Constructing complex social categories from distinct group membership information

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MOTIVATION

HOW ARE COMPLEX SOCIAL CATEGORIES CONSTRUCTED FROM INFORMATION ABOUT THEIR CONSTITUENT GROUPS?

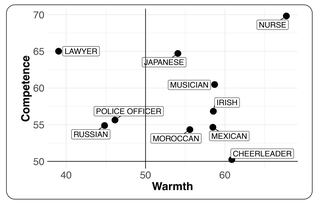
Previous research has examined how inferences about compound objects (e.g., fuzzy chair) are produced from their constituent concepts[1,2], but little is known about the **combinatorial processes** that subserve our ability to evaluate complex social categories (e.g., Irish musician).

Capitalizing on the observation that social perceptions can be organized along dimensions of **warmth** and **competence**[2], we test the abilities of two different models to predict ratings of 25 nationality-occupation concepts in those dimensions. For comparison, we also examine 25 combined animal habitat-animal type concepts (e.g., cave rat) in the **ferocity** and **size** dimensions, which have been shown to organize the animal concepts space[4].

STUDY DESIGN

10 social concepts, 10 animal concepts

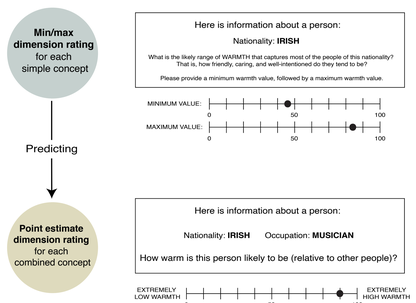
Stimulus set normed on Amazon Mechanical Turk (MTurk) (n = 100)



Attempted to minimize correlation between dimensions for social and animal concepts, respectively

Survey ratings

Two different groups of MTurk raters for social and animal concepts (n = 258, n = 242)



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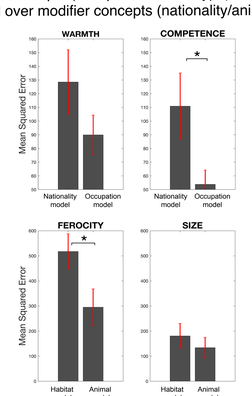
Familiarity scores for each simple and combined concept:
Composite of 3 questions about various types of exposure

Baseline non-combinatorial models

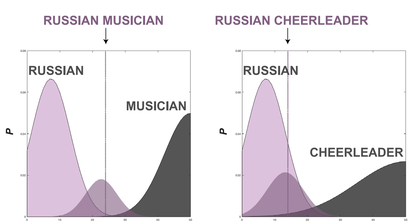
If participants use only one concept in the combination rating, head concepts (occupation/animal type) should be prioritized over modifier concepts (nationality/animal habitat):



Combinatorial models

Additive model:
Weighted average of simple concept ratings

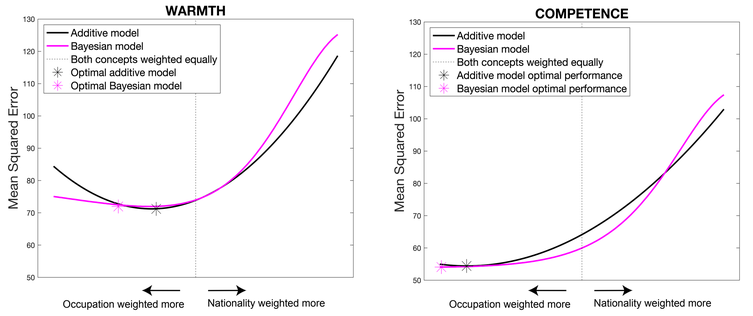
Bayesian model[5]:
Combines **distributions created from min/max ratings** to predict combined concept ratings; variance (i.e., concept uncertainty) used to adjust weight of one concept relative to the other



MODEL COMPARISON

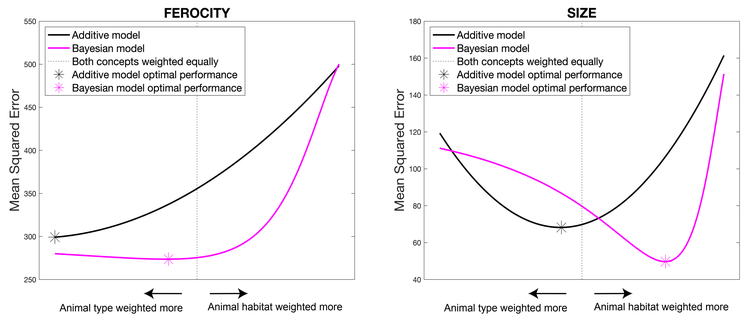
Model performance in social concepts category

Both models perform best when occupation is weighted more than nationality, in both the warmth and competence dimensions



Model performance in animal concepts category

Both models perform best when animal type is weighted more than animal habitat in the ferocity dimension; both models performed better in the size dimension, relative to ferocity (t = -3.41, p = .002); optimal Bayesian model outperforms optimal additive model in size dimension (t = 2.1104, p = .05)



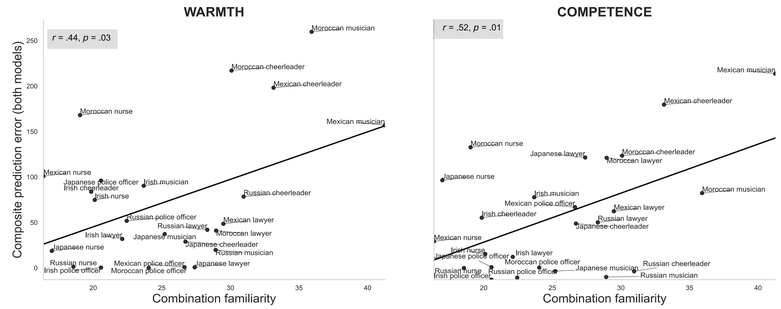
CONCLUSIONS & FUTURE DIRECTIONS

- In general, the head concept contributes more to people's evaluation of social and animal combinations, relative to the modifier concept
- For social combinations, in both the warmth and competence dimensions, the additive and Bayesian models show that occupation is weighted more than nationality
- More familiar social combinations are characterized by higher model errors, whereas the opposite is true for the animal combinations
- As people gain more experience with a social combination, they may develop a new concept for it that less closely resembles either of its constituents
- Word embedding models may be used in future behavioral studies to more precisely test whether distance between concepts in vector space (1) maps onto distance between concepts in the semantic space of human participants, and (2) predicts combinatorial patterns across a more diverse set of concepts.

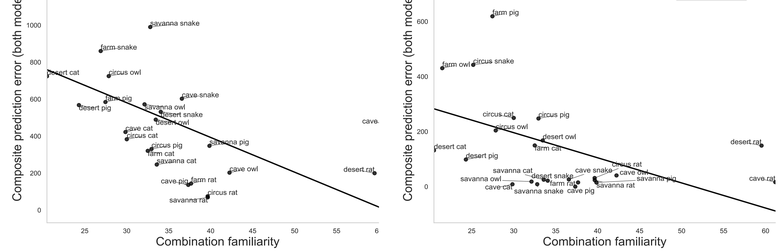
FAMILIARITY WITH COMBINATIONS

Familiarity modulates model performance

Composite prediction error derived from averaging errors of both models; **higher composite error** for more familiar **social combinations**, but only when nationality and occupation are weighted equally

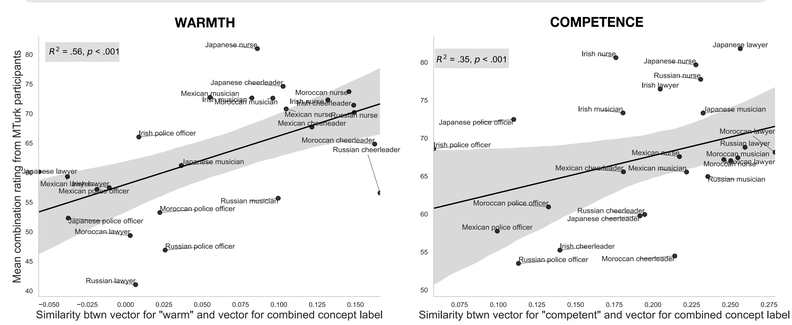


Lower composite error for more familiar **animal combinations**, contrary to pattern of results found for social combinations



WORD EMBEDDING MODELS

Word2vec model trained on a large set of Google News articles significantly predict social combination ratings.
Predictions for animal combination ratings were not significant.



ACKNOWLEDGEMENTS:

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