

Background and Goals

People associate word meanings with distributions of colors, which influences a variety of judgements in visual cognition (e.g., interpretations of information visualizations).

(Lin et al., 2013; Schloss et al., 2018; Rathore et al., 2020; Mukherjee et al., 2022)

Do color-concept associations likewise influence perceived similarity of word-meaning?

E.g., Do the words “day” and “happy” have similar meanings, by virtue of similar associated colors?

We considered three competing hypotheses. Color concept associations...

(1) reflect statistics of natural language and play little direct role in shaping perceived word-meaning.

(2) do capture structure beyond natural language statistics, but only influence semantic similarity when colors are explicitly evoked.

(3) capture structure beyond natural language statistics and influence perceived semantic similarity even when color is not explicitly evoked.

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To adjudicate these possibilities, we measured pairwise similarities between words based on color

associations and compared these to semantic similarities estimated via standard natural language processing

techniques (Mikolov et al., 2013). We tested how the two representational spaces contribute to human judgements of

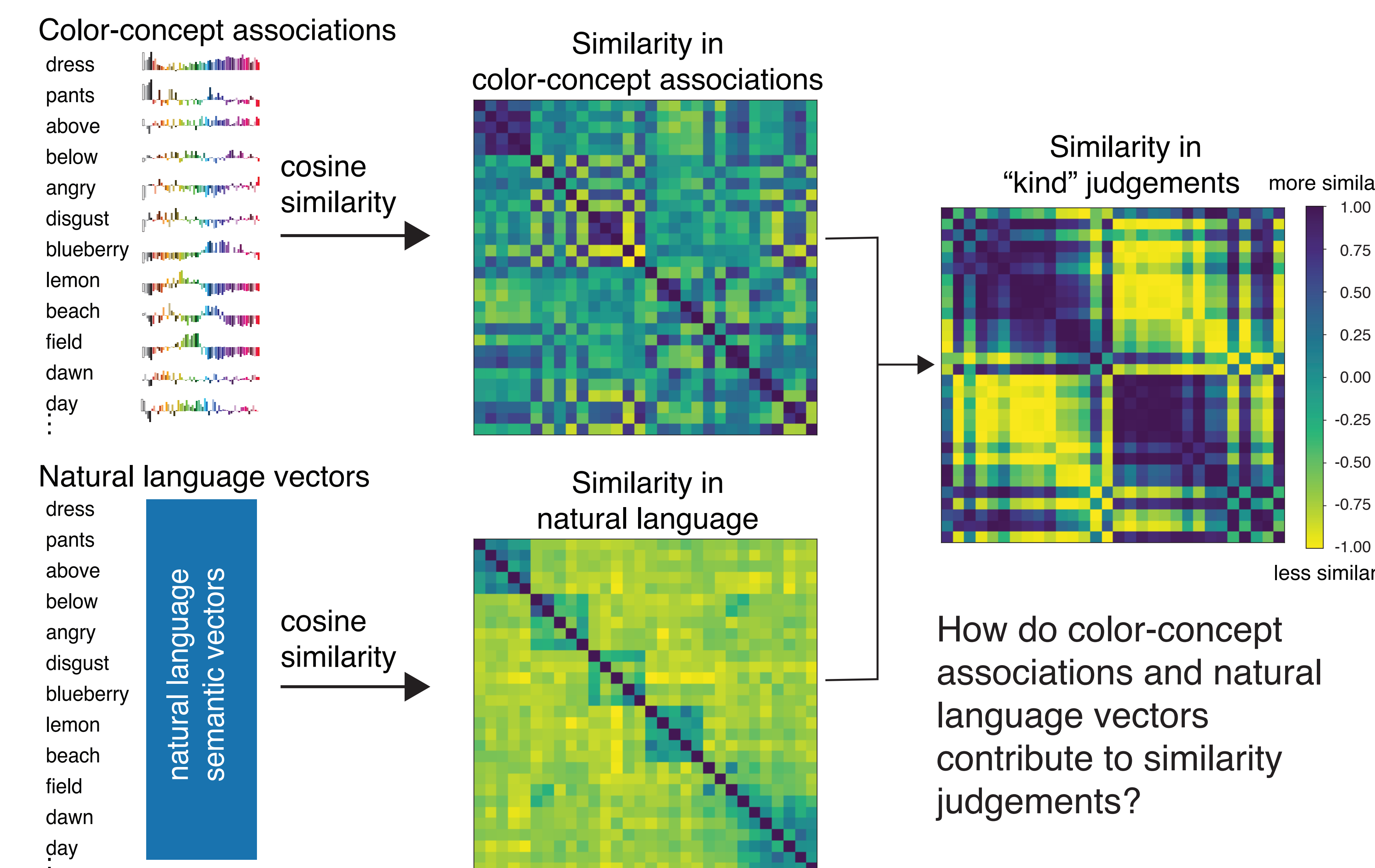
word-relatedness based on similarity of color, in symbolic/metaphorical relationships, or in kind.

General Method

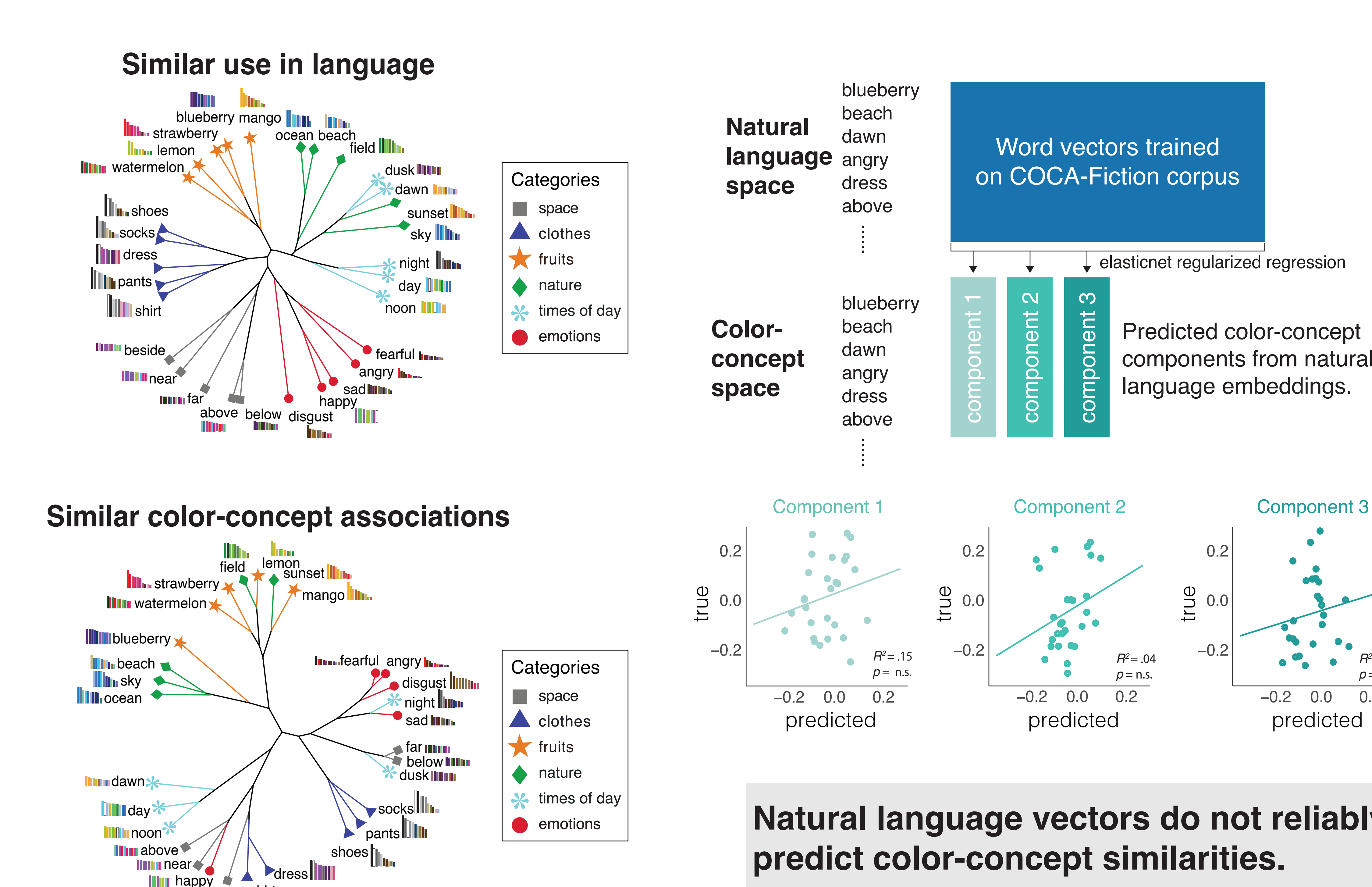
Color color-concept association rating task (275 participants)



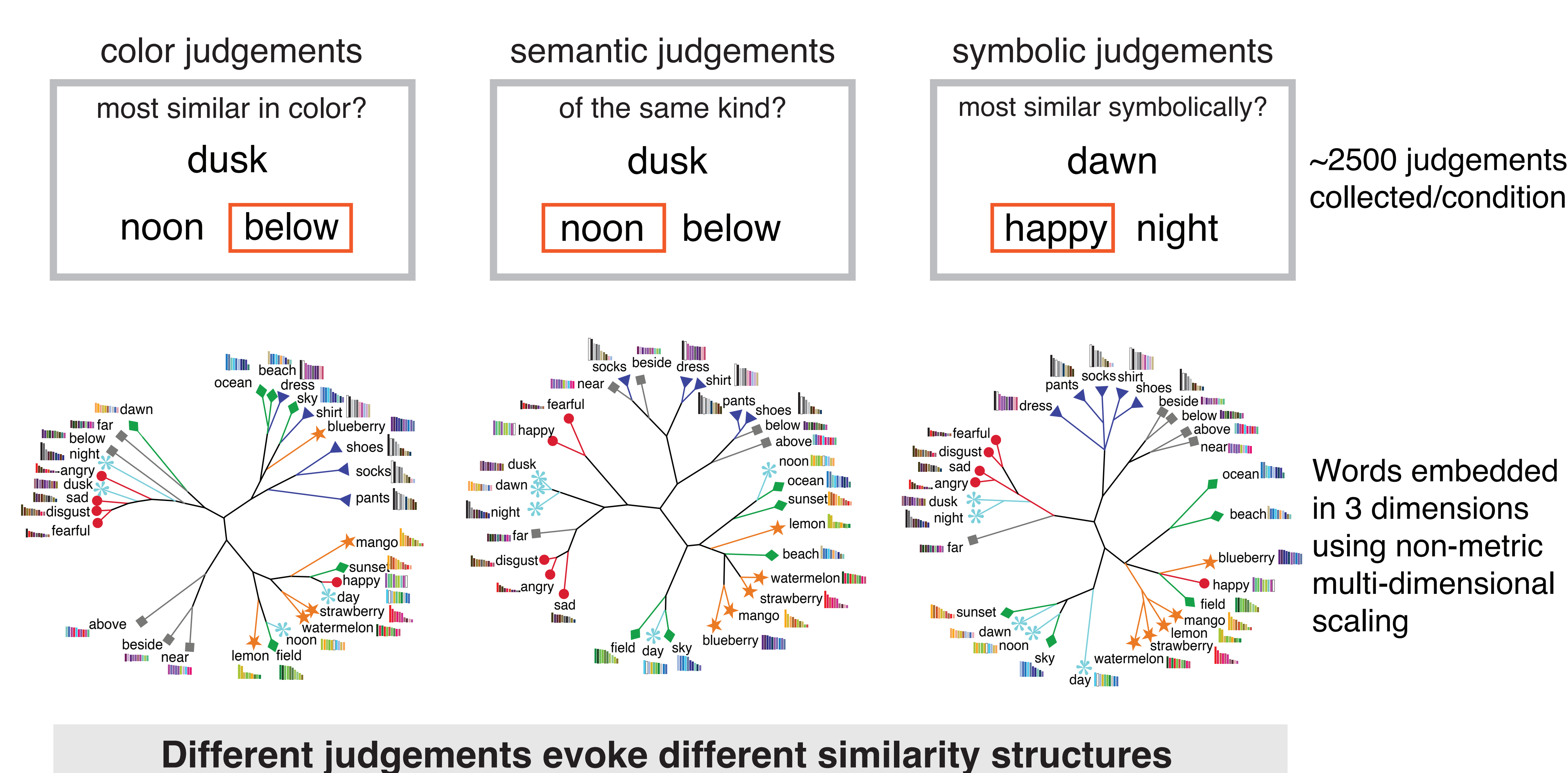
Estimating representational spaces



Are color-concept word similarities predictable from natural language?



Measuring conceptual structure with human triadic judgements



Color-concept ratings help explain human behavior for all judgements



Conclusions

Color-concept associations reveal a different representational space from the semantic space derived from natural language. Thus, natural language semantics do not explain color-concept associations.

Yet, color-concept associations explain unique variance in human judgements of semantic similarity, regardless of whether the task explicitly evokes color knowledge.

Our results support **Hypothesis 3**: the meanings that people attribute to words may partially reflect associations between concepts and color distributions in ways that are not reflected by the statistics of natural language.

Acknowledgements and References

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