

Psychology 351 - Psychology of Perception
Week 5 – Color vision

COLOR VISION

Color vs. wavelength

Uses of color vision: survival value

How many colors are there?

Spectral vs. non-spectral

Hue vs. saturation and brightness

Identification vs. discrimination

Newton's contribution: Prism experiments

Prisms add color vs. reveal color

Dimensions of color: Hue, brightness, saturation

Real world light sources

Newton's color circle

Opposite sides mix to form achromatic colors (greys)

Metamers

Updates to Newton's circle

CIE diagram

Color solids (3D)

Light sources vs. light reflectors

brightness vs. lightness

additive vs. subtractive mixtures

Color constancy

Monochromatic vision

Univariance principle, metamers again

Dichromatic vision

Neutral point

Trichromatic Theory: Young-Helmholtz

Color naming:

420 violet

465 blue

495 green

570 yellow

700+ red

Why not quadchromatic vision?

Birds have it! (ScientificAmerican200607.pdf)

Three cone types: Microspectrophotometry

Short wavelength cones (424 nm)

Medium wavelength cones (530 nm)

Long wavelength cones (560 nm)

Opponent Process Theory: Hering, Hurvich-Jameson

Color mixing

Afterimages

Color blindness (U. Calgary site)

Opponent cells in LGN, cortex

Which is correct: Trichromatic or Opponent Process?

Three triplets: levels of coding color in human vision

Short, Medium and Long wavelength-sensitive cones

Red-green, Yellow-blue, and Black-white opponent processes

Hue, brightness, and saturation

Other topics:

Color assimilation vs. contrast

Color filters and their transmission spectra

Color television broadcast

Spectroscope and diffraction gratings for producing rainbow

Benussi Ring

Neon color illusion and colored subjective (Kanizsa) figures

Watercolor illusion

Color scission (Metelli)