# The primacy of color in visual perception

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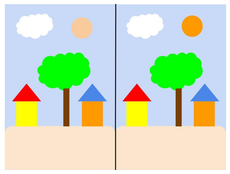
## Introduction

The extent to which visual perception is rich or sparse has been extensively debated (1, 2).

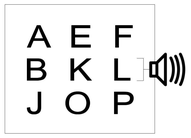
Change blindness experiments suggest that our perception is sparse because people often fail to notice large changes between images (3). It however depends on memory, and might underestimate the richness of visual experience.

Experiments using partial report (4, 5) suggest that visual perception is rich; however, the interaction of cue with sensory trace might change visual representation and these experiments might overestimate the richness of visual experience.

Experiments on color diversity estimates also suggest that visual perception is rich; however it is an open question whether these results demonstrate the perception of individual colors (6).



Change blindness




Iconic Memory

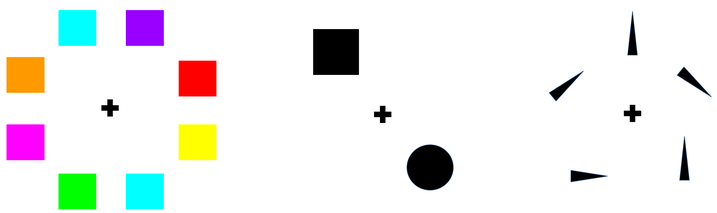

Color Diversity

## EXPERIMENT 1 (n = 17)

### Method

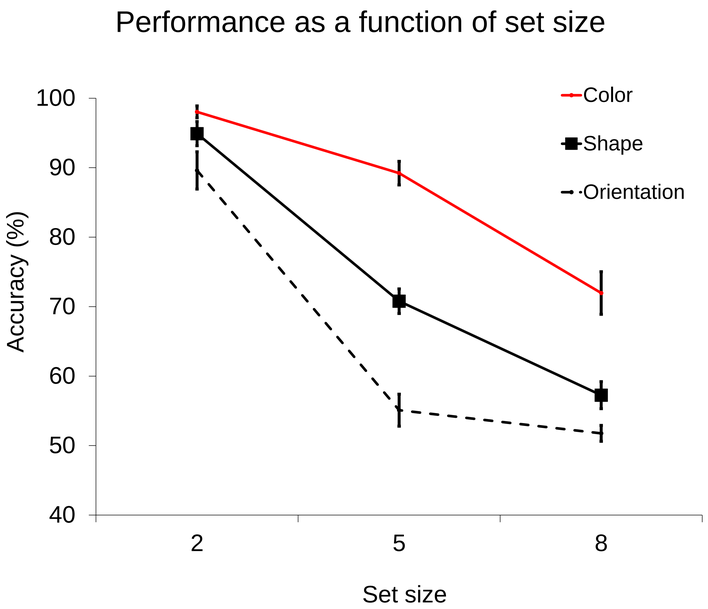
(1) 2, 5 or 8 stimuli were displayed for 300 ms
(2) On half of the trials one stimulus was repeated
(3) Stimuli were either colors, shapes or orientations
(4) Observers reported repetition on each trial
(5) Features were blocked and counterbalanced

Stimuli for Experiment 1



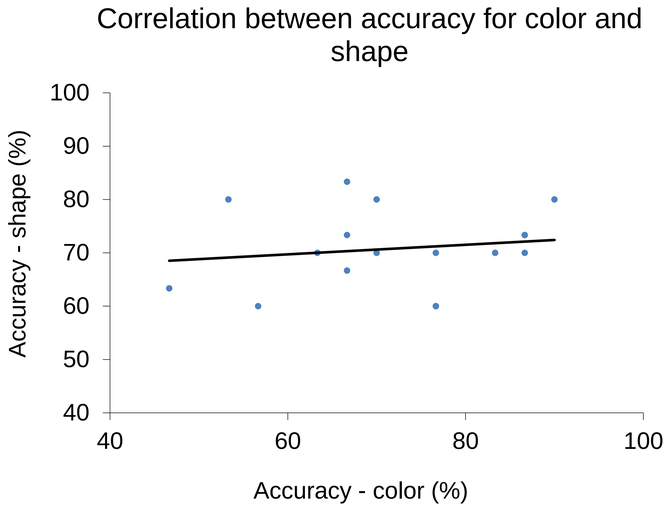
Colors Shapes Orientations

## Results




ANOVA revealed a main effect of set size ($p < .001$), feature ($p < .001$), as well as set size x feature interaction ($p < .001$), showing that performance decreases with increasing set size at different rates for different features. Color perception was superior at every set size.

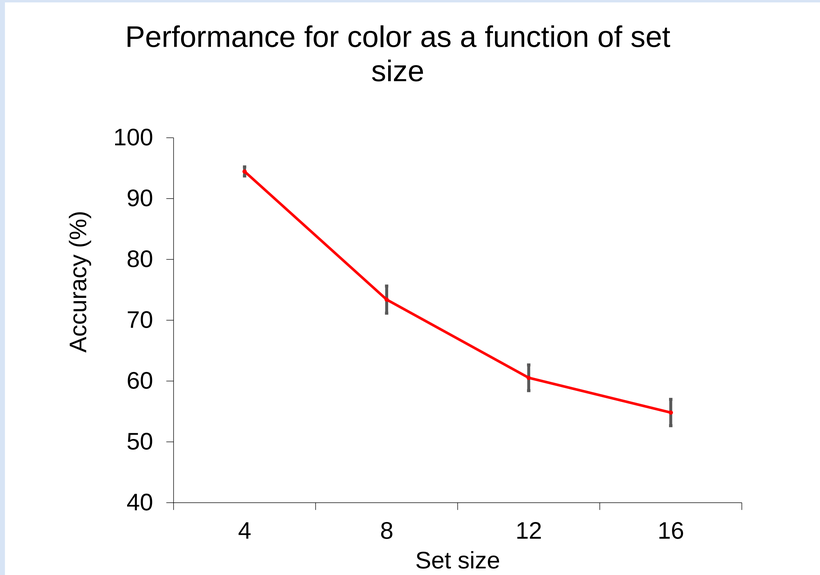
There was no correlation between performance for color and performance for shapes ($r(15) = .155$, $p = .55$), indicating separate resources.




## EXPERIMENT 2 (n = 12)

Here we further explored perception of color. We used the same method as in Experiment 1 with two modifications. We only used colors and we increased the set size to 16.

### Results




We replicated results from Experiment 1. Performance was significant even at set size of 16 ($p < .001$).

## Conclusions

(1) Our results demonstrate that the richness of our visual experience depends on the type of stimuli. Perception of color seems to be superior to perception of other visual features.

(2) Our data also show that the quality of visual perception decreases with increasing set size, demonstrating capacity limits of visual experience.

(3) Visual perception of color is significant even at very high set sizes.

**References**

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