

# Measuring the rapid acquisition and integration of structured knowledge

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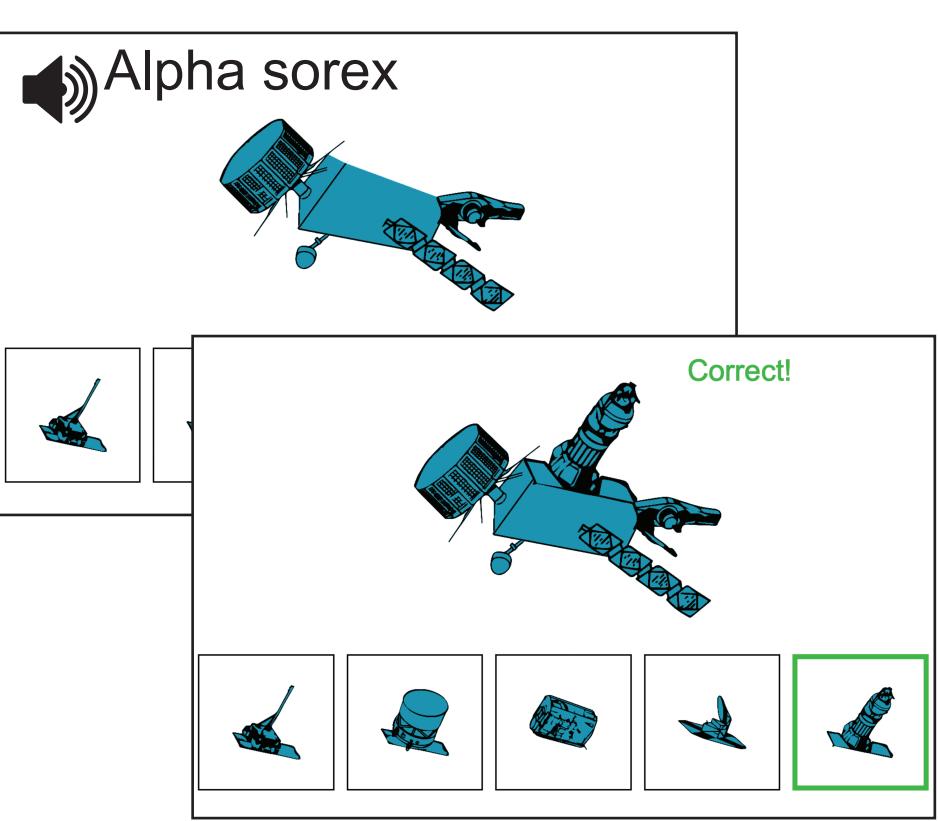
## Questions

Can we quickly build knowledge structures that scaffold continued learning?

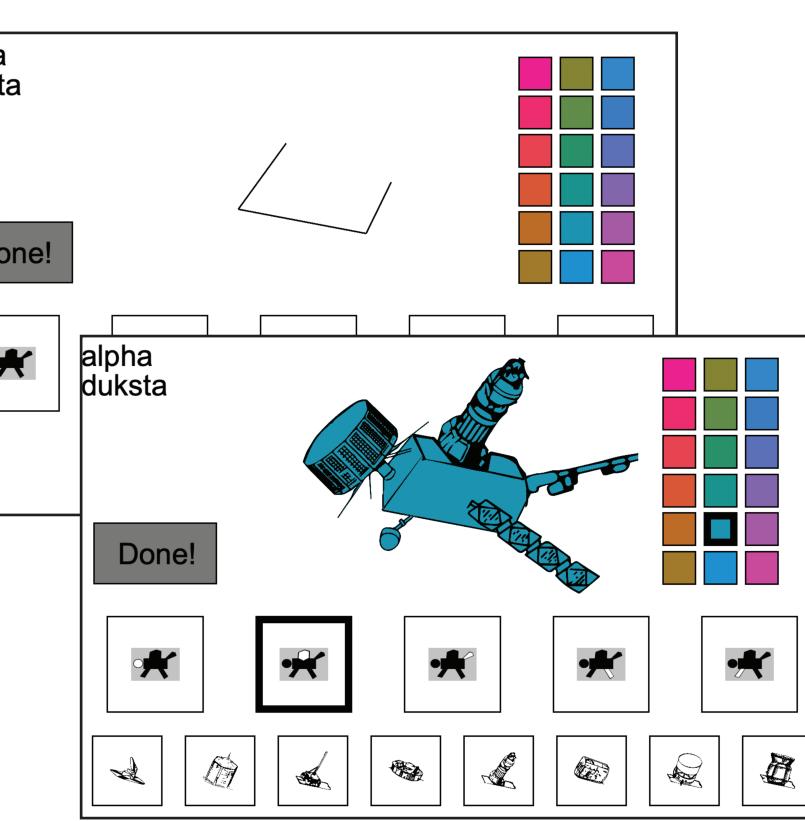
How do we integrate new information while retaining its specifics?

## Tasks

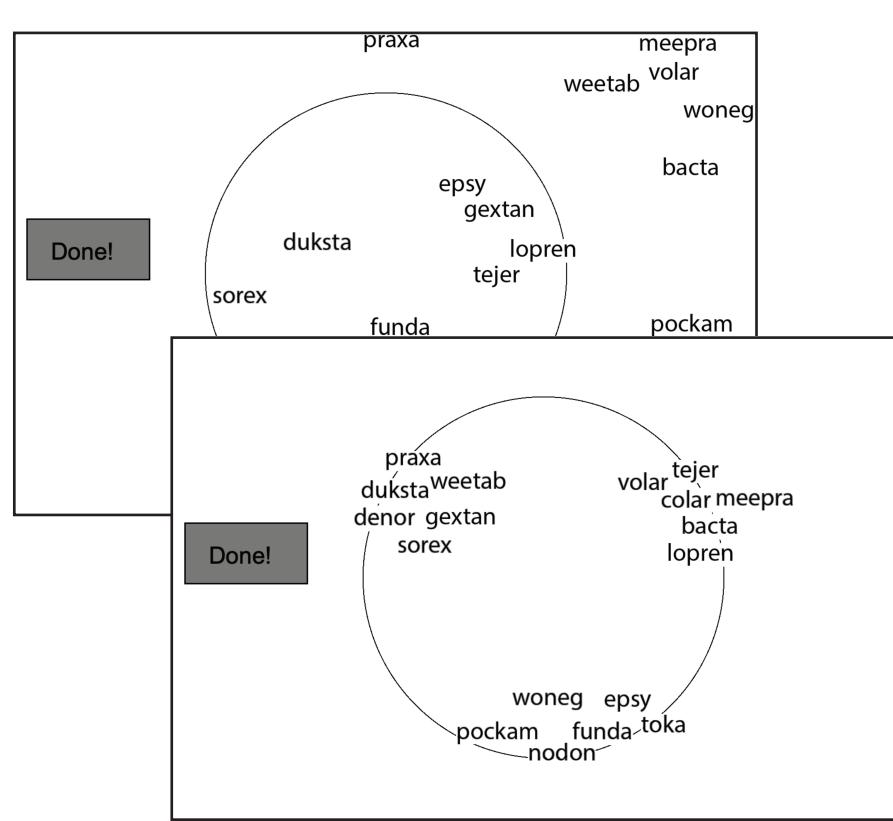
### Training (repeated until 66% correct)



### Test

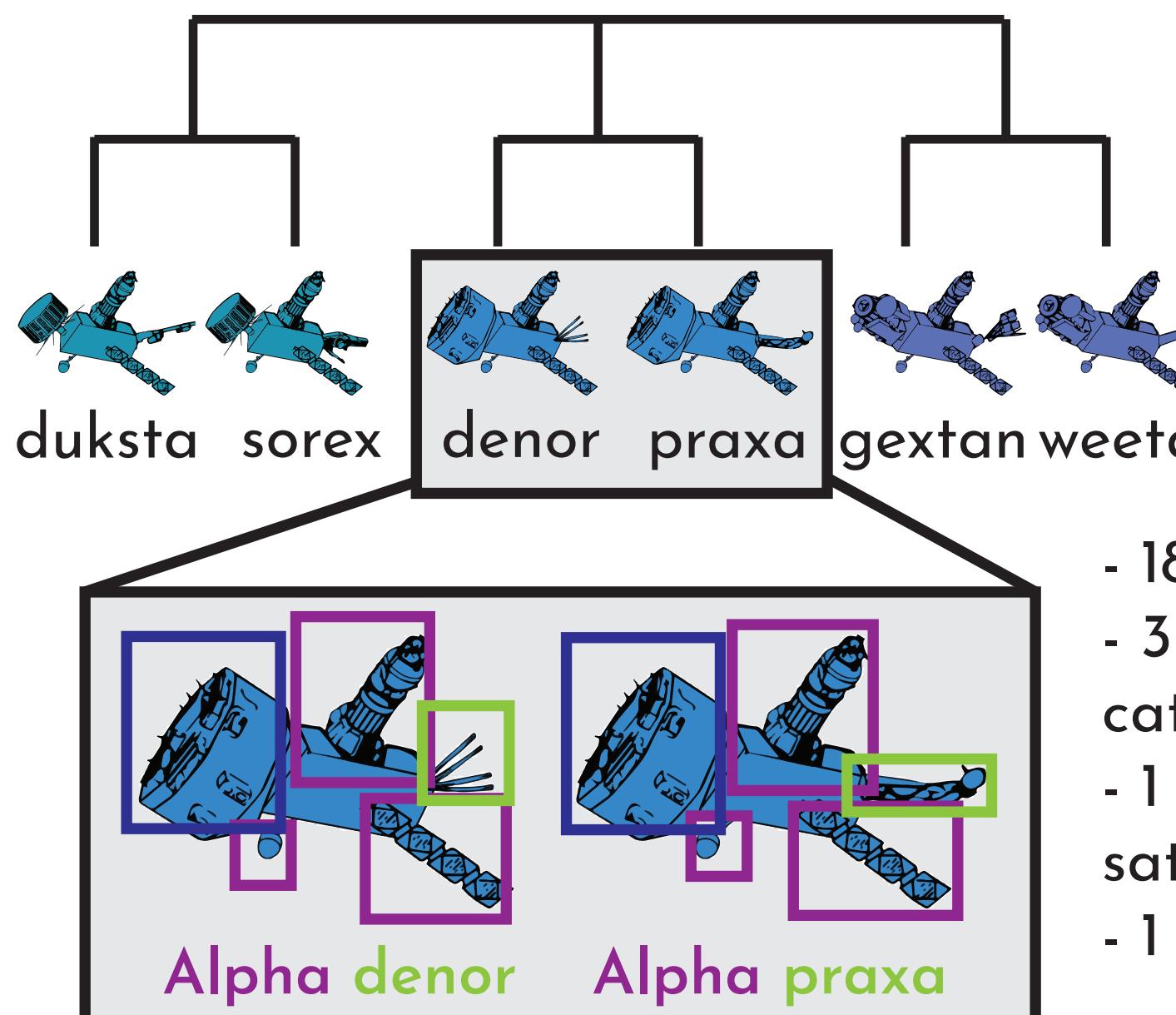


### Sorting (Exps 2 & 3 Only)

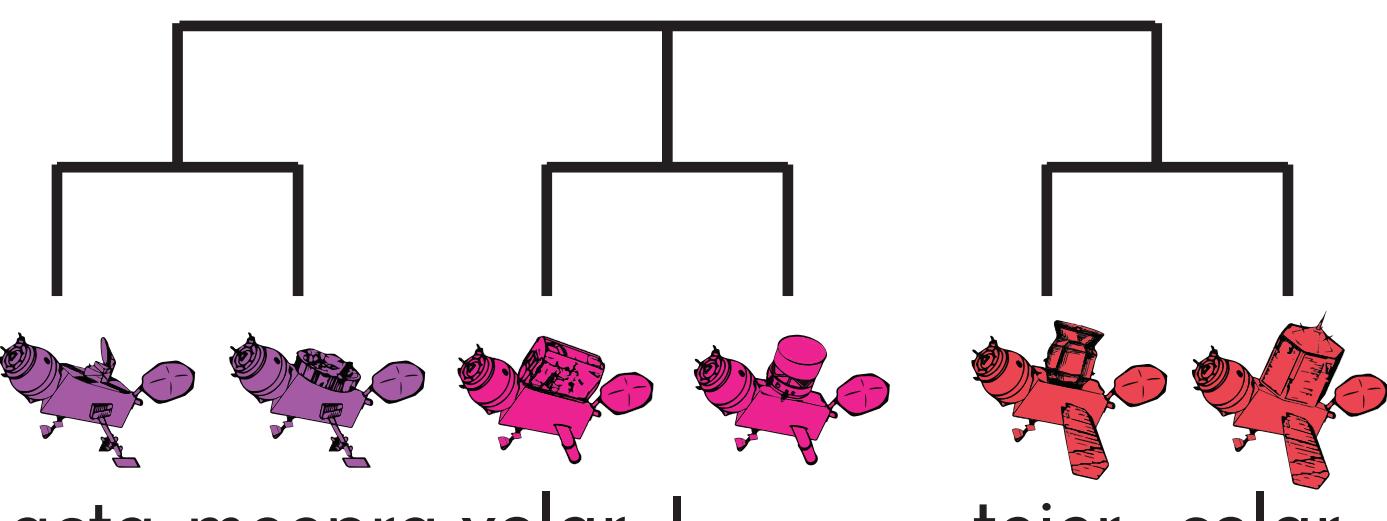


## Stimuli

### Alpha



### Beta



Adapted from Schapiro et al. (2017), Sci. Reports

- 18 satellites total (3 categories)
- 3 visual parts, class name shared with all other category members (**category-defining**)
- 1 visual part, color shared with one other satellite (**subcategory-defining**)
- 1 visual part, code name **unique** to a satellite

## Approach

### Train

Initial Training  
(2 subcategories/category)

### Test

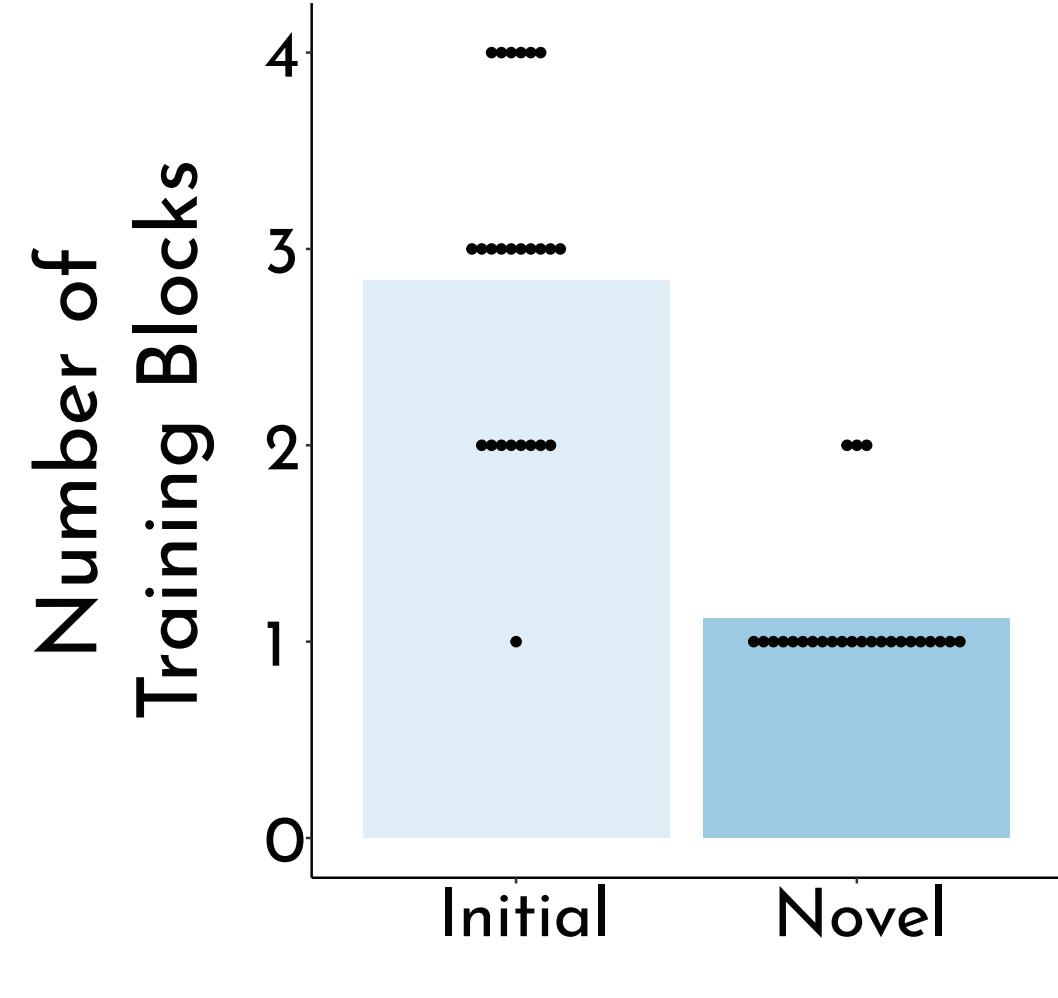
Train (New\*)  
Test (All)

Novel Training  
\*Except Exp 3 (All)

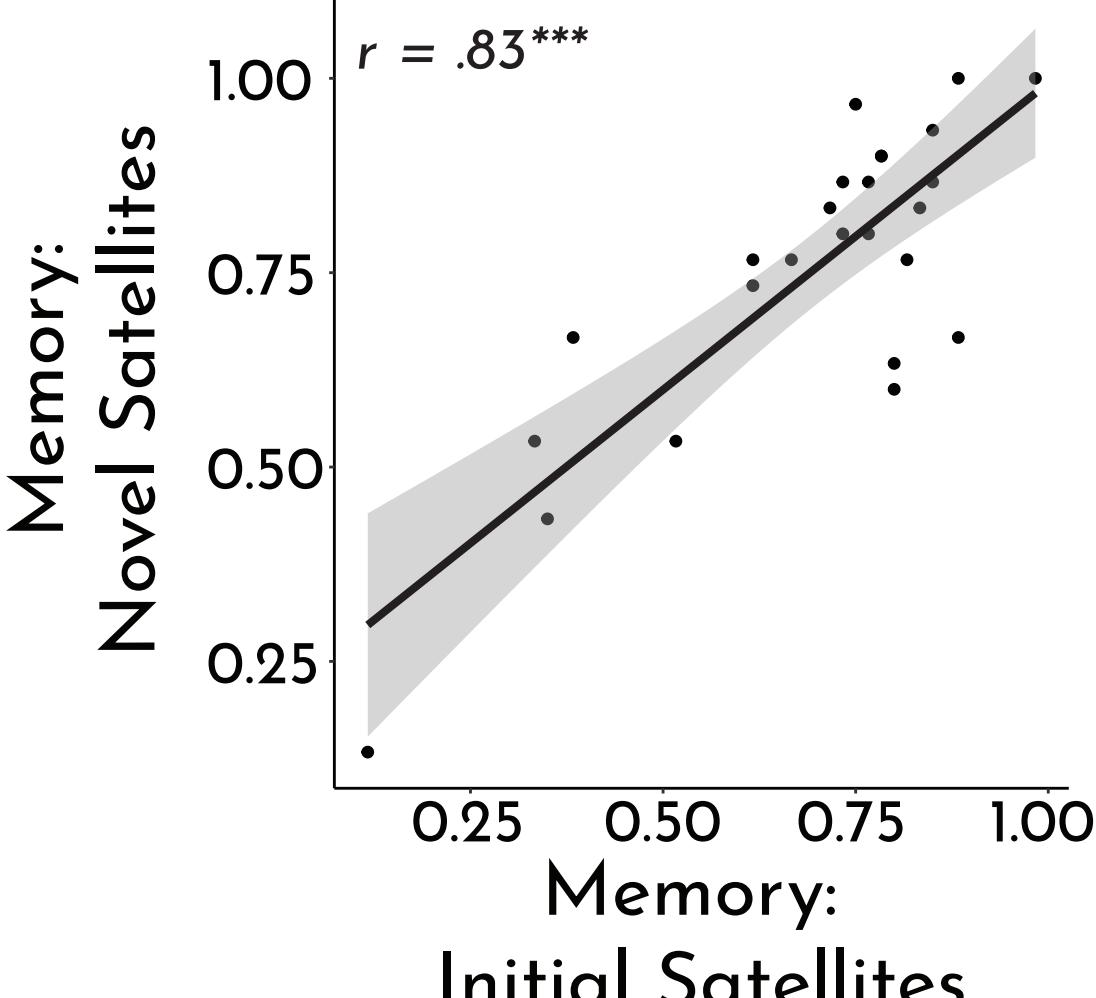
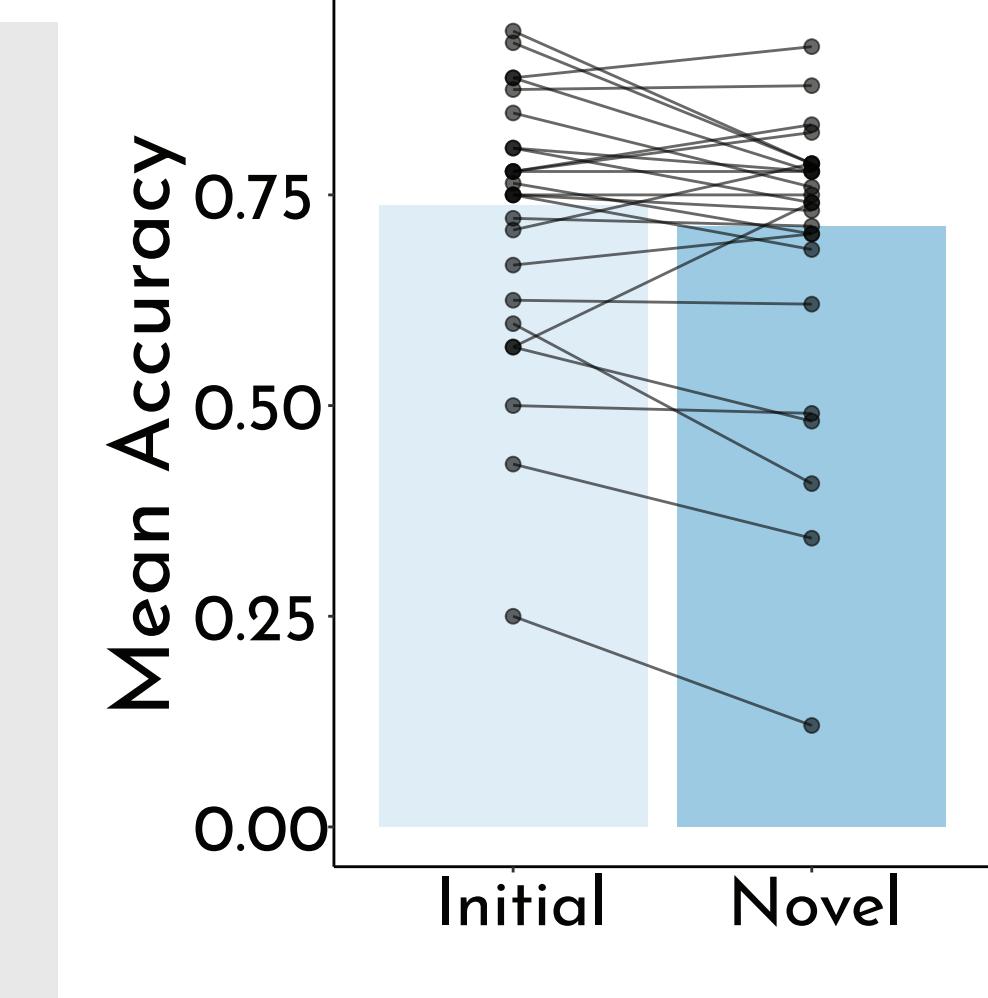
## Experiment 1

N = 25

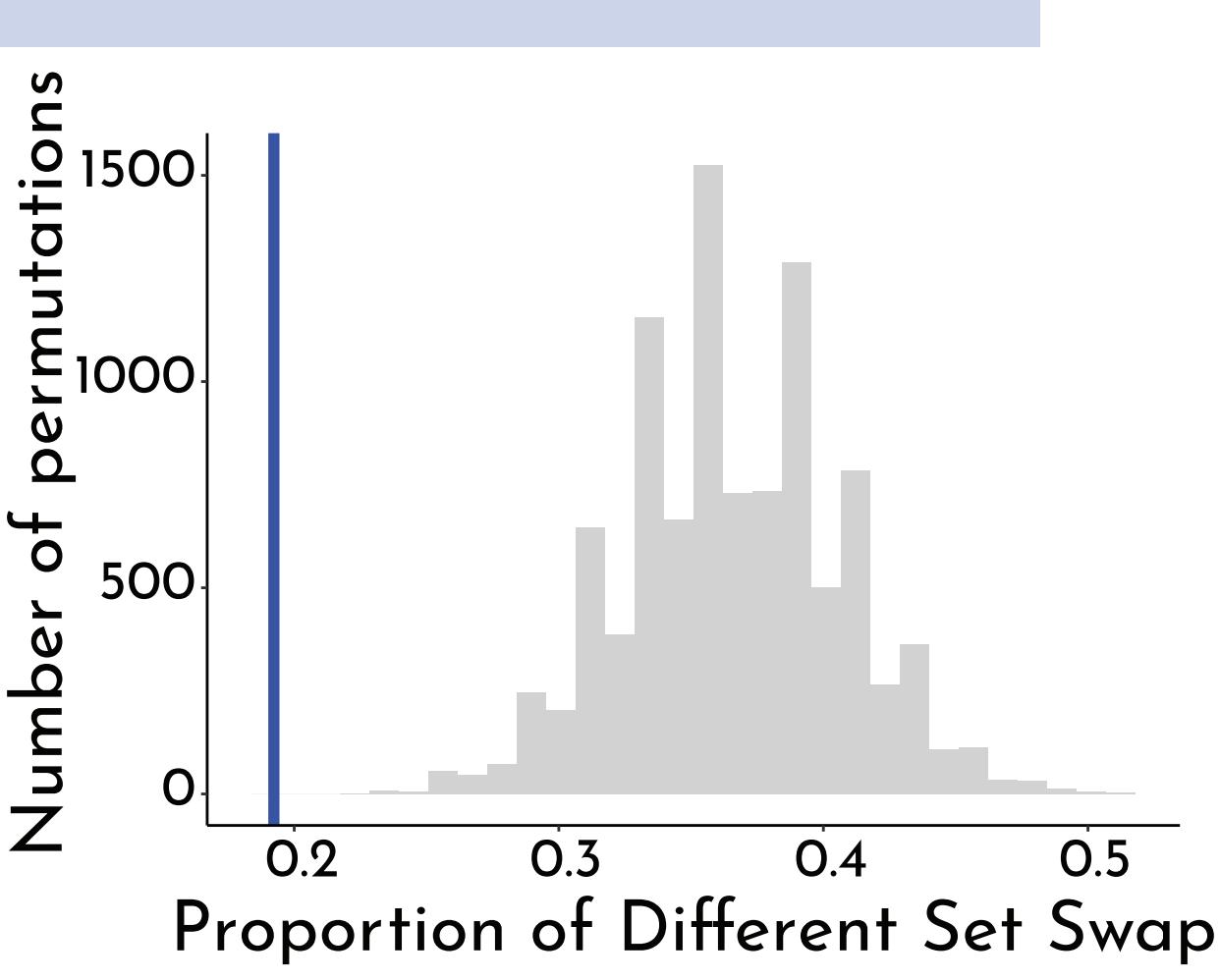
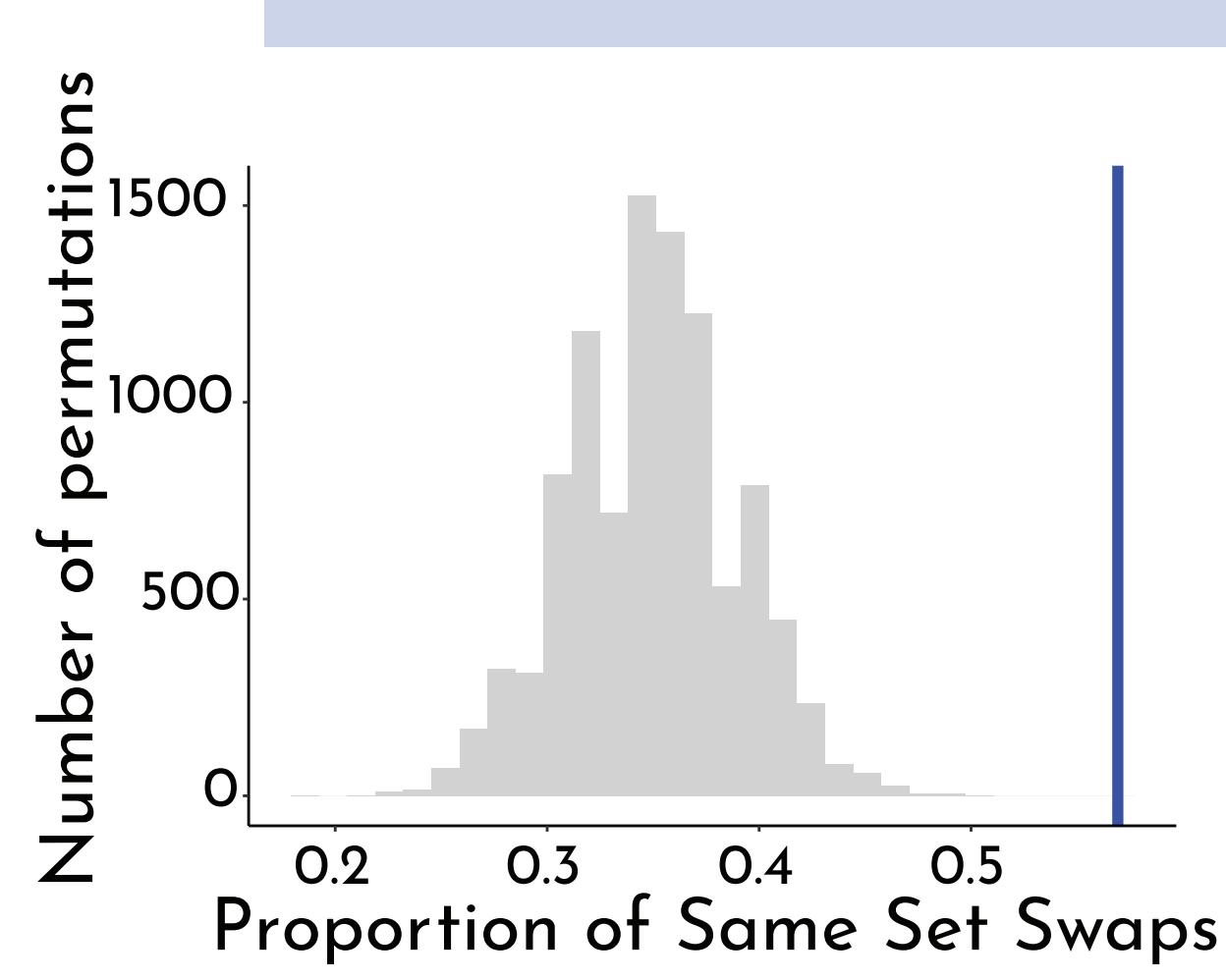
### Training Data



### Test Data



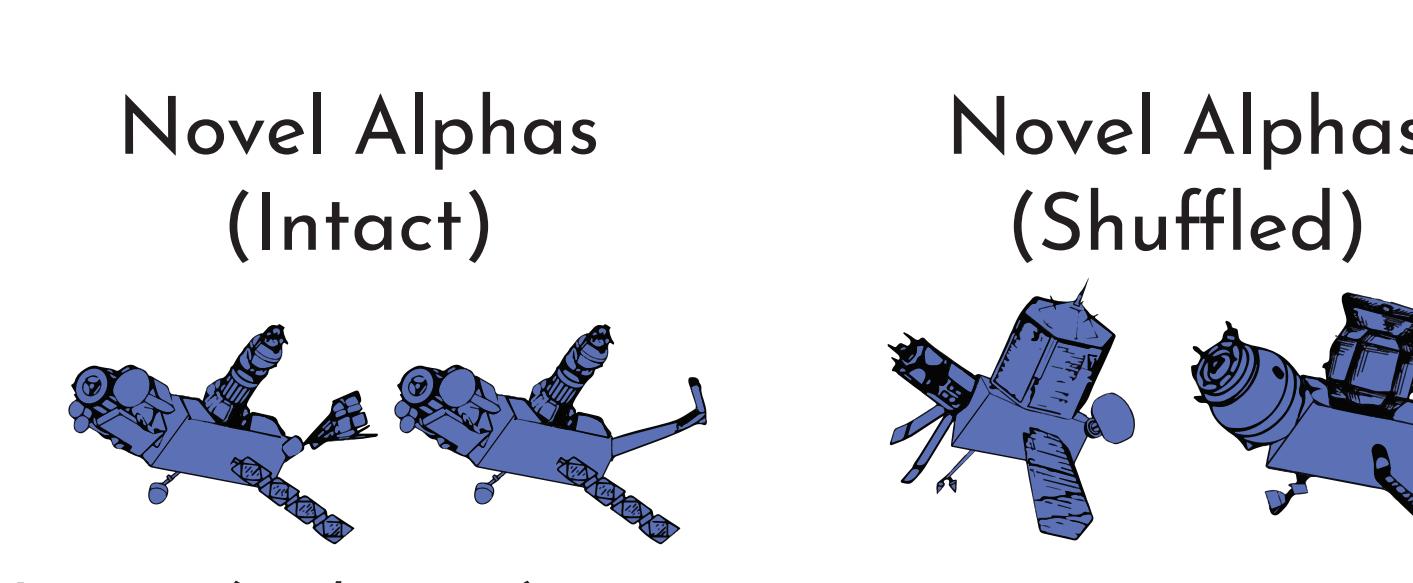
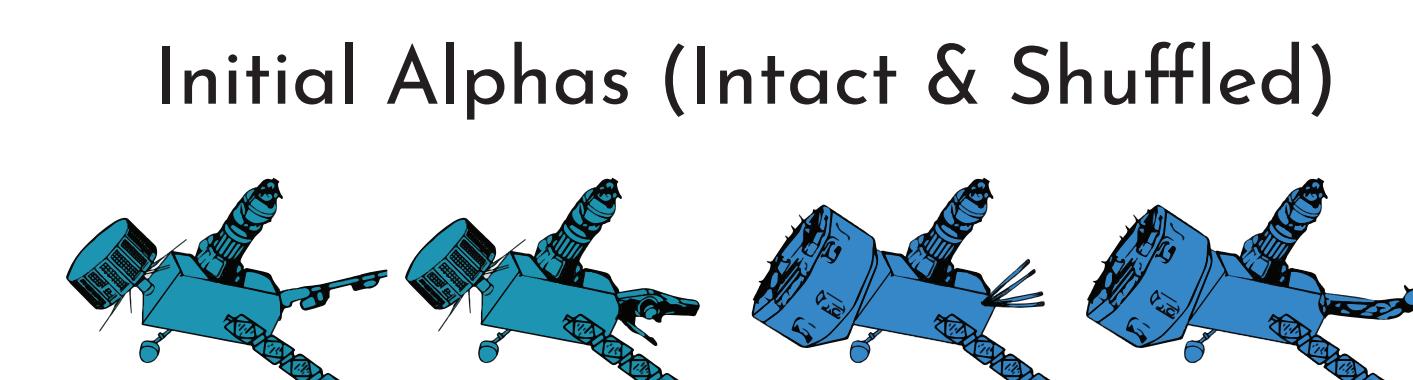
What kinds of errors are people making?



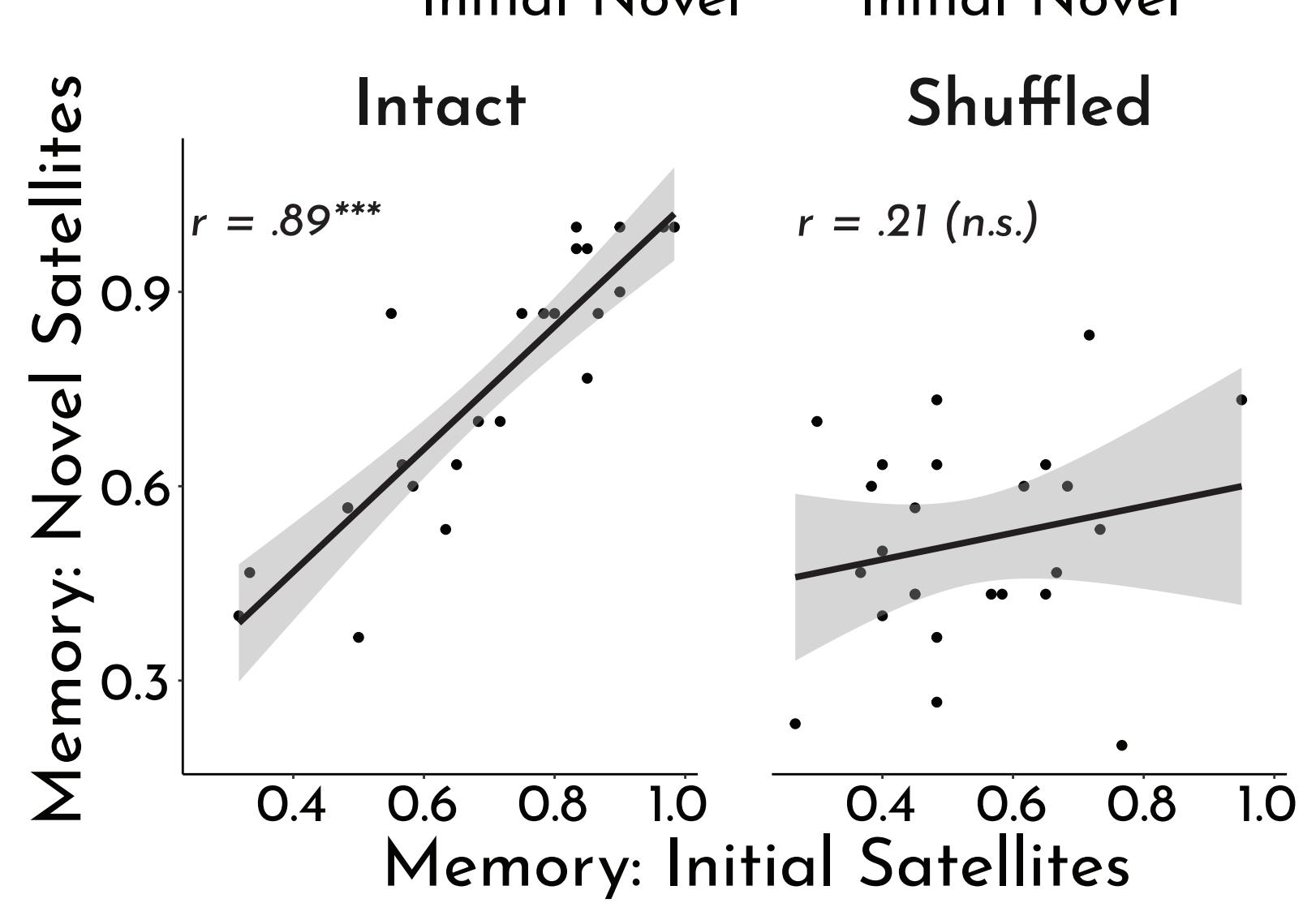
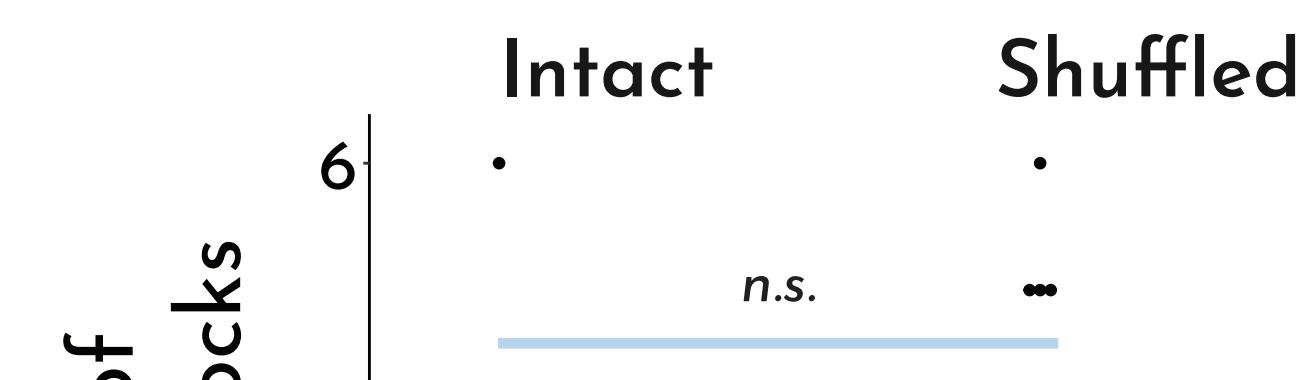
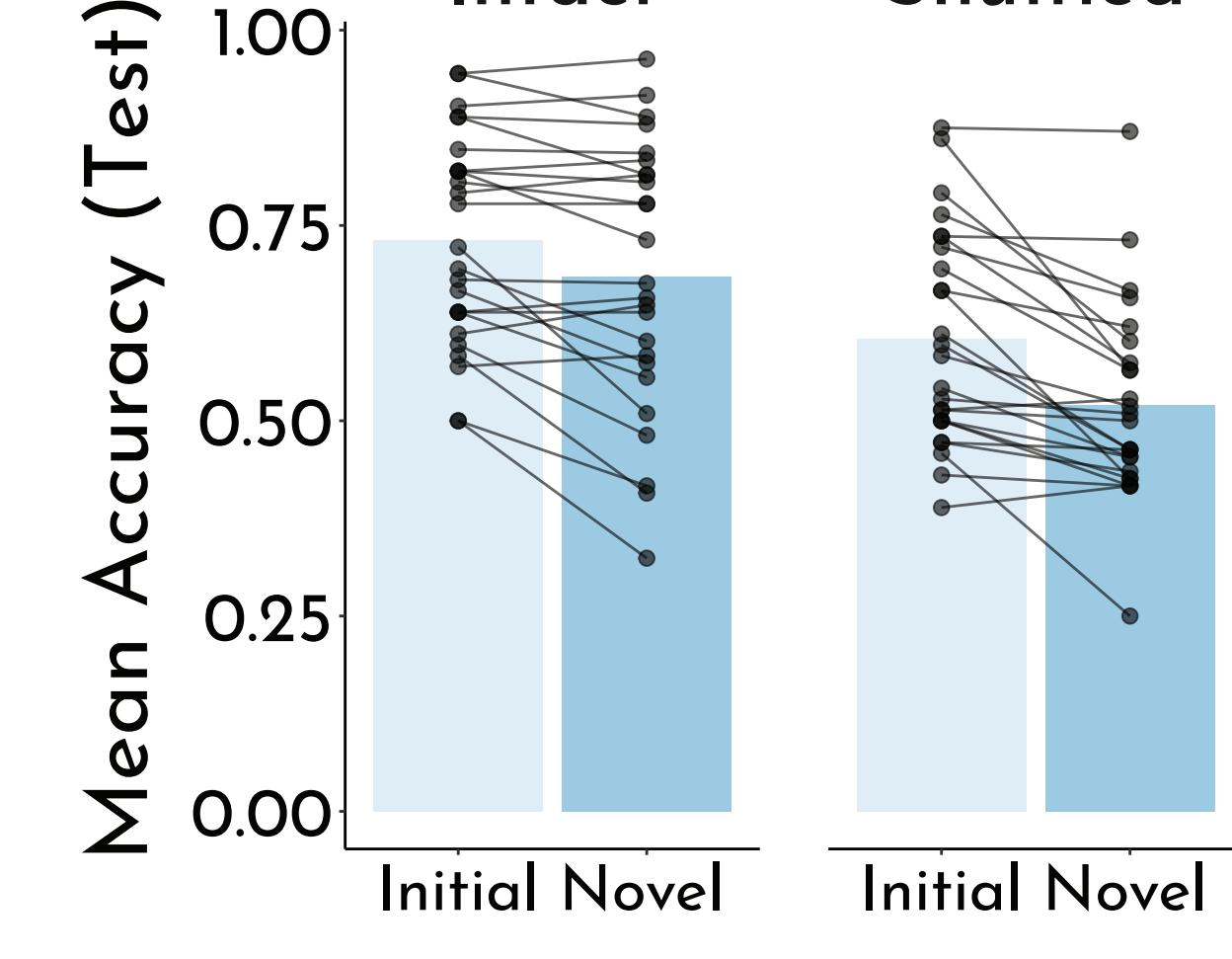
Participants may rapidly use novel category structure to facilitate new learning...

...But memory is still shaped by learning context

Is it structure per se that facilitates new learning?



N = 50 (25/group)



No structure in novel satellites → no benefit of prior learning

\*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001

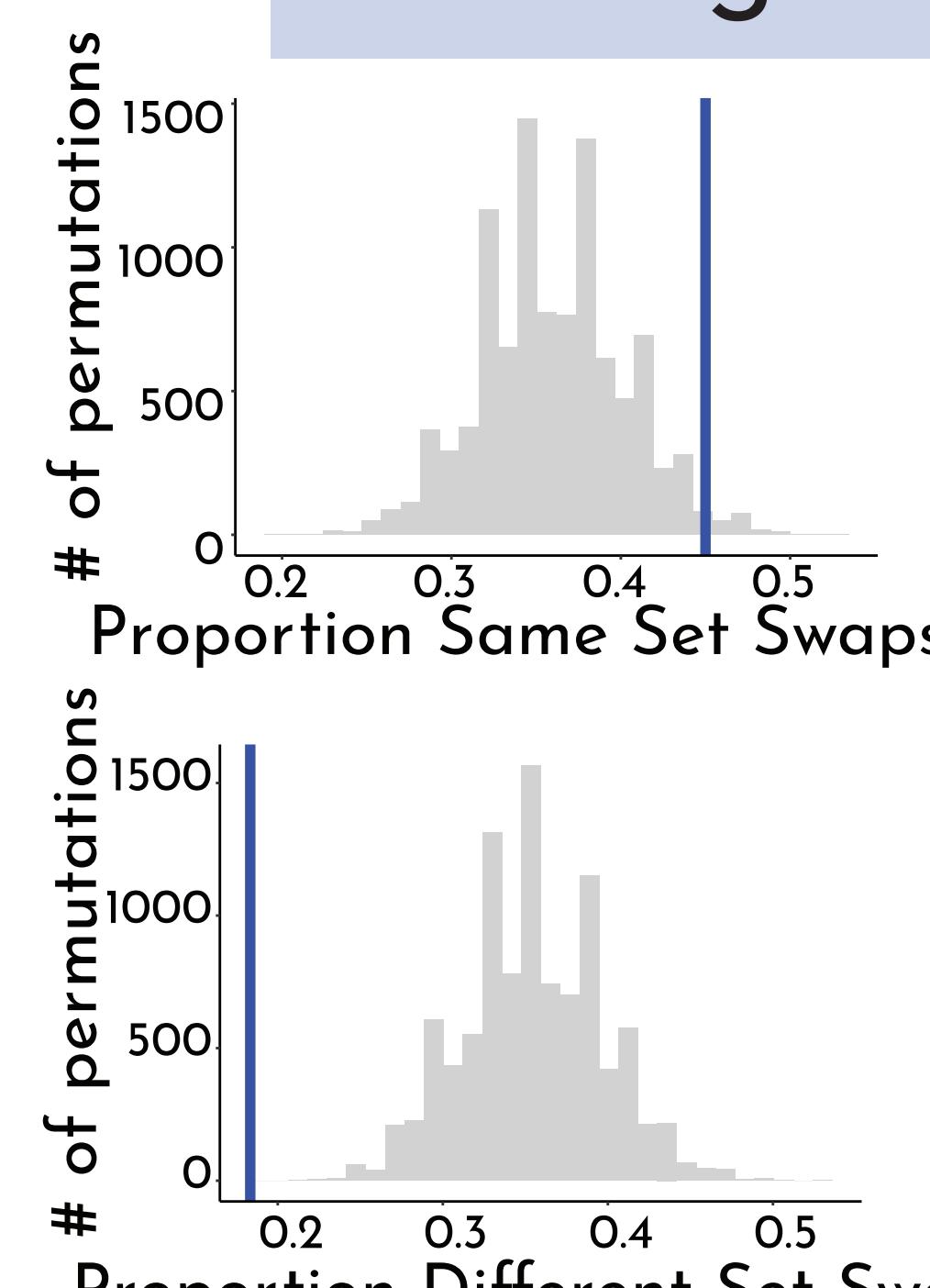
## Discussion

People are able to rapidly learn novel category structures and use that knowledge to scaffold new, related learning

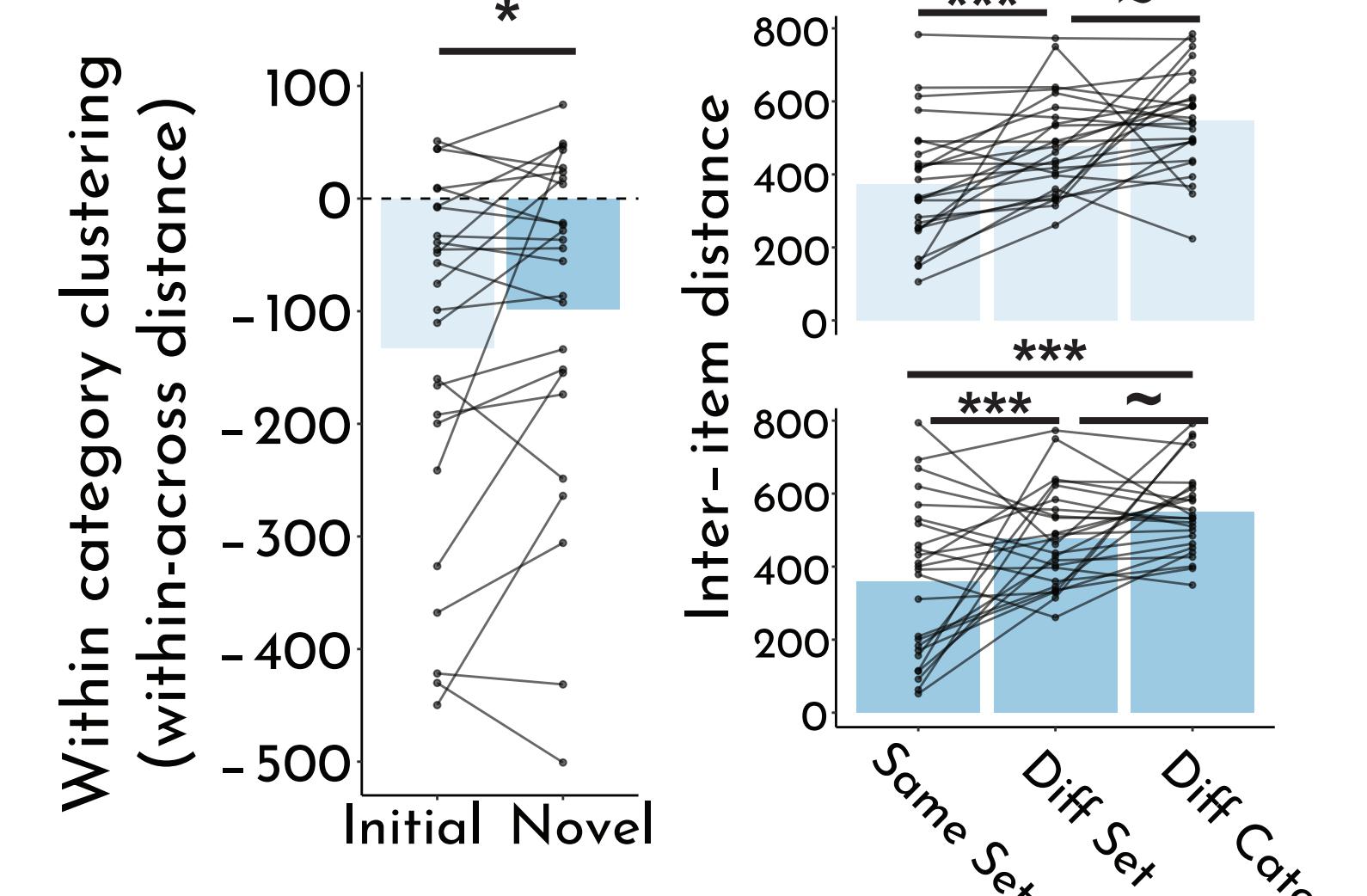
Newly learned information may not be fully integrated with prior information ("repulsion" in memory, reduced clustering with other exemplars)

Ongoing work examining possible role for sleep in integration process

Probing Integration in the Intact Group



### Sorting Data

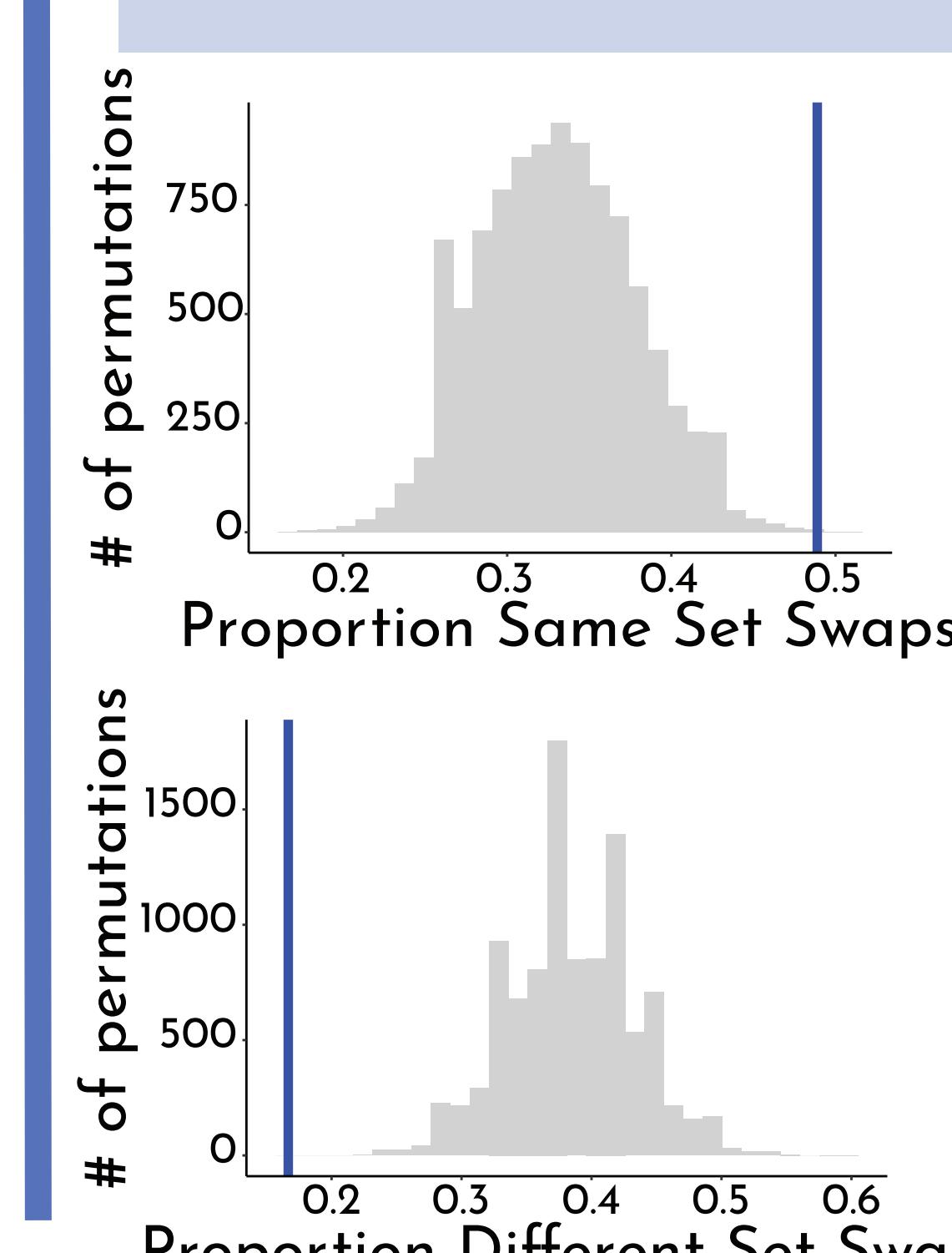


Initial and novel exemplars held "separate"

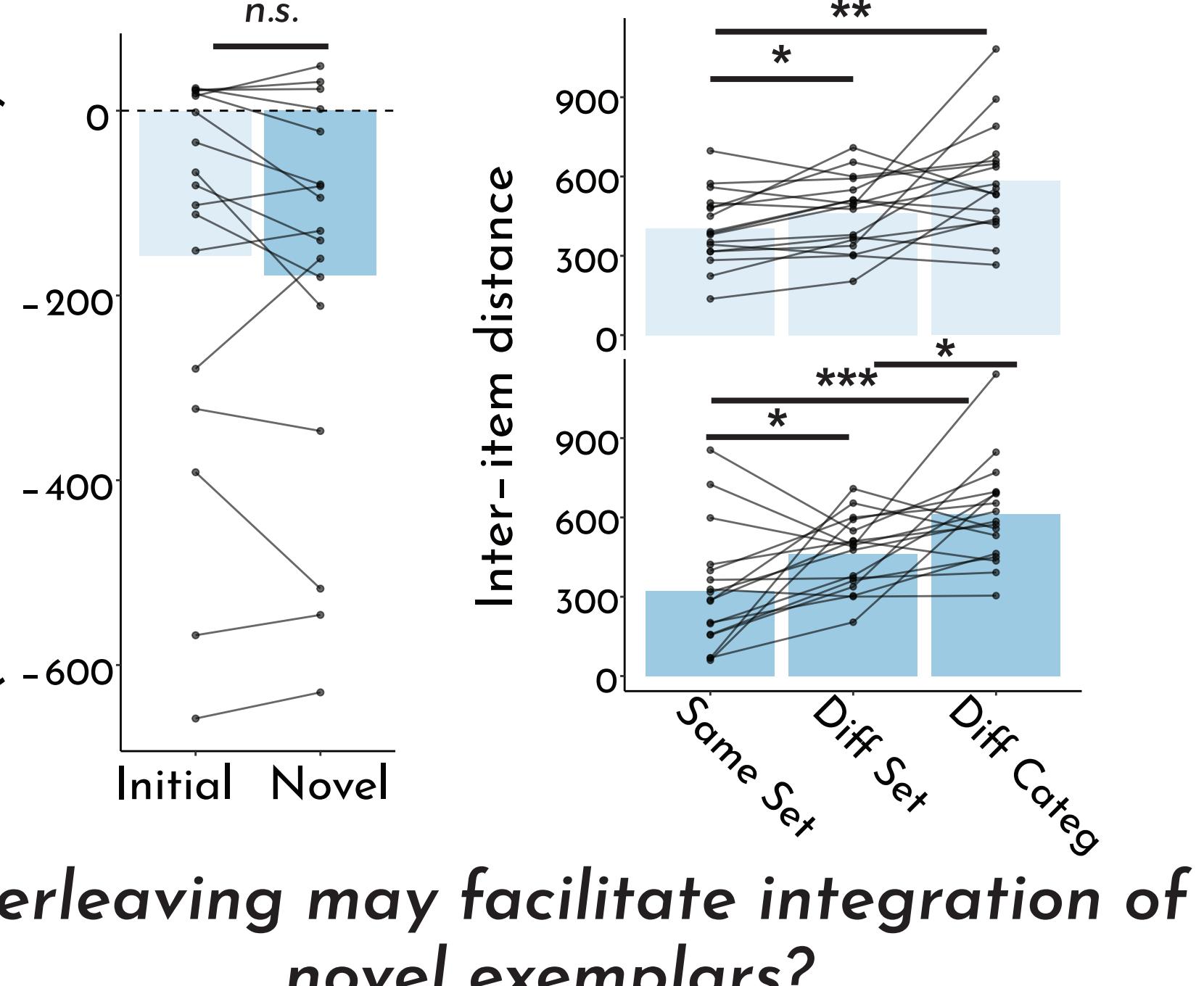
## Experiment 3

N = 17 (planned N = 25)

Role for interleaving in promoting integration?



### Sorting Data



Interleaving may facilitate integration of novel exemplars?