

Blue Blockers may adversely affect light-sensitive individuals

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Hypothesis

We hypothesize that blue blockers preferentially transmit wavelengths that increase discomfort, especially for those with light sensitivity.

Purpose

Blue blockers are often recommended in order to increase perceived contrast outdoors. These lenses transmit light at the red end of the spectrum and attenuate light at the blue end of the spectrum. An earlier study by Goodrich et. Al. (1) showed that 38/40 individuals asked to select a hue providing best perceived acuity chose green or bluish-green, with only two choosing reddish hues. Many blue blockers attenuate the preferred blue/green hues. Here we look at relative tolerance of red, white and blue.

Methods

A LuxIQ™ exam system (Jasper Ridge Inc) was modified to present four colors: white (6500°K color temperature), blue (470 nm), red (625 nm) and a simulation of an FL-41 lens, which is a weak blue blocker transmitting a pink hue. The LuxIQ was placed over a Colenbrander mixed contrast eye chart. Ten subjects with Dry Eye Syndrome were asked to increase the intensity for each color to their maximum comfort level, and those lux levels were recorded.

Results

Figure 2 shows the average tolerance of lux level versus color. Subjects tolerated blue and white about equally, and 60% higher than FL-41 and red. Nine of the ten subjects tolerated higher intensity of blue and white as opposed to the two reds (625nm and FL-41); the tenth subject tolerated all colors equally.

Conclusions

These results suggest that recommending blue blockers may involve a trade-off between perceived contrast and light tolerance, which may be a significant consideration for light sensitive individuals.

Support: Jasper Ridge Inc.

Disclosure: Harvey Fishman has no financial interest in this work. Peter Borden and Michele Klein are employees of Jasper Ridge Inc.

1. G.L. Goodrich, P.G. Borden, M.F. Klein, "Can color improve perceived acuity?" Envision Conference, 2016.

Figure 1: Chosen hues plotted in CIE color space. White 3000-6500°K and the standard white for a monitor (D65) are shown for reference. RGB monitor colors lie within the black triangle.

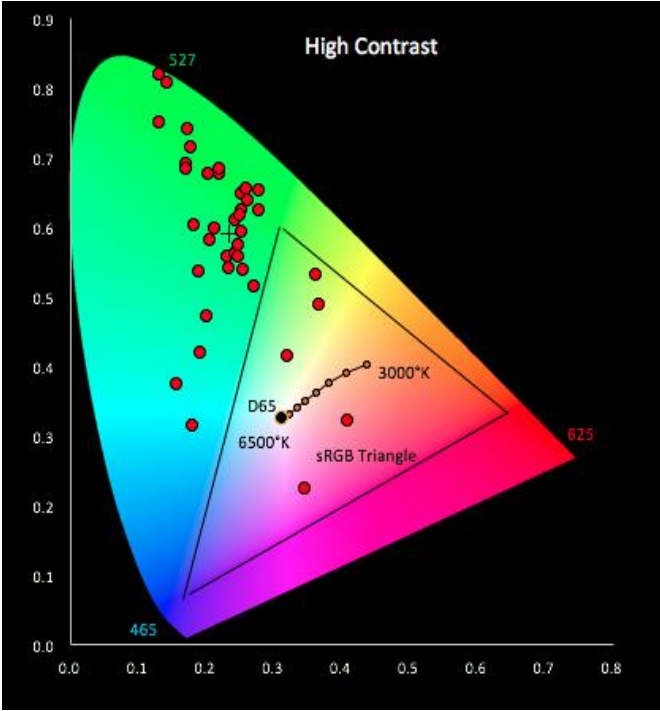


Figure 2: Tolerated lux level for white, blue, FL-41 and red light

