



Introduction

- Environmental enrichment effects on cognitive function and response to rewarding stimuli suggest that differential rearing may have an influence on rats' impulsive behaviors.^{1,2} Several previous studies have shown that enrichment leads to fewer impulsive choices, but increases impulsive actions.^{3,4,5}
- In the previous studies, social cohorts and novel objects have been compounded together to produce enrichment.¹ However, whether social and novelty factors separately influence enrichment results has not been examined.
- The current study sought to parse out the social and novelty enrichment effects on rats' impulsive behavior.

Method

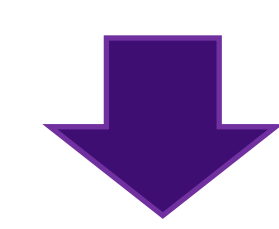


Figure 1. Enrichment Paradigm

24 male Sprague-Dawley rats
Rearing for 30 days (PND 21 to 51)

- IC: Isolated condition
- IC+: Isolated condition + novelty
- SC: Social condition
- SC+: Social condition + novelty

Impulsive Choice Task



Impulsive Action Task

Figure 2. Testing Procedure

Impulsive Choice Task³:

10 s → 1 pellet

30 s → 1, 2, or 3 pellet(s)

Impulsive Action Task^{3,5}: responses spaced at least 30 s apart were rewarded while premature responses reset the interval

Results

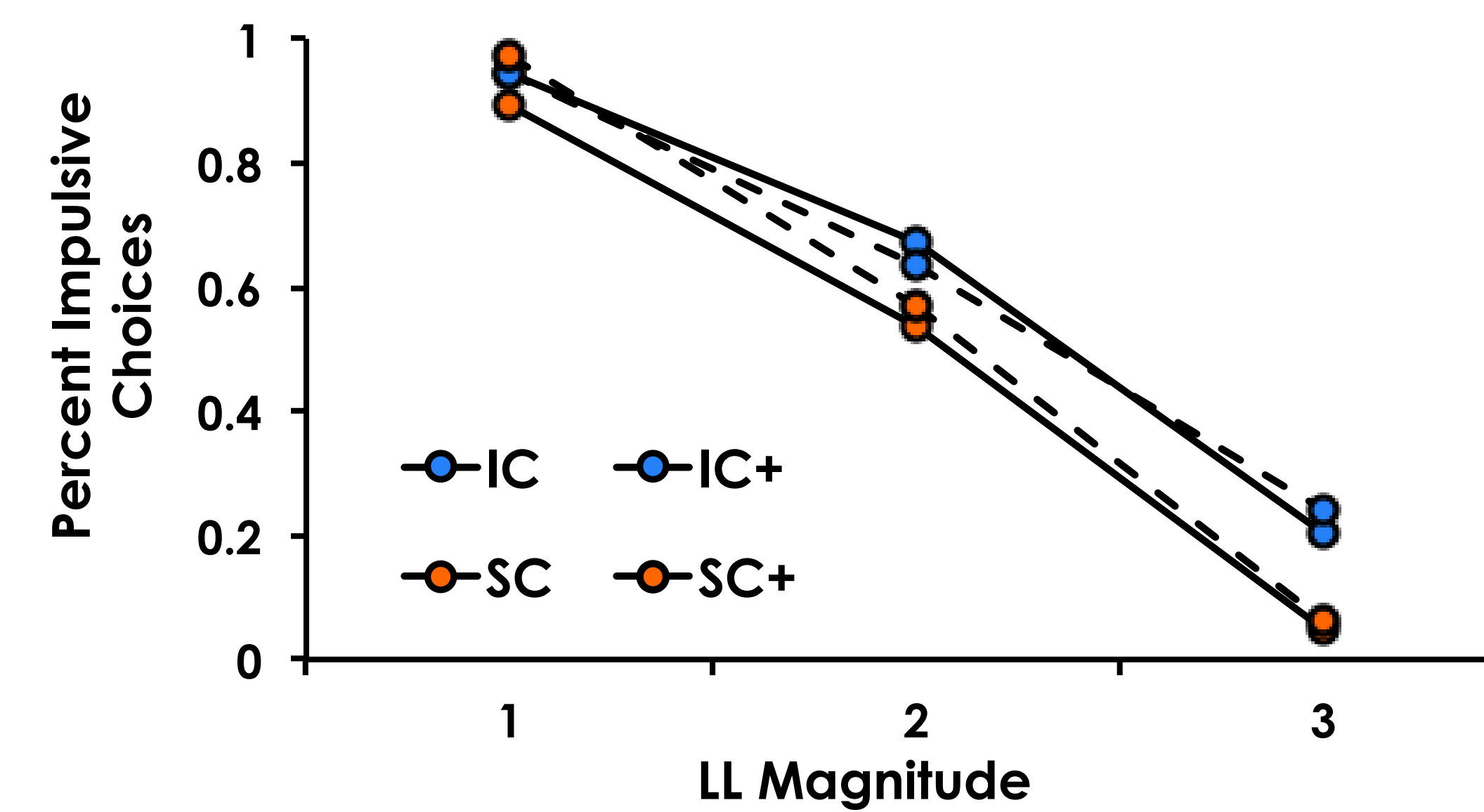


Figure 3. Impulsive Choice Behavior.

Isolated rats made more smaller-sooner (SS) choices. Novelty enrichment did not affect impulsive choice.

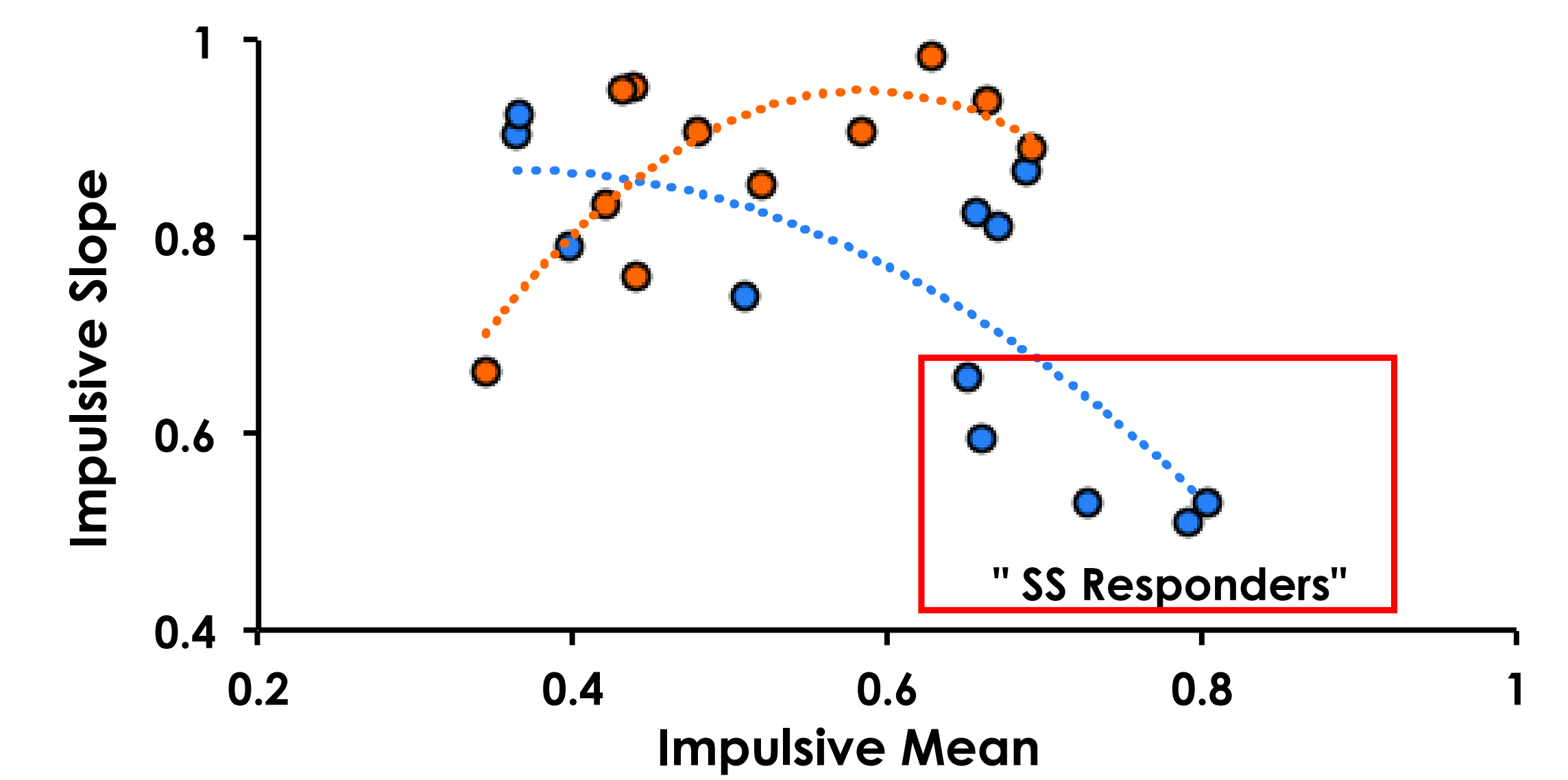


Figure 4. Impulsive Choice Behavior.

Isolated rats were more likely to fall in the “SS responder category”, failing to switch to the LL when the magnitude increased.

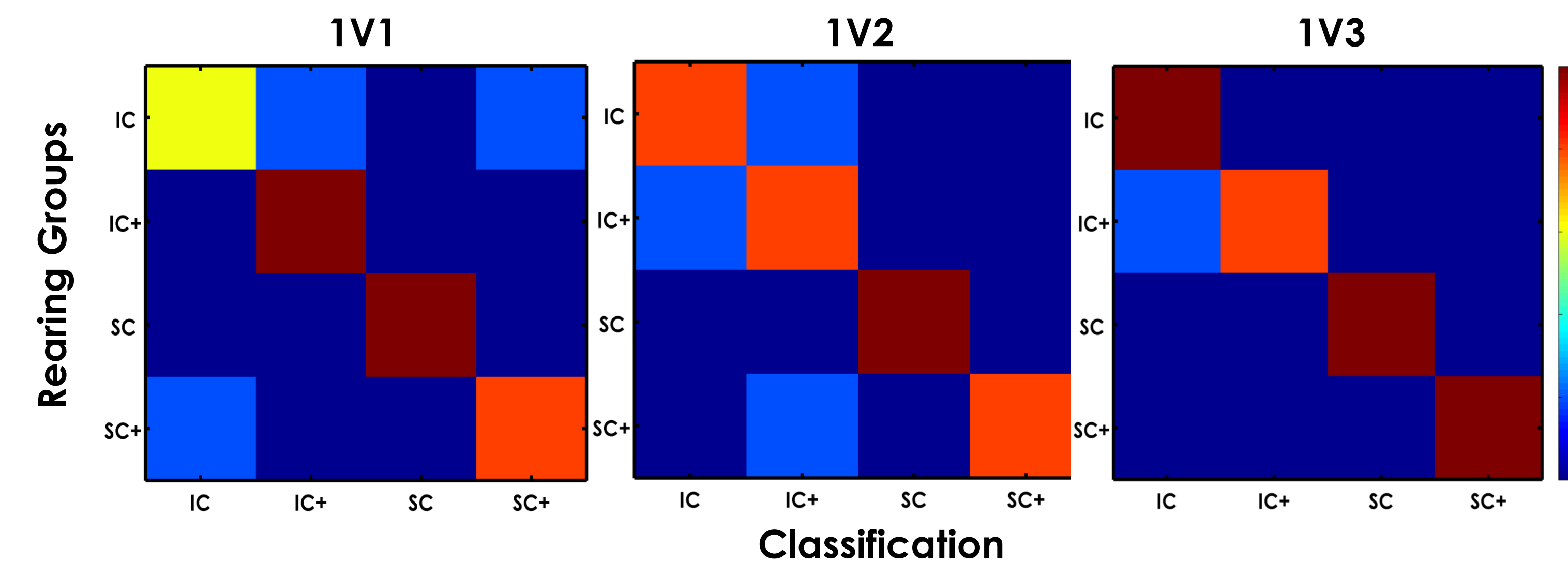


Figure 5. Classification. SS choices were used to classify rats into rearing groups. Color scheme indicates percentages of correct classification.

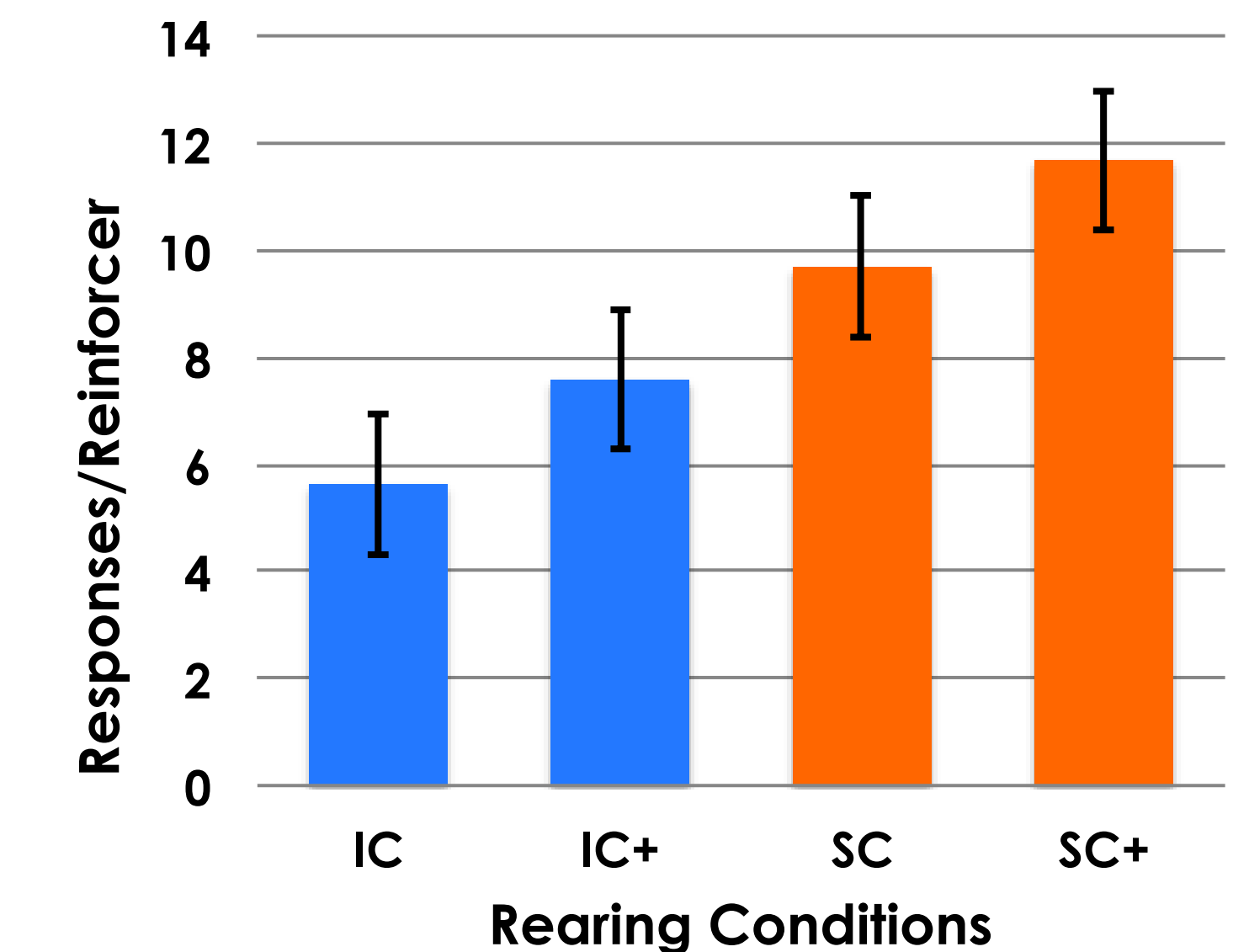


Figure 6. DRL Efficiency. Socially isolated rats had a lower number of responses/reinforcer.

Discussion

- Isolated rats made more impulsive choices in the impulsive action task and failed to adaptively make more LL choices when LL payoff increased. Moreover, this behavior adequately classified rats into their rearing conditions.
- Isolated rats showed better DRL efficiency, indicating better action inhibition.^{3,7}
- Novelty enrichment had no significant effects on impulsive choice and impulsive action.
- These results replicated previous findings^{3,4} and extended them by isolating the effects as due to social enrichment.

References

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