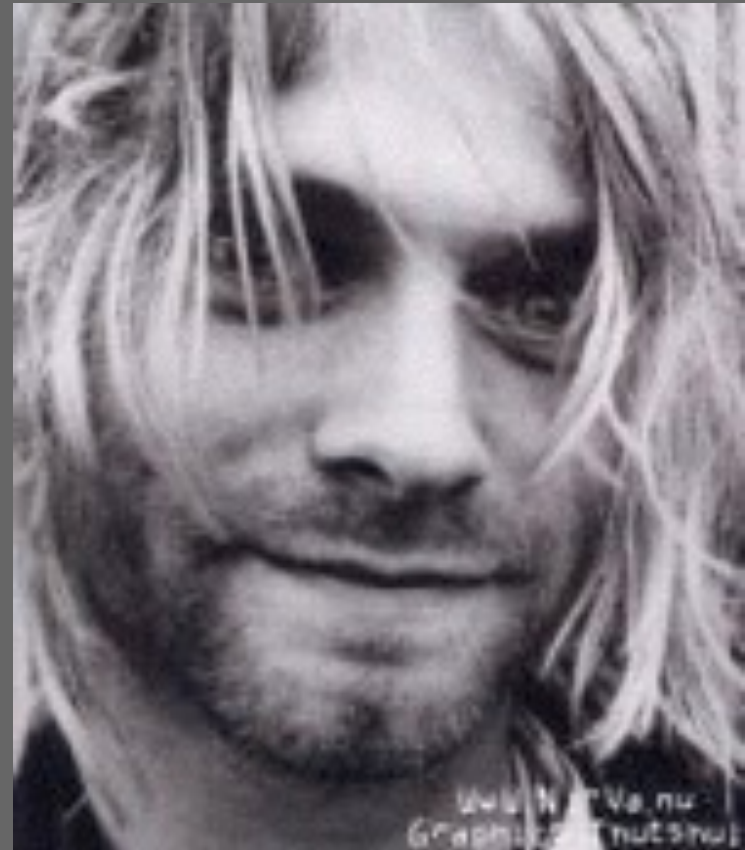


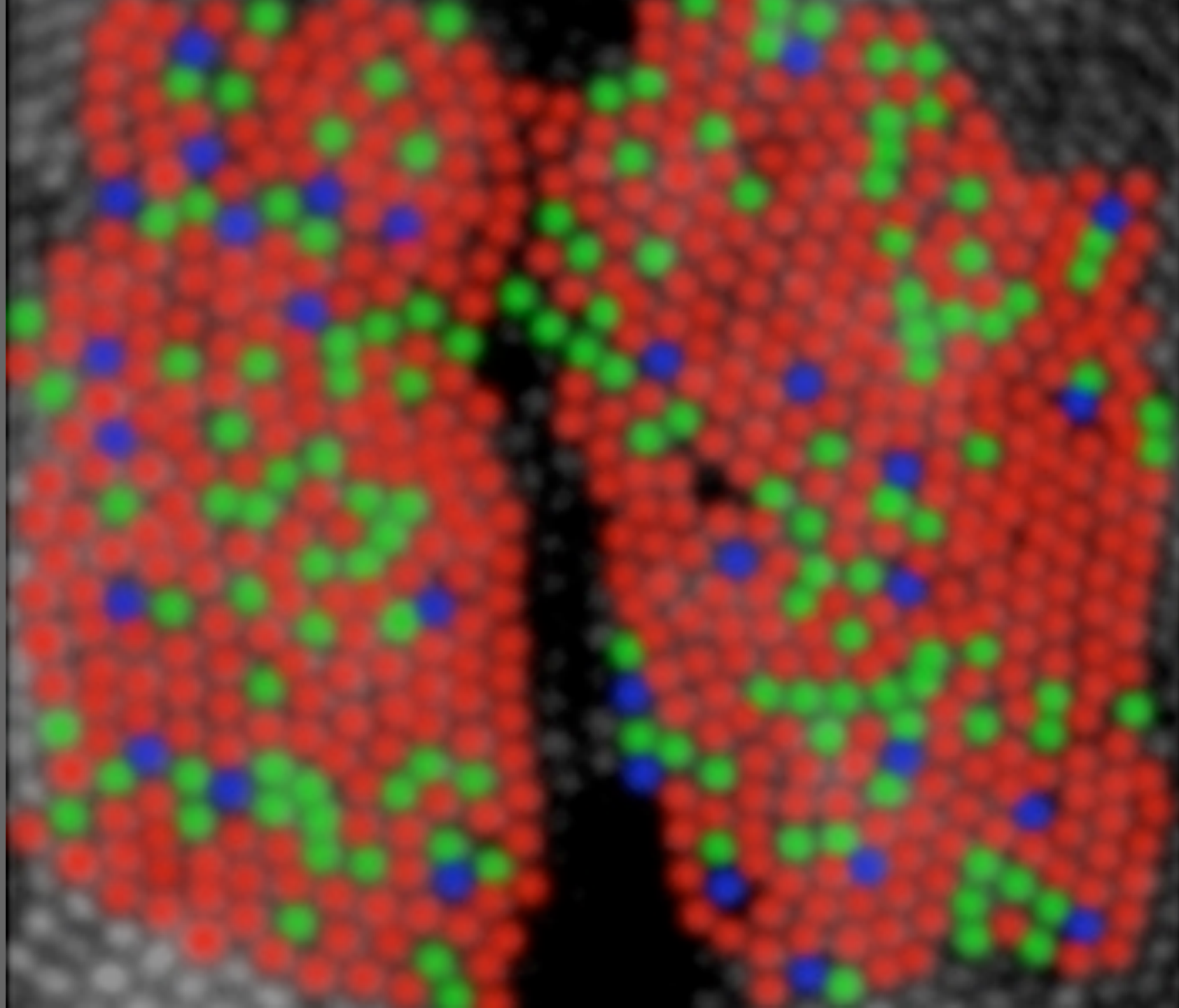
“Monkey see monkey do
I don't know why I'd rather be dead than cool
Every line ends in rhyme
Less is more, love is blind
Stay away
Give an inch, take a smile
Fashion suits, fashion style
Throw it out and keep it in
Have to have poison skin
Stay away
God is gay, burn the flag”

Kurt Cobain (1967-1994)



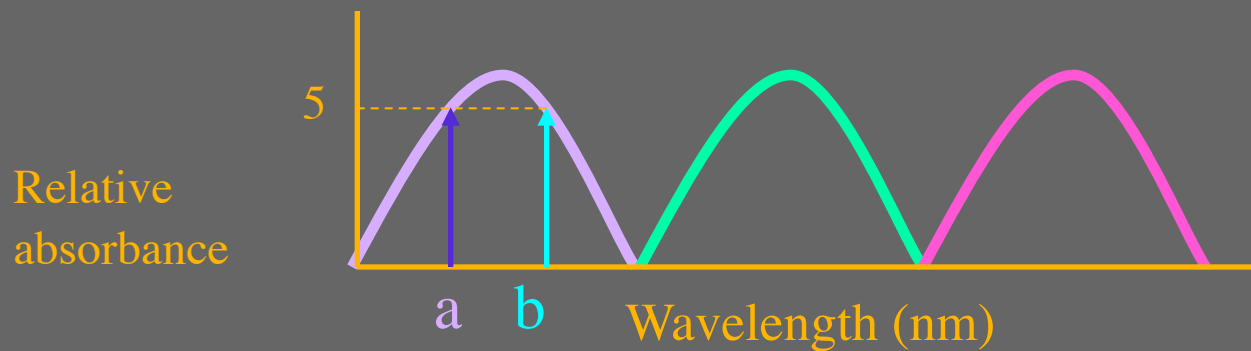


Johannes Vermeer (1632 -1675)



Trichromacy

Three non-overlapping photopigments



$$R(a) = R(b) = 5$$

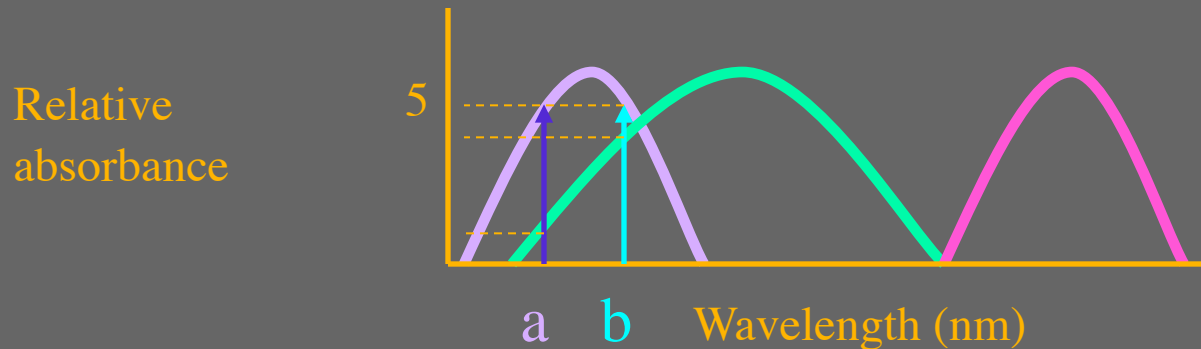
Cannot discriminate between a and b.

The response also changes with the intensity of a and b.

Within a single photopigment sensitivity band, the wavelength of the photon absorbed can never be signalled by the output.

Trichromacy

Two overlapping photopigments



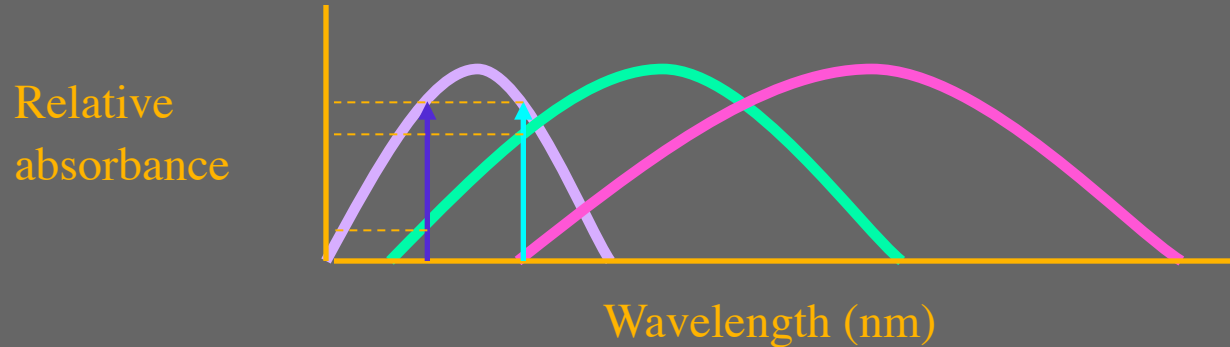
$$R(a) = 5,1$$

$$R(b) = 5,4$$

a and b can be discriminated between if both receptor types are compared

Trichromacy

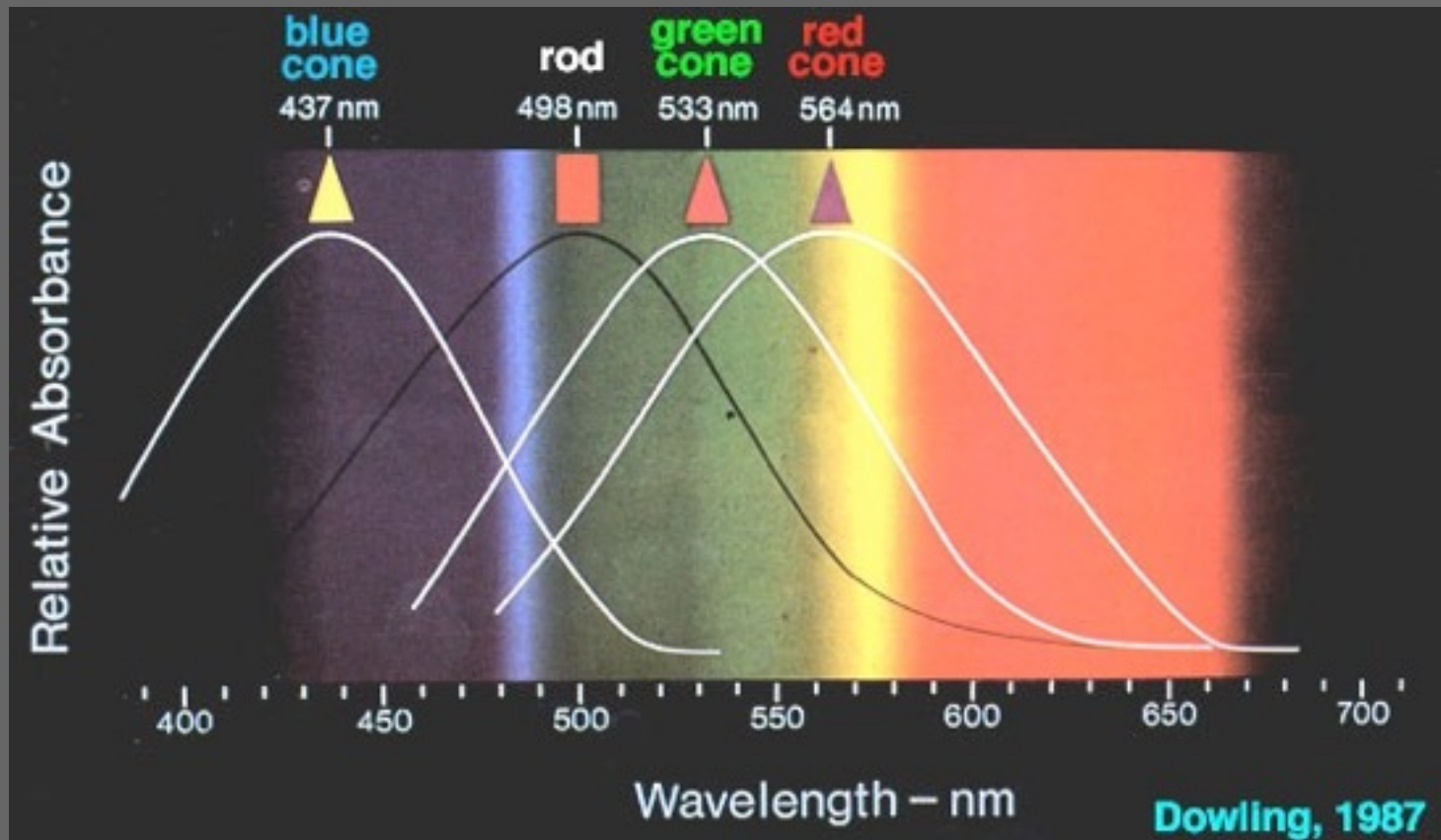
Three overlapping photopigments

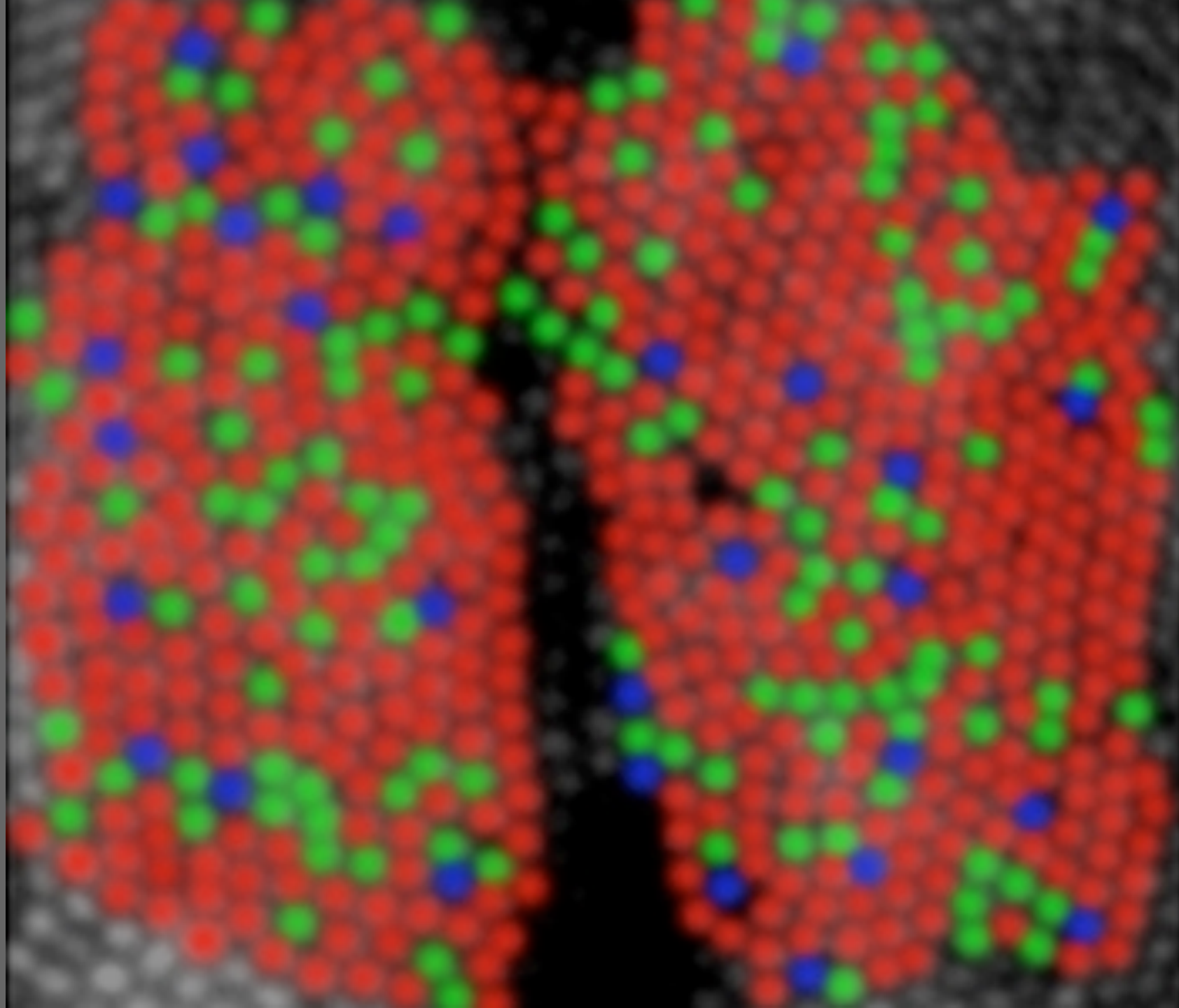


$$R(a) = 5,1$$

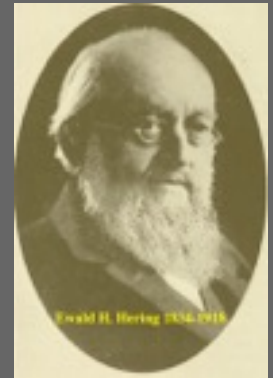
$$R(b) = 5,4$$

Trichromacy





A further solution...



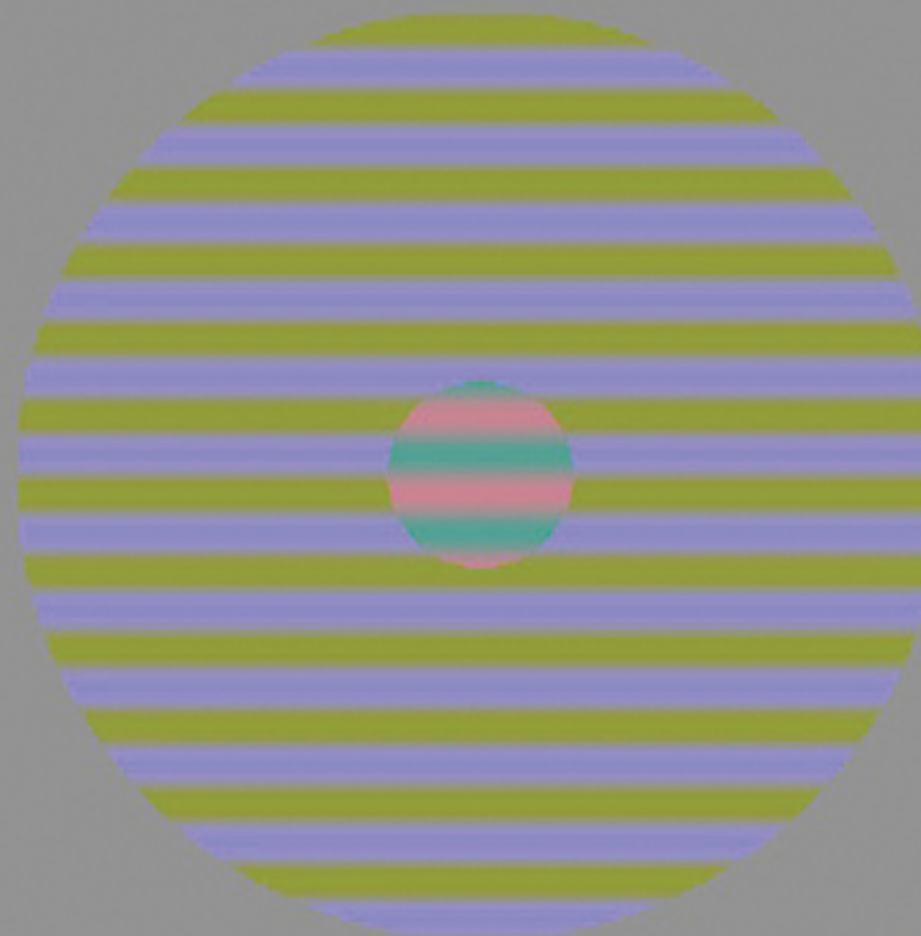
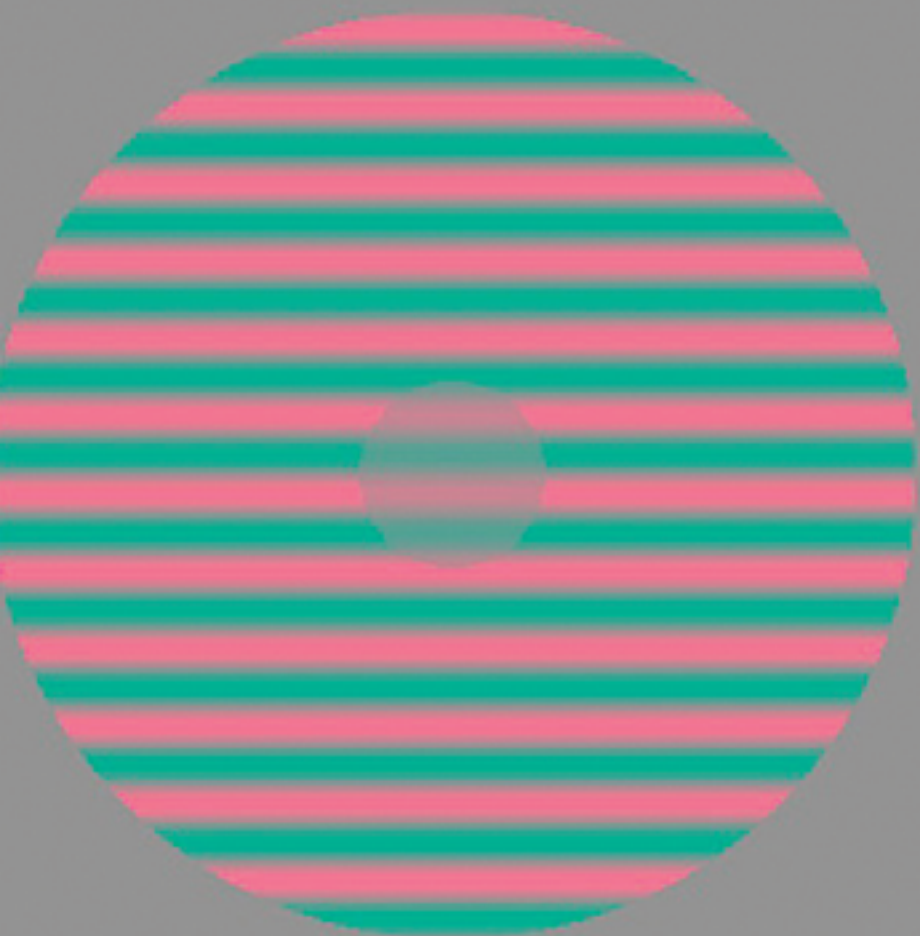
- “...the opponent-colours theory and the Young-Helmholtz three colour theory could, with some modifications very well exist side by side if one strictly distinguished between the *process of excitation* and the *process of sensation* and use the three colour theory for the former and my theory for the latter”.

Opponency

- Excitation and sensation
 - Hering was really thinking about his subjective experience of colour
- Opponency
 - A general strategy for the system
 - Cardinal
 - Based around early behavioural and physiological properties of the system
 - Sensual/Perceptual
 - Based around the subjective experience of colour

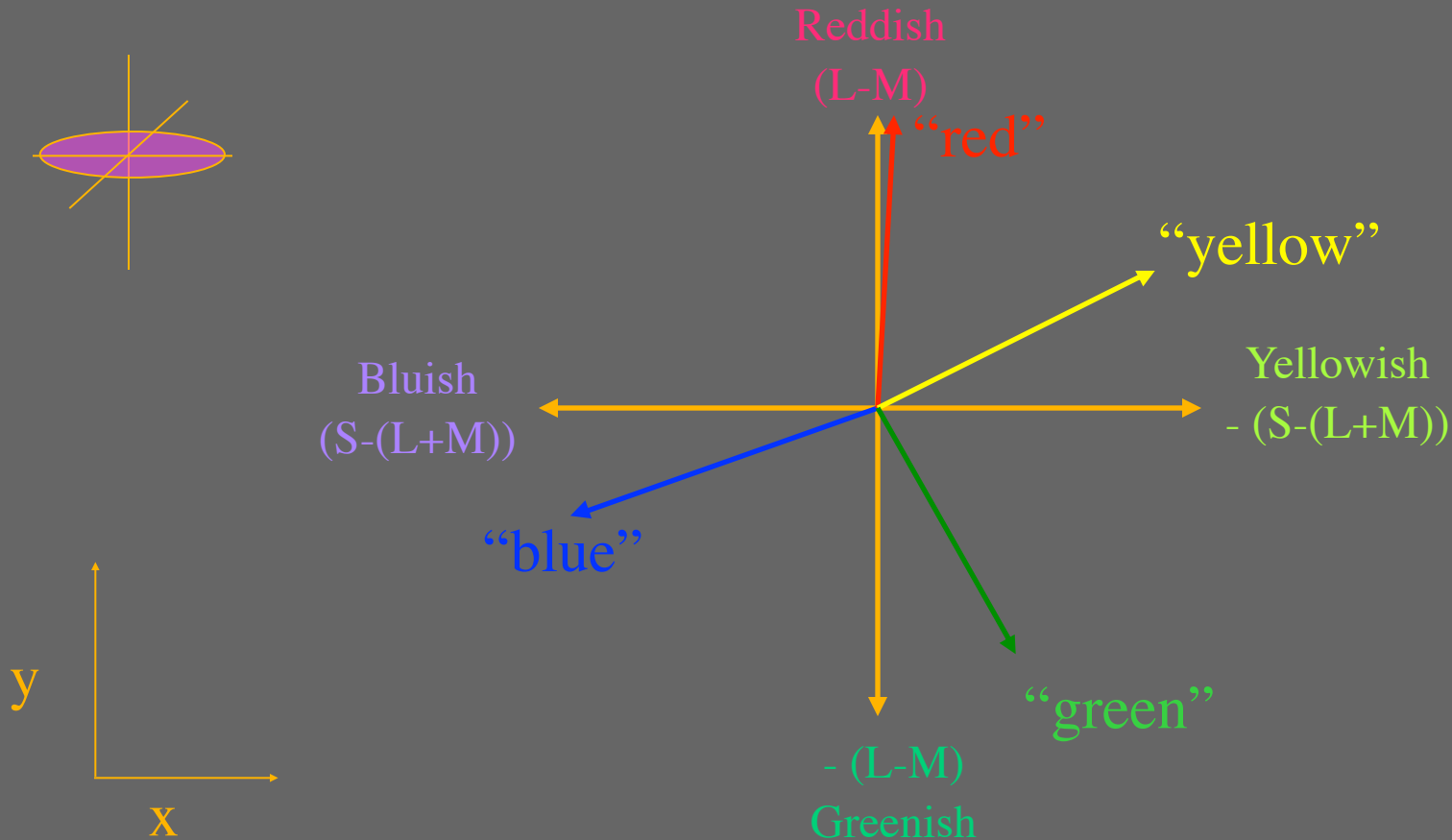
Colour categorisation

- Red
- Green
- Blue
- Yellow
 - Use one or two names for each colour



A perceived-colour space

Unique hues vs cones



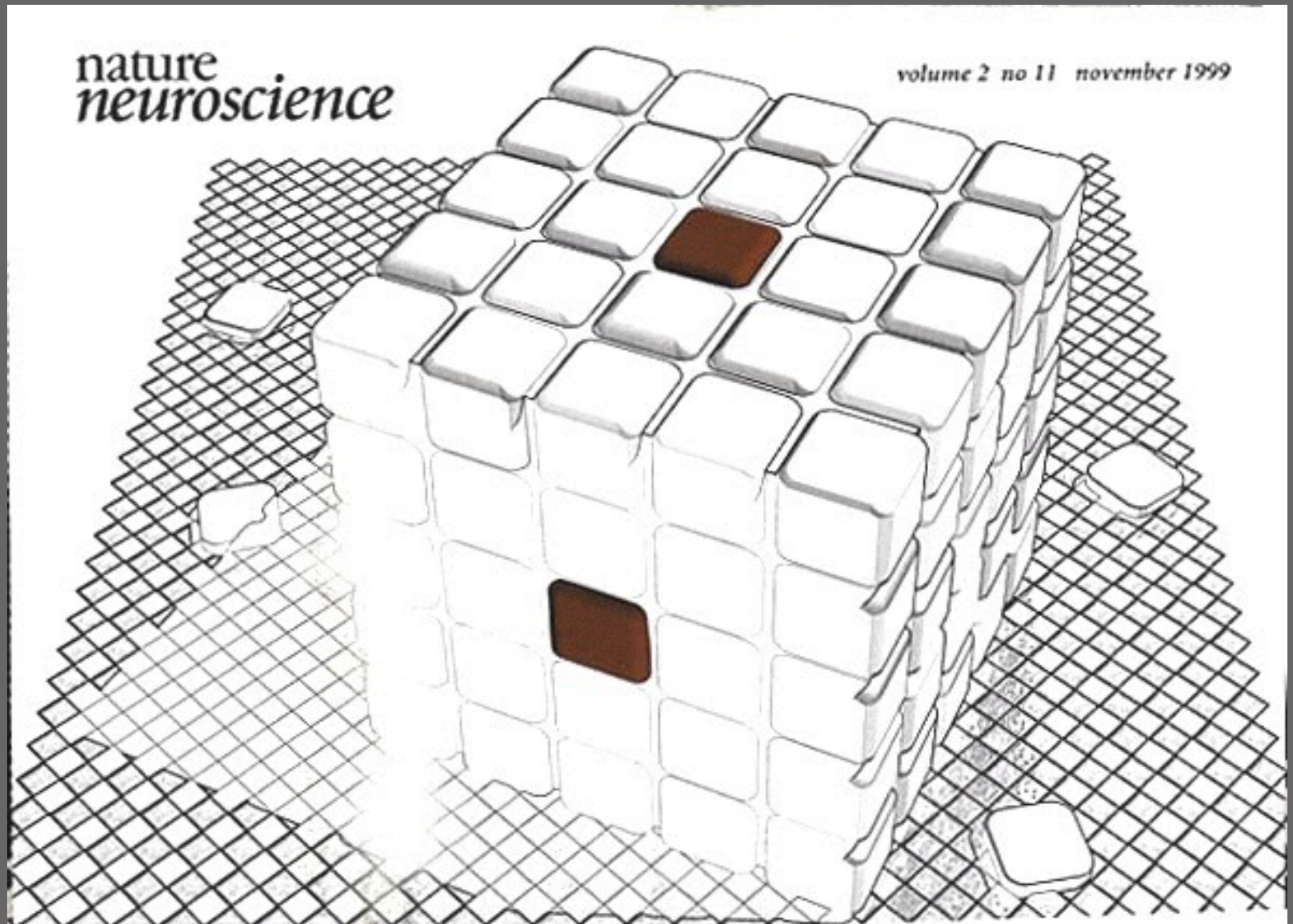
NEW VIEW OF PSYCHOLOGY

Shevell & Kingdom, Ann. Rev. Psych, 59:143-166 (2008)

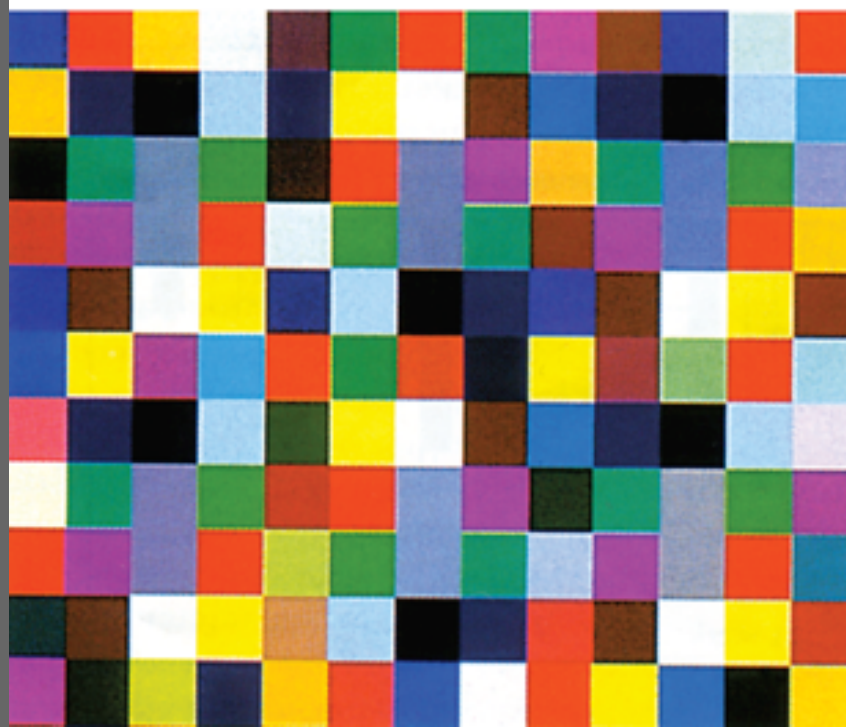
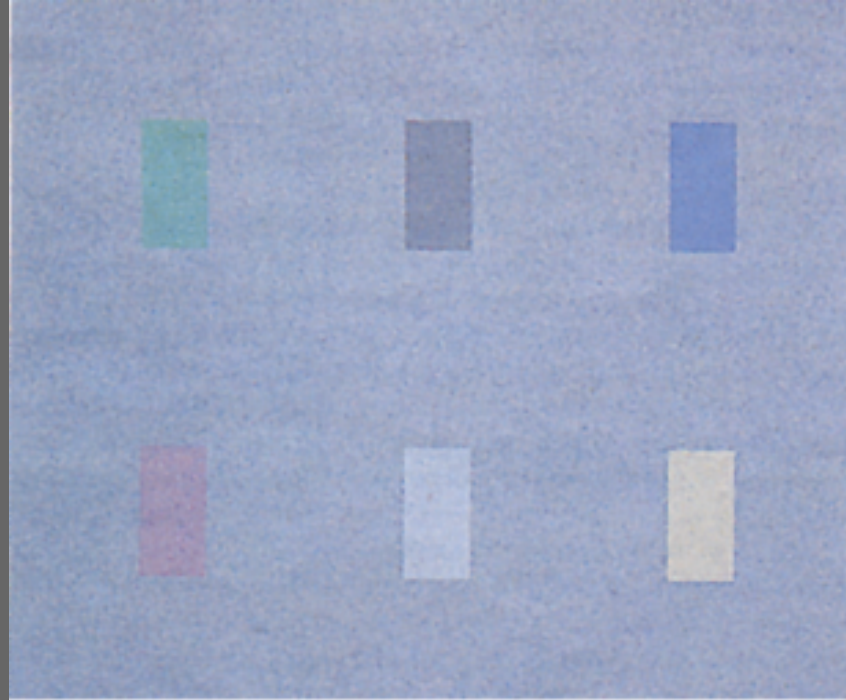
Colour and context



Colour and context



Lotto, R.B. & Purves, D. The effects of colour on brightness. *Nature Neuroscience* **2**, 1010-1014 (1999).



Shevell &
Kingdom (2008)

The qualia problem

- How do we know that when you and I see a colour that we both call “red”, we are actually having the same colour experience?

One Fish
Two Fish
Fish
Blue Fish