Color categories in macaque monkey and their sources

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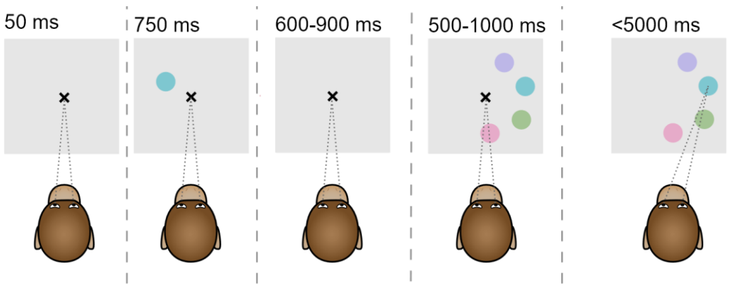
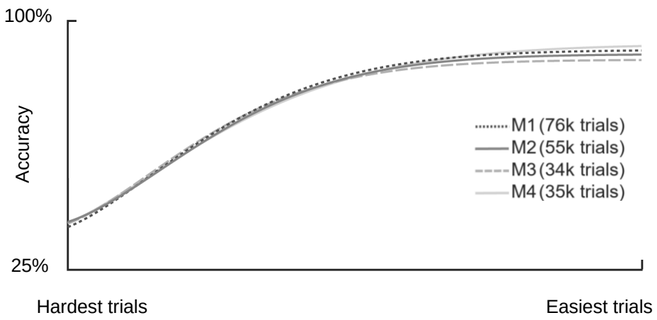
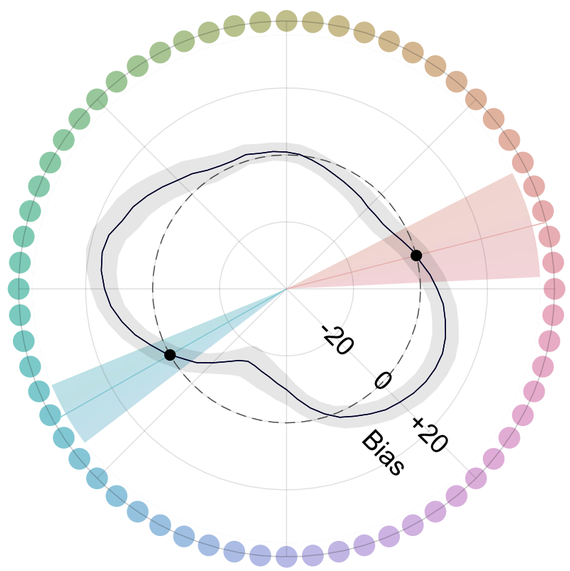
- Are color categories innate? Test in non-linguistic animal.
- Bae et al. (2015) showed that color categories could be recovered from biases in color memory.
- Their approach provides a non-linguistic test of color categories which can be used in trichromatic monkeys.





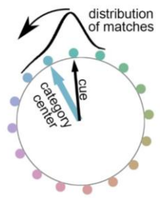
Mixture modelling uncovers 2 attractor points

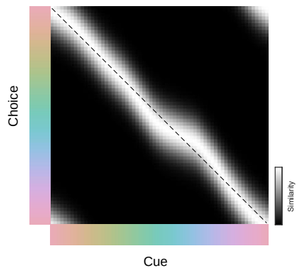


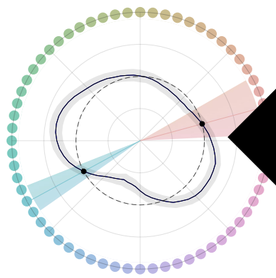
Theory and Simulations:
We identify two distinct potential sources of bias

1. Cognitive Bias:

One color is remembered as another

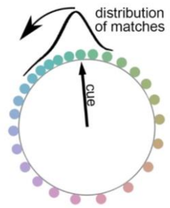


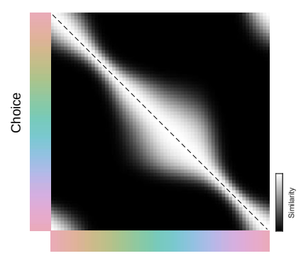


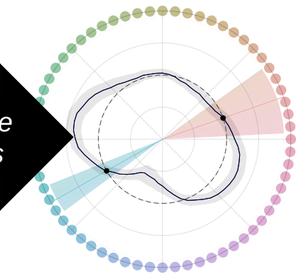


2. Stimulus-Space Non-uniformity:

More confusable distractors on one side than on other

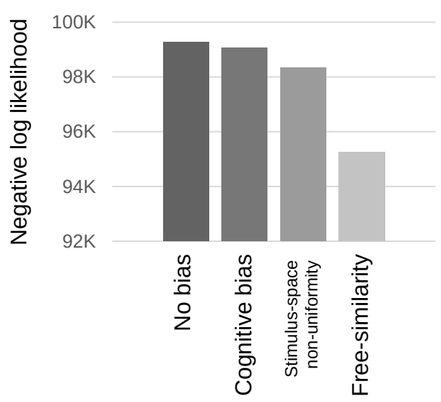


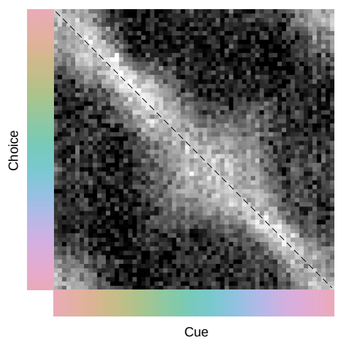




Similar mixture model results

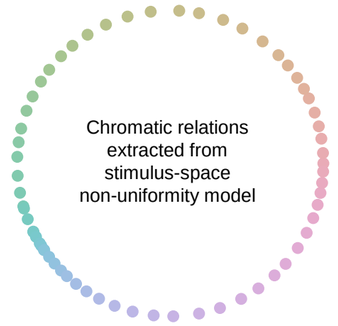
Data: a stimulus-space non-uniformity model accounts best for the data



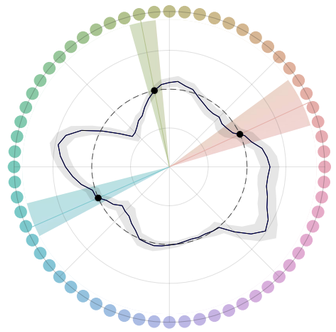


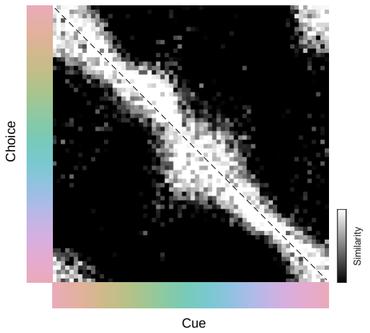
Free similarity model

We can generate a behaviorally derived uniform colorspace



Individuals have idiosyncratic cognitive biases





Conclusions:

- There are two attractor points found in all monkeys (warm and cool).
  - At the group level, a stimulus-space non-uniformity model accounts best for the data.
  - At the individual level, some animals show idiosyncratic cognitive biases.
- The behavioral data can be used to generate a behaviorally derived uniform colorspace.
- This data supports the hypothesis that color categories are not innate.

Bibliography:

1. Bae, G.-Y., Olkkonen, M., Allred, S. R., & Flombaum, J. I. (2015). Why some colors appear more memorable than others: A model combining categories and particulars in color working memory. *Journal of Experimental Psychology: General*, *144*(4), 744–763.
2. Schurgin, M. W., Wixted, J. T., & Brady, T. F. (2020). Psychophysical scaling reveals a unified theory of visual memory strength. *Nature Human Behaviour*, *4*(11), 1156–1172.