Current Biology, Volume *22*

Supplemental Information

Predictive Properties of Visual Adaptation

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Supplemental Inventory

Supplemental Figures and Tables

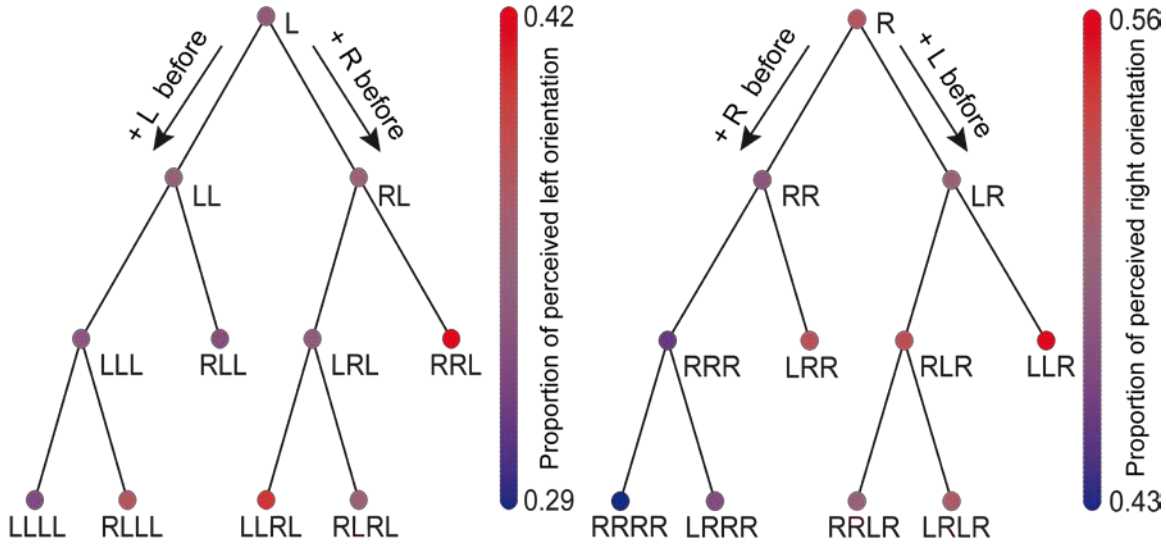

Figure S1. Preceding Series Analysis, Related to Figure 1

In the binocular rivalry experiment, we analyzed the predictability of the percept from the actual series that was presented just before the rivalry Gabor patches. We found little predictability effects, except a tendency whereby Right orientation was perceived when the preceding series terminated with a Left orientation (left side of the Figure) and the opposite tendency when the preceding series terminated with a Right orientation (right side of the Figure). These effects are much less striking than the ones reported in the manuscript. All the series used in the experiment are shown as a tree where the root is the last Gabor orientation of the series that preceded the test Gabor. In this format, the first row corresponds to size-1 series and the last row to size-4 series. Not all series were used in the experiments (missing leaves in the tree) in a attempt to reduce the runtime of the experiment, while preserving important statistics such as an equal number of Left and Right orientations, and an equal number of alternations from Left to Right and from Right to Left. The percentage of perceived left or right orientations in the test rivalrous Gabor is represented by the hue of the leaf.

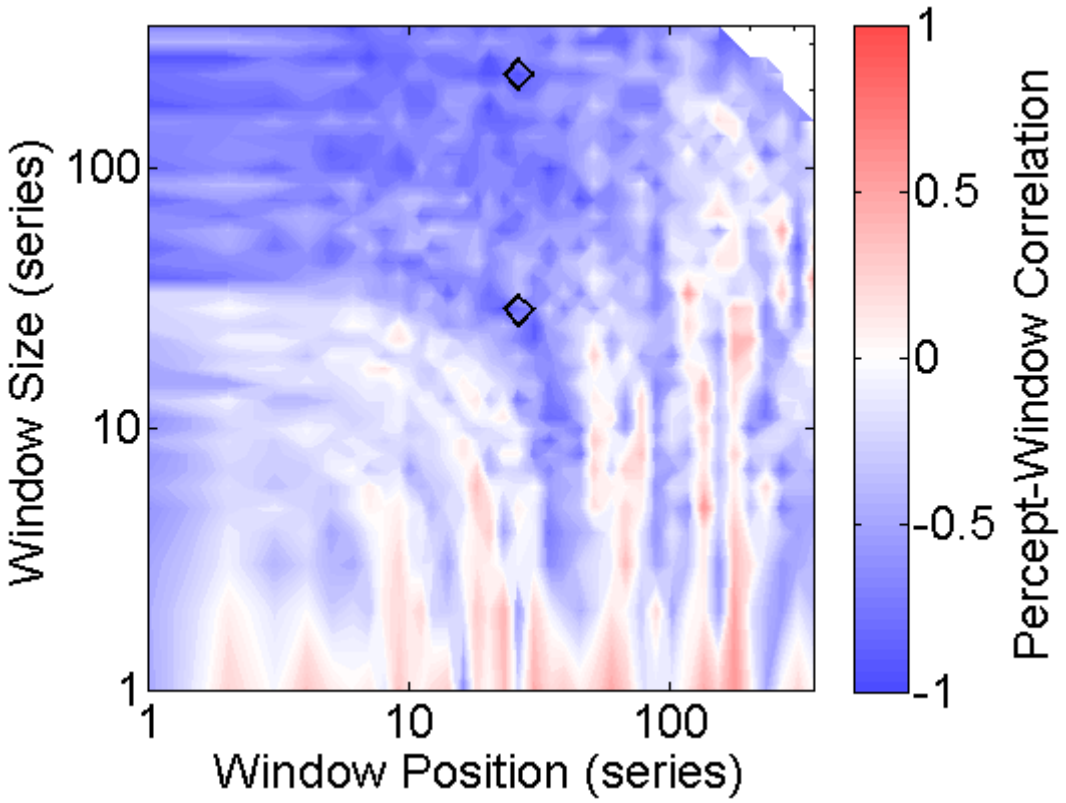

Figure S2. Correlation Analysis for Alternations, Related to Figure 2

In addition to match the proportion of left orientation in recent and reference history, the visual system could also try to match the number of alternations of orientations between the recent and the reference windows. According to this view, if the series alternates less in the recent history than in the reference, the next Gabor is expected to be different from the last displayed Gabor. We conducted the correlation analysis between the proportion of orientation different from the last event perceived in rivalry and alternation probability measured in windows of series, whose size and position varied. In a format similar to that used in Figure 2, the plot shows the correlation (hue scale) between the proportion of alternations in windows of various sizes and whether or not there was an alternation between the last Gabor of the series and the percept of the rivalrous test Gabor. Black outlines indicate the location of the significant correlations after correction for multiple comparisons. Only two significant windows were found and the windows were actually negative correlations between the current percept and the remote history. A negative correlation between the current percept and the recent history is expected for the alternation hypothesis to be a candidate explaining adaptation, but is not found. The results then confirm that predictions are made on the basis of proportions of orientation events only and not on the basis of alternations of orientation events.

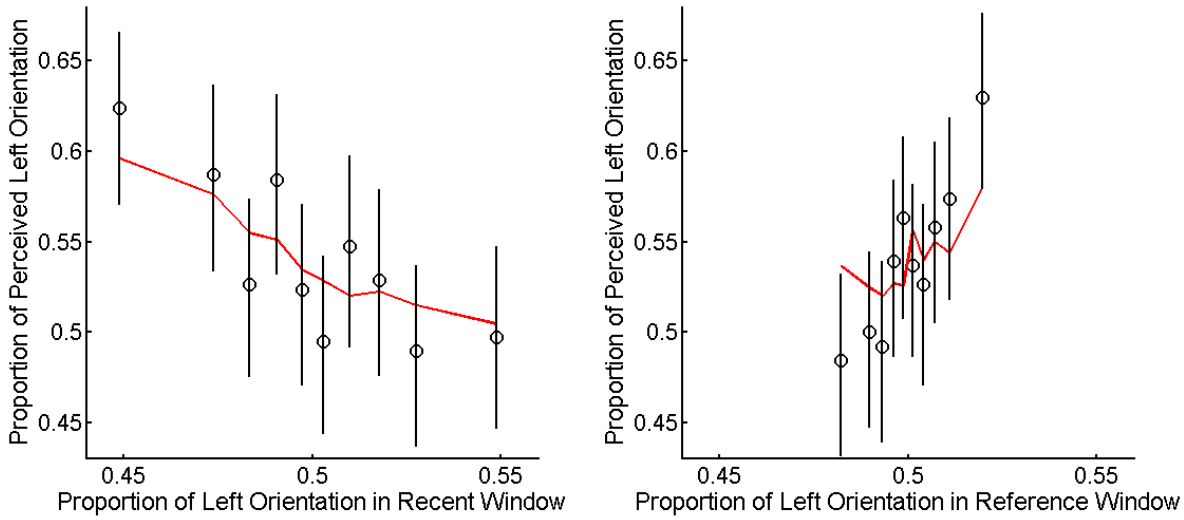

Figure S3. Model Results for After-Effect Experiment, Related to Figure 4

For each observer of the tilt after-effect experiment, a prediction was made for each possible trial for a reference window of size 87 at position 20 and recent history at position 1 (as inferred from the results shown in Figure 2b). The model was run using the recent history size as a free parameter (best parameters are shown below in Supplementary Table 1, average recent history size = 34). In the same format as that used for Figure 4, the plot on the left shows the relation between perceived orientation of the test Gabor and proportion of these orientations in the recent window (black circles: data; red line: model). The plot on the right shows the relation between perceived orientation of the test Gabor and proportion of these orientations in the reference window. Error bars are bootstrapped 95%-confidence intervals.

Table S1. Model Parameters, Related to Figure 4

Recent window size	Observers								
in rivalry experiment	7	43	42	55	33	60	24	16	
in after-effect experiment	41	39	58	18	32	24	38	24	31

The table shows the best values for the recent window size parameter of the model according to maximum-likelihood estimation for the two experiments. Size and position values for the reference window were taken from the correlation analysis (fixed to a size of 58 series and a position of 101 series for the rivalry experiment and 87 and 20 for the after-effect experiment). Position for the recent window was fixed to 1 (adjacent to the current percept). The average proportion of the displayed left orientations in the reference window was used to estimate the parameter q_L.