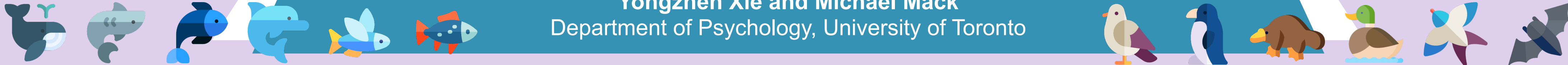
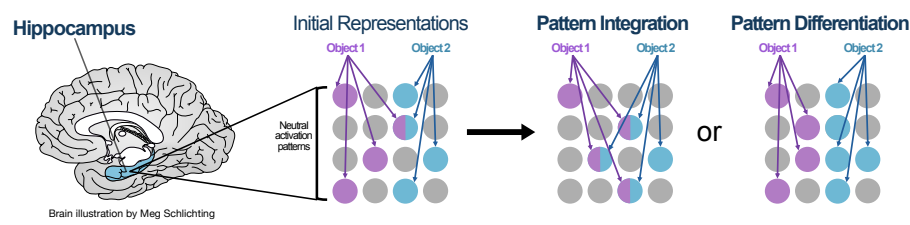


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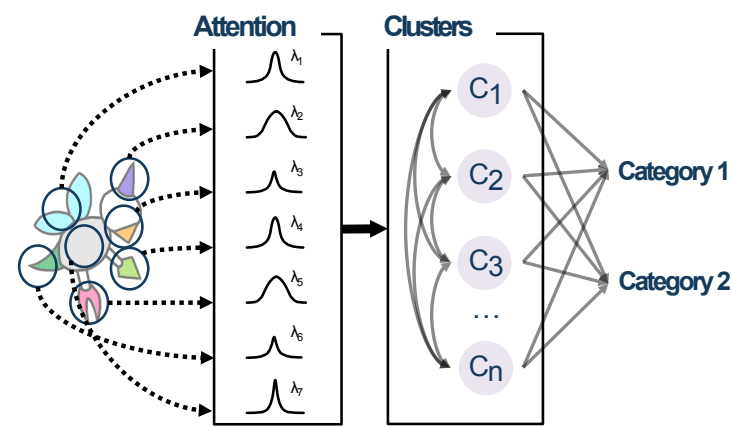
Introduction

We often learn real-world categories with exceptions of perceptual rules.
How do object representations transform during rule-plus-exception category learning?



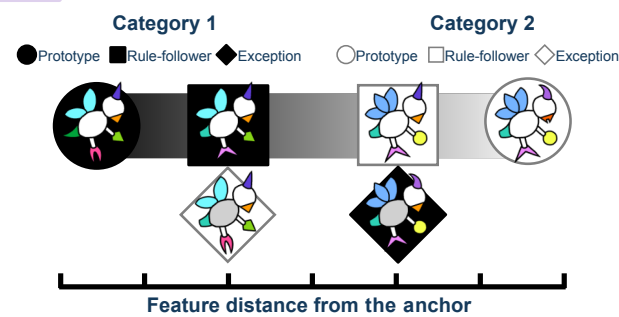
Computational Modeling

The Supervised and Unsupervised Stratified Adaptive Incremental Network (SUSTAIN) can simulate learning-related representational dynamics in the hippocampus.

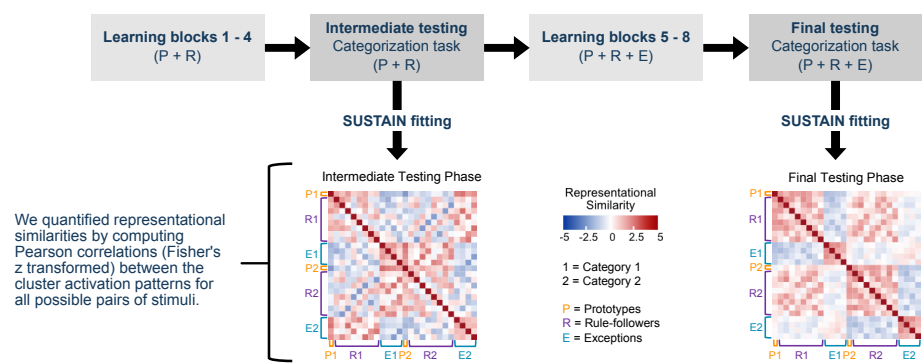


Methods

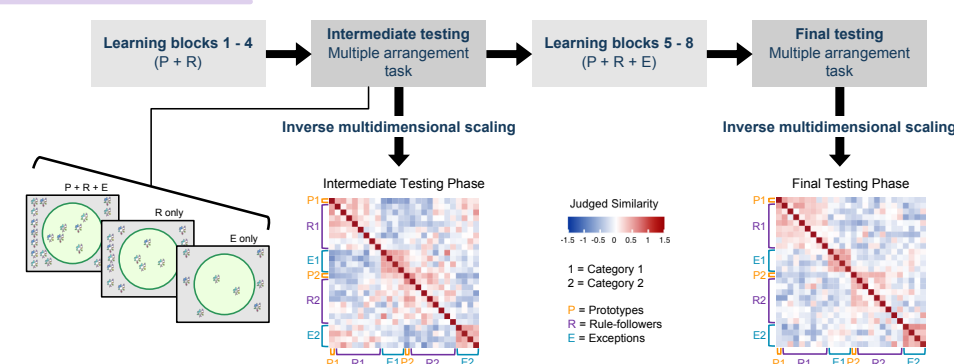
Stimuli



Experiment 1



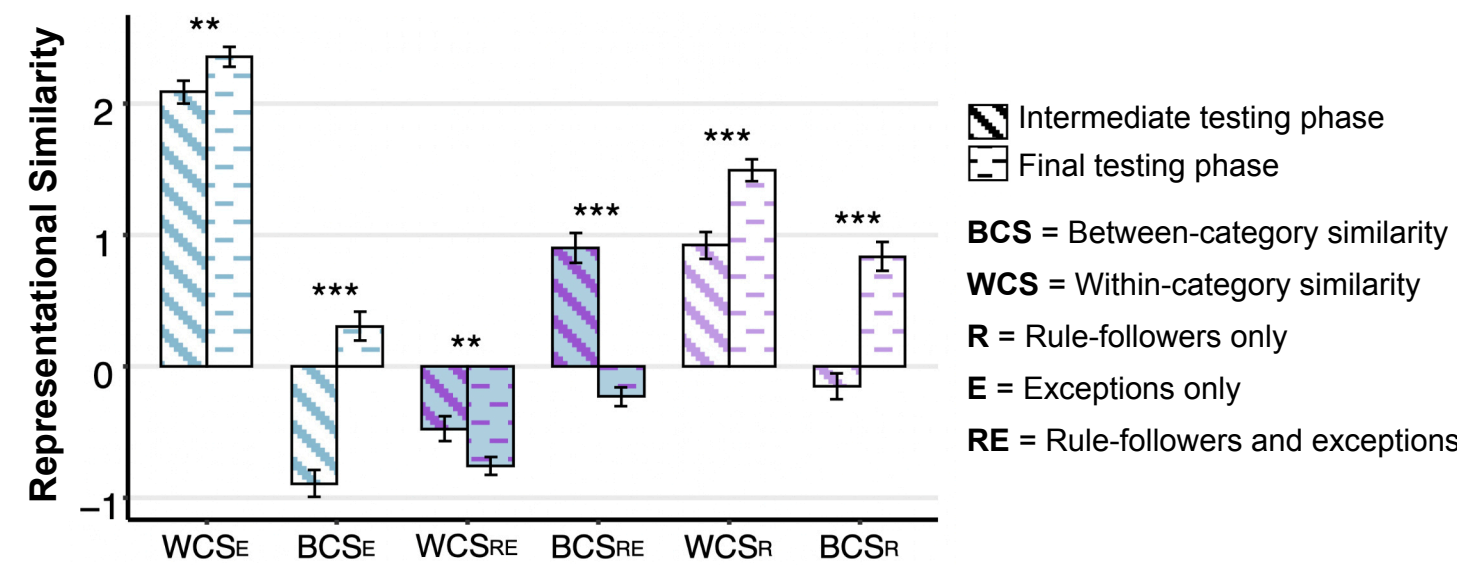
Experiment 2



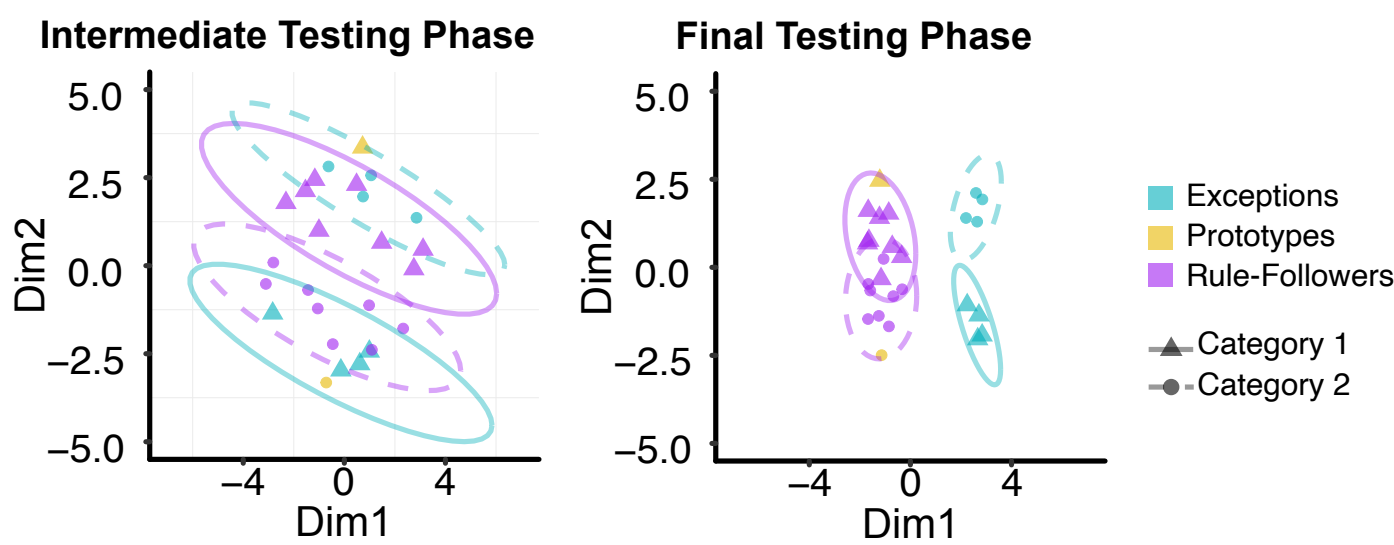
Experiment 1

Exception learning led to...

- (1) **Pattern differentiation** between rule-followers and exceptions, and...
- (2) **Separate pattern integration** of each stimulus type.

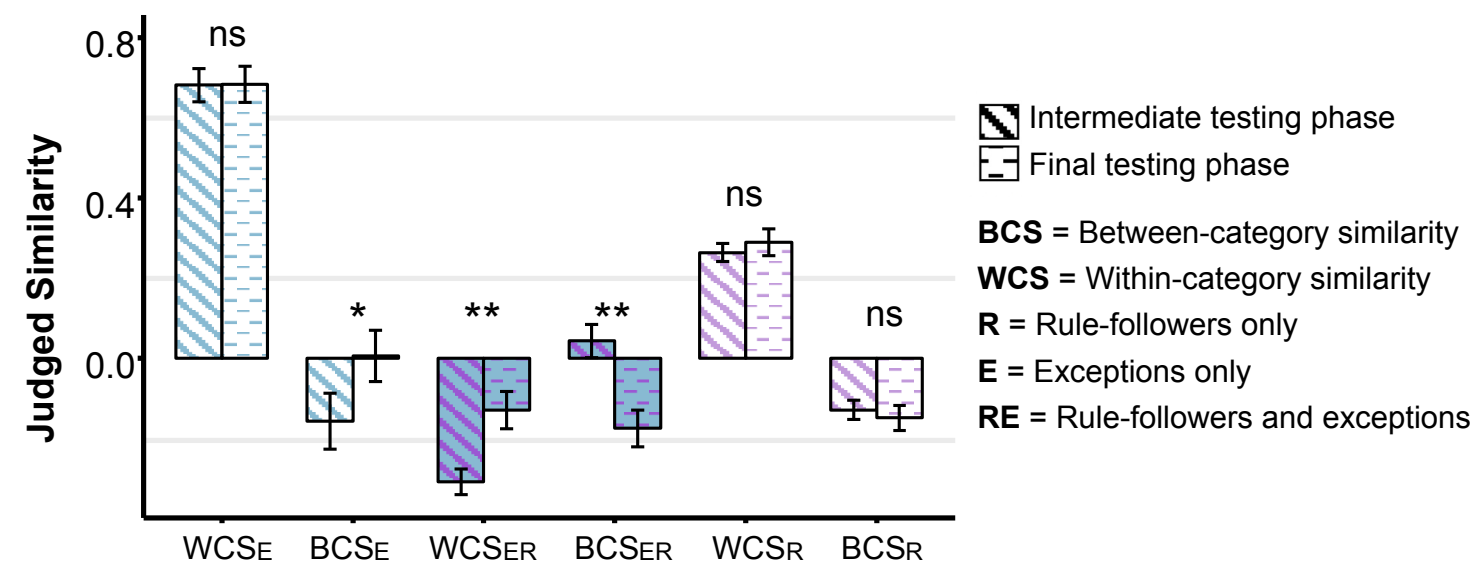


Multidimensional Scaling of cluster activation patterns in SUSTAIN revealed **hierarchical category representations**.



Experiment 2

Exception learning **increased the judged similarity** between rule-followers and exceptions in the same category.

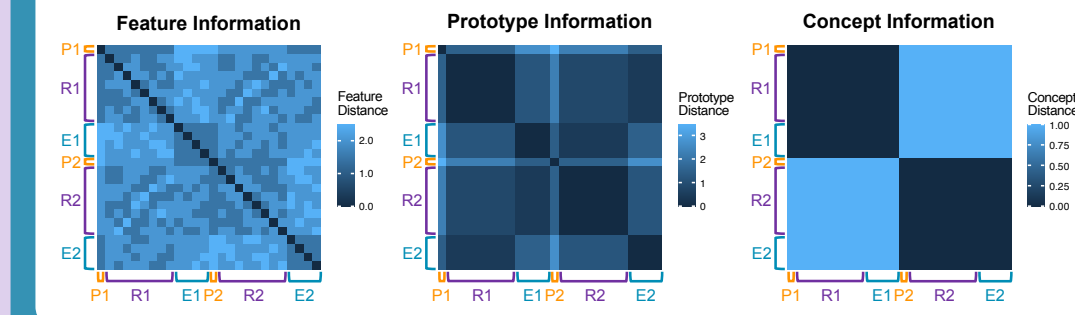
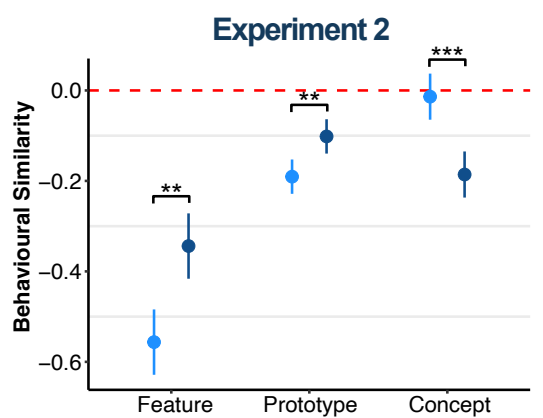
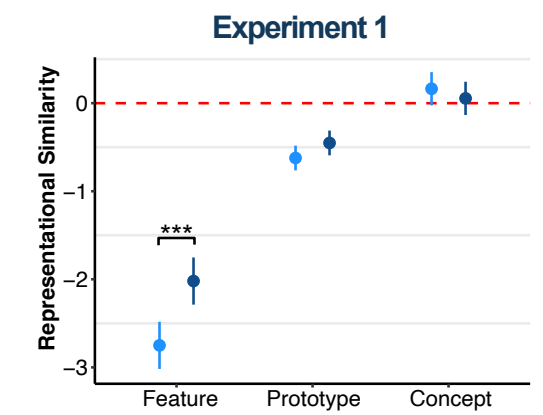


What Information Do Representational and Judged Similarities Entail?

Feature and prototype information, but not concept information, contributed to representational similarities in SUSTAIN throughout exception learning.

Concept information increasingly contributed to judged similarities through exception learning, whereas contributions of feature and prototype information decreased.

● Intermediate testing phase
● Final testing phase



Conclusions

- 1 Object representations undergo flexible integration and differentiation based on the perceptual patterns of categories.
- 2 Learning-induced transformations in object representational similarities can misalign with changes in similarity judgments.
- 3 The types and weights of information contributing to representational and judged similarities vary.
- 4 We can draw inferences about the representational dynamics in the hippocampus from computational modeling.

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Animal icons were obtained from <https://www.flaticon.com>.

Acknowledgements



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