

# Does Object Ownership Affect Spatial Memory in the Domestic Dog?

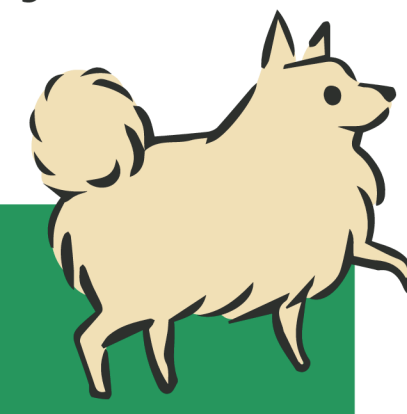
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## Background

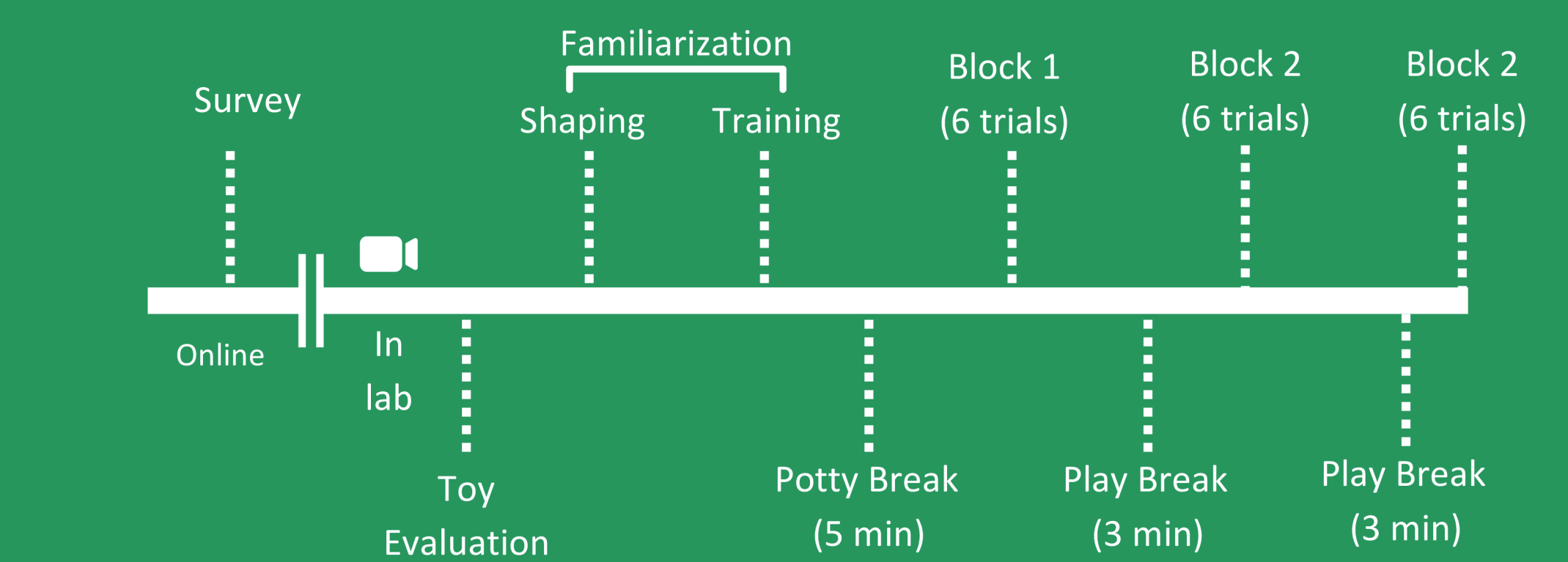
In human societies, **ownership** is a **cooperative arrangement** based on **mutually respected norms** (Kangniesser et al., 2020). As humans, though, we also have cooperative relationships with nonhuman animals with whom we engage in interactions with objects, most obviously the domestic dog.

Companion dogs inhabit social environments structured largely by **heterospecific social norms**, which are selected and enforced by human guardians and applied to dogs within the household. Thus, dogs are a compelling model species in which to examine ownership-like concepts.

The current project examined: **1)** whether a “cognitive hallmark” of ownership in humans, improved memory for owned objects, occurs in the domestic dog, and **2)** whether dog guardian beliefs surrounding object ownership are related to dog’s memory for their owned “owned” object.



## Methods



Prior to coming into the lab, dog guardians were asked to complete a survey focused on their beliefs surrounding object ownership in their dogs. Dog guardians were also asked to bring their dogs “favourite item” to the lab, where **the favourite item acted as the dog’s “owned object”** during the memory task.

In the memory task, 18 trials were completed by each dog. Half of the trials were completed with a novel object, while the other half were completed with the dog’s owned object.

## Memory Task Procedure

### A Trials

- Experimenter 1 (E1) hides an object (novel or owned) under one bucket with a treat.
- E1 places the occluder in front of the buckets for a **0s, 30s, or 60s retention interval**.
- Dog is released by dog guardian and chooses a bucket.
- Dog receives a reward if they choose the correct bucket, but no reward if they choose the incorrect bucket

B



### Data Analysis

A Generalized Linear Mixed Model (GLM-M) was used to analyze accuracy (“hit” or “miss”) on the memory task.

## Participants

**Dog Guardians**  
N = 53

### Self-Description

- ♀ Female – 94.34%
- ♂ Male – 5.66%
- ♀ Non-binary/third gender – 0%

### Household

- Single Dog – 53.84%
- Multi-Dog (2+) – 46.16%
- Cat – 28.3%



- Single Breed - 43.40%
- Mixed Breed - 56.60%

**Dogs**  
N = 53

### Age

M = 5.94 years ± 3.77 SD  
Range = 0.42 - 14.25 years

### Sex

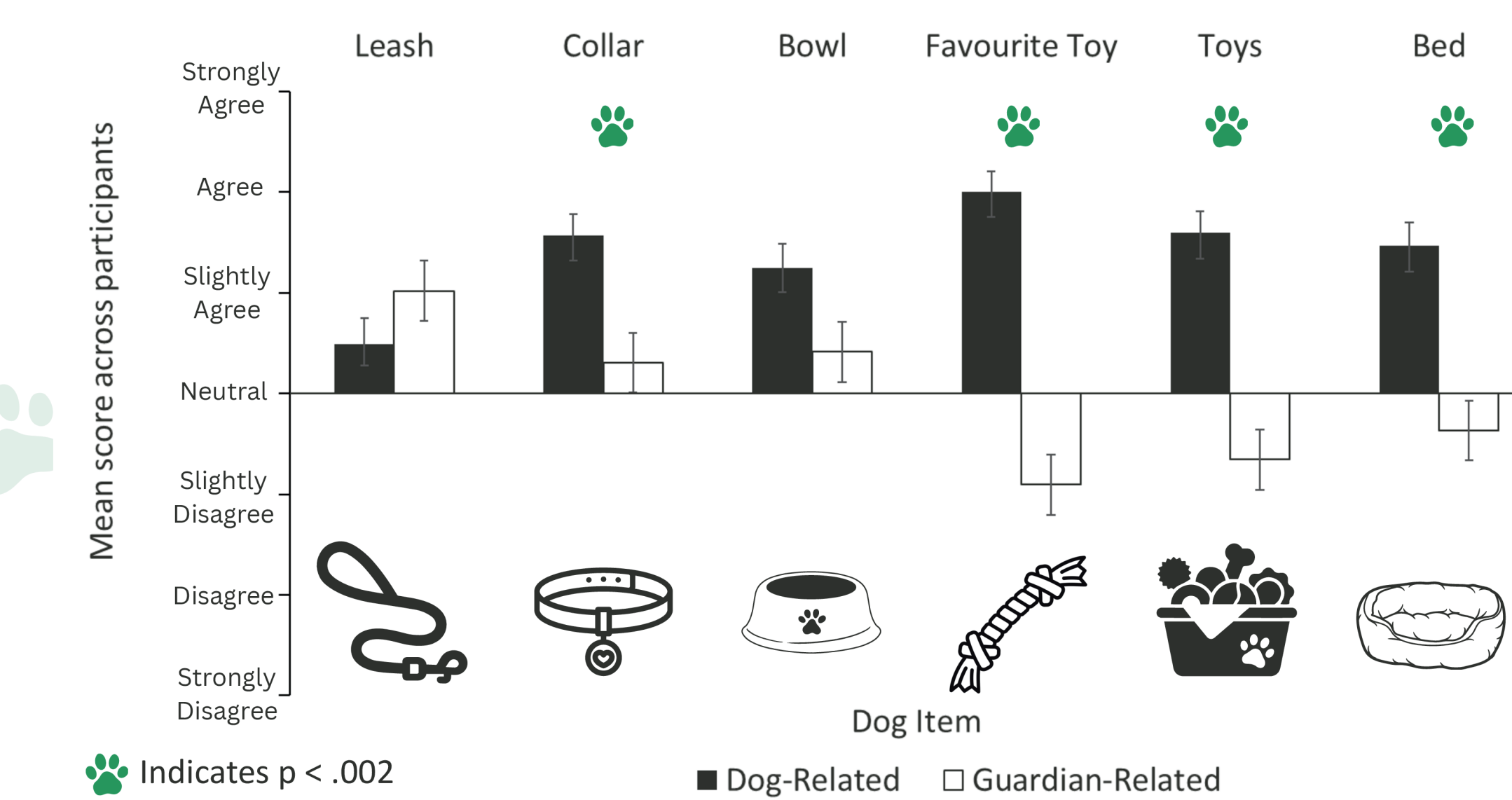
- ♀ Female – 54.62%
- ♂ Male – 45.28%

### Training

- Puppy School – 49.06%
- Agility – 26.42%
- Show – 24.53%
- Scent Work – 16.98%

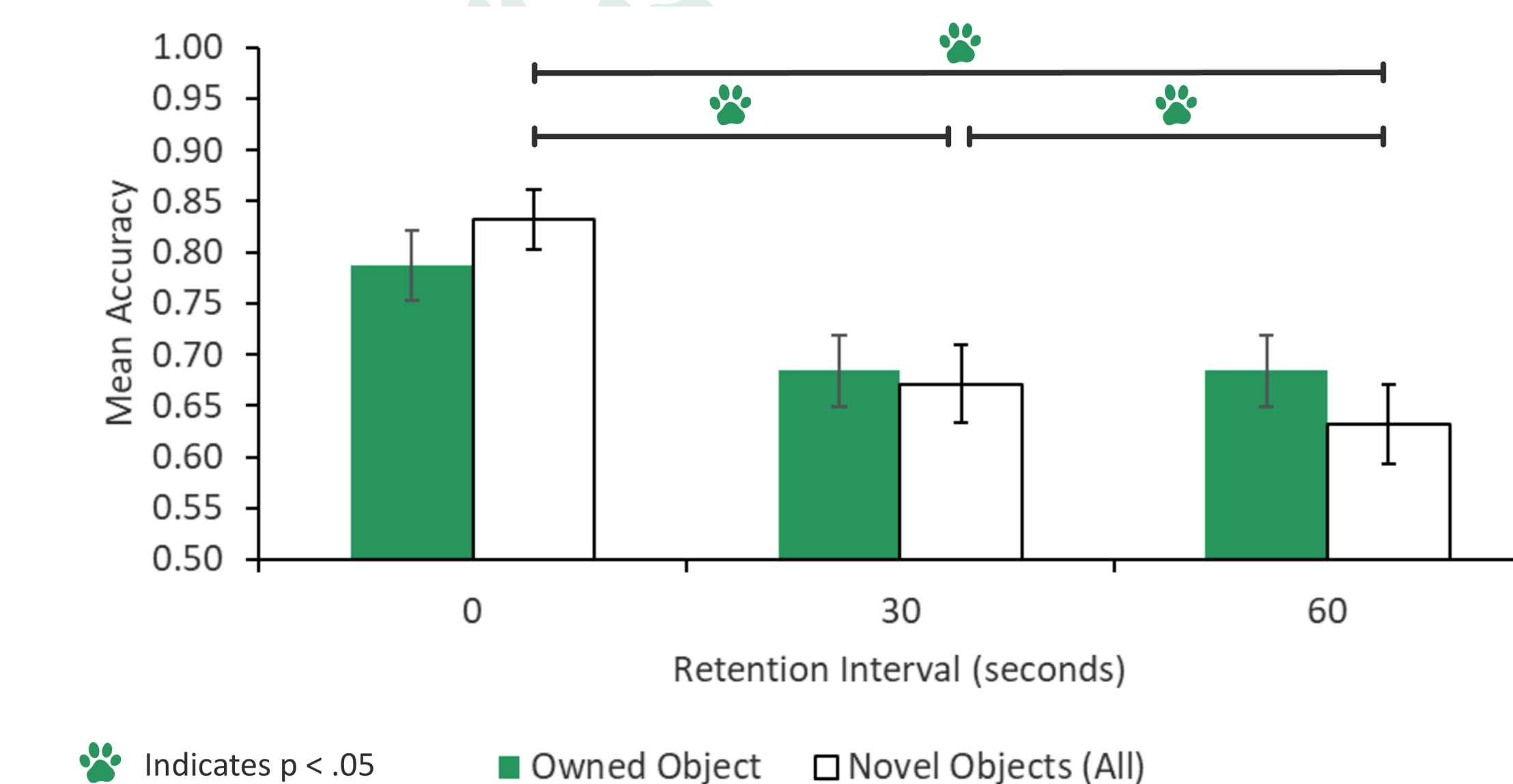
## Results

### Survey: Do dog guardians believe their dogs can own objects?



**Comparison of dog-related and guardian-related questions in the Dog-Item Scale using dependent samples t-tests.** For all questions, dog guardians (n = 53) were asked to rate their opinion on a scale from strongly disagree (1) to strongly agree (7). Statements were formatted “My dog’s [item] belongs to [my dog/me].” Each item appeared in paired dog-related and guardian-related statements, resulting in 12 statement ratings total.

### Memory Task: Do dogs have improved spatial memory for “owned” objects?



**Mean accuracy as a function of retention interval and object type for the memory task.** Retention interval significantly predicted accuracy, such that accuracy significantly decreased across retention intervals, OR = 0.98, 95% CI = [0.98, 0.99], p = .001. Object type (owned vs novel) did not have a significant effect on accuracy, OR = 1.01, 95% CI = [0.99, 1.02], p = .39. The interaction between RI and object type was not significant; however, due to the relevance to the primary research question, the interaction was examined using *emmeans* (Lenth, 2025). All comparisons were subject to Bonferroni corrections (Holm, 1979). For the **owned object**, there were no significant differences between across any RI. In comparison, *emmeans* found significant differences between all RI for the **novel objects**.

## Conclusions

1) **Dog guardians generally believe dogs can own objects**, though this belief varies based on context and object. These guardian beliefs **did not result in individual differences** for dogs in the memory task.

2) There was **no significant difference between owned and novel objects** on a forced object choice task; however, owned objects may offer a **small protective effect** for memory in spatial short-term memory tasks compared to novel objects.

## Future Directions

In my next study, I plan on having the dog guardian bring another item from home to the lab that does not belong to the dog—therefore creating familiarity, but not ownership—in order to tease apart the differences between these concepts in the domestic dog.

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