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CHROMATIC OBLIQUE EFFECT OF CONTRAST SENSITIVITY

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Purpose. Contrast sensitivity is lower for obliquely oriented achromatic gratings at high spatial and low temporal frequencies. Although this is suggestive of mediation by P-cell cortical correlates, no clear class 1 oblique effect has been demonstrated with isoluminant chromatic stimuli. Here we adapt the color mixture threshold method (Sellers et al., VR, 1986) to simultaneously measure luminance and chromatic oblique effects across various spatial and temporal conditions. **Methods.** Nine subjects were presented spatio-temporal sinusoids varying in orientation (principal and oblique), spatial frequency (1, 3, 7 c/d), temporal frequency (2, 5 Hz), and color contrast (16 different ratios of red and green with blue held constant at 50%). Each subject received at least four spatio-temporal conditions with at least four threshold points collected per ray. Thresholds formed an ellipse with the half-length taken as a measure of chromatic threshold at isoluminance, and the half-width as luminance threshold. A maximum likelihood method estimated five parameters (major axis, minor axis, angle, x & y coordinates of the center) to fit the ellipses. **Results**. While the typical achromatic oblique effect was observed at the higher spatial and lower temporal frequencies, a clear chromatic oblique effect was observed at lower spatial frequencies (maximum at 3 c/d, 2Hz; Sign Test, p=.008). **Conclusions.** A contrast sensitivity oblique effect exists in the chromatic channel. This is consistent with the contrast sensitivity oblique effect (Class 1) being caused by an orientation bias in the cortical stream conveying P-cell activity. Sponsored by ONR #N0001498AF00002