Modeling aesthetic experiences across dynamic natural inputs

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Background

- Perceptual properties critically drive our perception of beauty [1–3].
- For example, color, curvature, contour, and spatial integration across natural images predicted perceived beauty [4-6].
- However, in the literature, primarly short video clips or static images were used.

Research Objective

In this project, we tested whether and how different perceptual properties predict aesthetic judgments in a continuous beauty rating task while watching a dynamic and naturalistic movie.

Methods & Analysis

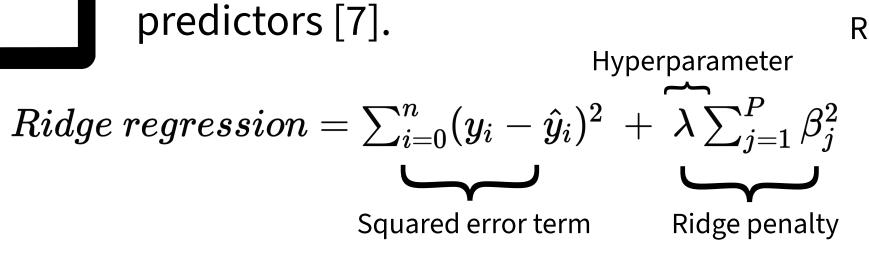
Procedure and stimuli:

30 participants continuously rated aesthetic experiences while wathcing the dynamic stimuli, the movie "Home". The movie includes a diverse range of visual contents, as shown below.

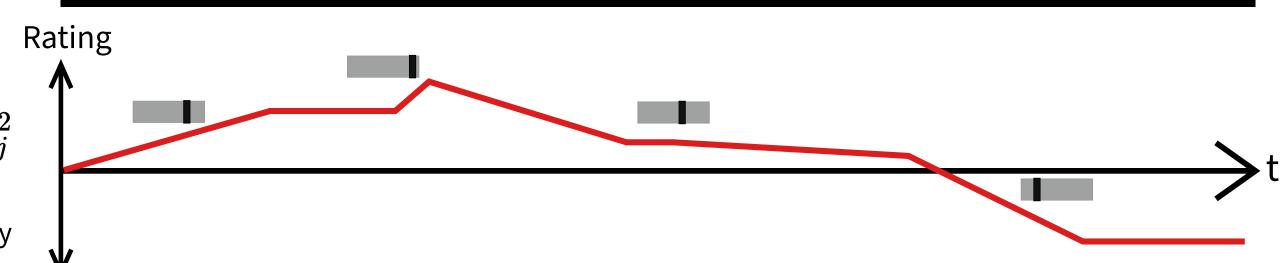


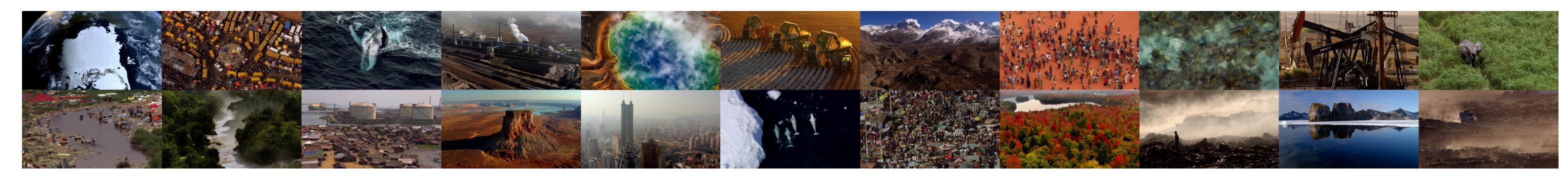
Behavioral data:

We correlated continuous beauty ratings with the predictors below. Then, we created a ridge regression model to predict these ratings using the same predictors [7].





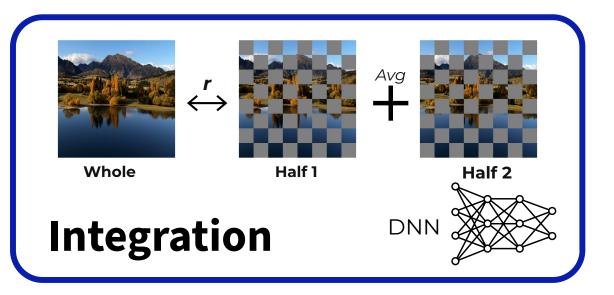


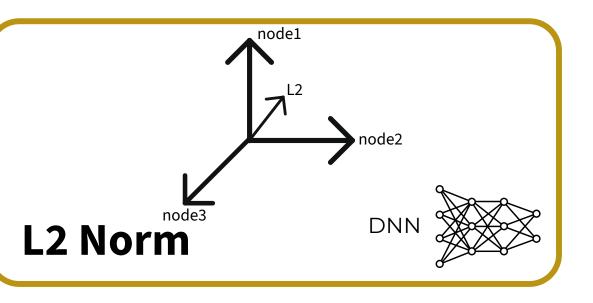


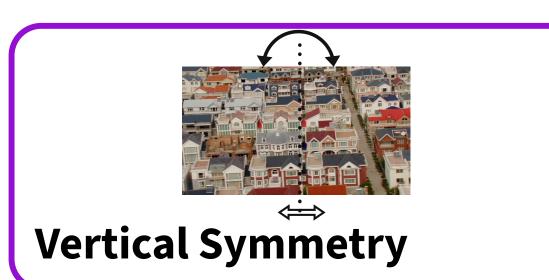
Predictors



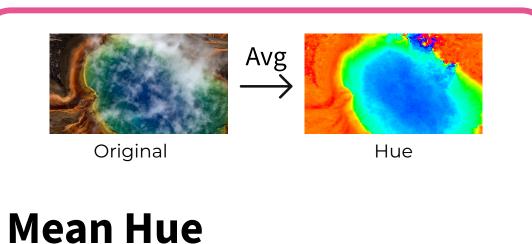


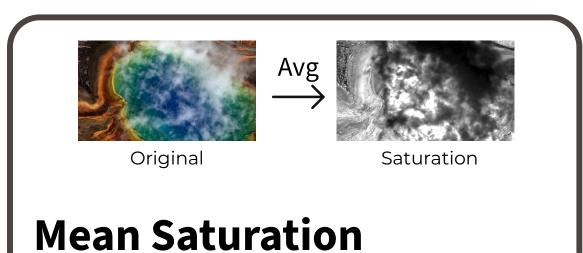


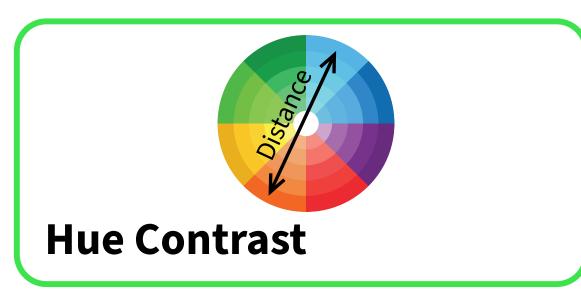












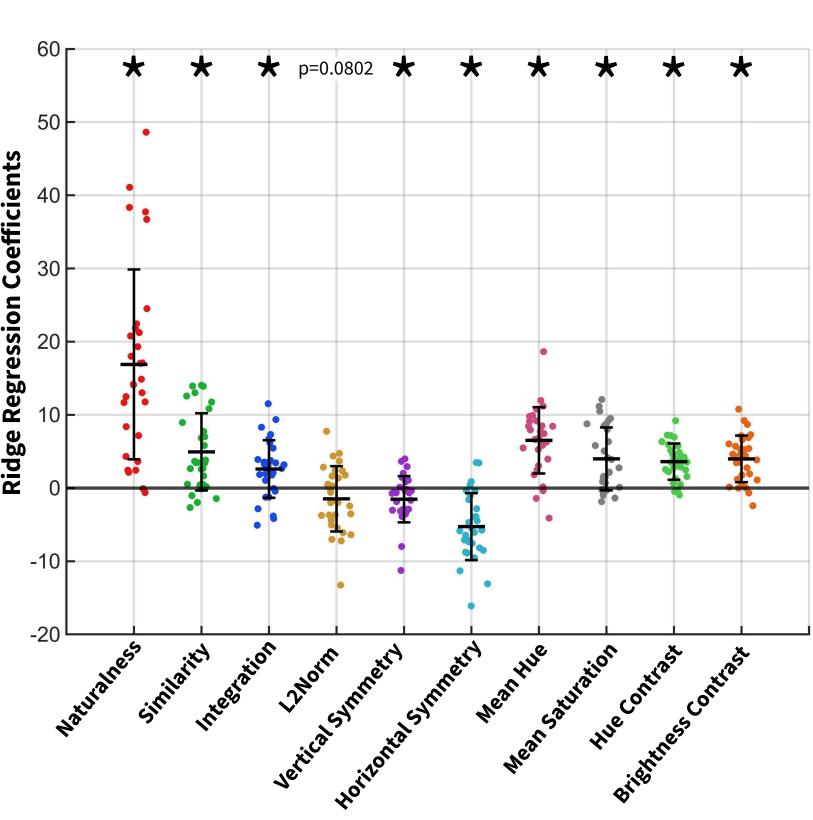


Results

Predictor-Rating Correlations Across Participants

Predictors have a significantly high correlation with beauty ratings, except for brightness contrast. **p**=0.0653 0.6 **Correlation Values**

Ridge Regression Coefficients Across Participants Predictors independently predicted beauty ratings.



Actual-Predicted Rating Correlations

Content-Based Predicted Correlations Natural and man-made scenes predicted each The model predicted each participant's ratings, both other, both within and between categories. within and between groups. **Predictio Prediction Prediction Correlations Correlations Between Participants Participants** Test Training 1/9 Subject 1 Natural Man-made Man-made Natura 8/9 movie parts Subject 1

Conclusion

- Perceptual predictors are capable of explaining beauty ratings in a dynamic and naturalistic movie.
- The model trained on these predictors generalize across content and individuals.
- Future studies could explore how these models generalize to different movies with vastly different contents.

References

- [1] Chatterjee & Vartanian (2014). Trends in Cognitive Sciences
- [2] Vessel et al. (2018). Cognition
- [3] Farzanfar & Walther. (2023). Psychological Science
- [4] Iigaya et al. (2021). Nature Human Behaviour
- [6] Nara & Kaiser. (2024). Science Advances [7] Hoear & Kennard. (1970). *Technometrics*

[5] Vartanian et al. (2024). Scientific Reports