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In our previous work, we reported measurements of heterochromatic flicker photometry (HFP) in 22 young observers, with stimuli that (nominally) modulated only L- and M-cones, and were kept at (approximately) a constant multiple of detection threshold (He, Taveras Cruz, & Eskew, 2020). These equiluminant settings were represented as the angle in the (L,M) cone contrast plane, with the “greenish” peak of the flicker in quadrant II and the “reddish” peak in quadrant IV; equiluminant settings were reported as the ‘greenish’ angle. The mean equiluminant angle was 116.3° (a M/L cone contrast ratio of -2 at equiluminance), for observers with an average age of around 20 years old. However, HFP settings can vary substantially with age, mostly due to changes in lens optical density, the dominant element of ocular media optical density (Sagawa & Takahashi, 2001). In the present study we sought to model the expected variations in equiluminant angle resulting from the effect of aging. For this purpose, we assume that all observers have the same equiluminant angle when analyzed with their own cone fundamentals. We then modeled the apparent change in equiluminant angle that results from varying ocular media optical density from age 20 to 60 when the data are analyzed using standard cone fundamentals. The ocular media density curves for the young and elder observers were estimated based upon the model developed by van de Kraats and van Norren (2007), while the density curve for the standard observer was obtained from Stockman, Sharpe, and Fach (1999). In standard cone coordinates, the measured $|\Delta M/M: \Delta L/L|$ ratio increases by almost 0.9 with aging. Unsurprisingly, the effect of increasing ocular media density is to produce an apparent reduction in relative M-cone contribution to the strength of the luminance mechanism, with that change solely being the result of changes in cone fundamentals.

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