

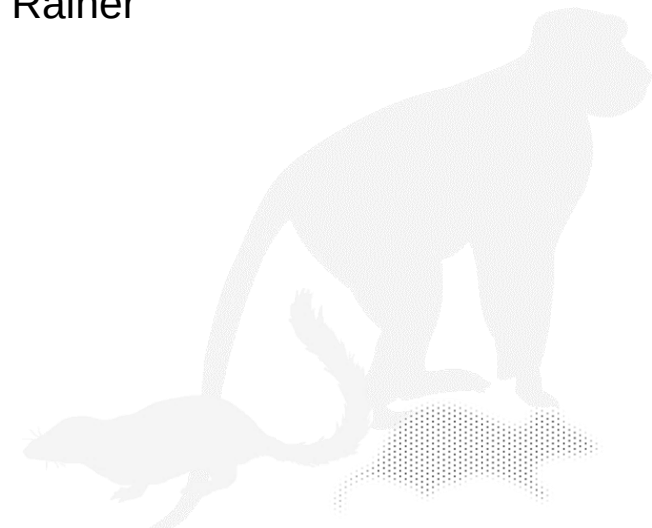
Comparative Study of Visual Learning in Three Mammalian Species

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Visual Cognition Lab

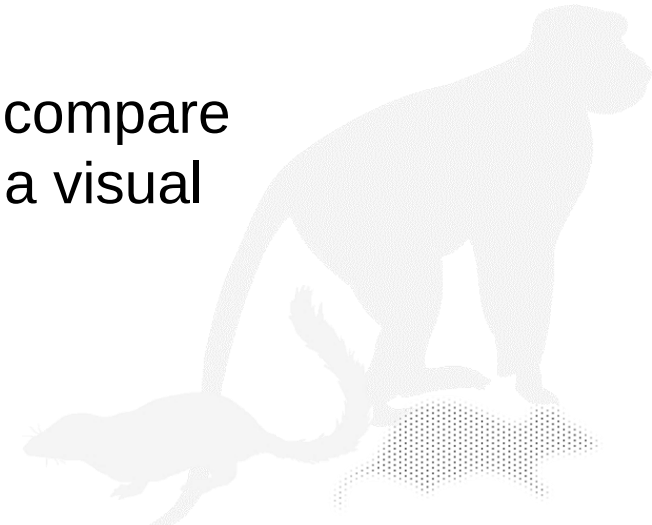
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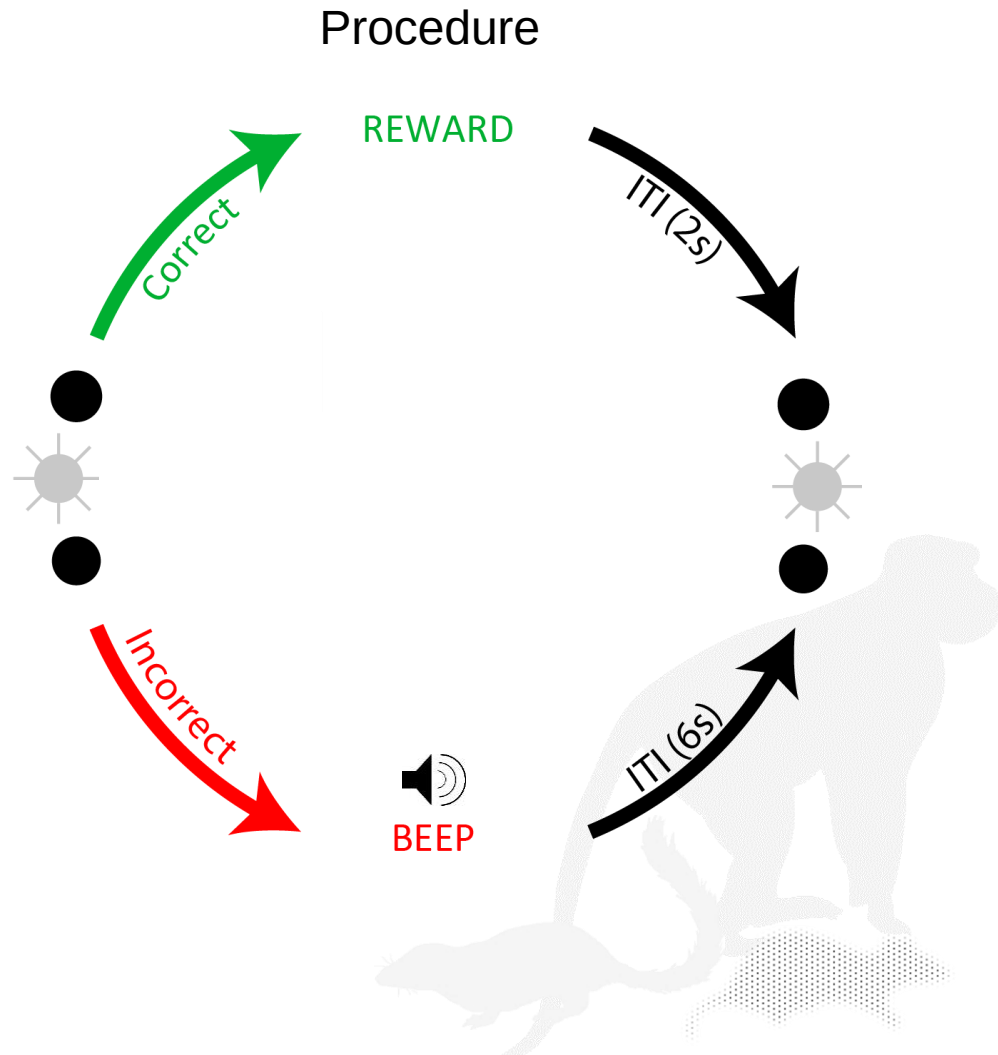
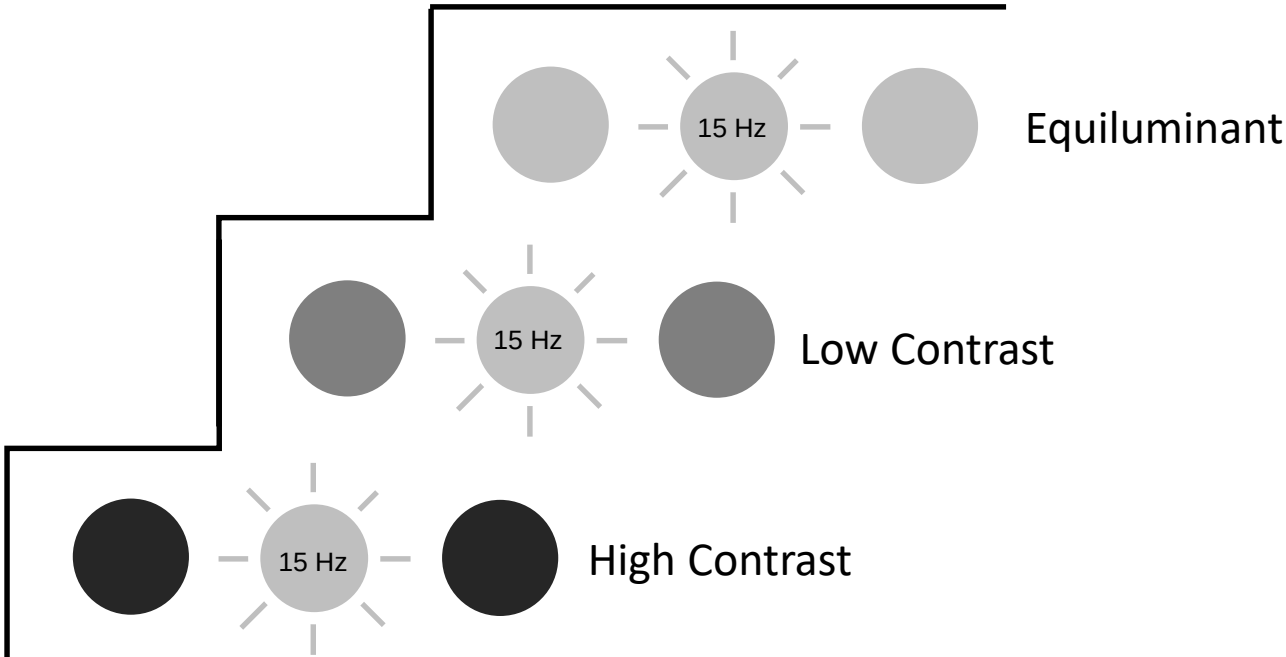
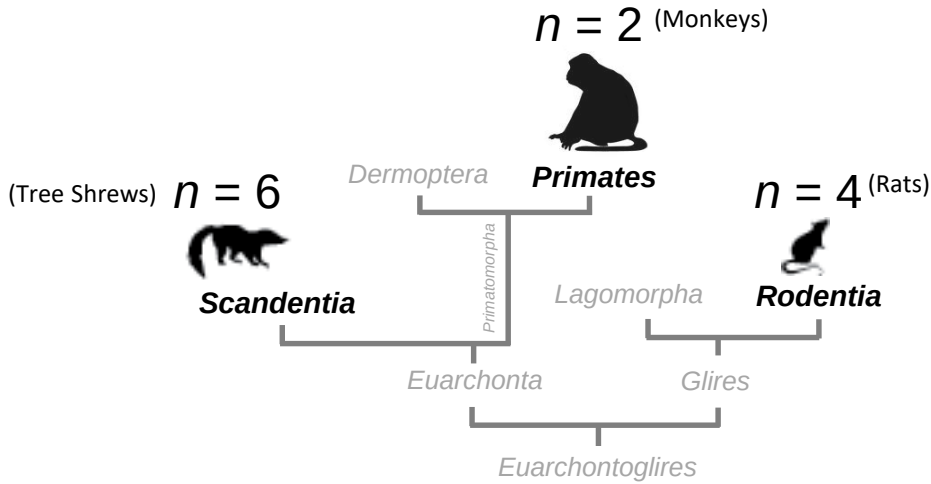


Introduction

- Rodents and Primates are two of the most highly utilized animal models for human visual processing.
- Research on cognitive processes in animal models is normally comprised of training on a particular behavioral task
- Few studies have directly compared behavioral performance between species on identical behavioral tasks.
- Purpose: to understand the learning-related behavioral characteristics of different animal species and how they compare to each other during the acquisition and performance of a visual learning task.

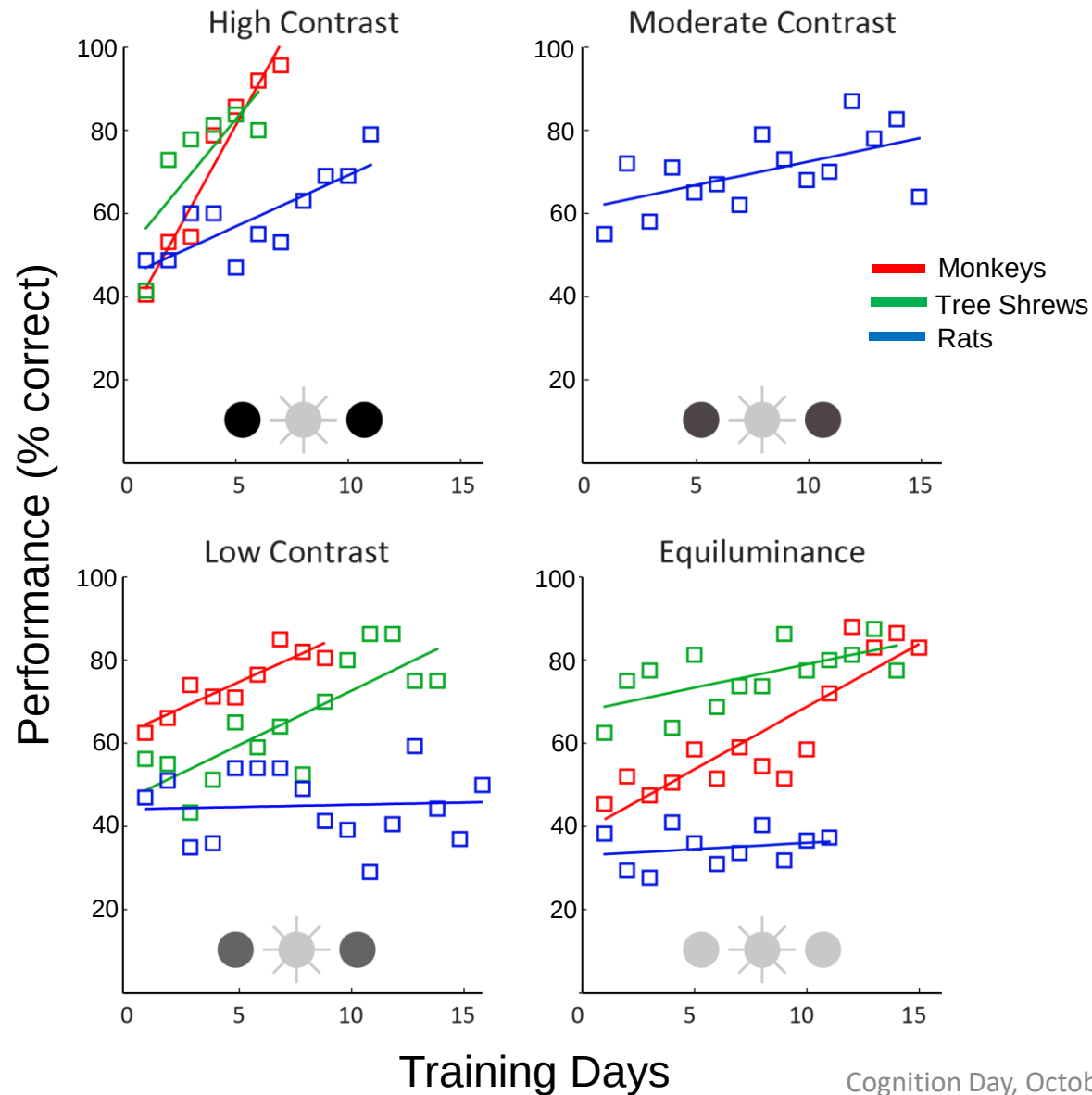


Methodology

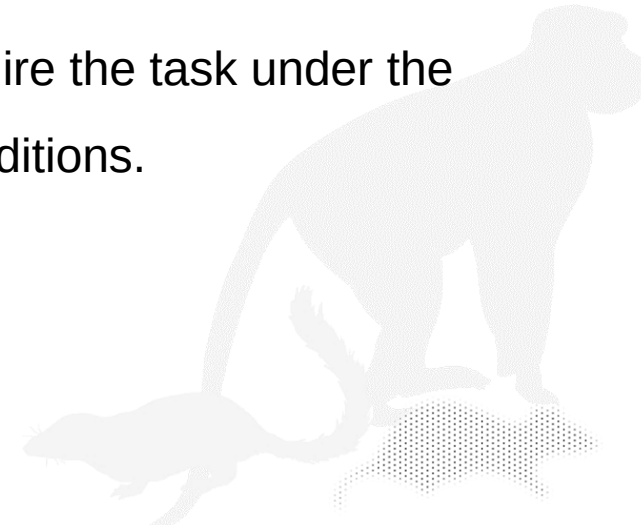


Results

Average Performance

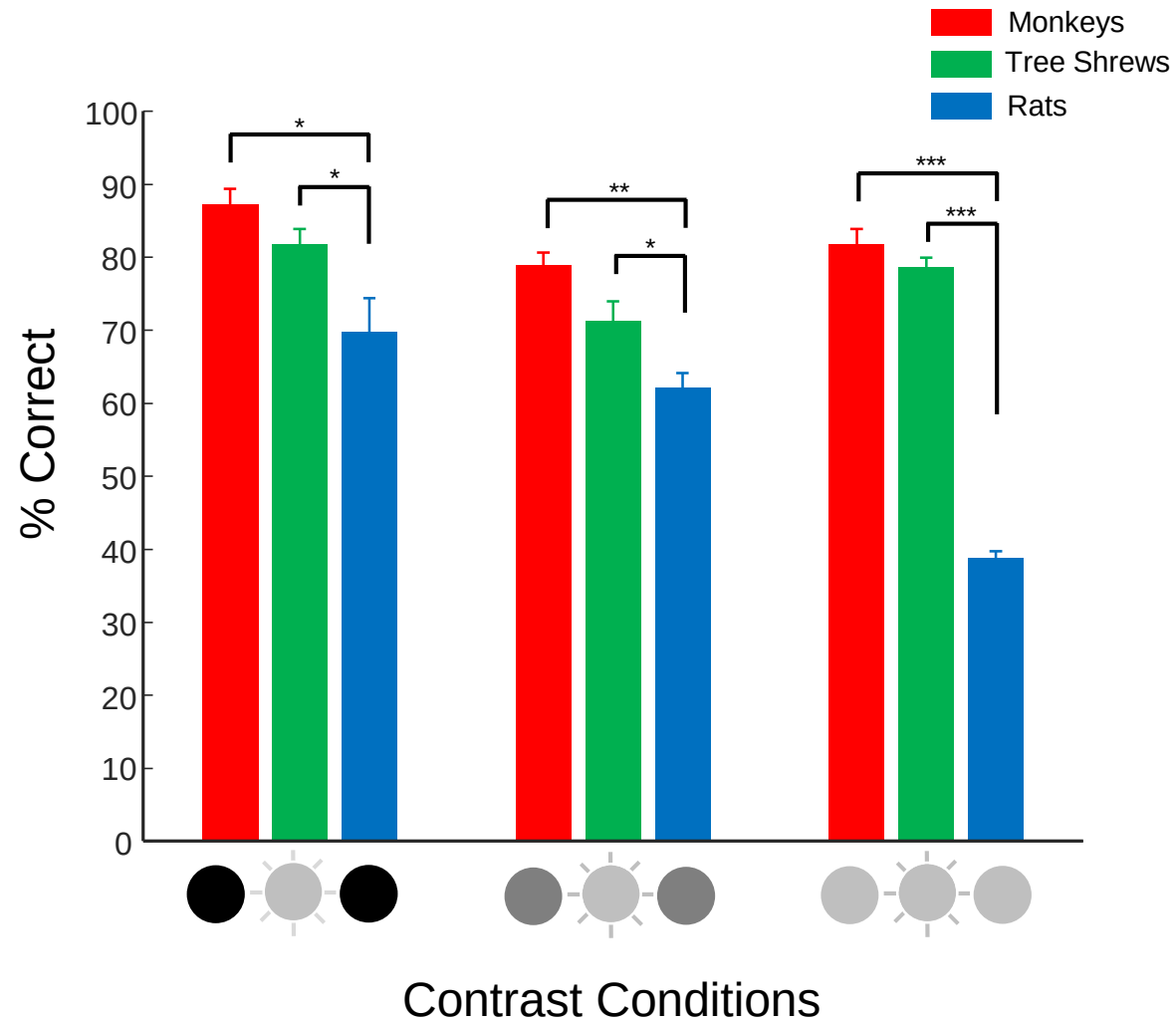


- All species managed to learn the task in high contrast condition
- Rats learned the task at a slower rate and had a lower peak performance compared to Monkeys and Tree Shrews
- Rats failed to acquire the task under the lower contrast conditions.

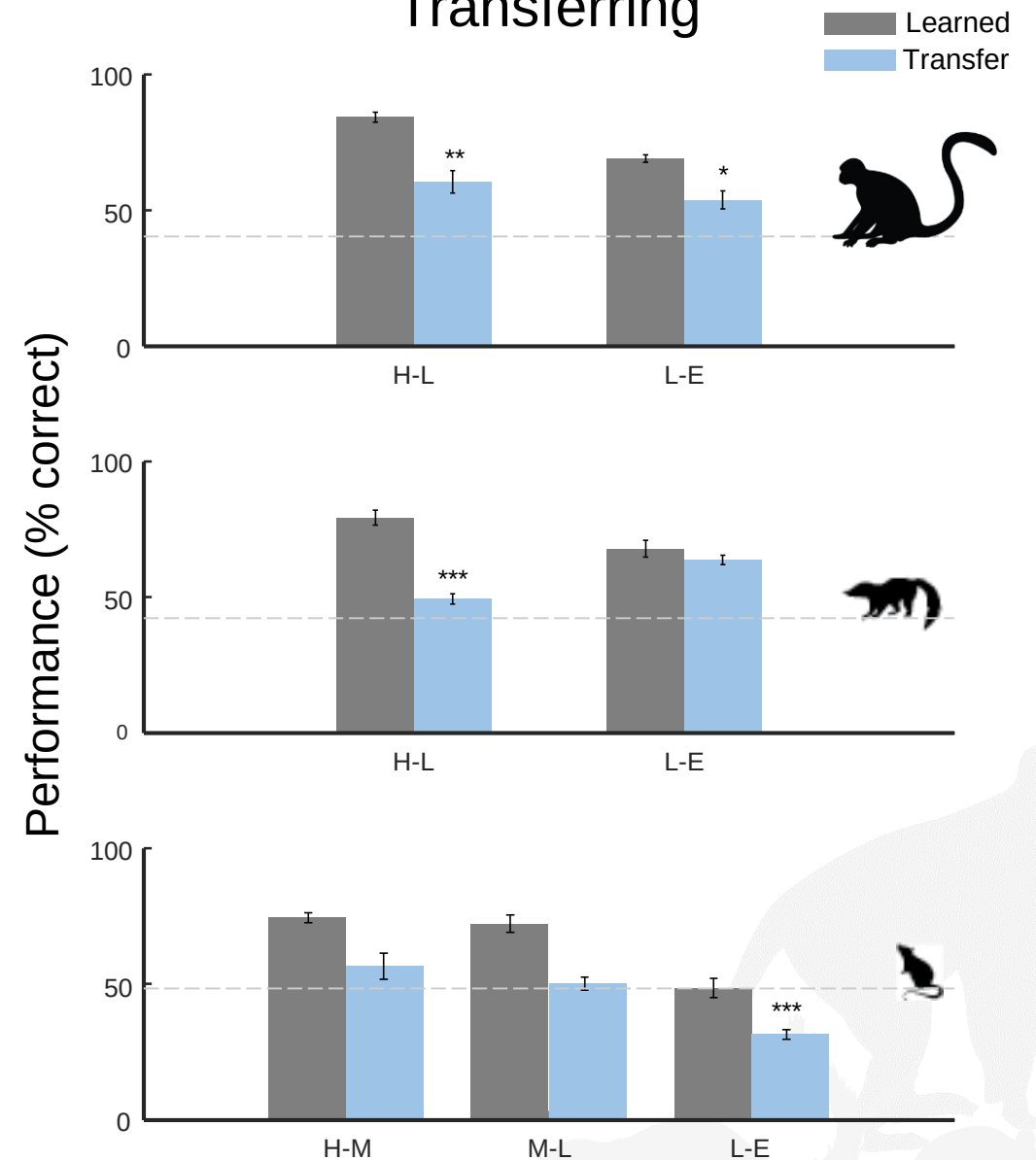


Results

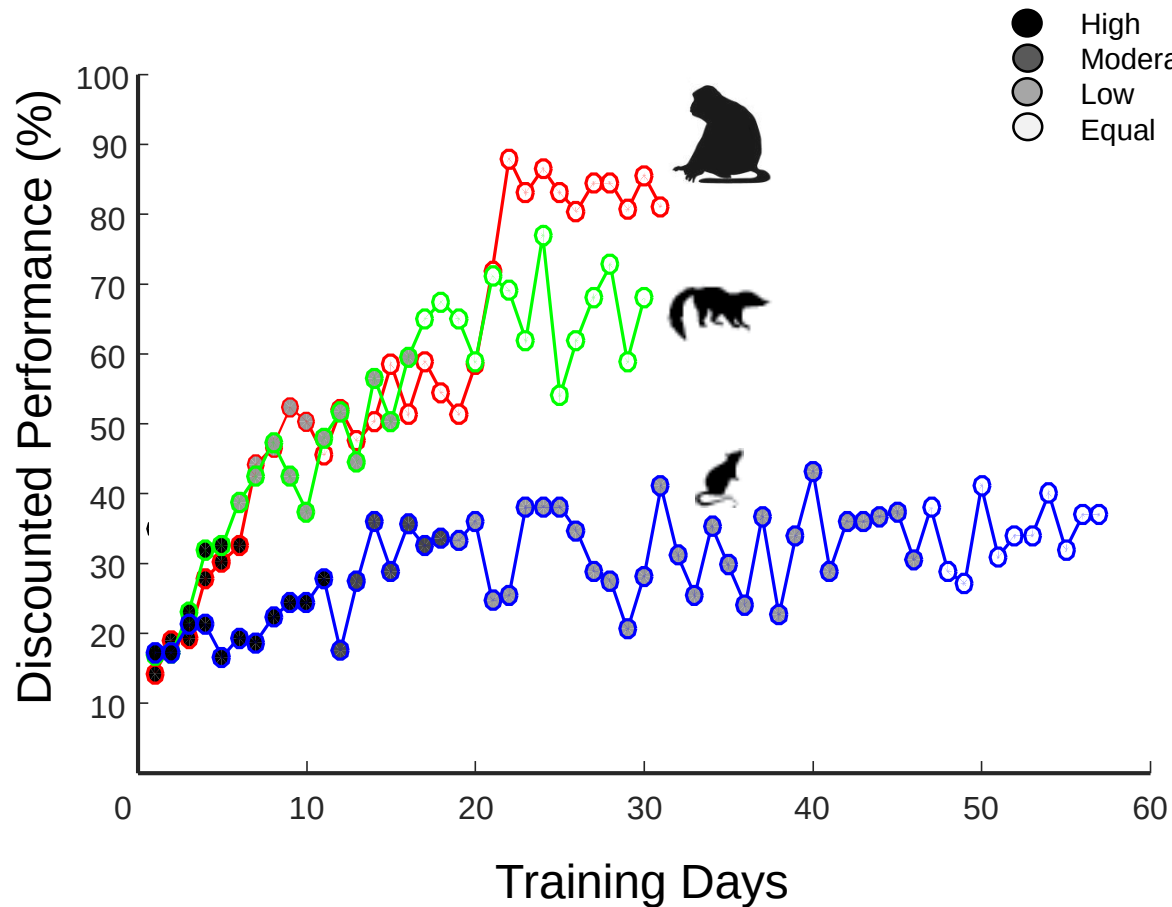
Peak Performance



Transferring

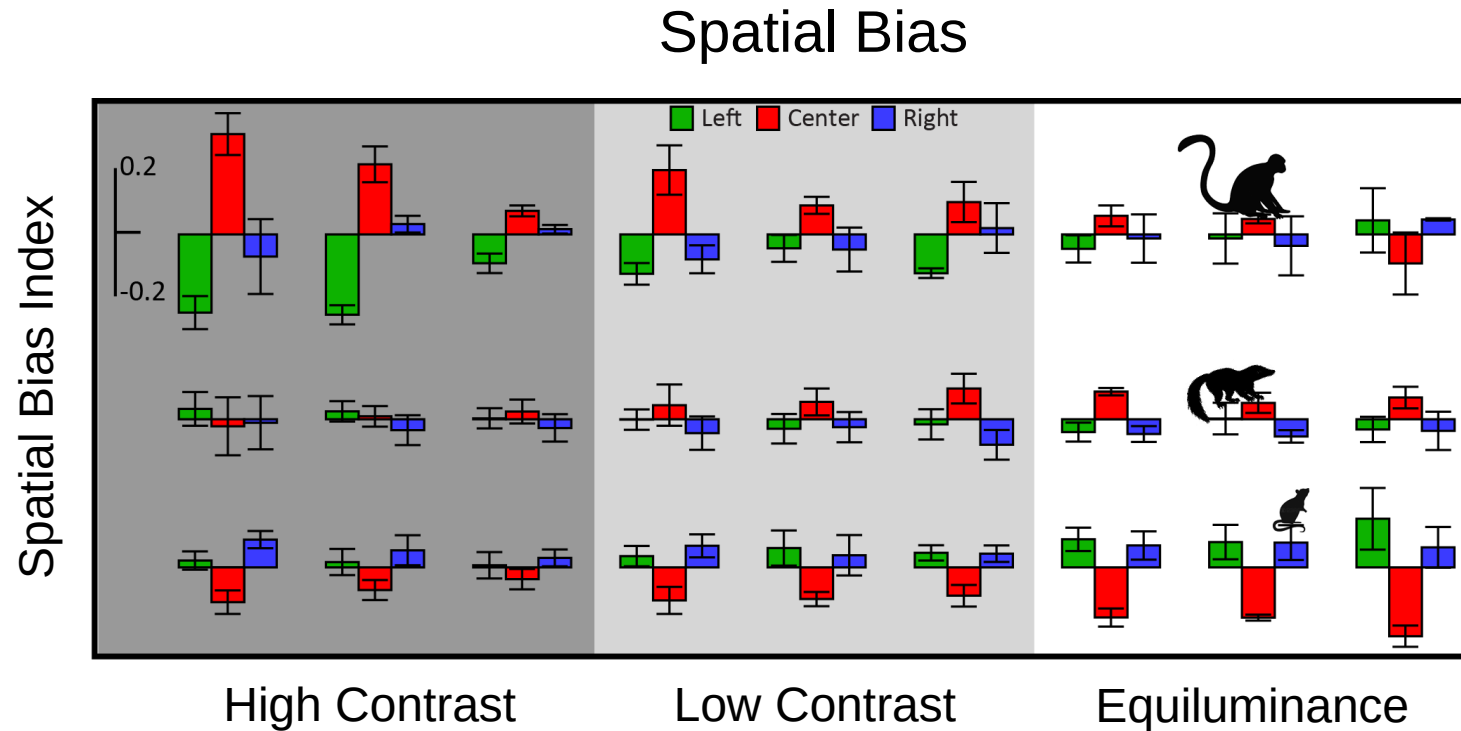


Learning Curve

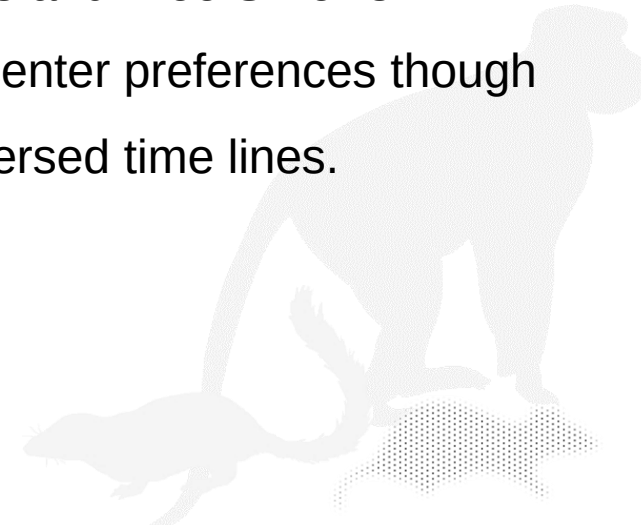


- Rats failed to transfer between conditions.
- Monkeys and Tree Shrews showed a similar overall performance, with monkeys exhibiting a higher max performance compared to Tree Shrews and Rats.

Results

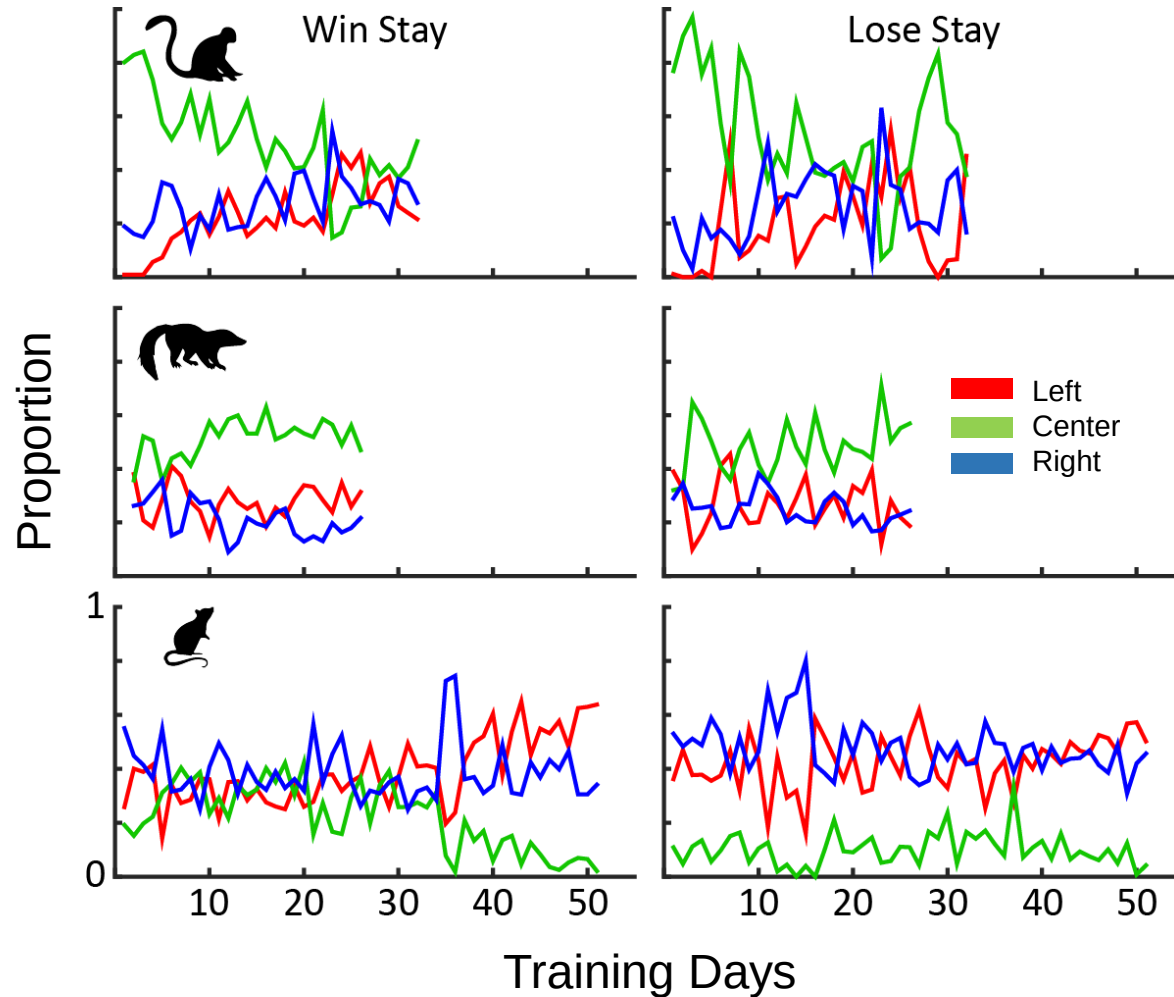


- Each species possesses unique pattern of spatial bias
- The Rats showed a pronounced center avoidance
- Monkeys and Tree Shrews exhibit center preferences though with reversed time lines.

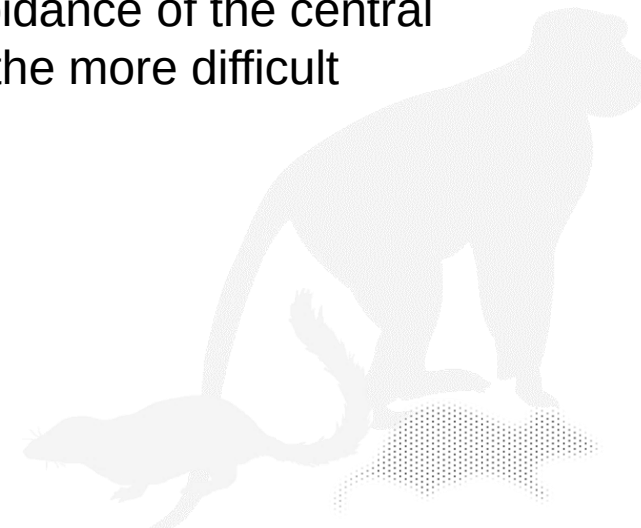


Results

Learning Strategy



- Learning strategy doesn't have an effect on the probability of win-stay vs. lose-stay at the central position for the monkeys or tree shrews
- The rats initially showed higher tendency of staying in the central position following a reward (win-stay strategy) and this shifted to a generalized avoidance of the central position during the more difficult conditions.



Conclusion

- Rats learned more slowly than the other two species.
- Tree shrews showed a relatively similar performance to Monkeys, with slightly lower peak performance.
- Each species exhibited a unique spatial learning strategy, with a pronounced central avoidance in rats versus central preference in Monkeys and Tree Shrews.
- Our data also suggest that tree shrews provide a better animal model in cognitive visual research than the rats, since the behavioral learning characteristic of the Tree Shrews closely resemble of the Monkeys.

Thank You

Cognition Day, October 5th 2016



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