

# Failure to Find Altruistic Behavior in Rats

Matt Wan, Cyrus Kirkman, Carol Franceschini, & Timothy Hackenberg

Reed College Psychology Department



## Introduction

- Altruism can be defined as behavior that benefits another while costing the individual.
- Bartal et al. (2011) reported that rats would release a trapped rat from restraint in the presence of food - which they interpreted as altruistic food sharing.
- The present experiment aimed to replicate and extend the Bartal study with detailed and repeated methods in order to examine more systematically the following question: **Will (and to what extent) a rat release and share food with a familiar rat?**

## Method

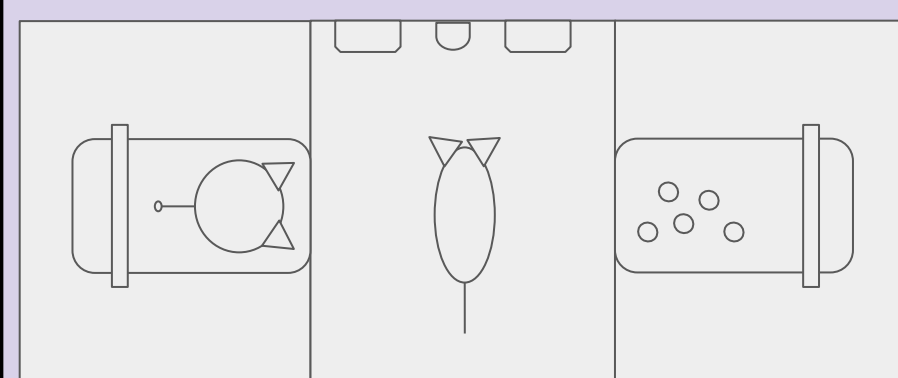


Fig. 1: The apparatus used with social SR+ on the left and food FR+ on the right.

- Three rats were trained to work on the left lever (LL) for a social reward (SR+) – 30s social interaction with a cagemate – and on the right lever (RL) for a food reward – access to 5 food pellets.
- There were 3 main conditions: (1) **Baseline**, in which which food rewards were available on FR1 on the right lever; (2) **Conc FR1 FR1**, in which both social and food rewards were available on FR1 on the left and right levers, respectively; and (3) **Conc FR1 FR1 with limited hold**, same as (2) except that the door to the food pellets remained open only for 30 s.
- Sharing** was defined as opening the social door while food pellets remained in the right chamber AND permitting the trapped rat to eat one or more pellets in the food tube.
- Sessions lasted 30 min



Fig 2. Total food responses, social responses across conditions: Baseline (Food) and Conc FR1 FR1, Food v Social

## Results

- Figure 2 shows that Social and Food responses occurred at comparable levels within and across conditions: Food mean = **11.3, 13.8**; Social mean = **11.0, 11.9**, in FR1 FR1 and FR1 FR1 (LH) conditions, respectively.
- Figure 3 shows pellets earned and pellets shared across the two FR1 FR1 conditions. With or without a limited hold, the percentage food shared was quite low (mean = **1%**, across subjects and conditions).

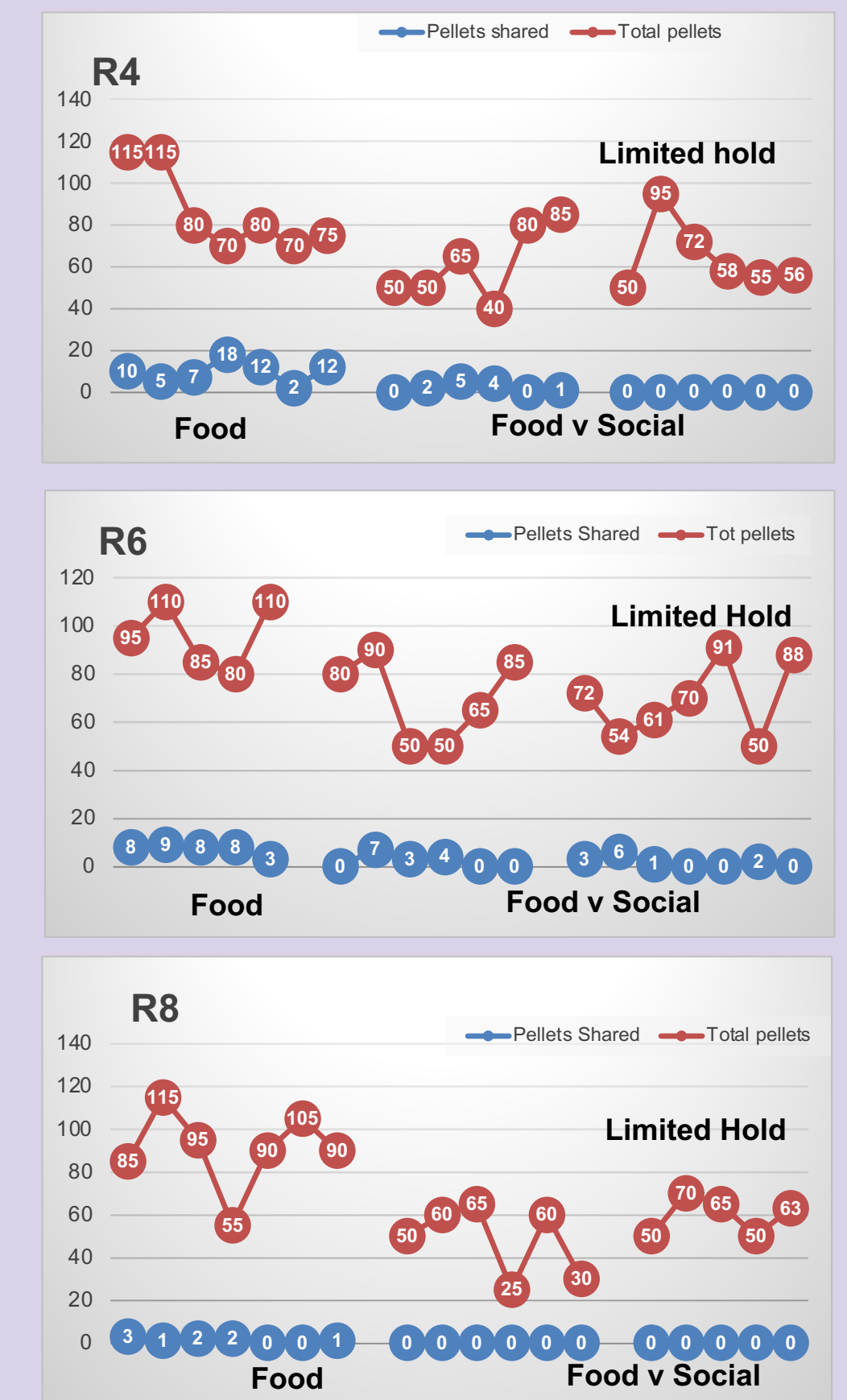


Fig. 3: Total pellets earned and shared across during Conc FR1 FR1 and FR1 FR1 (LH) conditions.

## Discussion

- Sharing, as we have defined it here, occurred at very low levels across sessions and conditions: Both the number of pellets shared and the pattern of pellet sharing was too modest to meet even the most lenient definition of sharing.
- The lack of sharing is at odds with the Bartal et al. (2011) study, who reported average latency to open the food and social door was comparable, and sharing on roughly 50% of the trials.
- The differences are likely methodological. Our study examined multiple patterns of behavior within and across sessions (**288** trials per rat), while the Bartal study included limited measures and brief testing (**12** trials per rat). The present study also included explicit and detailed measures of preference between social and food rewards, while the Bartal study was confined to overall latency measures.
- That the rats consistently worked to free a restricted rat suggests that social contact served a reinforcing function, consistent with prior work from our lab (Hiura et al., 2018).
- Follow-up research with these rats is exploring interactions between social and food rewards, and the degree to which the two rewards are economic substitutes, complements, or independent.

## References

- Bartal, I. B. A., Decety, J., & Mason, P. (2011). Empathy and pro-social behavior in rats. *Science*, 334(6061), 1427-1430.
- Hiura, L. C., Tan, L., & Hackenberg, T. D. (2018). To free, or not to free: Social reinforcement effects in the social release paradigm with rats. *Behavioural processes*, 152, 37-46.

## Acknowledgement

This study was supported in part by a Reed College Undergraduate Research Opportunity Grant.