

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Triadic comparisons reveal representational motifs in human color perception.

Permalink

<https://escholarship.org/uc/item/675702mb>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 47(0)

Authors

Zimnicki, Clementine

Rogers, Timothy T

Publication Date

2025

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed

Triadic comparisons reveal representational motifs in human color perception.

Clementine Zimnicki

University of Wisconsin-Madison, Madison, Wisconsin, United States

Timothy Rogers

University of Wisconsin-Madison, Madison, Wisconsin, United States

Abstract

While individual differences have been found in many aspects of color perception, it is unclear whether mental representations of color vary between individuals in a structured way. To test for structured variability, we collected perceptual similarity judgments for 58 colors in a triadic-comparisons procedure, and from each participant's judgments, embedded the colors into a personalized three-dimensional space. The personalized embedding predicted a participant's similarity judgments on held-out items significantly better than did (a) embeddings from other participants, suggesting reliable individual differences in perceived color similarity ($p < 0.0001$), and (b) color coordinates in a standardized perceptual color space (CIELAB; $p < 0.0005$). Across individuals, embedding structure did not vary randomly but fell into two clusters, one encompassing more distinct color categories and the other a more continuous perceptual space. The results suggest the existence of previously unrecognized "motifs" in how people represent colors.