

Changes in brightness perception with age

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Abstract

It is estimated that in the next 35 years, the population aged 60 or more will grow 100% globally and, specifically, the Latin American region will be the fastest growing with an estimated increase of 140%. The age of people could affect the amount of light that reaches the retina regarding the spectral power distribution (SPD) of the light source. As we get older, the eye lens becomes yellower which, consequently, reduces the eye transmittance. However, this decrease in transmittance is not the same for all wavelengths along the visible spectrum. With aging, the transmittance for short-wavelengths becomes considerably lower while at longer wavelengths, the transmittance is practically independent of age.

Understanding the influence of age on the perception of brightness of visual stimuli is an important issue for indoor and outdoor lighting. In particular, in order to design urban lighting specifications that support perceptions of security in urban environments, as well as to optimize light source technologies, one need to consider how elderly people will perceive the visual scene and the quality of lighting.

The aim of this work is to evaluate how the perception of brightness is affected by the change in transmittance of the eye with age. For this purpose, two experiments of brightness matching were carried out with two groups of people of different ages (20-30 years and 65 years or more). Our results suggest that there is a significant difference in brightness perception between the two groups, specifically, older people show a decrease in brightness perception for light sources with high emission at short wavelengths.

Keywords: *Brightness perception, eye transmittance, eye aging*