Exploring the Perception of Vastness, Openness, and Ruggedness

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Introduction

Environmental spaces can extend far from the observer and become, at some extreme, what we call “vast.” Although this dimension has been recognized in the literature on awe, vastness as an aspect of perception has undergone little formal study. This project represents one of the first explorations of visual correlates of vastness.

The goal of this project was to explore the validity as well as reliability of vastness, in that judgments of vastness are systematically related to other visual characterizations of scenes.

Research Questions

1) Is vastness a reliably recognizable perceptual feature?
2) Is vastness related to the visual components of an environmental scene? Specifically, are the features openness and ruggedness predictive of vastness?

Experiment 1

Participants:
A total of 51 individuals participated in Experiment 1. Thirty-one of the participants were students from the University of Utah. Twenty of the participants were residents of the Tübingen, Germany area.

Apparatus & Materials:
One hundred thirty-four images of natural landscapes were displayed to all participants (three of which were practice). The Utah sample viewed images on a monitor (1920 x 1200). The German sample viewed images in the PanoLab, a large-screen, wide field of view projection system.

Procedure:
Participants viewed images in a random order and were asked to provide ratings of vastness (0 - 100) for each image.

Experiment 1-Results

German: \( M = 50.58, SD = 10.07 \)
U.S.: \( M = 60.05, SD = 10.16 \)
\( n(49) = 3.26, p = 0.002 \)

Experiment 2

Participants:
A total of 22 individuals from the U.S. participated in Experiment 2.

Apparatus & Materials:
The same 134 images were displayed to all participants (three of which were practice). Participants viewed images on a monitor (1920 x 1200). A two dimensional grid of openness (on the horizontal axis) and ruggedness (on the vertical axis) was displayed throughout trials. The grid contained 64 black and white environmental images arranged based on the method described in (Oliva & Torralba, 2001).

Procedure:
Participants rated each image by clicking on a point in the two-dimensional openness-ruggedness grid. Openness was defined as “not having many obstructions of objects on the ground surface”. Ruggedness was defined as “protrusions or projections of ground surface into the height dimension, producing an uneven surface”.

Discussion- Experiment 1

1) Vastness was reliably recognized across two different populations.
2) The data demonstrate clear consistency of what is vast and less consistency in what is less vast.

Conclusion

Vastness has been shown to be both reliable and valid. Experiment 1 demonstrated consistency across populations. Experiment 2 demonstrated visual components of environmental images were predictive of perceived vastness.

Future work might examine other visual effects such as diffusion or movement and their influence on perceived vastness.

References and Acknowledgements

5. R2 = .55