

Colour Blindness

10 marks

Colour blindness: Consider the following oppositional colour palette:

Each of these two palettes uses opposing colours, either yellow to blue or green to red, to provide a palette that changes continuously from one extreme to the other.

The image itself is available on the course website where this assignment was located. Up load this image to the website <http://www.color-blindness.com/coblis-color-blindness-simulator/> and explore how well each of the two palettes compare for the various sorts of colour blindness.

- a. (3 marks) How well do each of these palettes work for those unable to see colour at all? Why?

Yellow-blue works, Monochromacy people are able to tell color on the right end is darker than color on the leftend.

red-green does not work. Monochromacy people see them a consistant grey all along the line.

- b. (3 marks) Which oppositional colour pair seems best over all – yellow-blue or green-red? Explain your answer.

yellow-blue seems better, because people with any kind of color blindness are able to distinguish left end from right end

However for people with red blindness or green blindness, the red-green picture looks very similar on its two ends.

- c. (4 marks) Given what we discussed in class about the photo-receptors in the human retina, what characteristic of the photo-receptors might explain your choice in part (b)?

Photo-receptors have 3 different cone types, they respond to long (red), medium(green) and short(blue) wavelength light. however the long and medium wavelength are similar. And between the long and medium wavelength there is very little that can be detected by the short wavelength cone. Therefor, suppose there is a color $c_1 = \alpha_1 \text{ red} + \beta_1 \text{ green}$, and $c_2 = \alpha_2 \text{ red} + \beta_2 \text{ green}$, then a person with red/green blindness can detect nearly 0 blue light from it. Also he can detect little difference between red and green light because green and red produce similar stimulus to the cone that detect medium/long wavelength light. So they wouldn't be able to distinguish between the 2 colours easily.