

## Scientists debunk the effectiveness of EnChroma glasses for colorblind people

October 29 2018



Credit: CC0 Public Domain

The recent commercialization of the EnChroma glasses has generated great expectations among the color blind thanks to a strong campaign on social networks and the media. Users of the glasses hoped to see new colors or even correct their color blindness.



The North American manufacturer advertises an improvement in color vision for certain types of color blindness, protan and deutan, by extending the range of colors users perceive without affecting the colors that are already distinguished without glasses. In fact, on its website, EnChroma states that their glasses "alleviate red-green color blindness, enhancing colors without the compromise of color accuracy," but say that their glasses "may not work" for severe red-green deficiency.

One claim on the company's website (at least until October 2017) was that their glasses "are designed to improve the everyday experience of color vision." However, that claim was recently changed to a more subtle statement: "The glasses are an optical assistive device for enhancement of color discrimination in persons with color blindness; they are not a cure for color blindness," it says, pointing out that "results vary depending on the type and extent of color vision deficiency per individual."

In an article published in *Optics Express*, researchers from the University of Granada (UGR) have debunked the effectiveness of these glasses for color vision deficiency (CVD), proving that the EnChroma glasses don't make color blind people's vision comparable to that of people without color blindness.

This UGR research involved 48 people with color <u>blindness</u>, after a public call to which more than 200 volunteers responded. The researchers used two complementary strategies to evaluate the effectiveness of the glasses. The first strategy consisted of evaluating the color vision of the participants with and without glasses using different types of tests: the Ishihara test (recognition) and the Fansworth-Munsell test (arrangement). Additionally, they used a test based on the X-Rite Color Chart, which evaluates subjective color naming.

The second approach for evaluating the effectiveness of the glasses



consisted of using the spectral transmittance of the lenses to simulate different observers, which allowed the researchers to evaluate the changes in color appearance.

Luis Gómez Robledo, professor from the UGR Department of Optics and one of the authors of this paper, says, "Normal human color vision is trichromatic thanks to a cluster of three types of photoreceptors known as cones, which are present in the retina. These cones are sensitive to short wavelengths (S), medium wavelengths (M) and long wavelengths (L). However in Europe, about 8 percent of men and 0.5 percent of women in the Caucasian population suffer from some type of congenital anomaly in the performance of some of the cones, which causes color vision deficiencies. This anomaly is a sex-linked recessive trait, with the red-green color vision deficiency being the most frequent in humans."

Red-green CVD is classified into two types: protan and deutan, depending on the affected cones. Moreover, there is another classification based on the severity of the deficiency: protanomalous or deuteranomalous, and protanopic or deuteranopic.

## Glasses similar to those used for hunting

This study carried out by the UGR shows that a color-blind person using the EnChroma glasses will not perceive new colors, but rather sees the same colors in a different way.

"This makes it possible for some individuals using these glasses to distinguish some colors, but to the detriment of others, which will be now confused. Even though a <u>color</u> filter such as that used by the EnChroma glasses may change the appearance of colors, it will never make <u>color vision</u> more similar to a normal observer's vision," the authors state.



The effect of using the EnChroma glasses is similar to that achieved with glasses designed for specific activities (shooting, hunting, low eyesight etc.), where the use of colored glasses helps to better perceive certain stimuli thanks to an increased contrast with the surroundings.

Additionally, during the research, the observers were asked to look at their surroundings with the glasses and to subjectively assess the possible improvement. None of the participants noticed any improvement to the colors of their surroundings when looking through the glasses, except for one female participant with very mild deuteranomaly.

The results show that the glasses specifically used in this study don not confer any improvement in the recognition or arrangement <u>color</u> <u>blindness</u> tests. Therefore, the glasses cannot improve scores in professional screening tests, contrary to what the company claims on its website.

**More information:** L. Gómez-Robledo et al, Do EnChroma glasses improve color vision for colorblind subjects?, *Optics Express* (2018). DOI: 10.1364/OE.26.028693

Provided by University of Granada

Citation: Scientists debunk the effectiveness of EnChroma glasses for colorblind people (2018, October 29) retrieved 28 April 2024 from <u>https://phys.org/news/2018-10-scientists-debunk-effectiveness-enchroma-glasses.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.