Official Title
The Effects of Stimulus Variability in Natural Visual Scenes

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HUMAN PSYCHOPHYSICS: MATLAB ANALYSIS

1) All analyses were performed using code available in NaturalImageThresholds github repository (https://github.com/AmyMNi/NaturalImageThresholds)

2) To use ToolboxToolbox (https://github.com/toolboxhub/ToolboxToolbox) to configure the code in Matlab, run: tbUseProject('NaturalImageThresholds')

3) To create plots of individual session analyses, run: ~/MATLAB/projects/NaturalImageThresholds/analysis/analyzeSessionData.m

4) To create plots of individual participant analyses (across all experiment sessions for that individual participant), run: ~/MATLAB/projects/NaturalImageThresholds/analysis/analyzeExperimentData.m

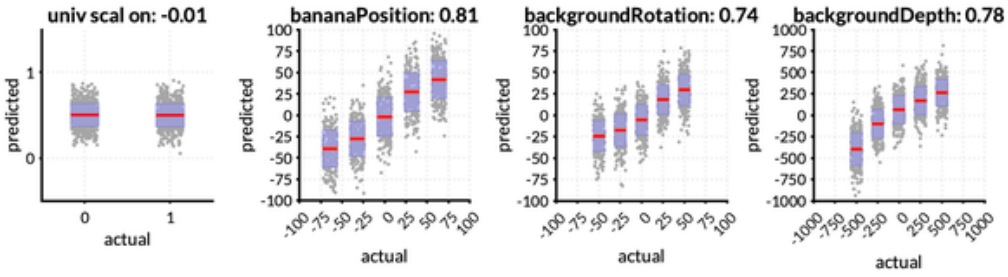
5) To create plots of summary analyses (across all participants), run: ~/MATLAB/projects/NaturalImageThresholds/analysis/analyzeSummaryData.m

HUMAN PSYCHOPHYSICS APPENDIX: STATISTICAL ANALYSIS

1) The software described above performs three paired t-tests (Noise 0 vs Noise 1; Noise 0 vs Noise 2; Noise 1 vs Noise 2). These are run two-tailed to compare the difference in mean thresholds (over subjects) across the three conditions. Because there were three such tests, a significance level of $p < 0.0167$ was chosen to determine the significance of any difference across conditions. This is the Bonferonni corrected level for three tests applied to a baseline significance value of 0.05.

HUMAN PSYCHOPHYSICS: ANALYSIS OF NON-UNIVERSAL SCALING

1) Summary:
    a. I did not use universal scaling for the creation of the human psychophysics experiment images (instead, I set the scaling to be individualized for each image). Thus, this scaling variability became a part of the task-irrelevant variability.
2) Control results:
    a. To test whether there was any effect of this scaling variability, monkey electrophysiology was used to test whether there were any differences in the neuronal responses between individually scaled vs. universally scaled images. Below are the results of a linear regression with 4 factors. The 2nd panel illustrates the ability of the neuronal population to predict (y-axis) the various banana positions (x-axis), with cross-validation. The correlation between the predicted vs. actual positions is listed in the title (0.81). The 3rd and 4th panels illustrate the neuronal population's ability to predict background-object rotation and background-object depth. The main takeaway from this figure is the 1st panel, which illustrates that the neuronal population cannot differentiate the individually scaled images from the universally scaled images.



3) To calculate the mean luminance of each image to compare mean image luminance across the different noise levels:
    a. Use NaturalImageThresholds (https://github.com/AmyMNi/NaturalImageThresholds)
    b. Run: ~/MATLAB/projects/NaturalImageThresholds/images/runCompareLuminance.m