

Colored backgrounds and perceptual sensitivity

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Recent studies suggest effects of colored backgrounds on diverse perceptual and cognitive tasks. In two different experimental designs we measured reaction times (RT) and d-primes in a orientation classification task of achromatic Gabor patches at different spatial frequencies and contrasts surrounded by red, blue, or grey isoluminant surrounds. Results revealed an effect of colored backgrounds on RT and d-primes at low spatial frequencies and low contrast. Relative to grey backgrounds, we observed that both red and blue backgrounds increase RT and lower sensitivity although the effect of red is markedly larger than the effect of blue. Estimates of Gabor/background photoreceptor excitation ratios revealed similar ratios within L and M cone systems (confirming isoluminance as measured by a luminance meter), but markedly different ratios within the S cone system and the rod system. We interpret our results as evidence of different effects of red and blue backgrounds within the magnocellular pathway, which responds best to low contrast and quickly saturates at medium contrast, has best sensitivity to low spatial frequencies, and receives proportionally greater input from S cones as well as rods (in mesopic conditions).