Variation in problem-solving performance between urban and rural black-capped chickadees

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Introduction

- Species in urban environments are subject to new selective pressures
- Increased contact with novel manmade items results in different behaviours
- Studies of the difference in problem-solving success between urban and rural birds yields conflicting results[1][2]
- **Urban chickadees are predicted to be more likely to and faster to solve novel food-motivated tasks than rural chickadees**

Methodology

Capture — Chickadees from urban and rural environments around Ottawa, Ontario were captured.

Task — Birds were deprived of food for 30 minutes. A novel food-motivated task was then presented.

Video — The birds' interactions with the task were recorded for one hour.

Analysis — The videos were analyzed for:
- If the task was solved
- The latency of solve



Results

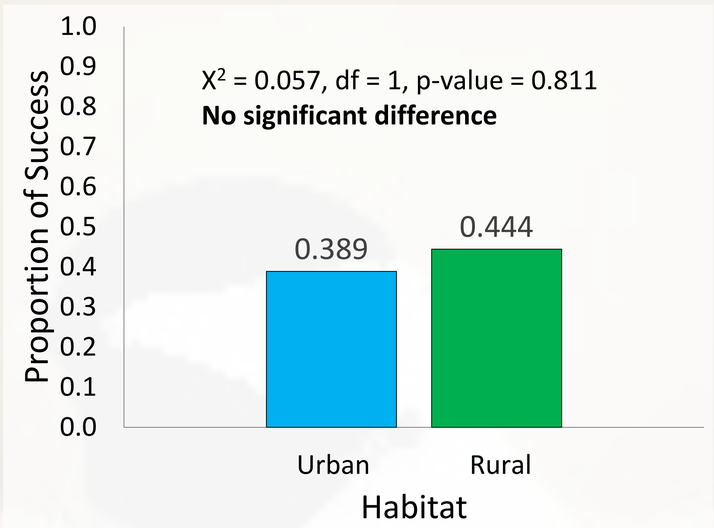

Figure 1. Proportion of success of a novel food-motivated problem-solving task in urban and rural chickadees captured from three different urban sites (n=36) and three different rural sites (n=36). A chi-square analysis was used to determine statistical significance.

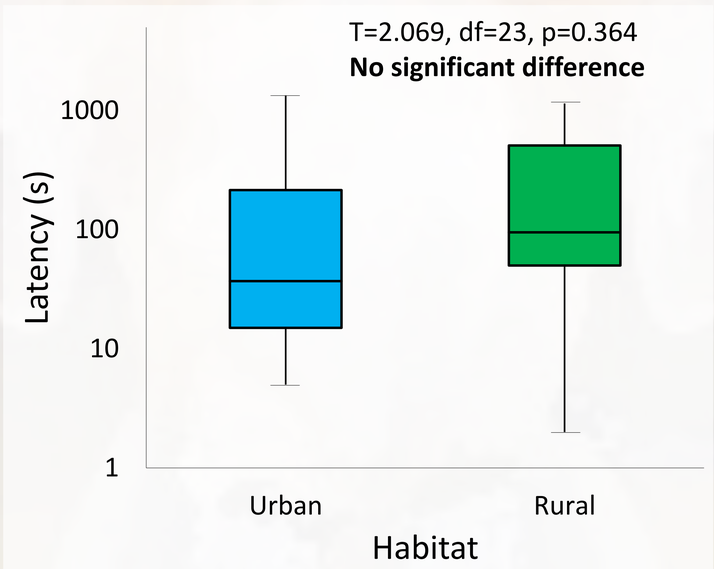

Figure 2. Latency to solve after first contact of a novel food-motivated problem-solving task. Data is collected from urban (n=12) and rural (n=13) chickadees who were successful at solving the task. A two-sample T-test assuming unequal variances was used to determine statistical significance.

Discussion

- Proportion of success and latency to solve are not significantly different between urban and rural birds
- Both differences are not statistically significant ($p>0.05$)
- Both are likely due to chance or confounding variables
- The results for latency to solve may also be affected by a small sample size

Conclusion

- Urban and rural chickadees are equally likely to solve novel food-motivated tasks and solve at the same speed
- Possible confounding variables in urban environments:
  - Bird feeders and accessible food
  - Selective pressures that decrease interaction with novel items
  - Reduced nestling development due to poor nutrition[1]
- Future studies may analyze the frequency of attempts it takes chickadees to solve a task[1]
- This can be another measure of problem-solving ability

Acknowledgements

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References:
[1] Papp S et al (2015) *Behav Ecol Sociobiol.*, 69(3), 471-480.
[2] Preiszner B et al (2016) *Anim Cogn.*, 1-11.