10/3/2022

OUR COLOR VISION IS LIMITED

Designing with the mind in mind, Jeff Johnson, Chapter 4

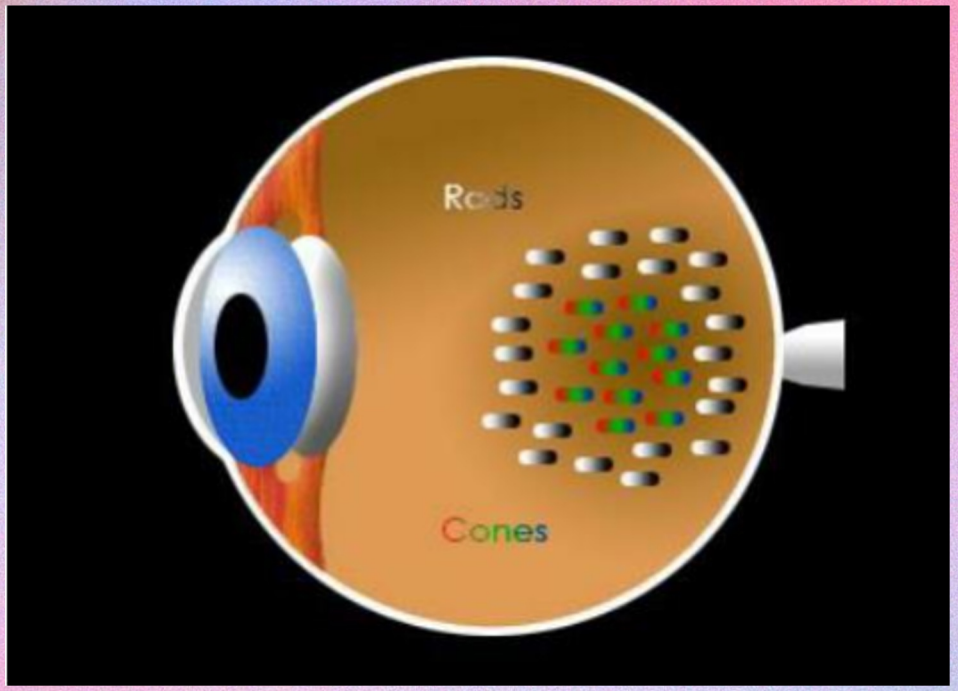
YASMINE FAZAZI

My wife asked me which one I like best

link to image

Rods:
Overall Brightness

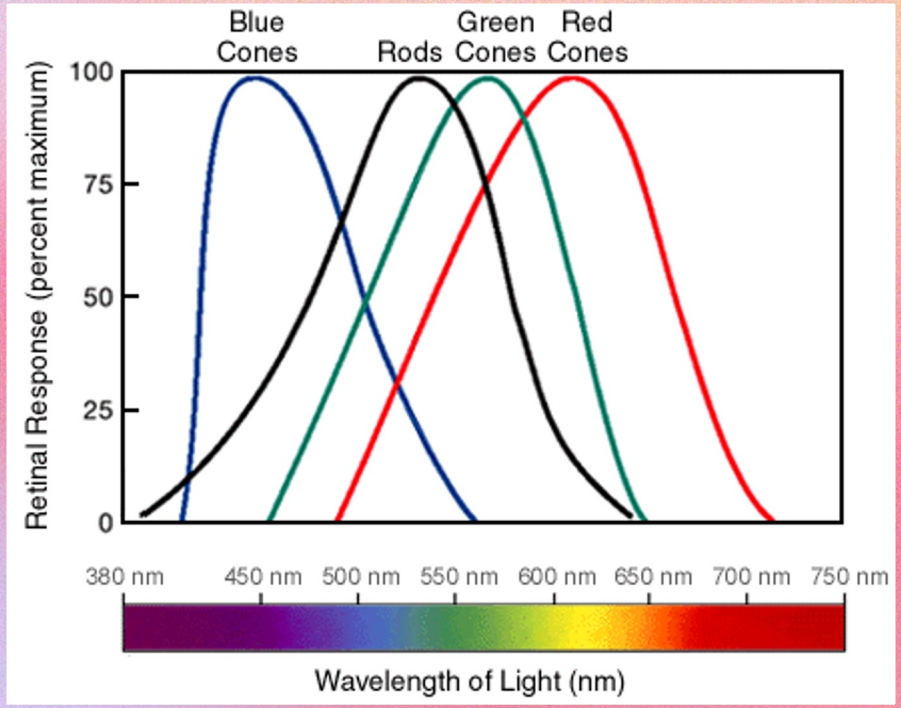
Cones:
Different frequencies of light (color)



Interesting fact: Men have more rods, some women have more cones

Picture from: Leber's Congenital Amaurosis, link

Cones and Frequencies



Low frequency: most sensitive to the middle (yellow) and low (red) frequencies.

Medium frequency: Most sensitive to high-frequency blues through the lower middle-frequency yellows and oranges.

High frequency:
Most sensitive to light at the upper end of the visible light spectrum—violets and blues
Less sensitive and numerous

Picture from: Jeff johnson, DWMIM CH4

How does the brain combines signals from the cones to allow us to see a broad range of colors?

SUBTRACTION

Color opponent channels:

- **Red–green difference signal channel:**
  Visual cortex subtract: (Signals coming over the optic nerves) - (Signals from the medium- and low frequency cones)

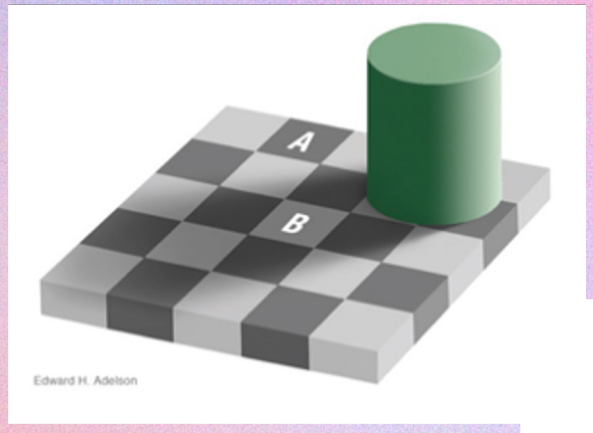
- **Yellow–blue difference signal channel:**
  Other neurons in the visual cortex(Signals from the high- and low-frequency cones)

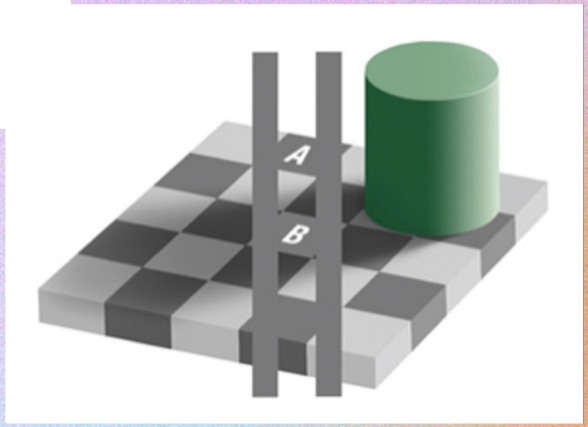
- **Luminance (or black–white) signal channel:**
  A third group of neurons in the visual cortex adds (the signals coming from the low- and medium-frequency cones)

VISION IS OPTIMIZED FOR CONTRAST, NOT BRIGHTNESS

Our visual system is considerably more sensitive to variations in color and brightness

specifically, to contrasting colors and edges—than to precise brightness levels as a result of all this subtraction.





Picture from Neil Bossenger, link

DISTINGUISHING COLOR

Factors affecting ability to distinguish colors:

Paleness

The paler 2 colors are, the harder it is to tell them apart

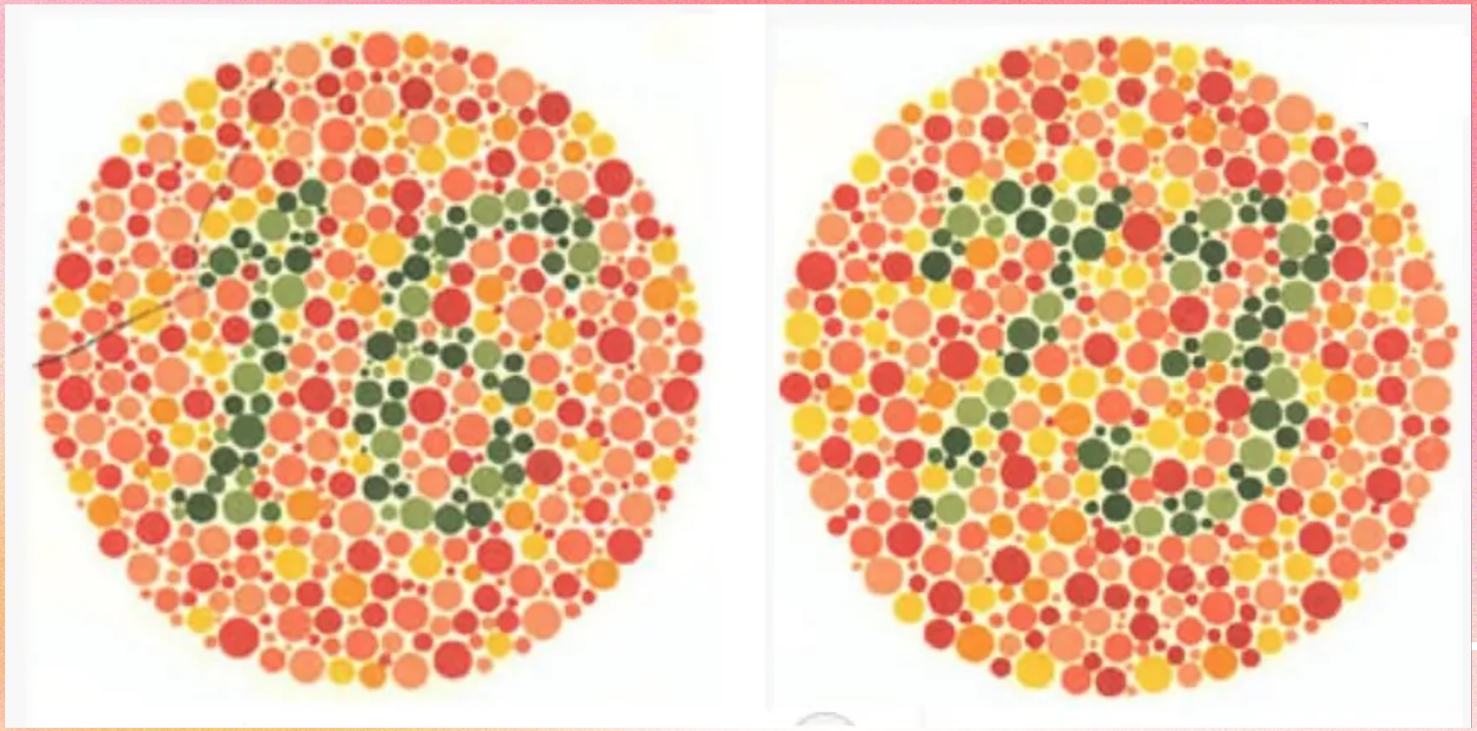
SIZE

The smaller objects are, the harder it is to perceive the color

SEP ARATION

The more separated colors are, the harder it is to tell the difference

COLOR BLINDNESS



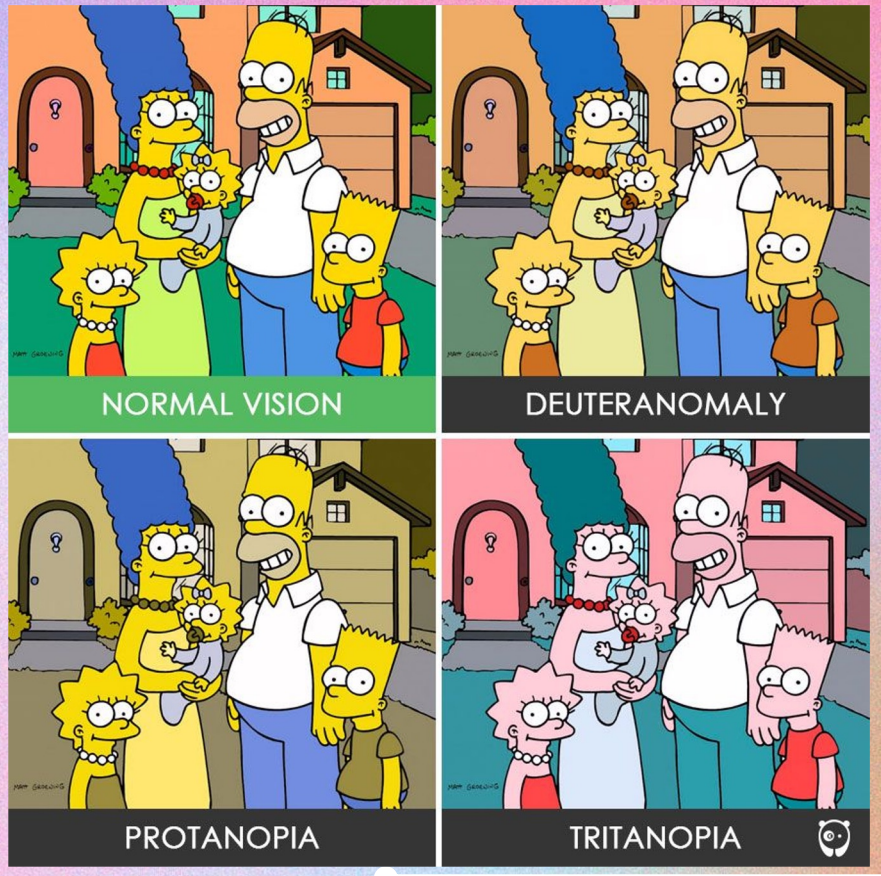
https://mspoweruser.com/color-blind-chrome-plugin/

COLOR BLINDNESS

Does not: imply no color perception.
Does: implies that one or more of the color subtraction channels aren't operating normally, which makes it challenging to identify some color combinations.

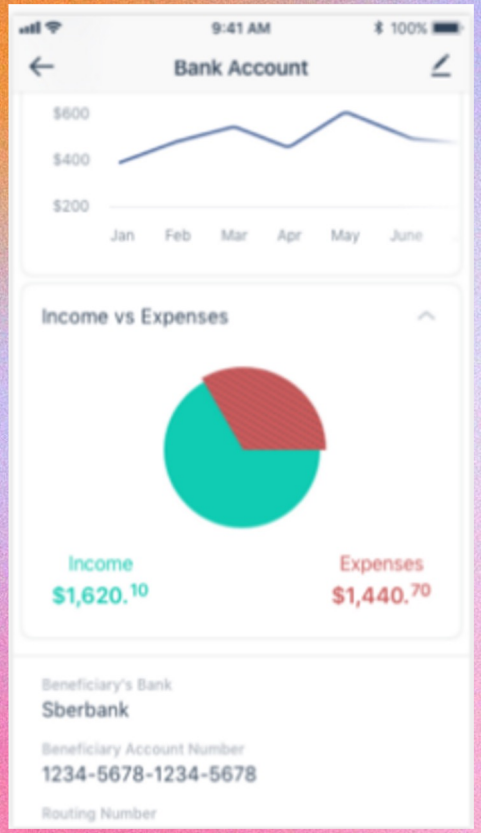
Most common type:
RED and GREEN

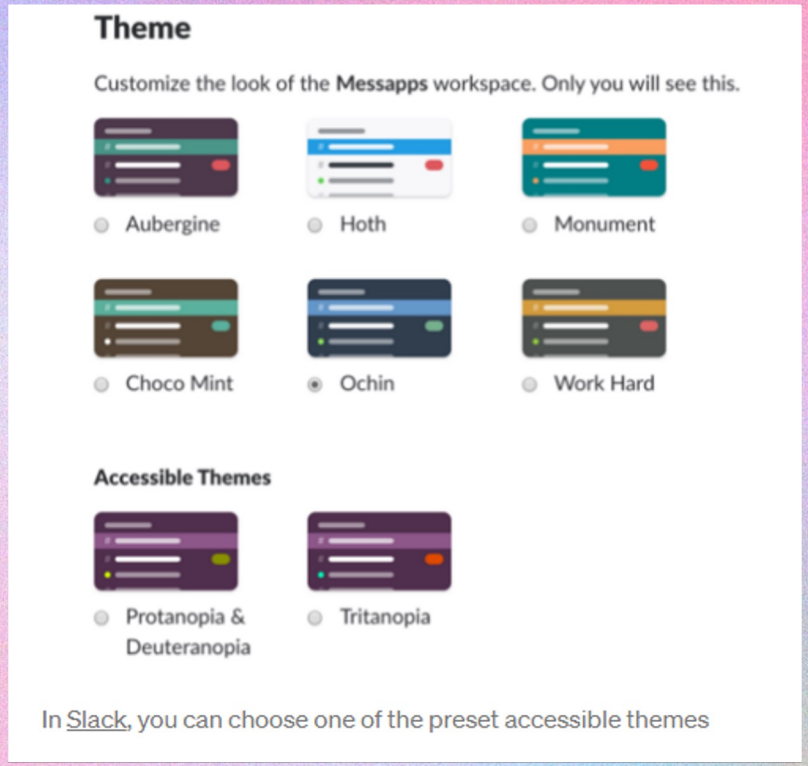
8% men and less than 0.5% women



Picture: Giedrė Vaičiulaitytė, link

COLOR BLINDNESS IN DESIGN





Picture: Ivan Tuchkov, link

EXTERNAL FACTORS

01

Variation among color Displays

Depending on technologies, software, settings

02

Grayscale Displays

Rare now but some devices still use grayscale displays

03

Display angle

Angles can alter colors

04

Ambient illumination.

The lighting can affect how we perceive colors

Guidelines for color use

Distinguish colors by saturation and brightness

=> HIGH **Contrast**
=> Use grayscale testing

Use distinctive colors

Each color causes a strong signal on only one color-opponent channel

Separate strong opponent colors.

Placing opponent colors such as red and green or blue and yellow can be disturbing

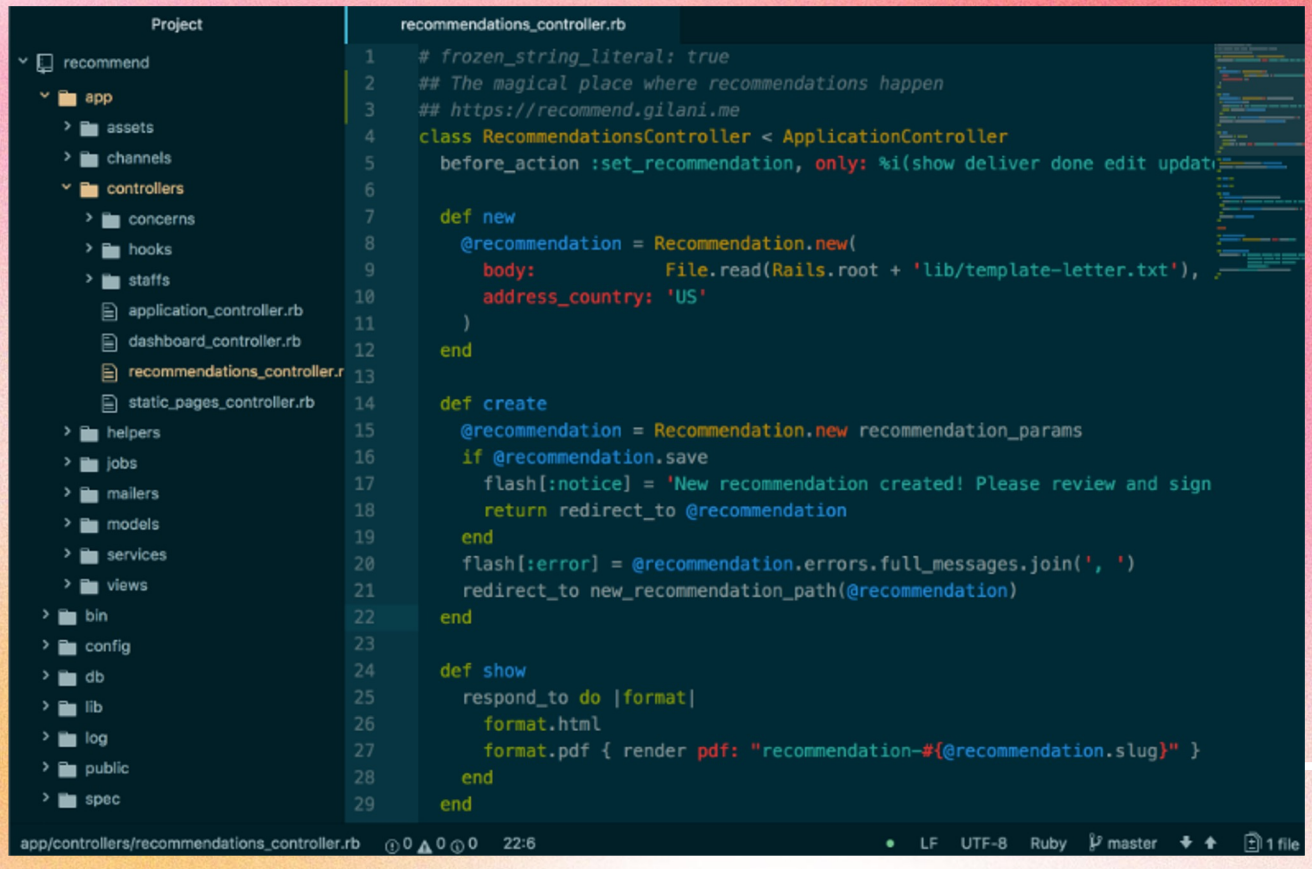
AVOID THIS!

Avoid color pairs that color-blind people cannot distinguish

DO NOT USE: dark red versus black, dark red versus dark green, blue versus purple, light green versus white.
USE: dark reds, blues, and violets against light yellows and greens.
=> **Color blindness simulator**

Use color redundantly with other cues

Use colors as well as other **SIGNIFIERS** such as **symbols**, **icons**, or **shapes**. Don't rely solely on color.


Project
recommend
app
assets
channels
controllers
concerns
hooks
staffs
application_controller.rb
dashboard_controller.rb
recommendations_controller.r
static_pages_controller.rb
helpers
jobs
mailers
models
services
views
bin
config
db
lib
log
public
spec
recommendations_controller.rb
frozen_string_literal: true
The magical place where recommendations happen
https://recommend.gilani.me
class RecommendationsController < ApplicationController
before_action :set_recommendation, only: %i(show deliver done edit updat
def new
@recommendation = Recommendation.new(
body: File.read(Rails.root + 'lib/template-letter.txt'),
address_country: 'US'
)
end
def create
@recommendation = Recommendation.new recommendation_params
if @recommendation.save
flash[:notice] = 'New recommendation created! Please review and sign
return redirect_to @recommendation
end
flash[:error] = @recommendation.errors.full_messages.join(', ')
redirect_to new_recommendation_path(@recommendation)
end
def show
respond_to do |format|
format.html
format.pdf { render pdf: "recommendation-#{@recommendation.slug}" }
end
end
app/controllers/recommendations_controller.rb
0 0 0
22:6
LF
UTF-8
Ruby
master
1 file

THANKS!