

Effects of Grouping on Preference for Color Triplets

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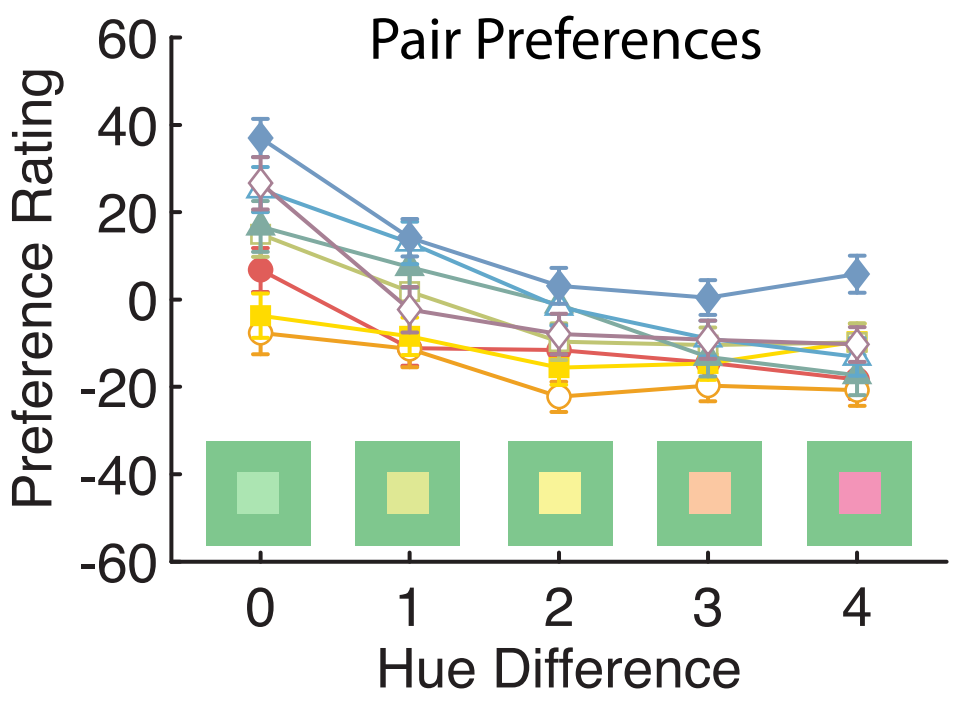
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Background

Preference for color pairs

People prefer harmonious color pairs ($r = +.79$), which are generally more similar in hue ($r = +.65$).

(Schloss & Palmer, 2011a)



Relative size affects color pair preferences

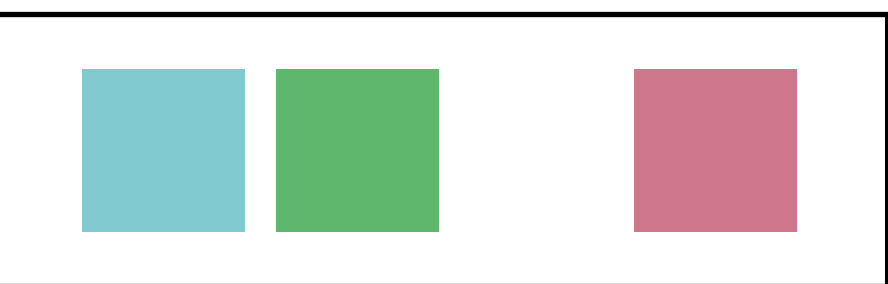
People prefer pairs with yellower (49% variance explained) and lighter figures (+9% more variance explained) on bluer, darker grounds. (Schloss & Palmer, 2011b)



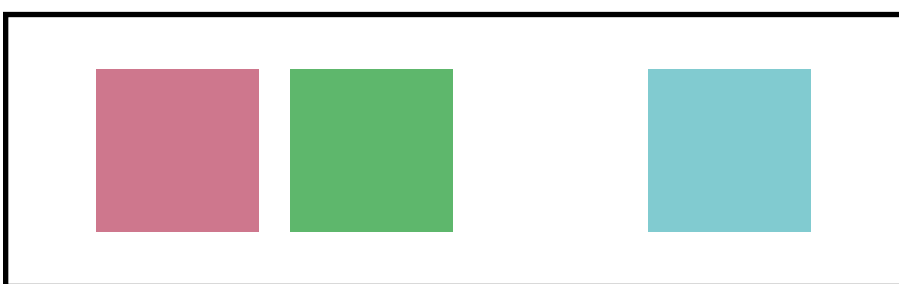
General Questions:

Do additional spatial factors, such as spacing, influence preference for color combinations?

More specifically, do people prefer more similar colors to be spatially closer, and more contrasting colors to be further apart; i.e., do they show a preference for congruent groupings by both proximity and color similarity?



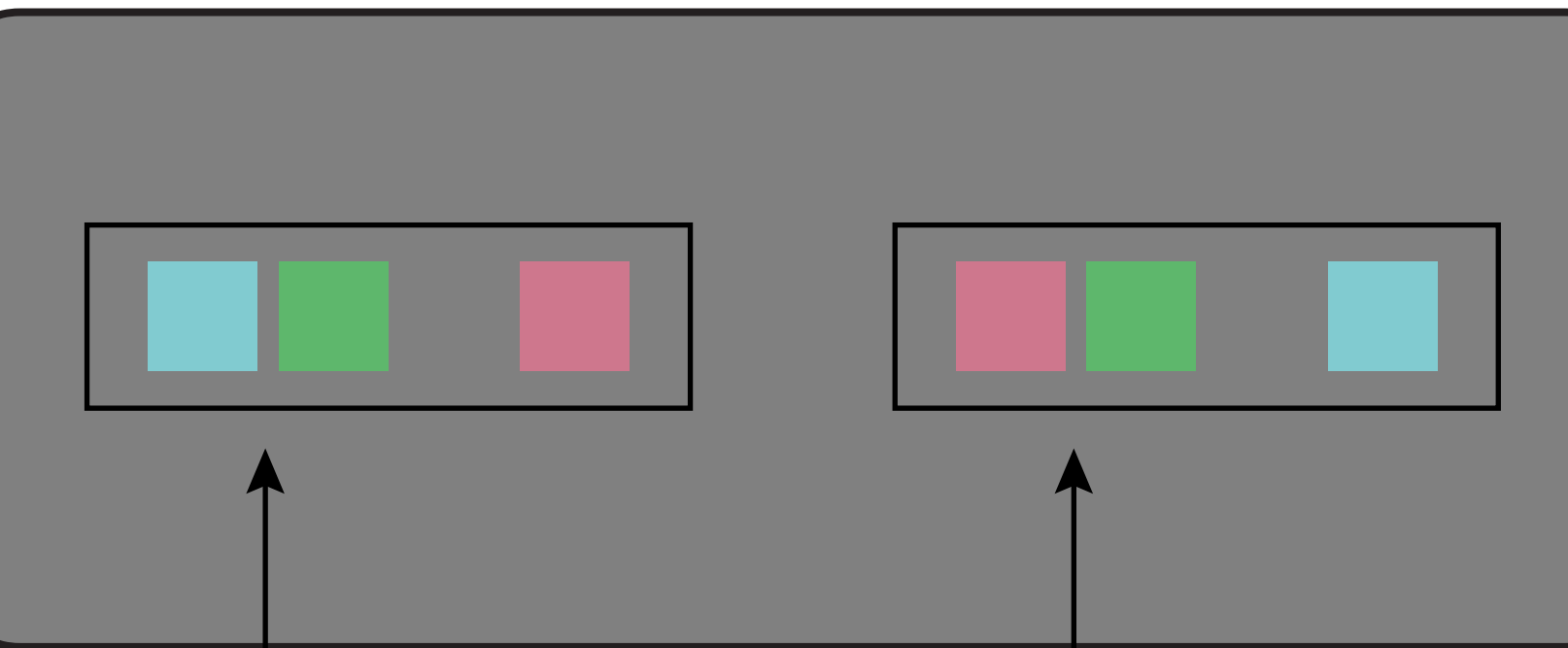
Congruent Grouping
by color and proximity
(similar colors closer)



Incongruent Grouping
by color and proximity
(contrasting colors closer)

General Methods

Which color combination do you prefer?



congruent
grouping

incongruent
grouping

Position of the congruent triplets was left/right counterbalanced.

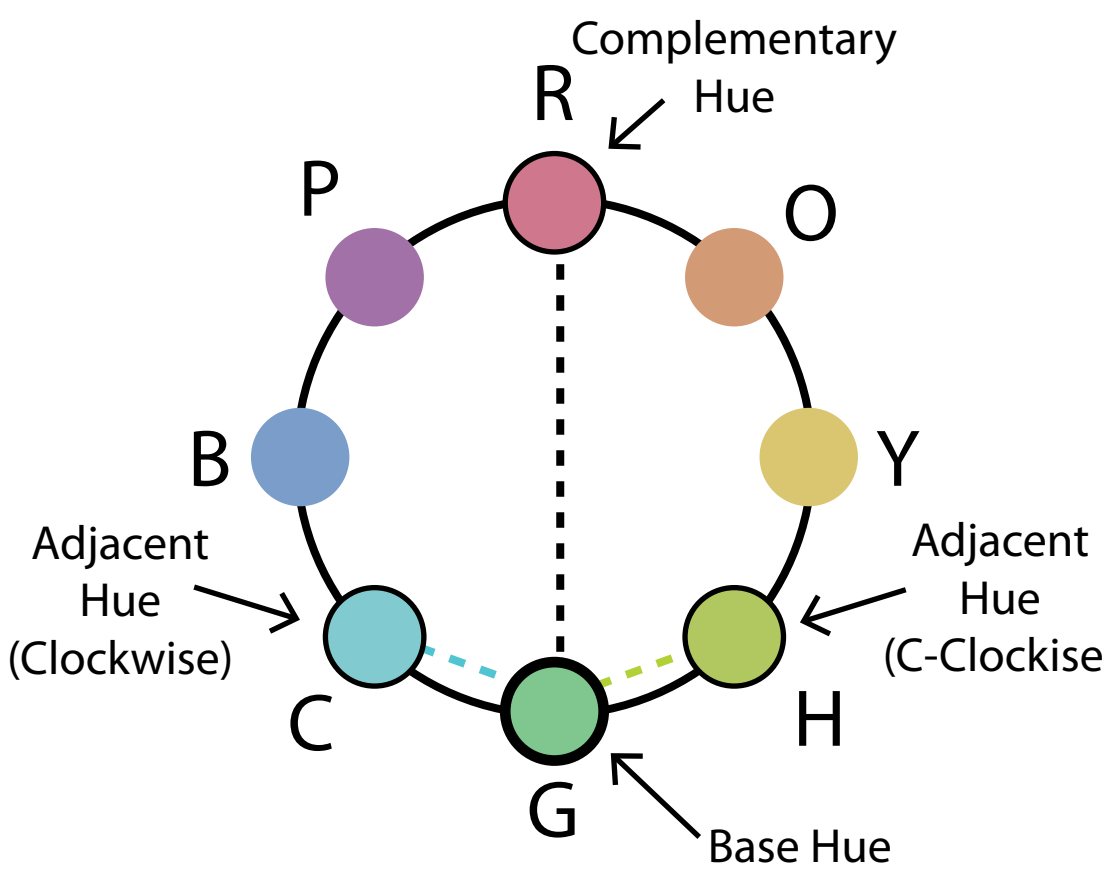
Middle square position was left/right counterbalanced (closer to left or right flanker) over trials, but was the same within trials.

closer to left flanker

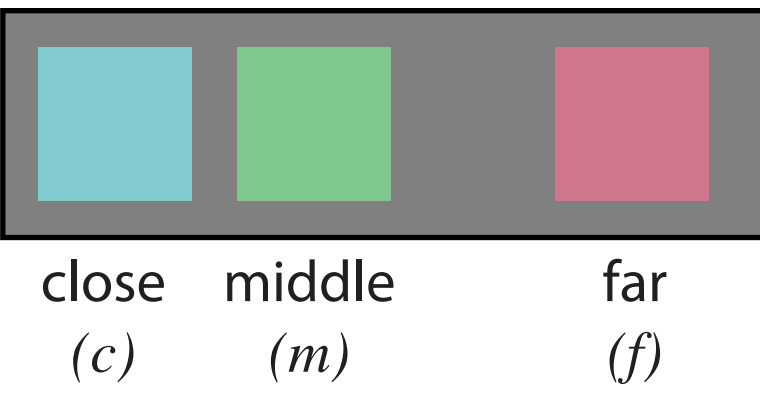
closer to right flanker

Experiment 1: Congruent grouping is preferred

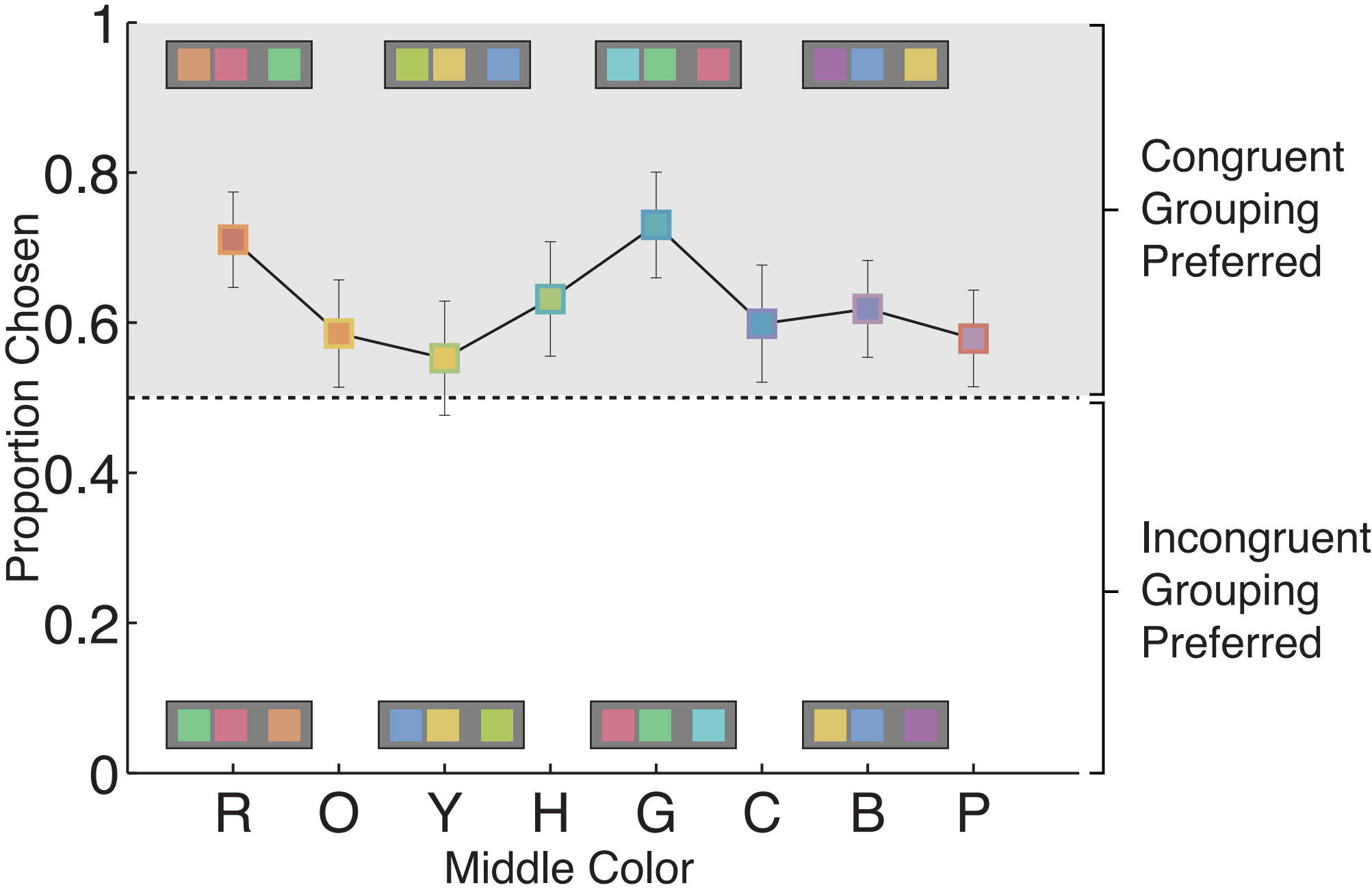
Berkeley Color Project (BCP)
Muted Colors



Each base hue was a "middle color" combined with 1 adjacent and 1 complementary flanker



Congruent color & spatial grouping preferred ($p < .01$)



64% of the variance (multiple- $r = +.80$) in the probability of choosing the left triplet for 64 conditions is explained by:

$$+\Delta \text{ Similarity} = S(c,m) - S(m,f); [54\% \text{ of variance}]$$

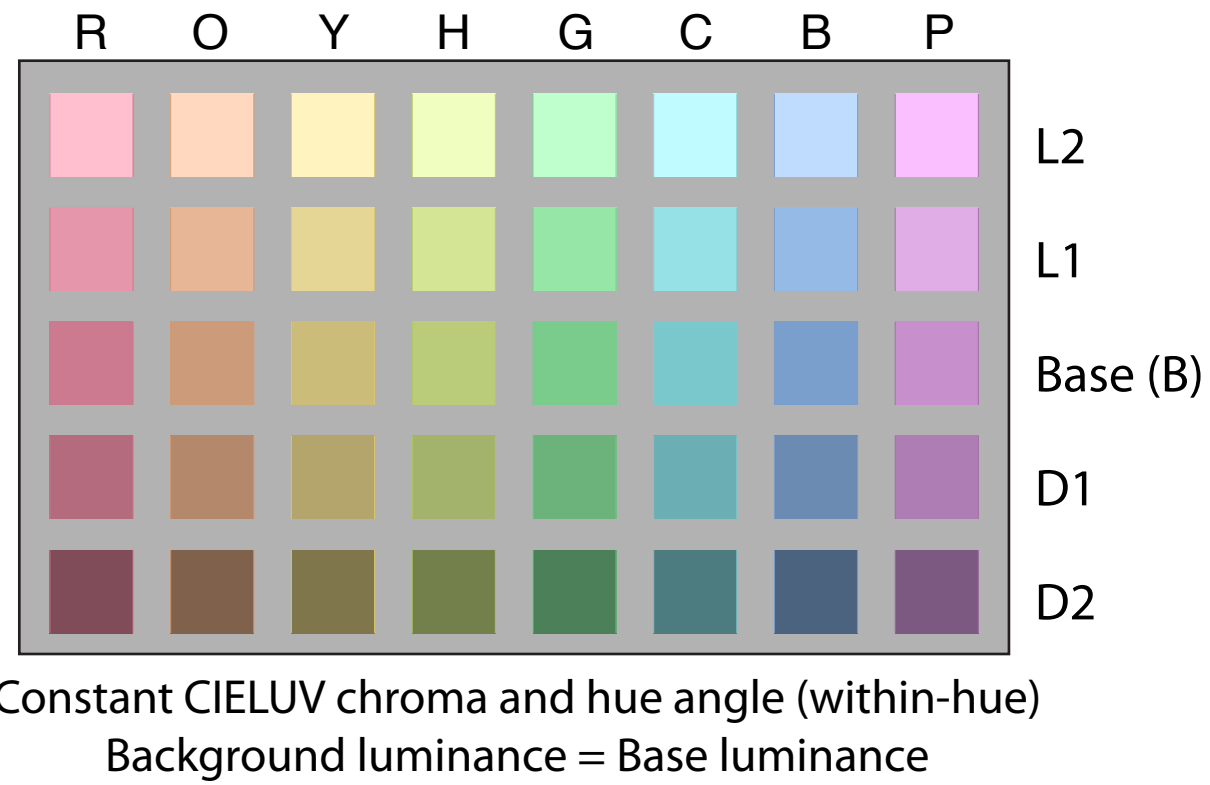
$$-\Delta \text{ Redness} = |R(m)-R(c)| - |R(m)-R(f)|; [+10\% \text{ of variance}]$$

Why do people prefer colors that differ more in redness-greenness to be farther apart?

1. Prefer colors with different lightnesses (ΔL) to be close [i.e., $L(Y) > L(B)$, but $L(R) \sim L(G)$]?]
2. Berkeley students like blue and yellow to be closer because they are UC Berkeley's colors?

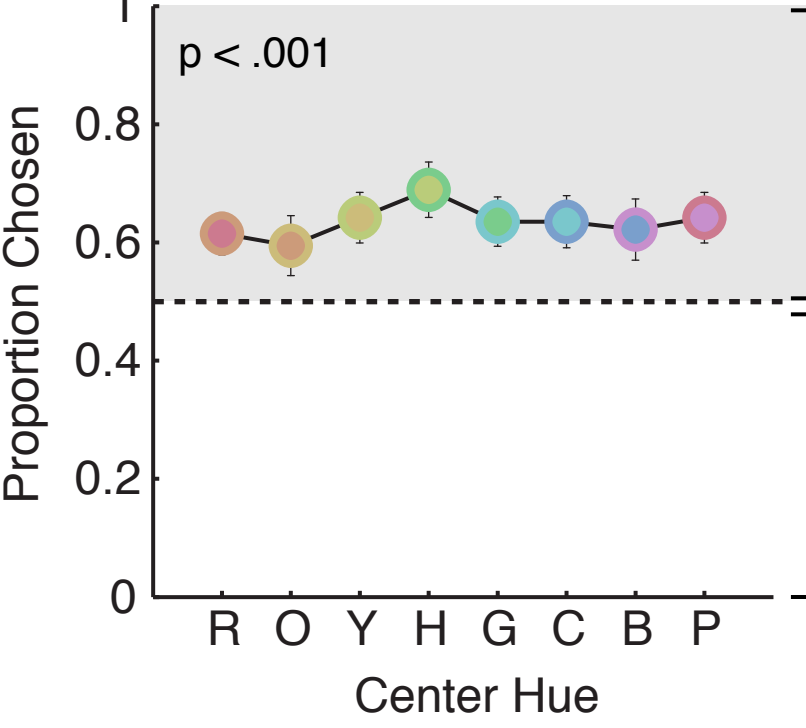
Experiment 2: Luminance Controlled Colors

Five Luminance Levels



Constant CIELUV chroma and hue angle (within-hue)
Background luminance = Base luminance

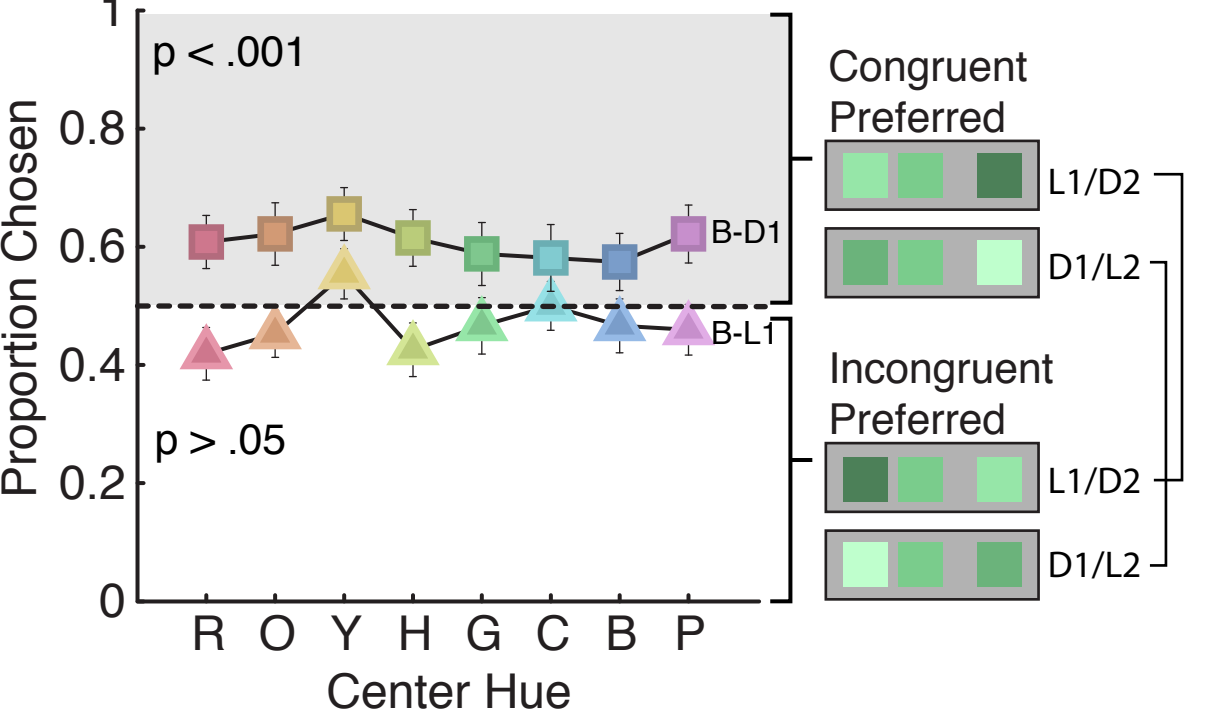
Δ Hue Only
(Base Series)



Effects of redness reduced with controlled luminance.

Preference for prefer colors contrasting in lightness to be closer?

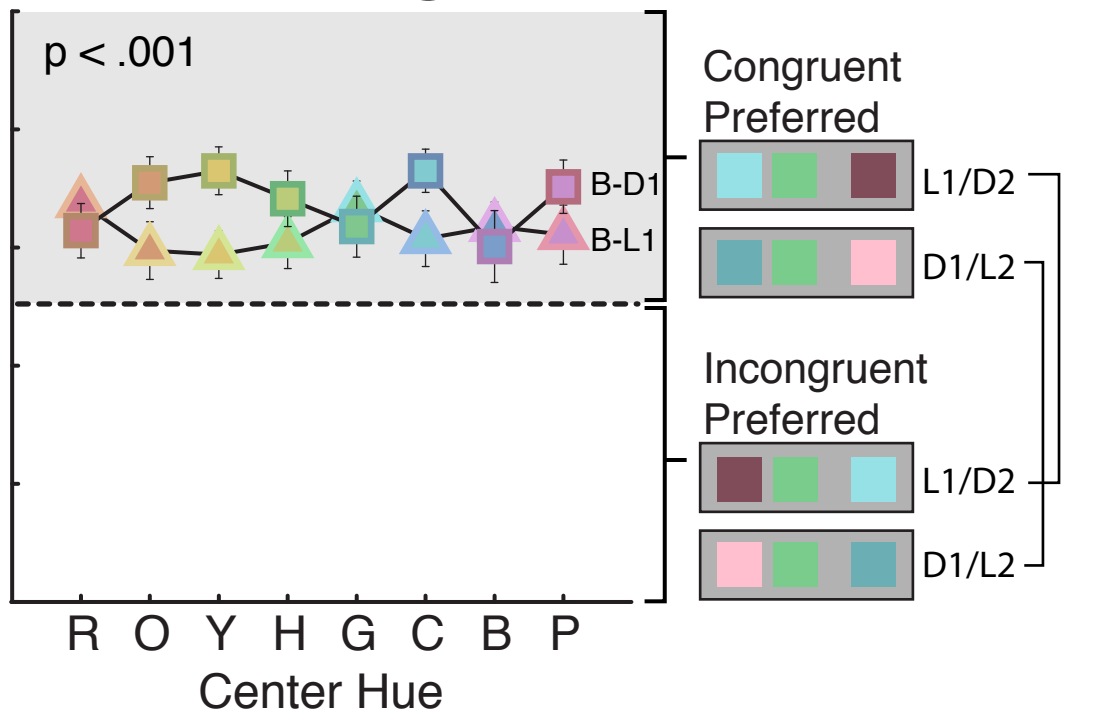
Δ Lightness Only



No effect for lighter colors (L1/D2), which is consistent with grouping data (see Experiment 3).

Consistent

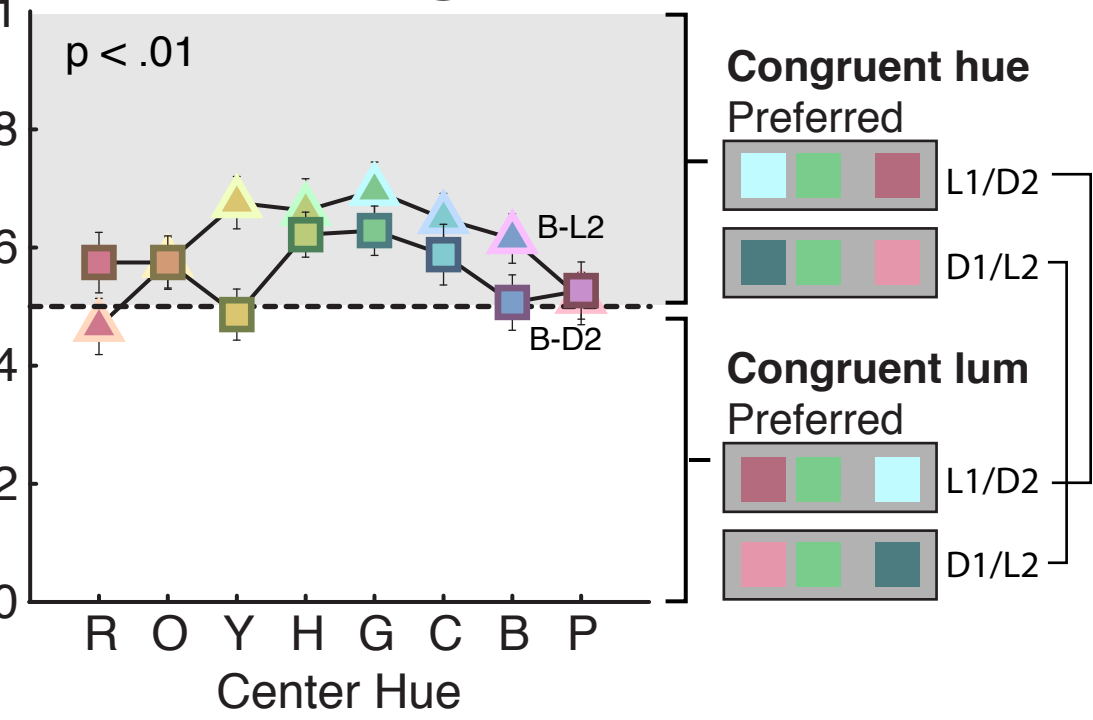
Δ Hue & Δ Lightness



Congruent proximity-hue grouping preference was reduced for the inconsistent dark set (L1/D2), ($p < .01$), compared with the consistent dark set (D1/L2). No corresponding difference was evident for the light set: L1/D2 vs. L2/D1 ($p > .05$).

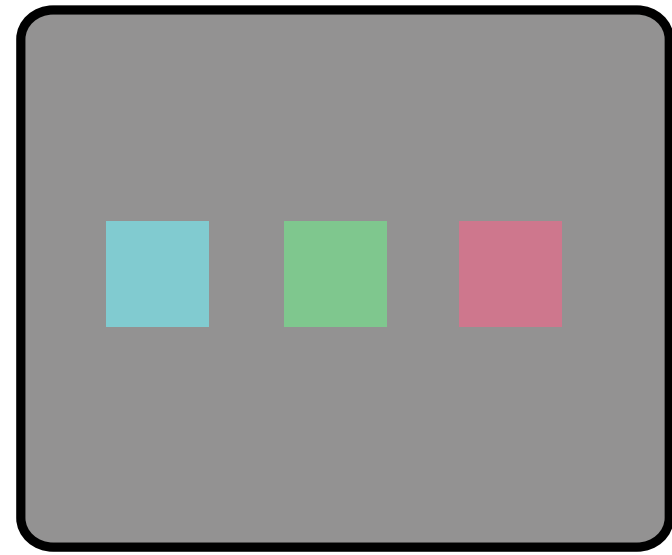
Inconsistent

Δ Hue & Δ Lightness



Experiment 3: Explicit Color Grouping Task

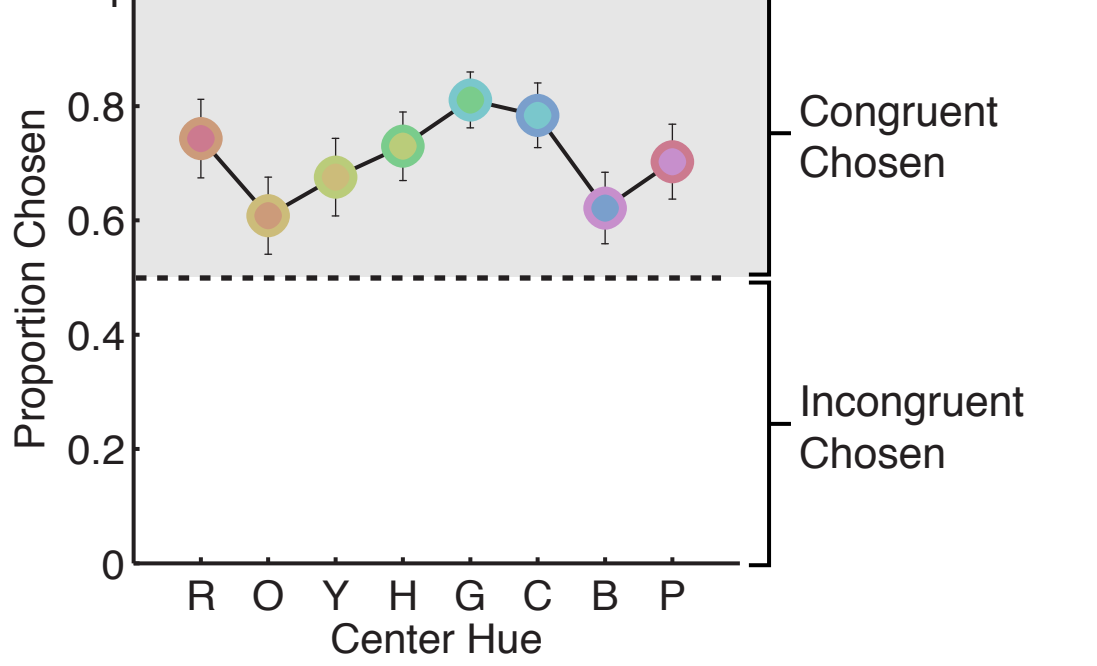
Color Grouping



Same color triplets as in Exp. 2, but equally-spaced.

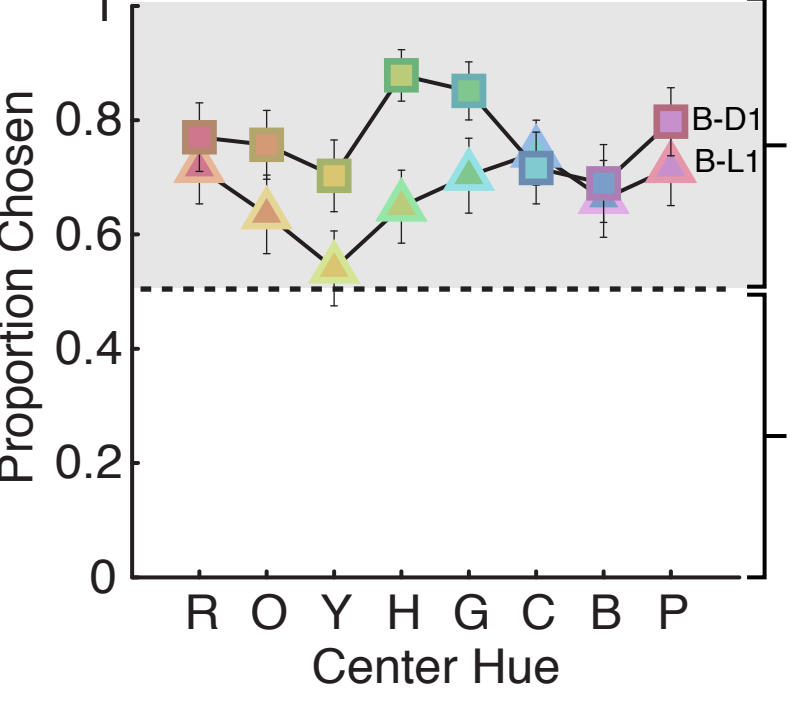
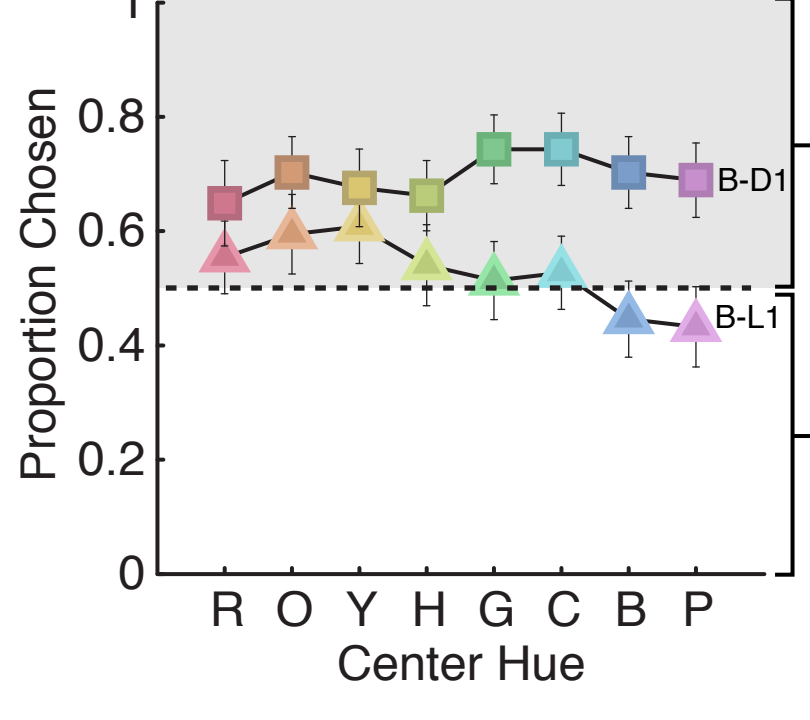
Task: Does the central square group more with the left or right square?

Δ Hue Only
(Base Series)

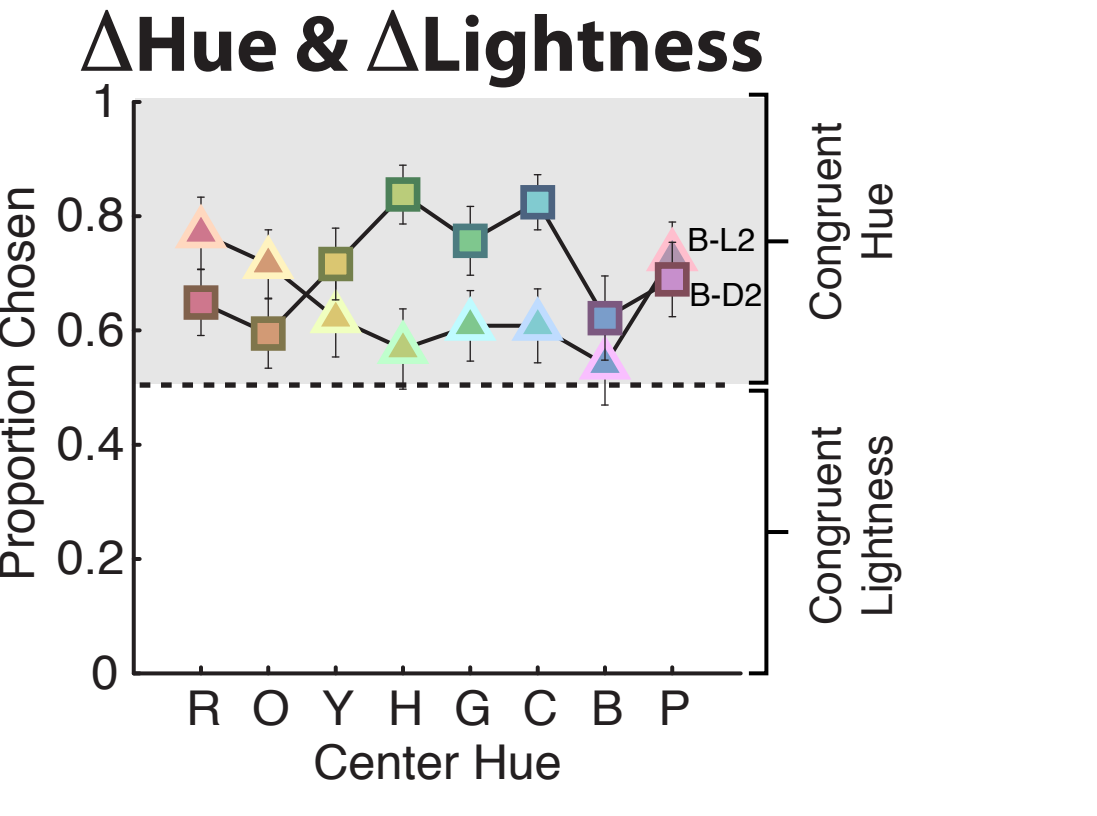


Consistent

Δ Hue & Δ Lightness



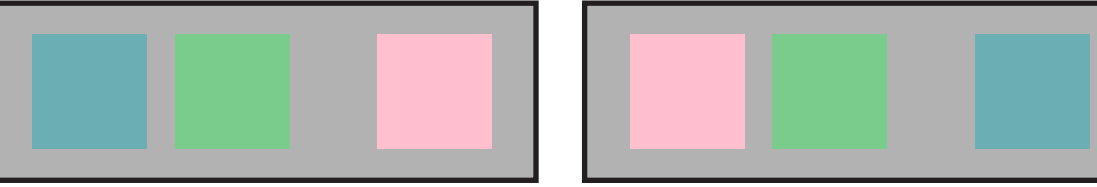
Inconsistent



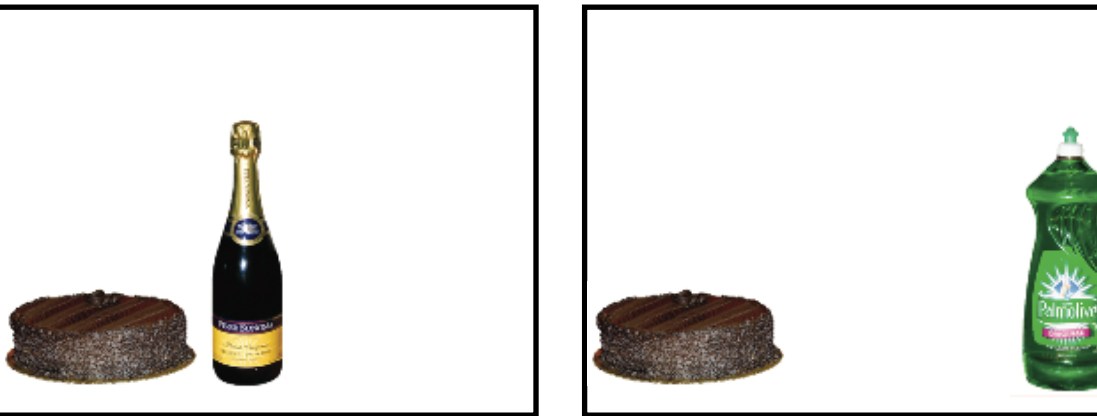
Grouping between proximal colors strongly predicts triplet preference ($r = +.79$).

General Conclusions

Spacing influences preferences for color combinations:
People prefer color combinations with congruent features (spacing, hue, and luminance are congruent).

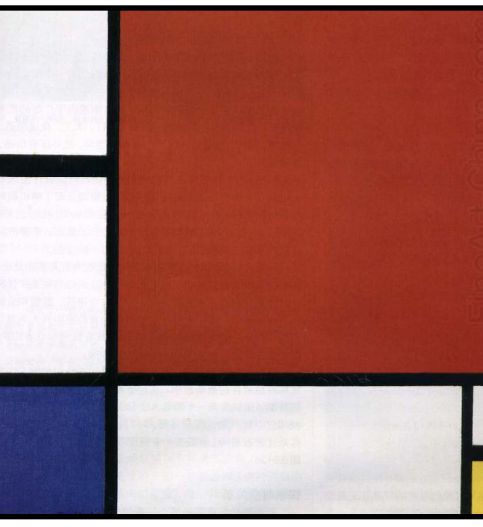


These findings are reminiscent of preferences for semantically related objects to be close together and unrelated objects far apart. (Leyssen, Linsen, Sammartino & Palmer, 2012)



With knowledge about

1. preferences for relative size (Schloss & Palmer, 2011b)
2. preferences for spacing of colored squares we are closer to understanding preferences for more complex compositions (e.g., Mondrian paintings).



References and Acknowledgments

Leyssen, M. H. R., Linsen, S., Sammartino, J., & Palmer, S. E. (2012). Aesthetic preference for spatial composition in multiobject pictures, *i-Perception*, 3, 25-49.
Schloss, K. B., & Palmer, S. E. (2011a). Aesthetic response to color combinations: preference, harmony, and similarity. *Attention, Perception & Psychophysics*, 73, 551-571.
Schloss, K. B., & Palmer, S. E. (2011b). The role of spatial organization in preference for color pairs, *Perception*, 40, 1063-1080.

We thank Stephen Guo, Thomas Langlois, Saki Wang, Kelly Whiteford, Katie Chang, Vishruth Venkat, Madison Zeller, Mathilde Heinemann, Arielle Younger, Jackson Jewitt, and Joseph Austerweil for their help with this project. This research was funded by NSF Grants No. 0745820 and No. 1059088 and a Google Gift.