

Spatial Learning in Domestic Dogs: A Pilot Study on Diverse Testing Trials

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INTRODUCTION

Background research

- Research has suggested that dogs are able to navigate a maze with food reinforcement, but have a low spatial memory capacity (e.g., MacPherson & Roberts, 2010).
- Specifically, dogs had lower performance when completing a Radial arm maze (RAM) when compared other animals.
- According to Craig et al. (2012), dogs completed the same RAM task but had higher performance due to fewer trials per day.

Research purpose

- There has been little research found on the effects of testing trial on spatial learning. Therefore, the current study expanded research by assessing diverse testing trials on spatial learning within dogs.

Hypothesis

- The researchers hypothesized that dogs in the long trial condition would outperform dogs in the intermediate trial condition.
- Additionally, it was hypothesized that dogs in the intermediate trial condition would outperform dogs in the control/mass trial condition.

METHOD

Subjects

- $N = 12$ (Males = 5; Females = 7)

Materials

- Dog demographics.
- Test stimuli: six plastic food containers with three food containers baited with a dog treat (see Apparatus).

Procedure

- The food reinforcers were placed in the same container across condition and test trial.
- During the trial, the dog was allowed to freely roam the room for 10 minutes to find the baited containers. If not found within 10 minutes, the trial was terminated.
- Once a trial was complete, the owner would walk the dog.
- After the walk, the procedure was repeated until all test trials were complete.

Dependent Measures

- Higher performance was defined as more correct container choices, less wrong container choices, less repeat choices, and shorter latency to complete the task.

METHOD

Apparatus

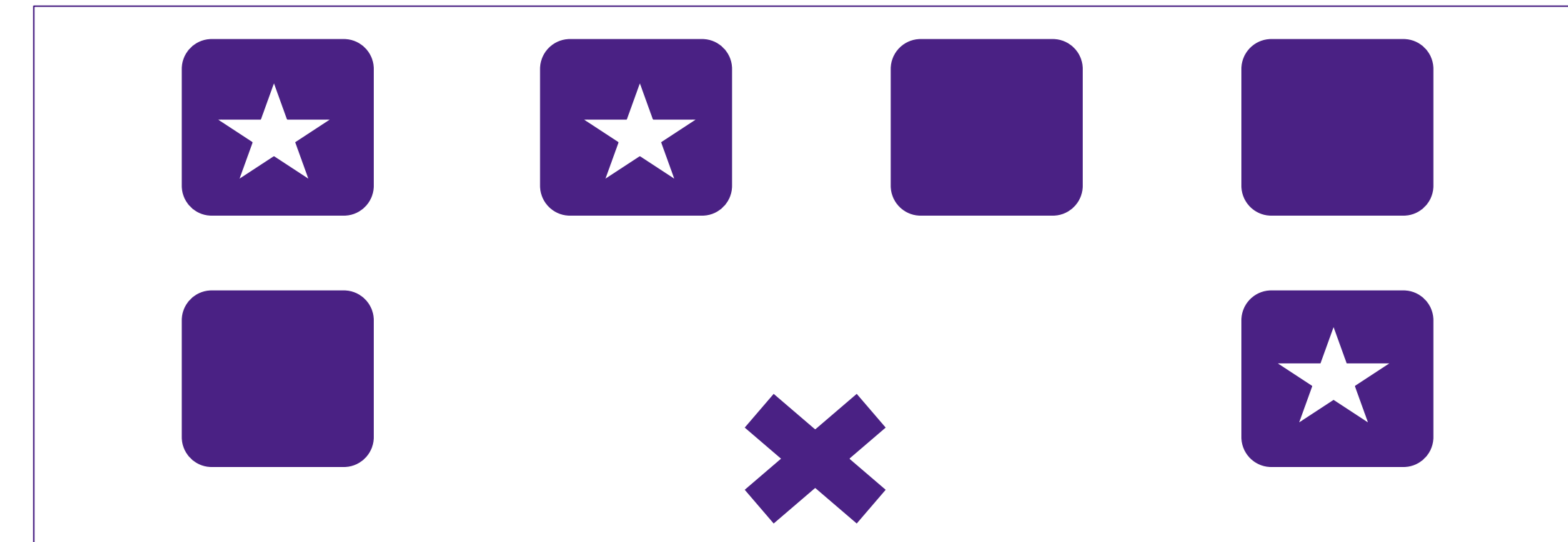


Figure 1. Half-moon layout of the task.

Conditions

Day 1	Day 1	Day 2	Day 1	Day 2	Day 3
Dog Demographics	Dog Demographics	Trial	Dog Demographics	Trial	Trial
Trial	Trial	Walk	Trial	Walk	Walk
Walk	Walk	Trial	Walk	Trial	Trial
Trial	Trial	Walk	Trial	Finish	Complete
Walk	Walk	Trial	Finish		
Trial	Trial	Complete			
Walk	Finish				
Trial					
Walk					
Trial					
Complete					

Figure 2. Mass trial condition was 6 trials over 1 day.
 $N = 4$

Figure 3. Intermediate trial condition was 3 trials over 2 days.
 $N = 5$

Figure 4. Long trial condition was 2 trials over 3 days.
 $N = 3$

RESULTS

- Results of a two-way repeated measures (RM) ANOVA with correct container choices as the dependent measure revealed a significant main effect of Trial, $F(5, 45) = 3.124, p = .017$.
- Results of a two-way repeated measures (RM) ANOVA with latency as the dependent measure revealed a significant main effect of Trial, $F(5, 45) = 7.858, p < .001$.
- Results of a two-way repeated measures (RM) ANOVA with wrong container choices as the dependent measure revealed a significant main effect of Trial, $F(5, 45) = 3.685, p = .007$.

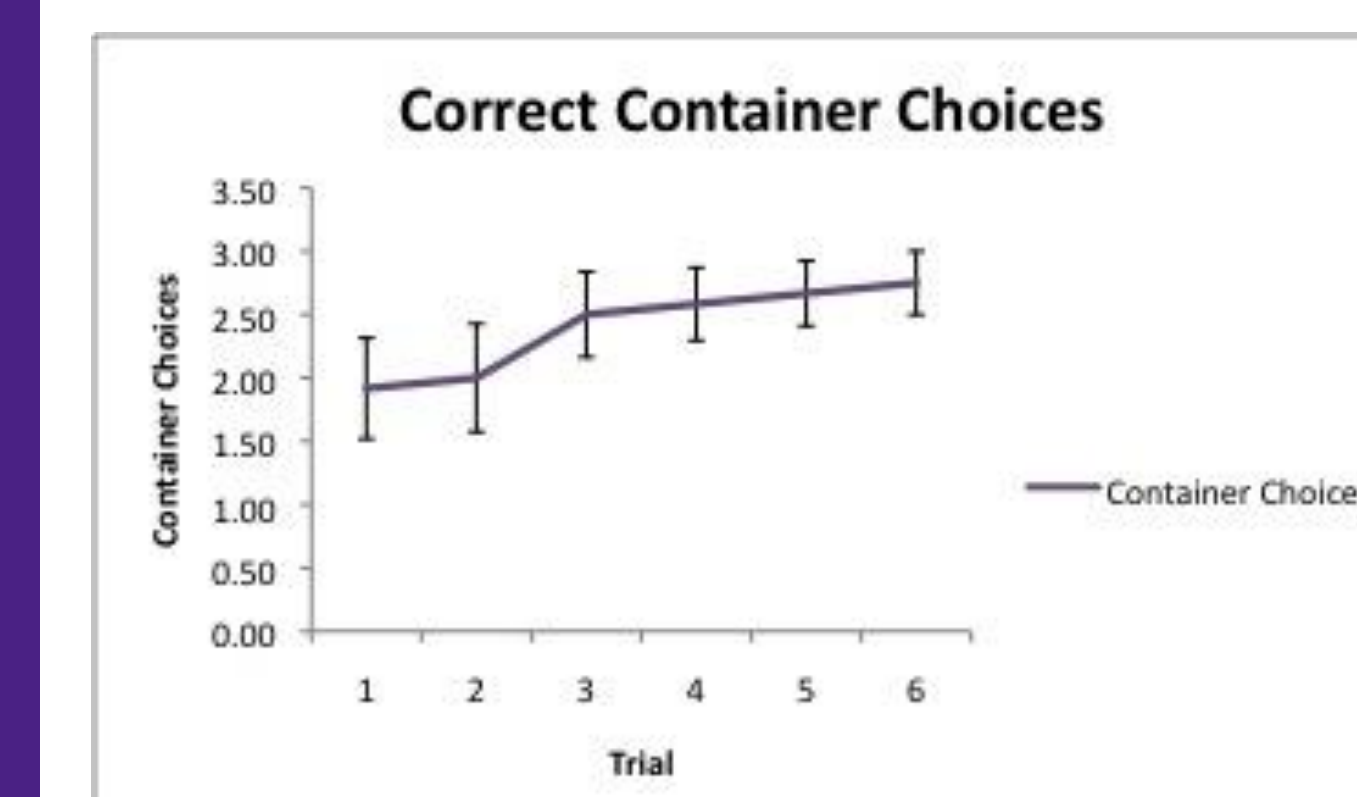


Figure 5. Mean correct container choices collapsed. Trial 1 correct choices > Trial 4 correct choices (marginally significant at $p = .053$).

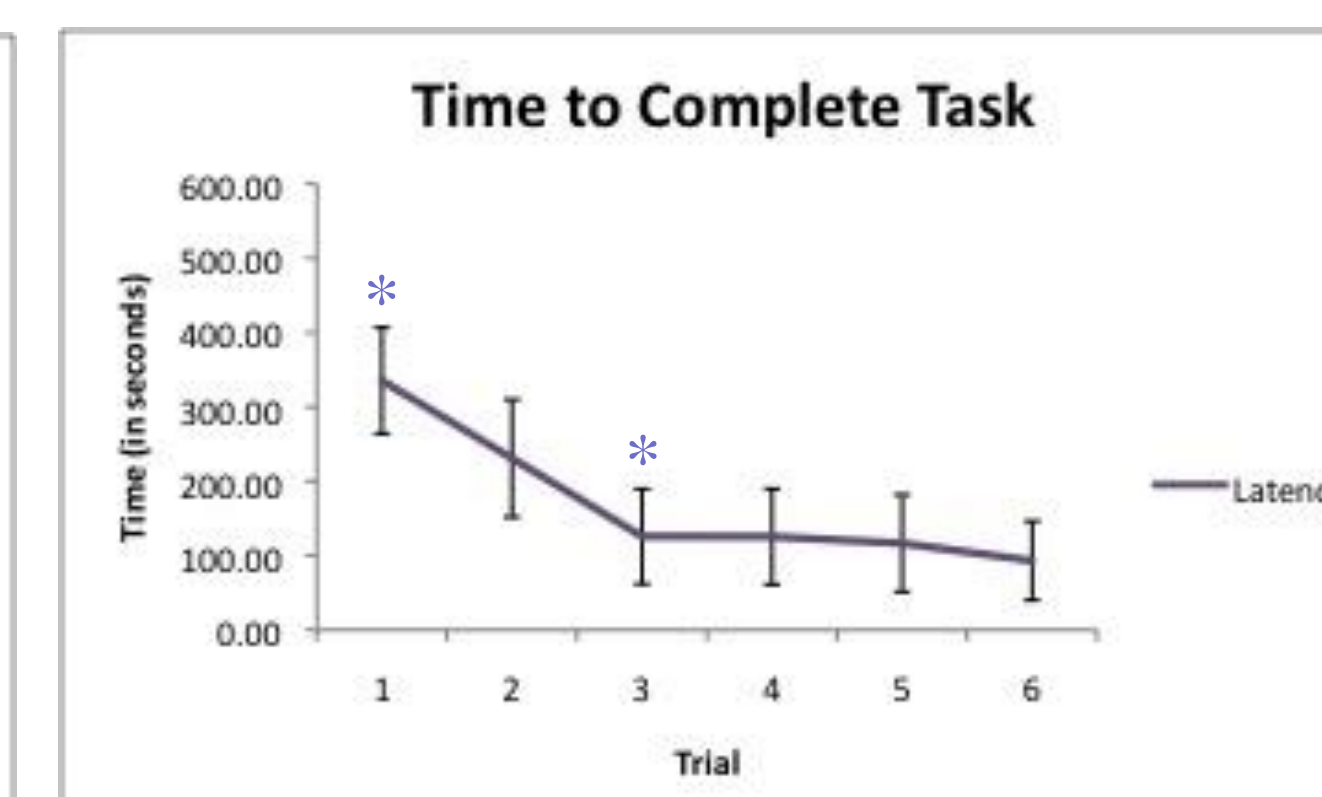


Figure 6. Mean latency collapsed. Trial 1 time > Trials 2-6 time. Trial 3 time > Trial 5 time.

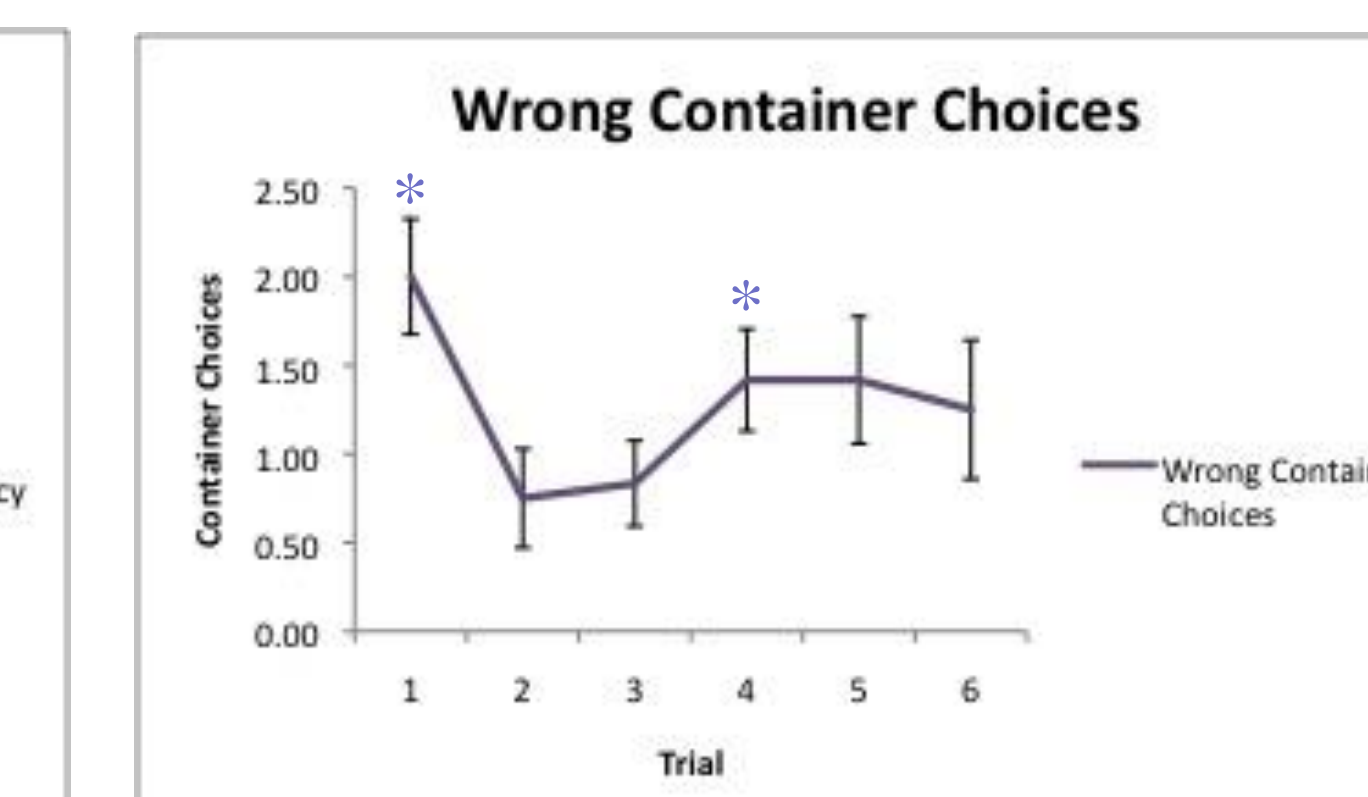


Figure 7. Mean wrong container choices collapsed. Trial 1 wrong choices > Trial 2 & Trial 3 wrong choices. Trial 4 wrong choices > Trial 2 & Trial 3 wrong choices.

* indicates $p < .05$

DISCUSSION

Conclusion

- There was a significant difference in trial, but there was no difference between condition (testing trial).

Implication

- It may be possible that dogs do not need longer delays between trials to learn the specific task.

Limitations

- Small sample size; not enough subjects per condition.
- Ceiling effects; there is the possibility of the task being too easy.
- Dog treats were not always reinforcing.
- Odor cues in the room could be present; this could exist for both dog treats and other dogs.

Future Research

- Future research should explore a more difficult task when measuring various testing trials.
- Future research can also look at reference memory and working memory to determine learning in the dog.

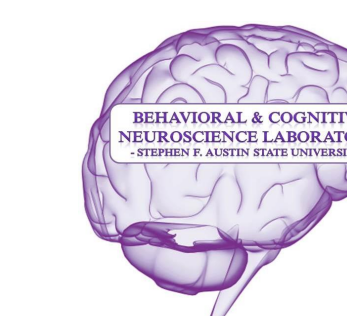
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- Craig et al. (2012). Domestic Dogs (*Canis familiaris*) and the Radial Arm Maze: Spatial Memory and Series Position Effects. *Journal of Comparative Psychology*, 126(3), 233-242.
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