The Effect of Light Filtering Technology on Enhancing Color Perception for Individuals With Color Blindness

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Color blindness (color vision deficiency, or CVD) affects approximately 1 in 12 men (8%) and 1 in 200 women, and worldwide, there are estimated to be about 300 million people with CVD, almost the same number of people as the entire population of the USA (Colour Blind Awareness,2022). This research aims to create a cost-efficient method of light-filtering technology to enhance color perception for individuals with CVD and people with low socioeconomic profiles. The hypothesis was, if an individual with color blindness uses cost-effective light-filtering technology, then they will be able to perceive changes in color because the light-filtering technology shifts the colors they cannot see to a spectrum they can see and distinguish. Two eyeglasses were made using eyeglass frames and gel filter transparent green and red color film plastic sheets. Inverted red and green lenses are used between the two pairs to attend to the potential difference in each participant's eye dominance. Each color-blind participant first took the color-blind test without glasses (control group). Then, the test was conducted using eyeglasses #1(red-green eyeglasses) and eyeglasses #2 (green-red eyeglasses) (experimental group). The results indicated the participants' scores in Ishihara's test were 13.6/34 (40.0%) without eyeglasses, 24.5/34 (72.1%) in eyeglasses #1, and averaged 26.1/34 (76.8%) in eyeglasses #2. The new eyeglasses, the investigator demonstrated an improvement of 12.5 (36.8%) in the Ishihara test. The cost of the new eyeglasses was $12.01 compared to commercial eyeglasses, which cost $200-400. In conclusion, the results demonstrate that color perception improved for each participant, helping their color blindness.

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