The relation of color naming and the environment
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Overview
Question: Why is there variation in color naming across languages?
Prior research: Two main theories
(a) Universal constraints
(b) Local linguistic convention
Proposal: Local environmental factors, such as the relative frequency of different colors in the local flora (color diet), influence color naming.
Results: Color naming systems of languages with heavily green-colored diets differ significantly from those without predominantly green-colored diets.

Color and cognition
The issue: Different languages have different numbers of color terms…
… and languages with the same number of terms draw the boundaries between terms in different ways.
Prior work: Evidence for universal tendencies2,3 Evidence for relativity & non-universal variation4,5 Potential influence of environmental factors: Brunnescence hypothesis: Effects of UV light on color perception6, but see also 7 This study explores a different possible environmental influence: color diet

Color diet hypothesis
If color naming systems are influenced by color diet, then languages with similar color diets should have similar color naming systems.

Measuring dissimilarity
Each language partitions the color space into color terms. Edit distance provides a measure of the (dis)similarity between languages’ color naming systems.

Testing the hypothesis
Question: Are languages within a climate category more similar than chance?
Permutation test: Is the edit distance between languages within the same climate category (e.g., monsoon, savanna) smaller than within hypothetical permuted climate categories?

Climate categories
108 languages from the World Color Survey2,8 were categorized according to the Köppen-Geiger climate classification system9, a correlate of natural vegetation10.

Results
Overall, languages within actual climate categories differ less than within randomly permuted categories, p < 0.05.

Taking a closer look at the tropical languages…

Grue and greenery
Languages in green-predominant climates are more likely to have a single term for green/blue, “grue”.
Languages in less-green climates have greater variation in naming. 24% of savanna languages use a 3-term system.

Conclusions
Does color naming vary by color diet? Yes!
Potential explanation: Different color diets can give rise to different color naming systems, which can affect which semantic category systems are communicatively efficient11,12.

Selected references

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