Color discrimination with filter lenses assessed through the use of the CAD test: a preliminary study

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Colors and visual illusions

Every perception of color is an illusion, we do not see colors as they really are. In our perception they alter one another. (Josef Albers)

Color only starts to exist when our perception systems produce the impression of 'color': light is perceived on the retina as a stimulus and is processed into a perception of color in our brain. In substance, colors are already illusions in themselves....
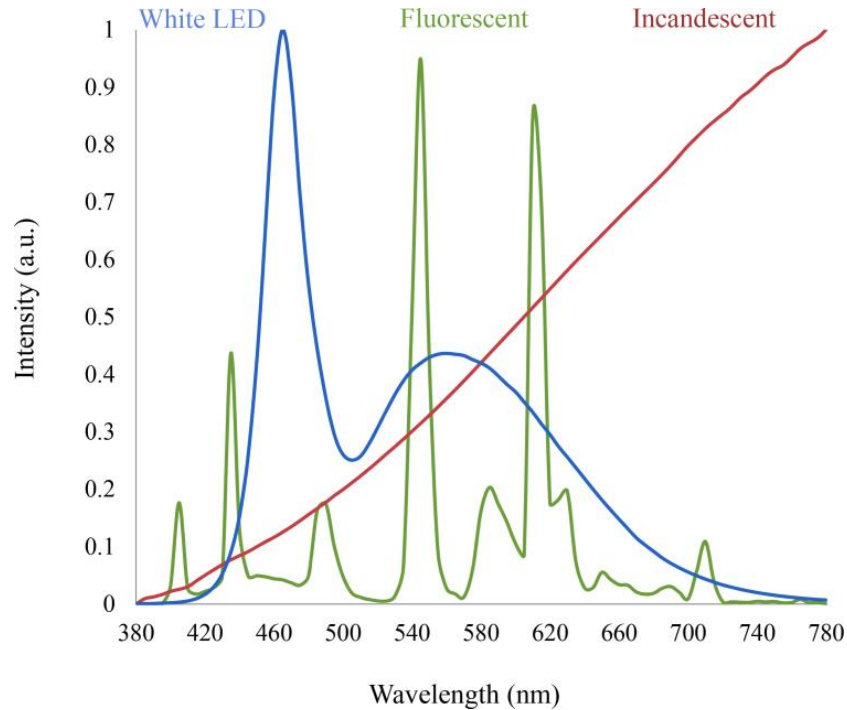(Color illusions, by Gianni Sarcone and Marie Jo Waeber)
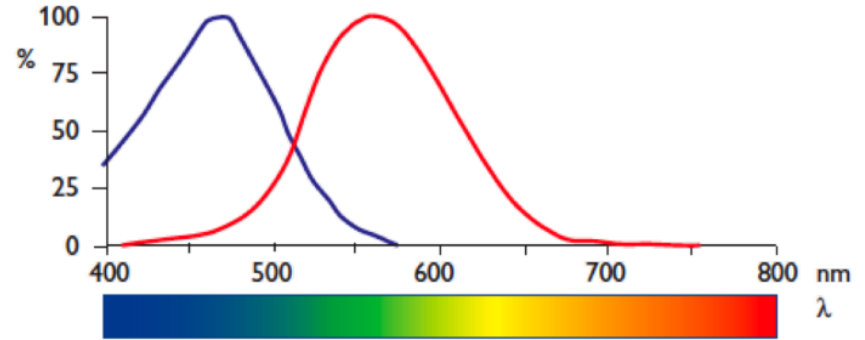
Spectral sensitivity of the human eye

Standard luminosity functions V(λ) and V'(λ)
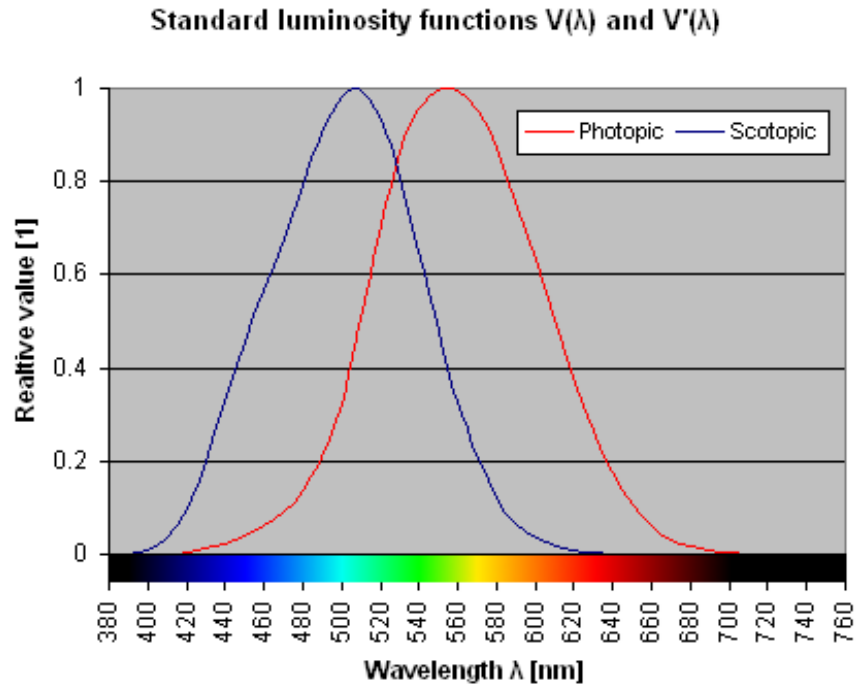
Eye damages caused by electromagnetic radiation
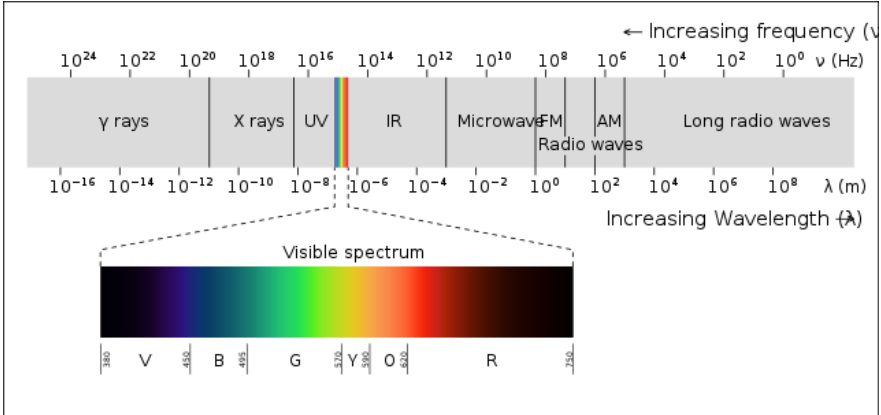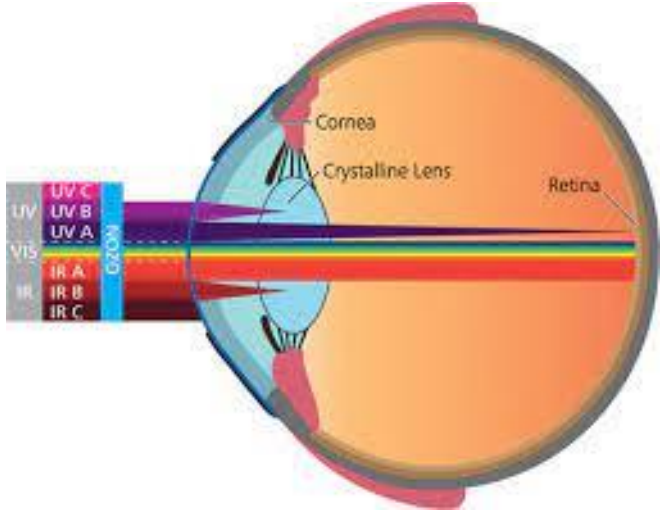
New light sources

The third class of retinal photoreceptors
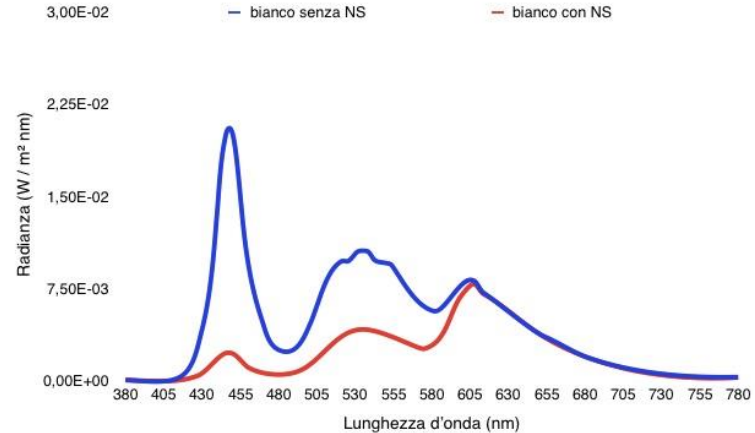

Spectral sensitivity functions: V(λ) (red function) and B(λ) (blue function)

The circadian rhythm and the blue light

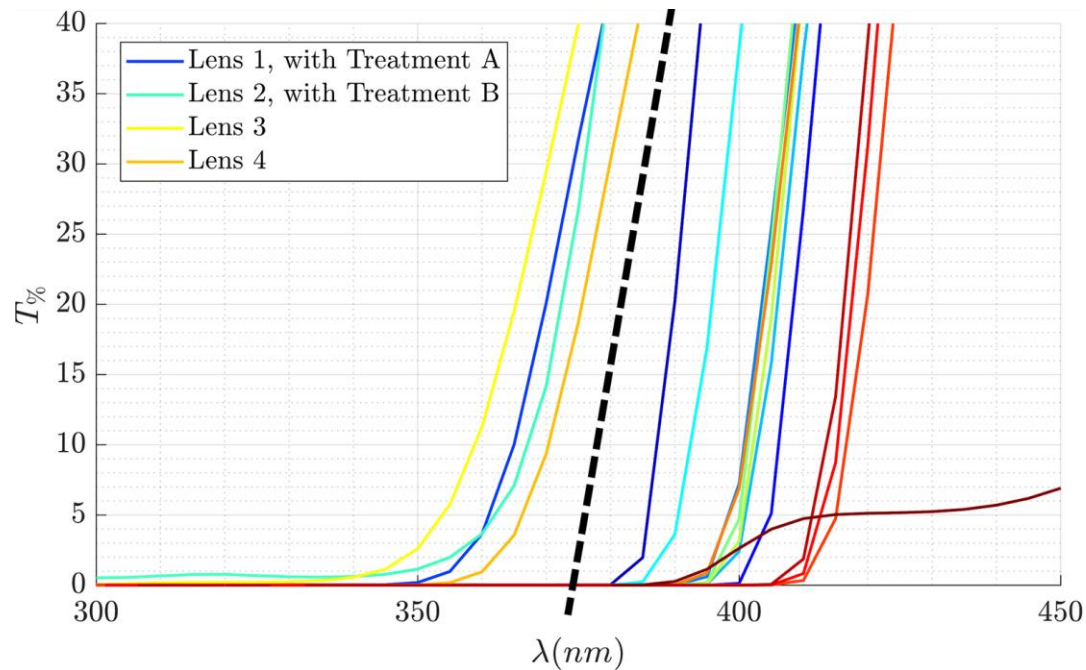# Aids for the blue light: the night shift
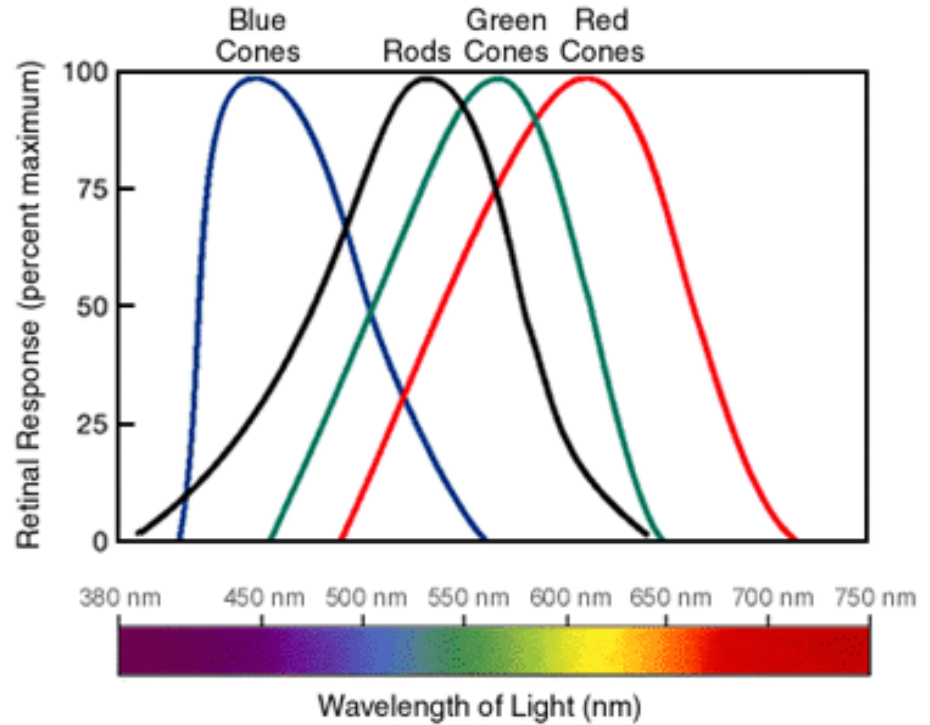
Aids for the blue light: lenses

Ophthalmic lenses, contact lenses and intraocular lenses

Do blue-block lenses block all harmful radiations?

Color vision

There are three types of cones (S, M, L) that are sensitive to different wavelengths of the visible spectrum
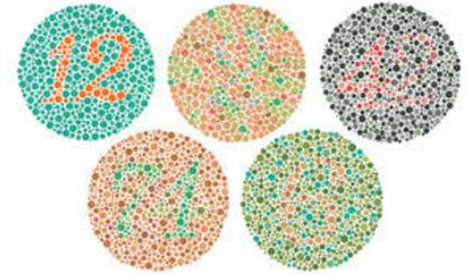
Why we need to measure color vision?

- Checking if there is an influence of filter lenses in color vision;
- Recognizing acquired or congenital deficiencies;
- Job security;
- Picking up early warning signs of illness

Color vision tests

- Ishihara's test
- Nagel anomaloscope test
- CUCT test
- D-15 test

New test: Colour Assessment & Diagnosis test (CAD)

The Colour Assessment and Diagnosis test

- It's possible to diagnose accurately the subject's class of color vision (normal, deutan-, protan-, tritan-like congenital
  loss, or acquired color-vision deficiency)
- Thresholds were measured in several color directions selected along the YB and RG axes
- Introduction of CAD unit
- The CAD test uses spatiotemporal luminance noise to isolate the detection of colour signals
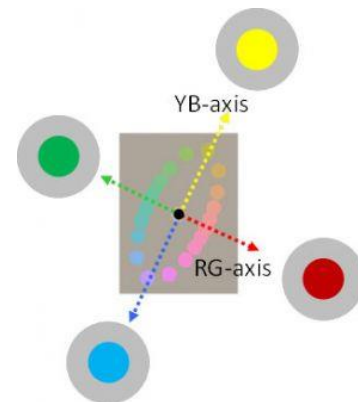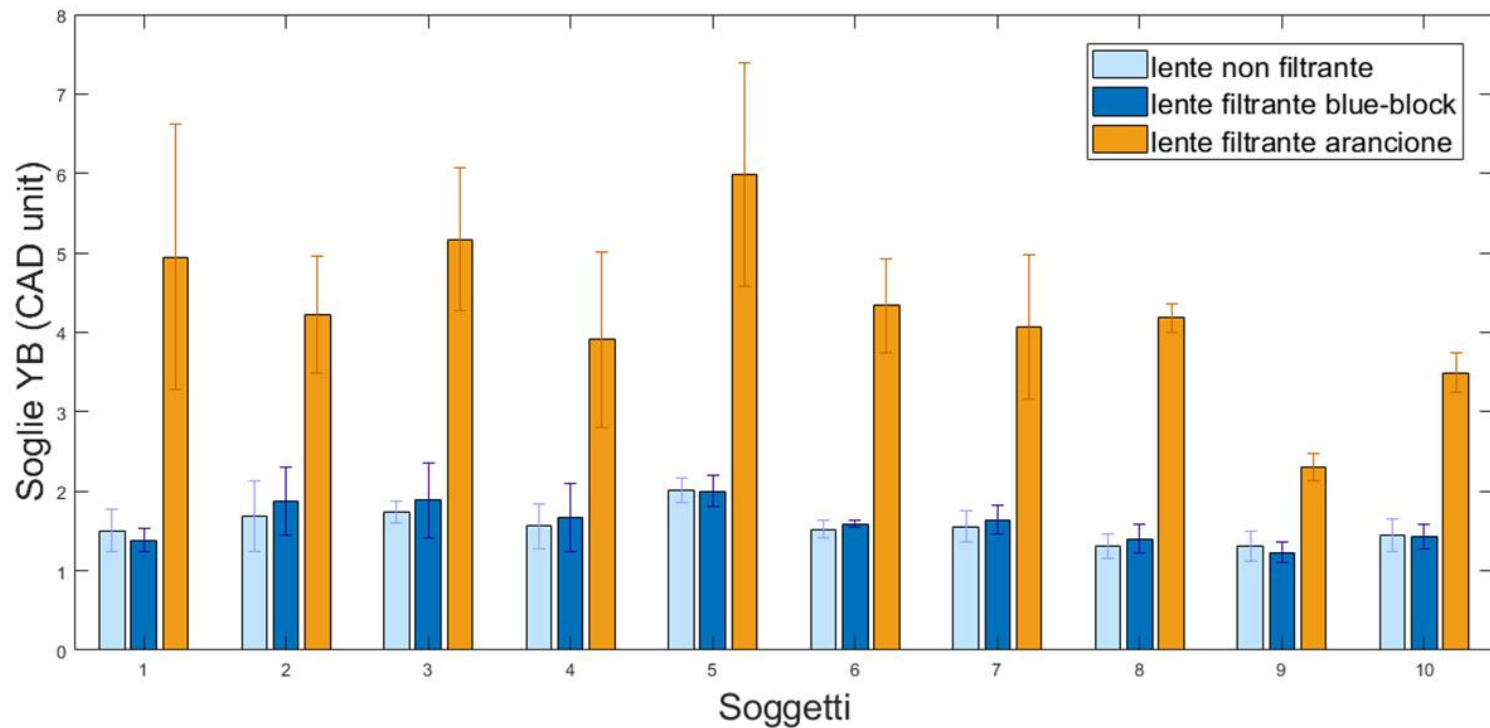
The CAD test
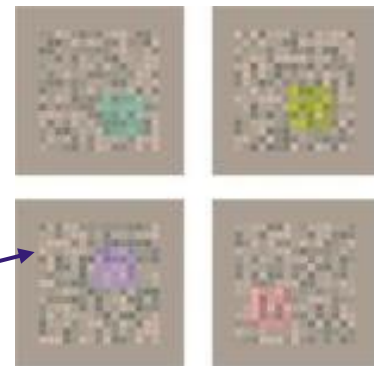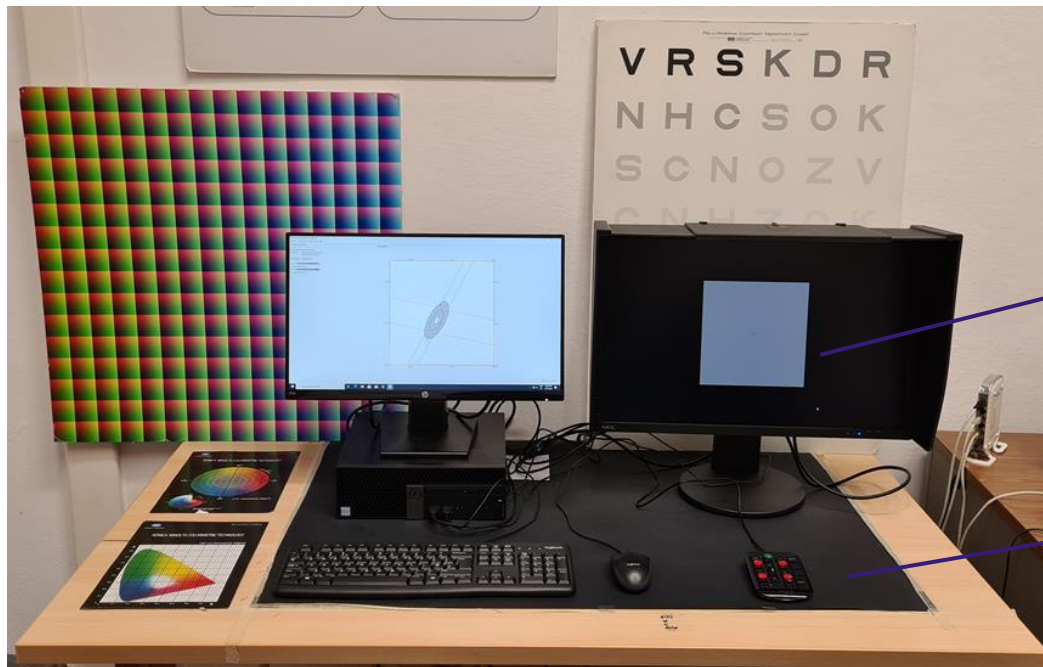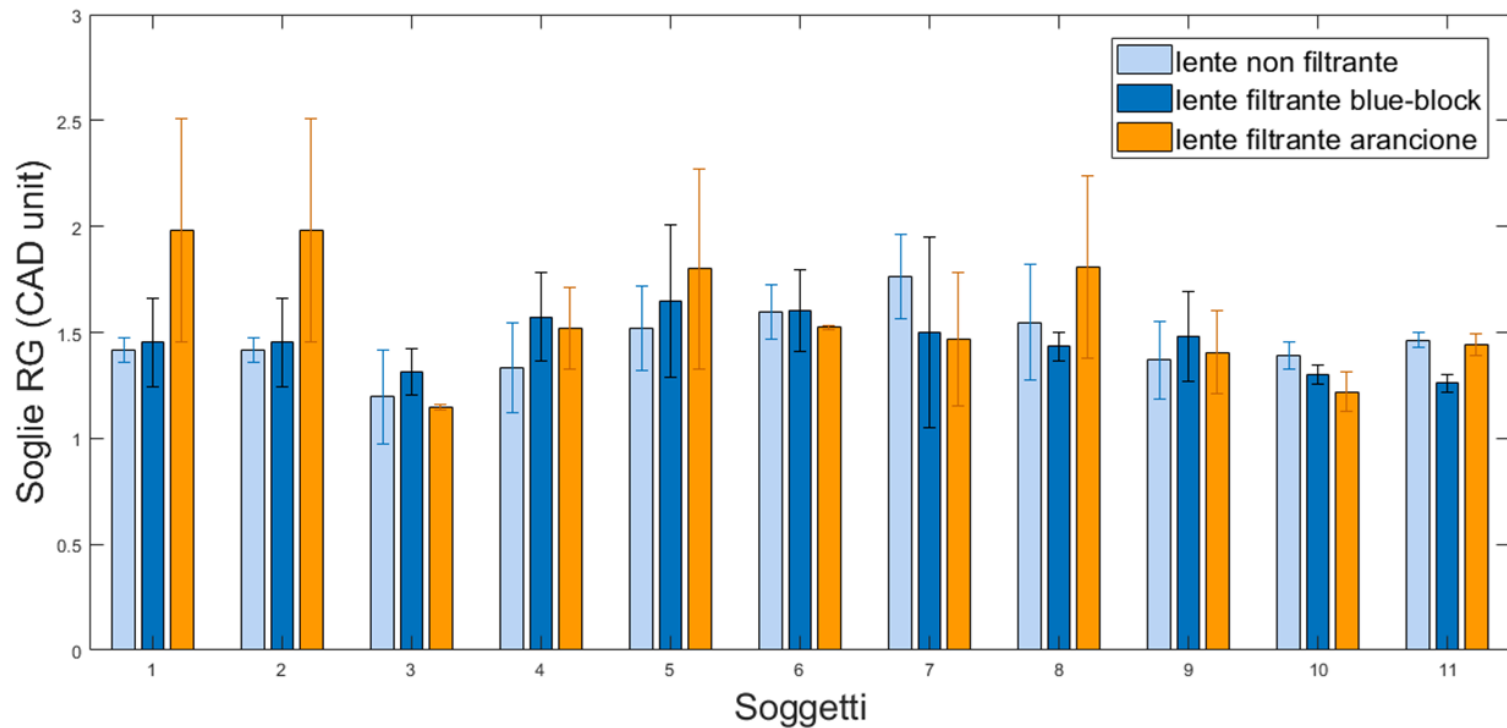
Color perception through filter lenses
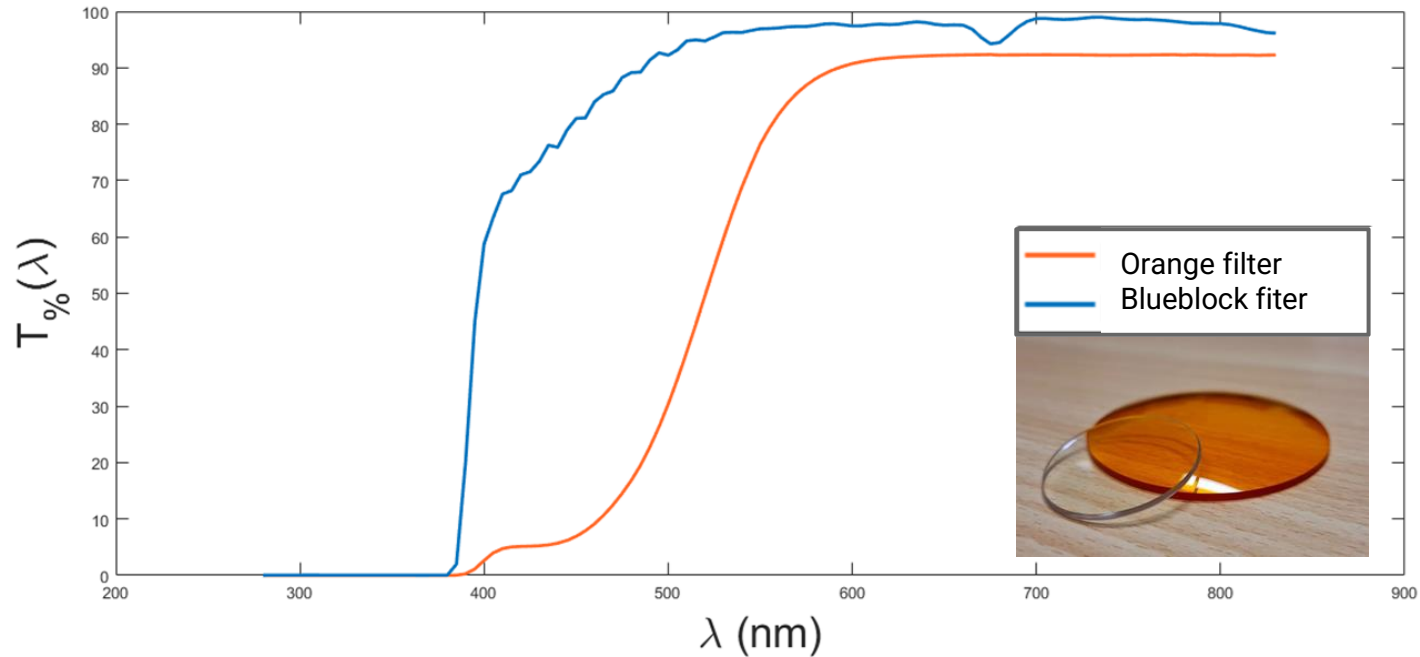
Results: YB thresholds

Results: RG thresholds

Conclusions

- The CAD test can be used to measure the variation in color perception through filter lenses;
- The blue-block lens does not affect the color perception;
- Integrating subjective parameters on color perception into regulations for filter lenses wear.

Thank you for your attention