Crossed-Uncrossed Projections from Primate Retina are Adapted to Disparities of Natural Scenes

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Supplemental Information

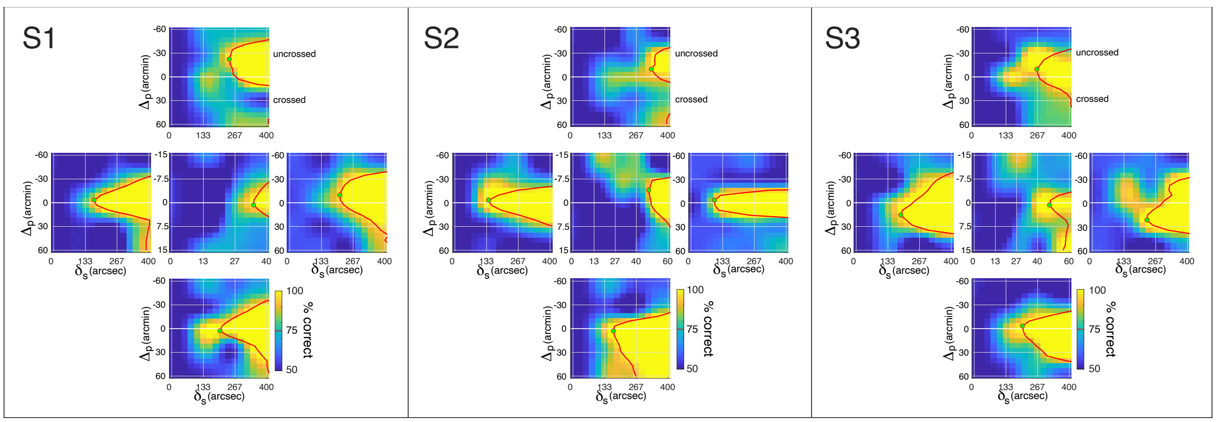

Fig. S1. Individual subject data from stereoacuity experiment. The format is the same as Fig. 2C. Each large panel shows the data from one subject. The smaller panels show the data from different field locations: middle panels for the fovea and left, upper, right, and lower panels for the corresponding peripheral field locations. Color represents the percentage of correct responses for each combination of relative disparity and pedestal disparity. The lowest thresholds are indicated by the green spots.

Tested variable	Source	dof	ANOVA (p)	K-W (p)
Proportion correct	Relative disparity	177	**10e-12**	**10e-15**
	Pedestal disparity	175	**10e-15**	**10e-15**
	Field location	176	0.289	0.7377
	Relative × Pedestal	8	**0.028**	-
	Relative × Location	6	0.910	-
	Pedestal × Location	12	**0.001**	-
	Relative × Pedestal × Location	24	0.613	-
Stereoacuity	Location	35	0.2697	0.2557
	Horizontal *vs* Vertical	37	0.3987	0.4152
Pedestal differences	Crossed *vs* Uncrossed	68	**0.0037**	**0.0067**

Table 1. Results of statistical tests on the stereoacuity data for the peripheral field locations. From left to right, the table shows the variables in the specific test, degrees of freedom, p values from ANOVA tests, and p values from Kruskal-Wallis tests. Significant values are in bold. To determine which effects were statistically reliable, we conducted an *n*-way ANOVA, grouping for relative disparity, disparity pedestal, and peripheral field location (thus, we did not include the foveal data in the tests). To test for stereoacuity differences, we performed a *1*-way ANOVA grouping for field location, but also comparing horizontal and vertical meridians. To assess effects of disparity pedestal at different field locations, we compared the performance differences between pedestals of -30 and 30arcmin, and between pedestals of -60 and 60arcmin.

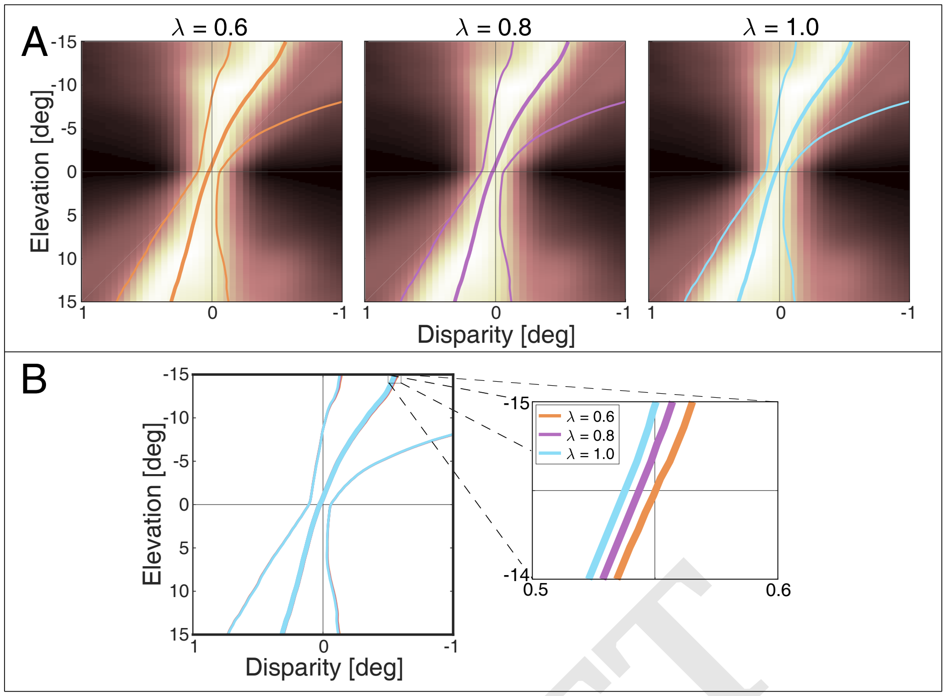

Fig. S2. Effect of cyclovergence on natural-disparity statistics. **A**: Distributions of naturally occurring horizontal disparity along the vertical meridian for different values of λ (Eq. 1). The panels from left to right show the data for λ = 0.6, 0.8, and 1.0. The abscissas are horizontal disparity and the ordinates are elevation along the vertical meridian. Heatmap color represents the normalized probability of different disparities; lighter colors indicating greater probability. The thick curves represent the median disparity at each eccentricity. The thin curves represent the 25^{th} and 75^{th} percentiles. **B**: Comparison of medians and percentiles along the vertical meridian for different values of λ. The plot on the left shows the data for λ = 0.6, (orange), 0.8 (purple), and 1.0 (blue). They are so similar that the curves nearly superimpose. The plot on the right is a highly magnified view of the medians and percentiles at an elevation of –14 to –15°, where the largest effect occurs. The data are very similar with a maximum difference in median disparity of less than 1arcmin.

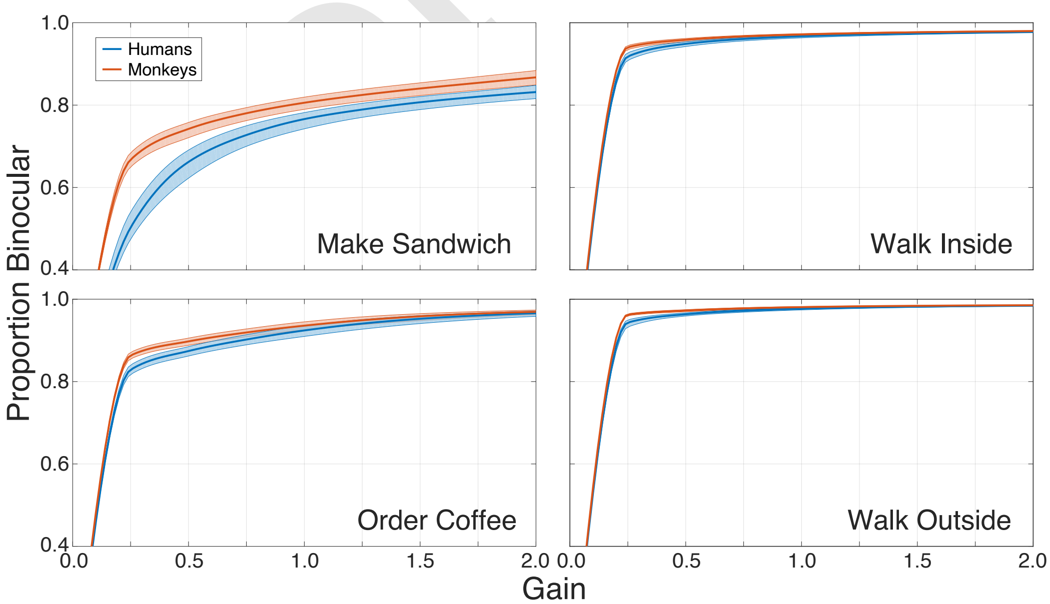

Fig. S3. Distribution of natural disparities during different tasks and how crossed-uncrossed projections affect binocular integration. Proportion of disparities projecting to the same hemisphere for the four tasks performed in (24, 25): *Make Sandwich*, *Order Coffee*, *Walk Inside*, and *Walk Outside*. Proportion is plotted as a function of overlap width (*i.e.*, gain) for different asymmetries. The orange and blue curves represent the proportions based on the monkey and human data, respectively, assuming symmetric overlap. As in Fig. 6, the proportion has been computed for $\pm 8°$ of elevation for both species.