

Modeling aesthetic experiences across dynamic natural inputs

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Background

Research Objective

- 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, primarily short video clips or static images were used.

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

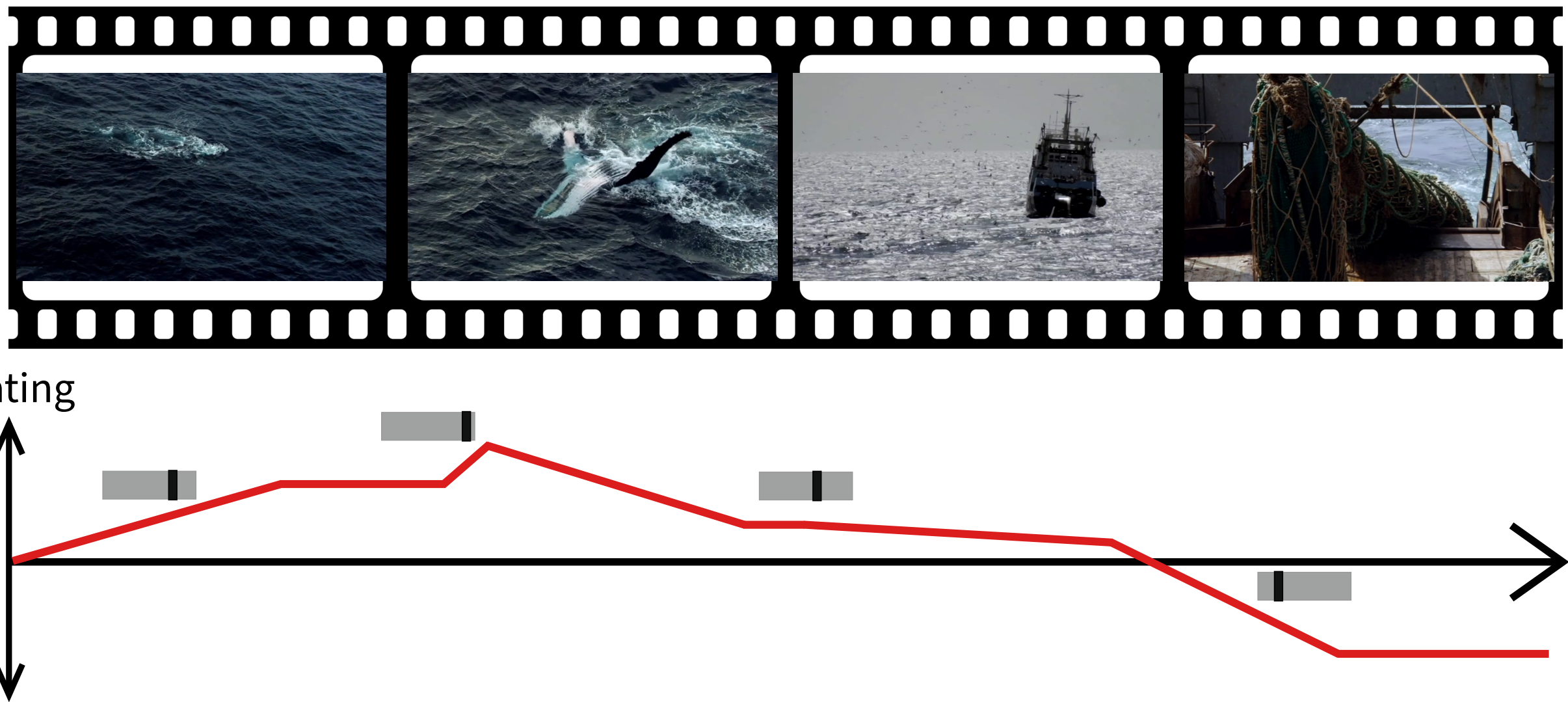
Procedure and stimuli:
30 participants continuously rated aesthetic experiences while wathcing the dynamic stimuli, the movie "Home". The movie includes a diverse range of visual contents, as shown below.



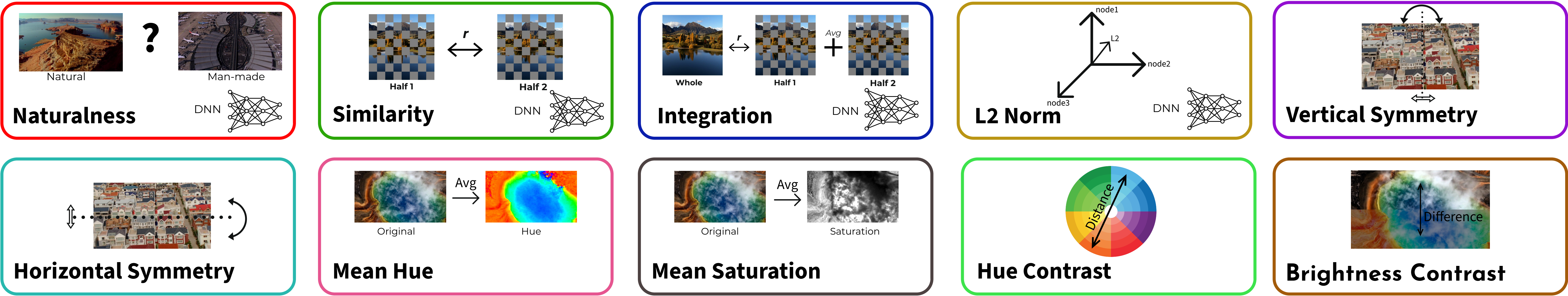
Behavioral data:
We correlated continuous beauty ratings with the predictors below. Then, we created a ridge regression model to predict these ratings using the same predictors [7].

$$\text{Ridge regression} = \underbrace{\sum_{i=0}^n (y_i - \hat{y}_i)^2}_{\text{Squared error term}} + \underbrace{\lambda \sum_{j=1}^P \beta_j^2}_{\text{Ridge penalty}}$$

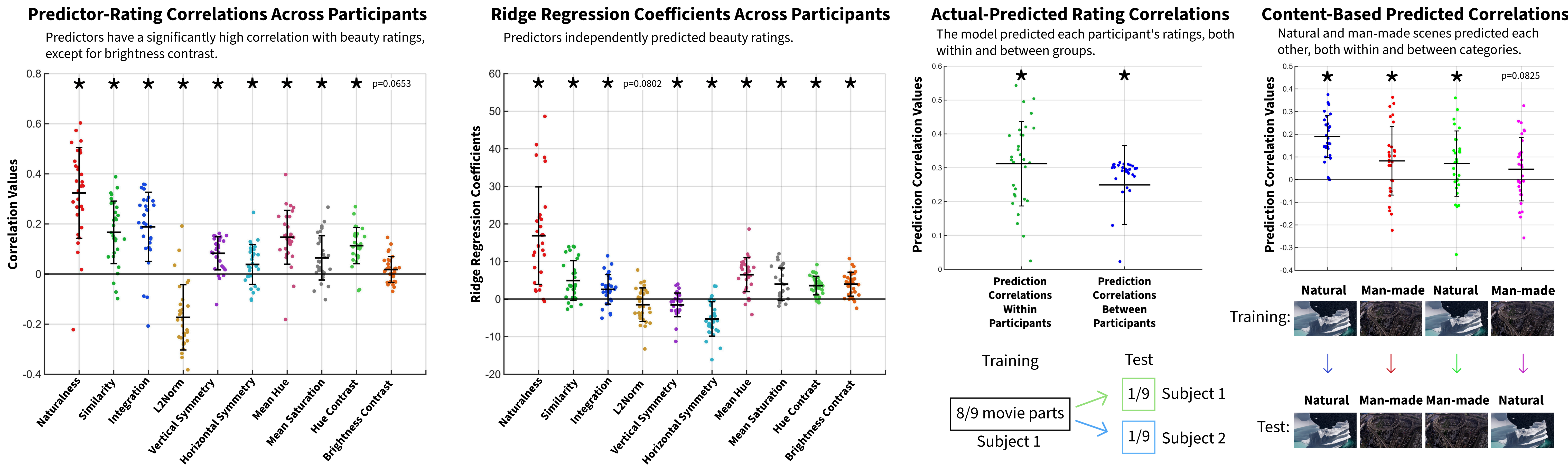
Hyperparameter



Predictors



Results



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*
[5] Vartanian et al. (2024). *Scientific Reports*
[6] Nara & Kaiser. (2024). *Science Advances*
[7] Hoar & Kennard. (1970). *Technometrics*