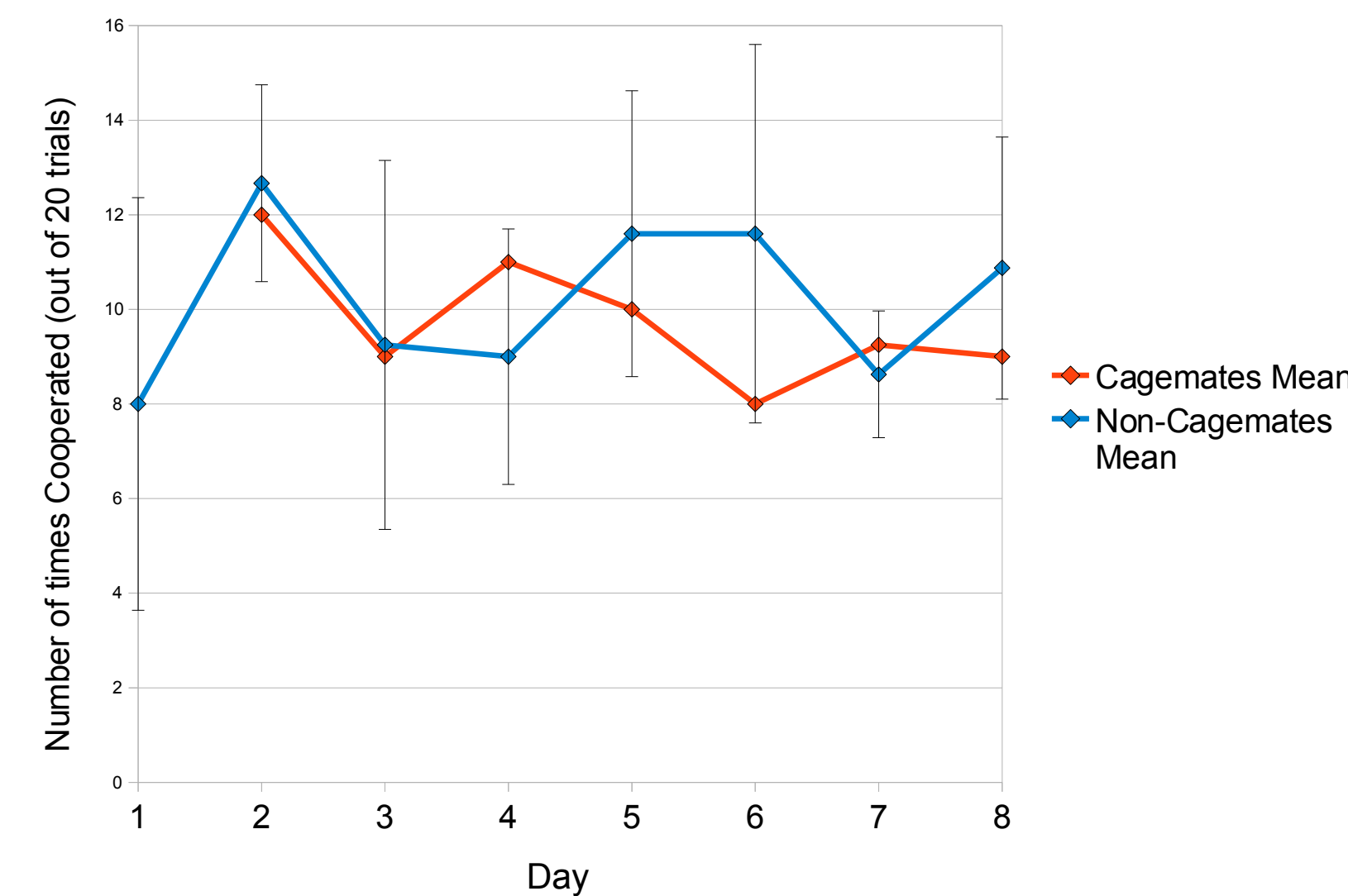


Figure 1 (above) shows the average levels of daily cooperation for cagemate pairs and non-cagemate pairs on the iterated Prisoner's Dilemma task

Average Total Cooperation

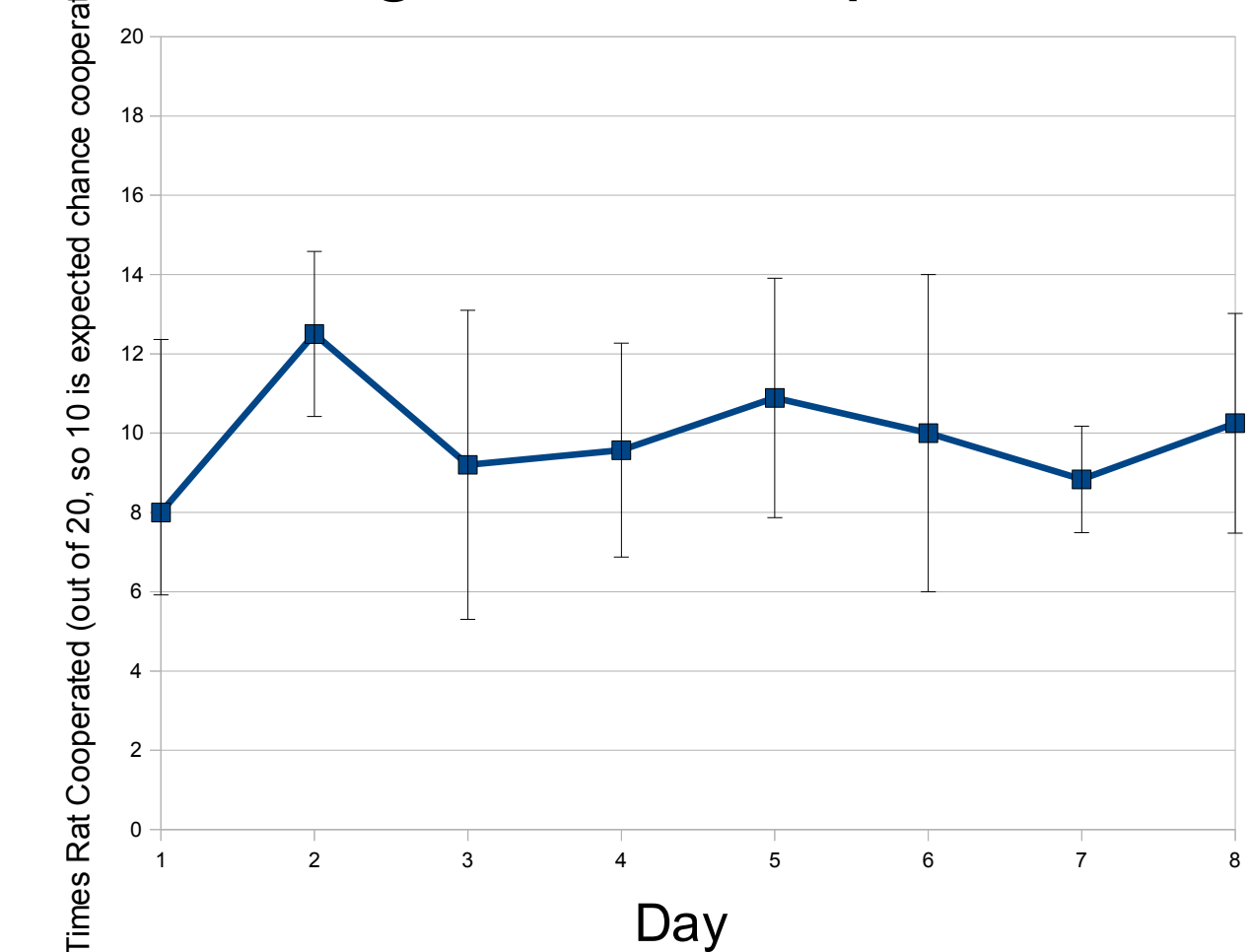


Figure 2 shows the average daily level of cooperation between all rat pairs. Rats cooperating ten times out of twenty are cooperating at levels expected by chance.

Effects of Allop. on Cooperation

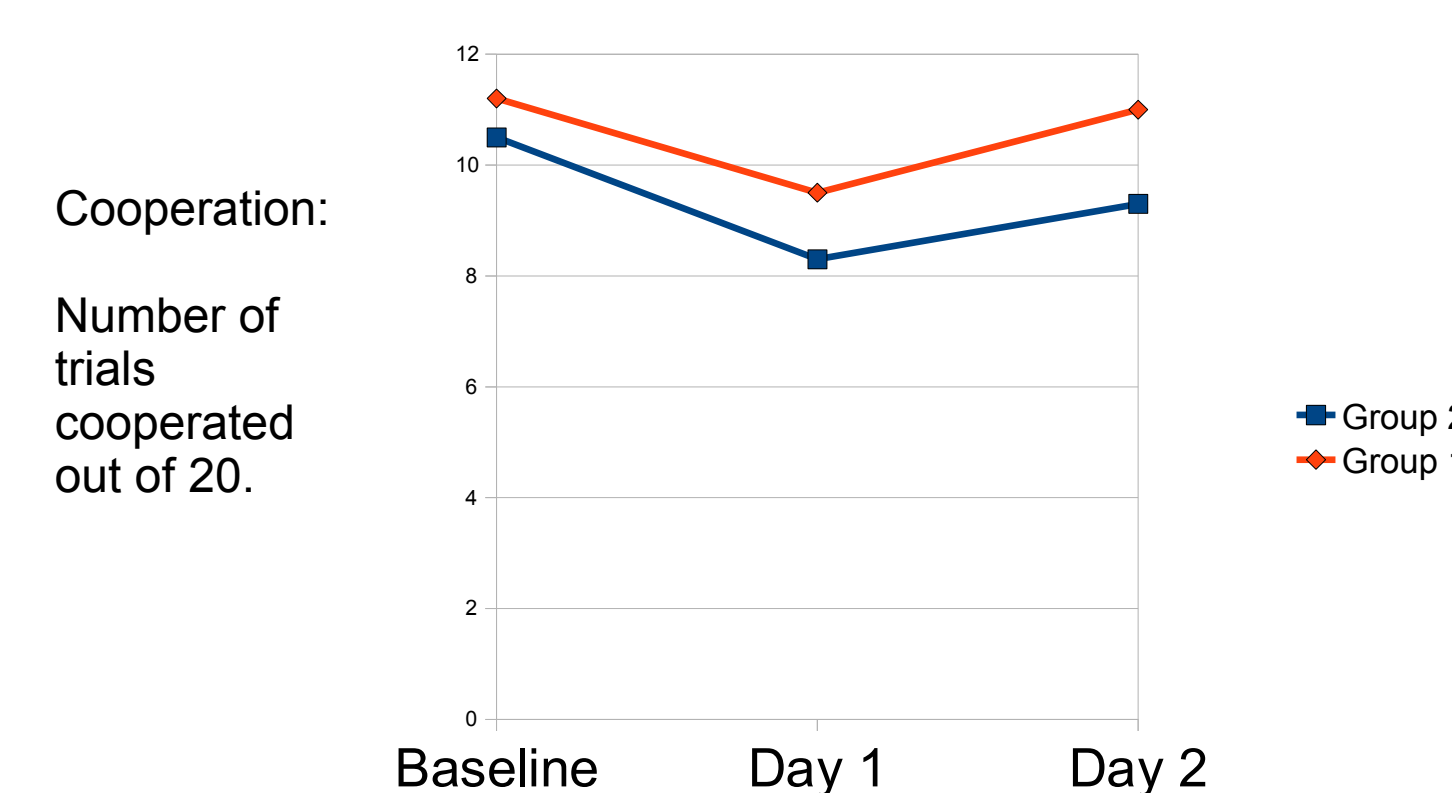


Figure 3 shows the effects of Allopregnanolone on cooperation in the iterated Prisoner's Dilemma task. Group 1 (red) received Allop on day 1 and placebo on day two. Group 2 (blue) received placebo on day one and Allop on day two.

- Rats did not cooperate above chance
- There was no significant difference in cooperation level between rats that were paired with cagemates and rats that were paired with non-cagemates.
- Allopregnanolone did not enhance cooperation in rats.

Conclusions

	Wodka et al.	Viana et al. (2020)
Training	8 non-consecutive days	10 consecutive days (but learned after 1 day)
Sample Size	15 Sprague-Dawley strain rats	5 Sprague-Dawley strain rats
Visual Cues	Rats could not see arm prior to entry	Rats could potentially see arm prior to entry
Age of Rats	Approximately 1 year	Approximately 3 months

Acknowledgements

I would like to thank Dr. Tinkler, Dr. Sheese, Dr. Vicary, and the psychology senior thesis class, and all of the volunteers (listed below the title) that helped with data collection.