

Colour Illusions

Jane and Bao Le



Question to Ponder about:

How exactly does colour affect our art works?

Re-cap:

Hue - Colour Identification

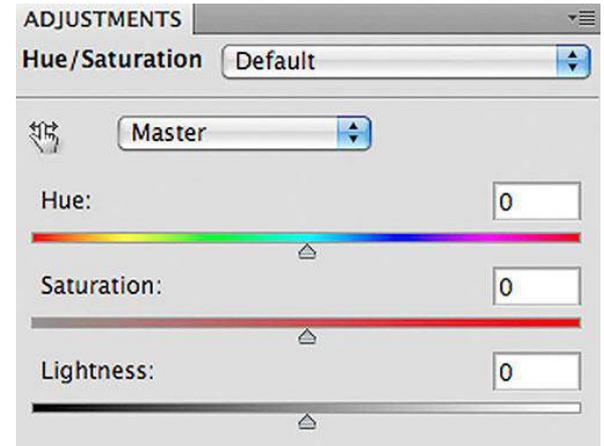
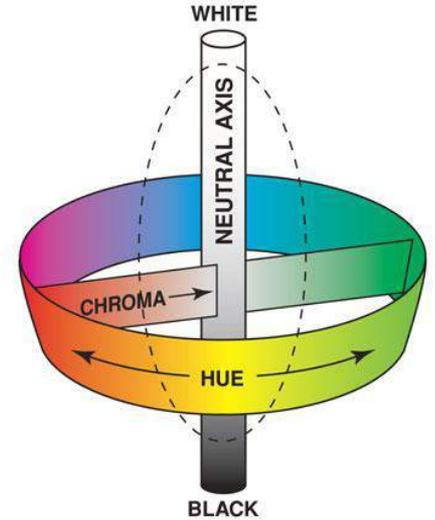
Value - relative lightness/darkness of a colour

Tint - addition of white to increase lightness

Shade - addition of black to reduce lightness

Tone - addition of grey

Chroma - intensity of a colour's purity/saturation



Remember when ...



Colour Illusions

- Itten's colour theory
- Simultaneous Contrast Effect
 - Understanding the Effect
 - Hue
 - Value
 - Chroma
- Bezold effect

Itten's Color Theory

Johannes Itten

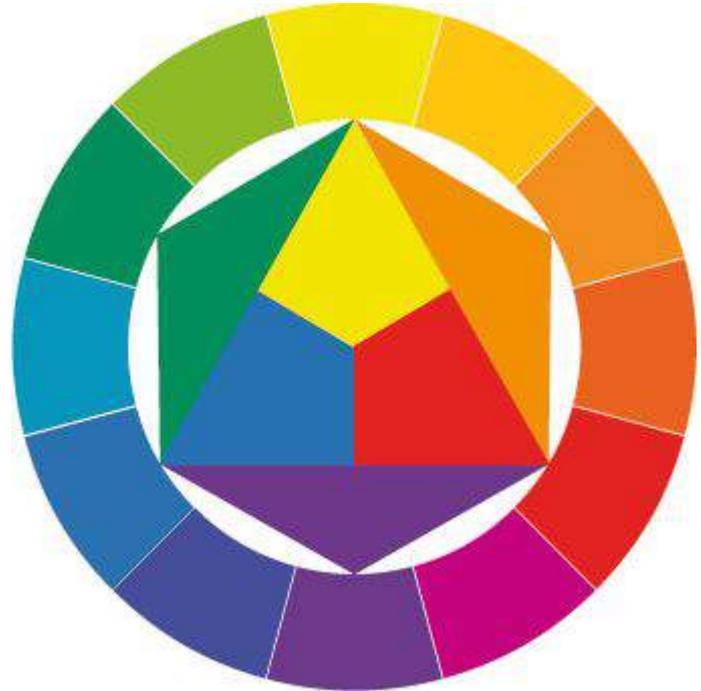
(11 November 1888 – 25 March 1967) was a Swiss expressionist painter, designer, teacher, writer and theorist associated with the Bauhaus (*Staatliches Bauhaus*) school.



Itten's Twelve-Part Color Circle

-Johannes Itten was one of the first people to define and identify strategies for successful color combinations.

-He also published a book, *The Art of Color*, which describes these ideas as a furthering of Adolf Hölzel's color wheel. Itten's so called "color sphere" went on to include **12** colors.



Itten's Twelve-Part Color Circle

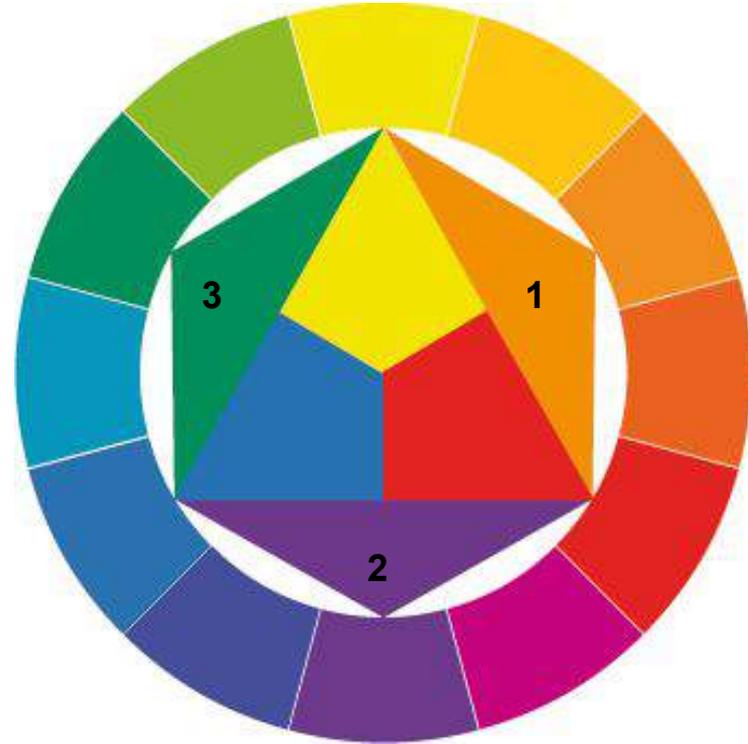
Primary colors: yellow, red, blue

primary colors + primary colors = secondary colors

yellow + **red** = **orange** (1)

red + **blue** = **violet** (2)

yellow + **blue** = **green** (3)



Itten's Twelve-Part Color Circle

primary colors+secondary colors= tertiary colors

yellow+orange=yellow orange (1)

red+orange = red orange (2)

red+violet = red violet (3)

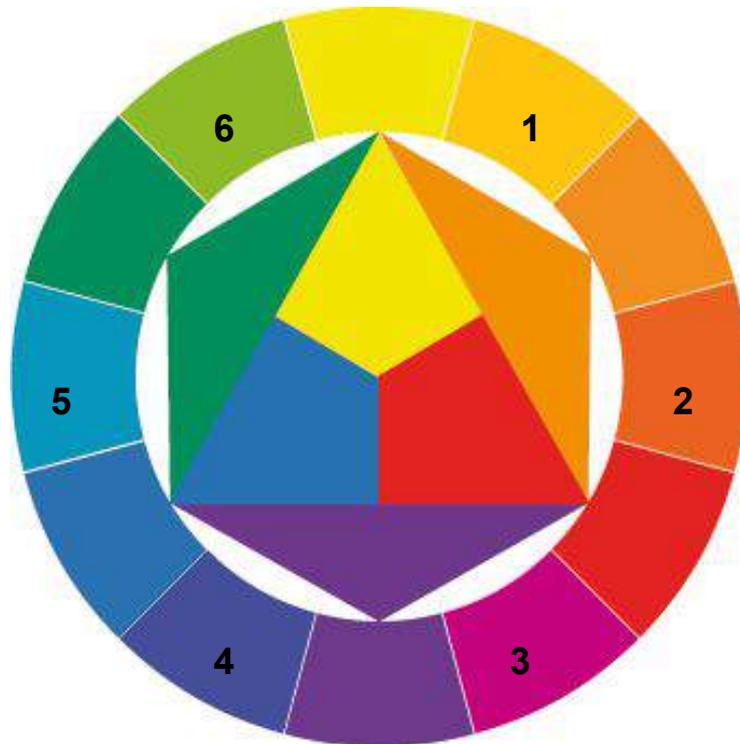
blue+violet = blue violet (4)

blue+green = blue green (5)

yellow+green = yellow green (6)

3 primary colors+ 3 secondary colors+ 6 tertiary colors

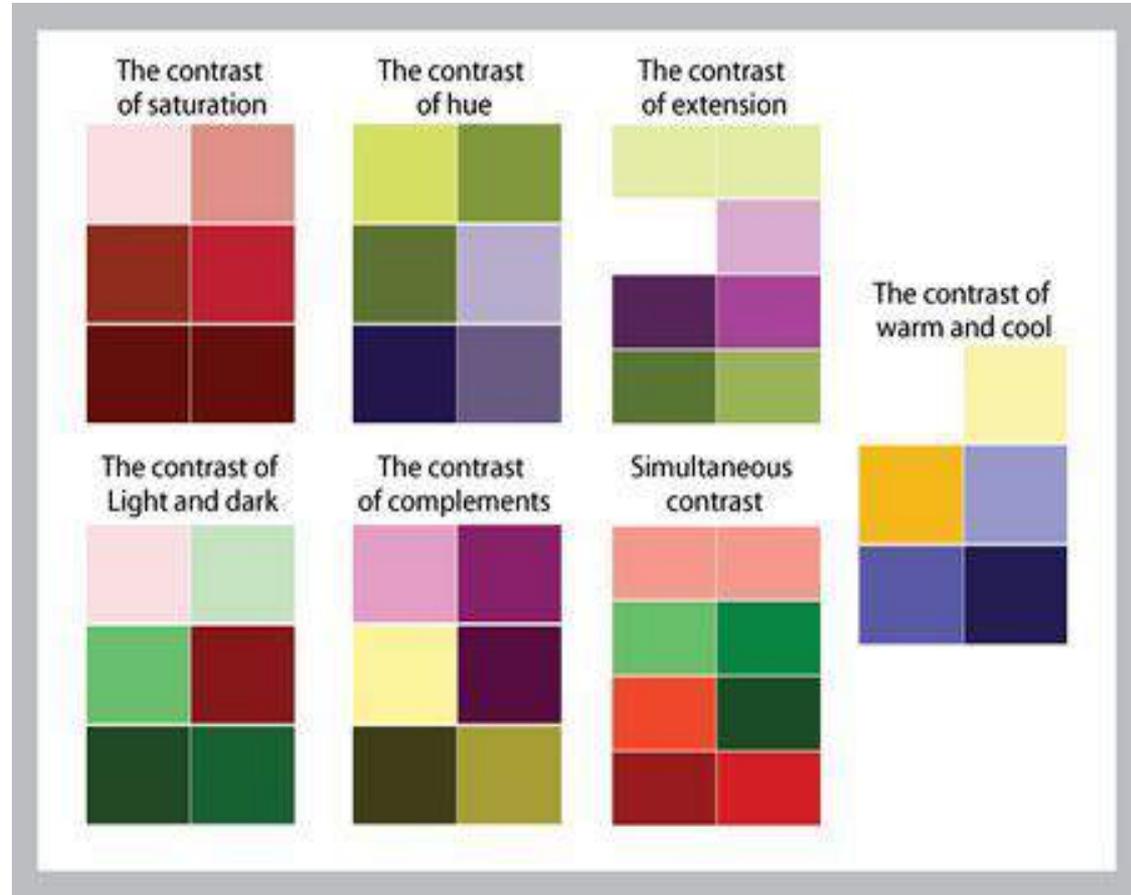
Total: 12 colors



Itten's Seven Color Contrasts

-Through his research he devised **seven** methodologies for coordinating colors utilizing the hue's contrasting properties.

-These contrast add other variations with respect to the intensity of the respective hues.
Contrasts obtained due to...

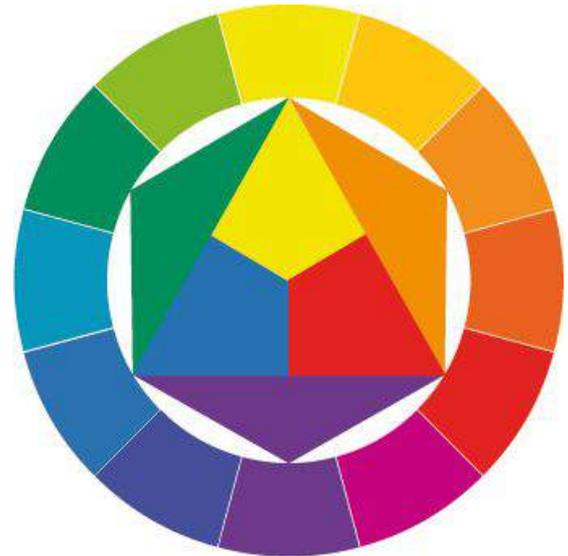
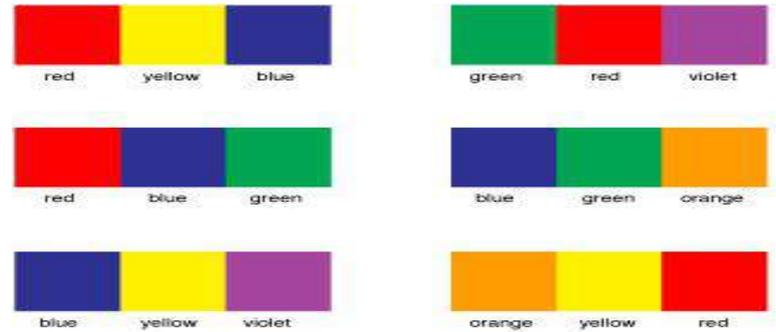


1. Contrasts of hue

-Contrast of hue is illustrated by undiluted colors in their most intense luminosity.

-The intensity of contrast of hue diminishes as the hues employed are removed from the three primaries.

-Yellow/red/blue is the extreme instance of contrast of hue. Orange, green and violet are weaker in character, and the effect of tertiary colors is still less distinct.



2. Light-dark contrast

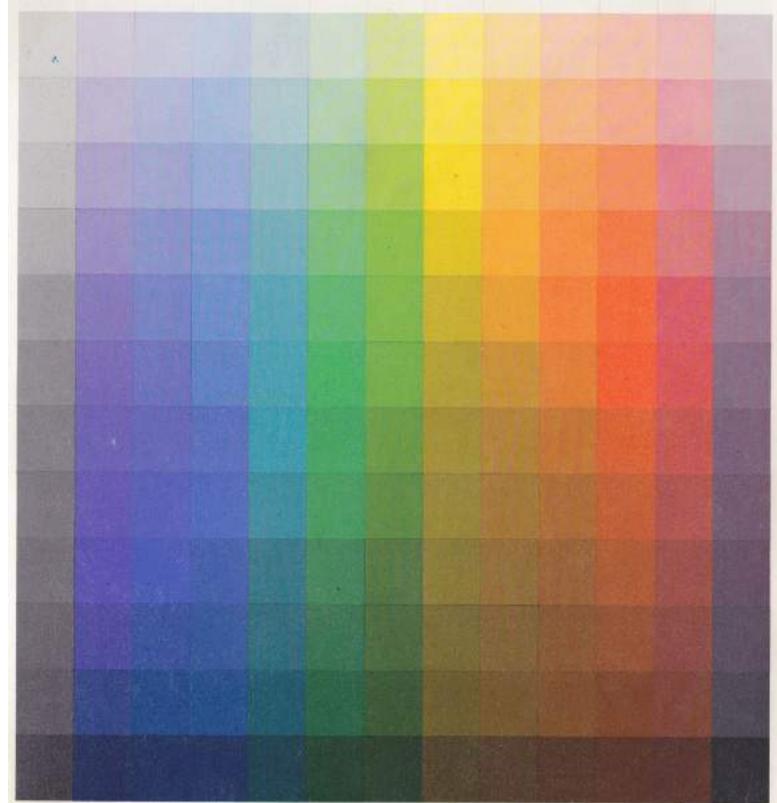
-The painter's strongest expressions of light and dark are white and black.

-The effects are opposite with the realm of grays and chromatic colors between them.



2. Light-dark contrast

-Chromatic light-dark contrast are illustrated in twelve equidistant steps from white to black and have been repeated for each of the twelve hues of the color circle, in brilliances equal to the corresponding grays.



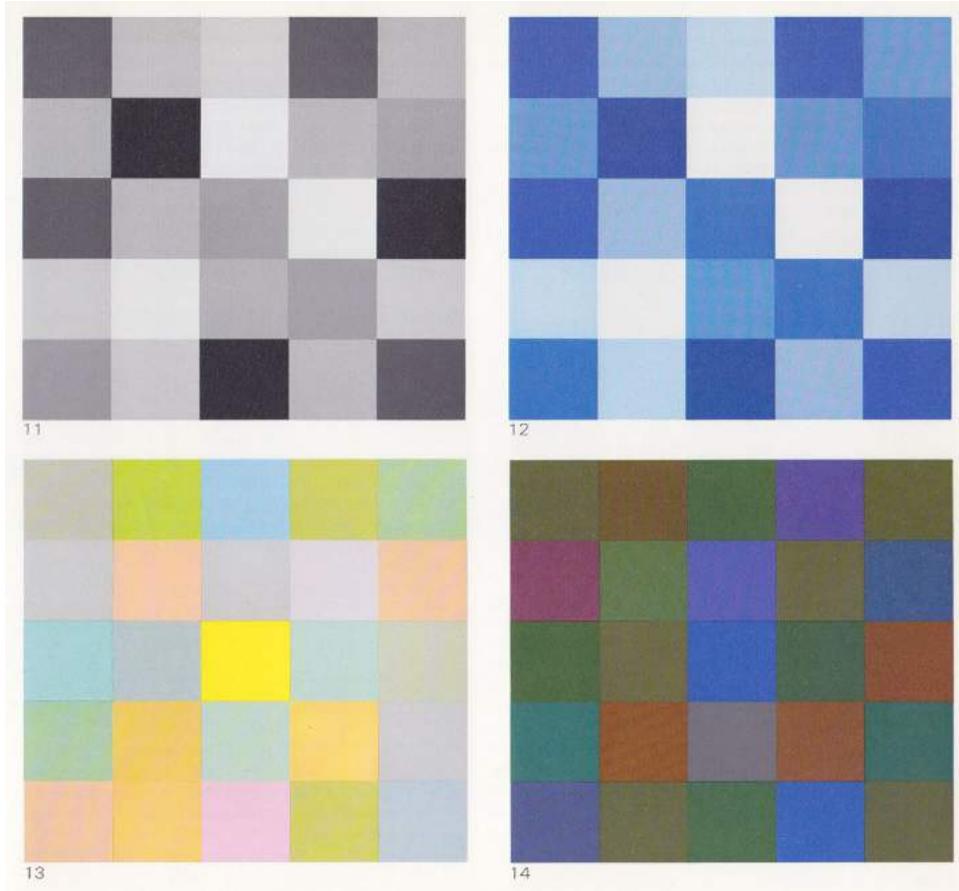
2. Light-dark contrast

11 Light-dark composition in black, white, and grays

12 Same composition as Fig. 11, in blue

13 Colors of equal brilliance

14 Colors of equal darkness



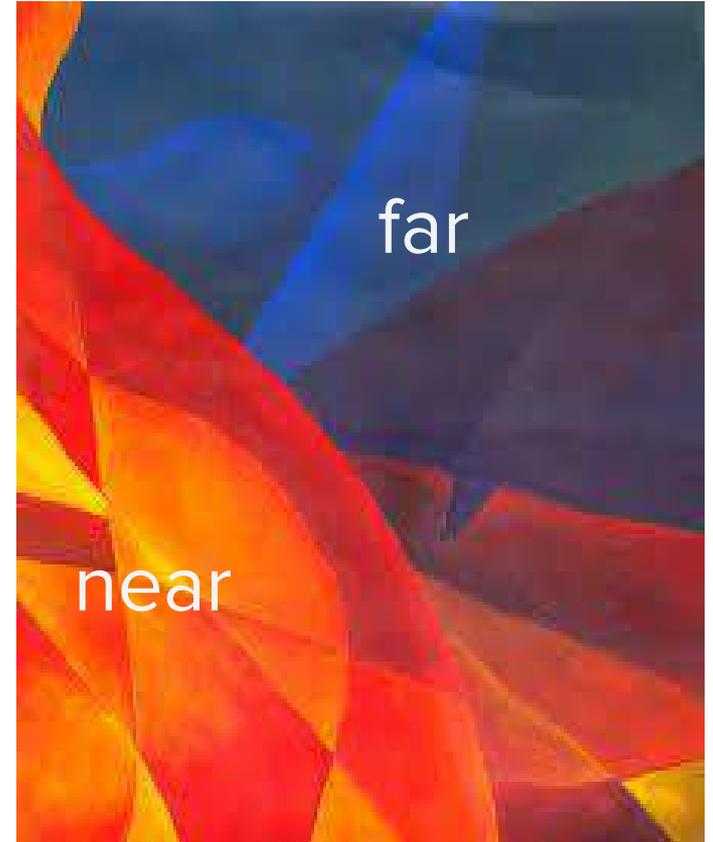
3. Cold-warm contrast

-cold-warm properties:
verbalized in a number of other contrary terms

-warm/cold; sun/shadow; opaque/transparent;
stimulant/sedative; dense/rare; earthy/airy; near/far;
heavy/light; dry/wet

-These diverse impressions illustrate the versatile
expressive powers of cold-warm contrast. It can be
used to produce highly pictorial effects.

-In landscape, more distant objects always seem
colder in color because of the intervening depth of
air. Cold-warm contrast contains elements
suggesting nearness and distance.



3. Cold-warm contrast

16 The strongest cold-warm contrast: red-orange / blue-green

17 Inversion of proportions of Fig. 16

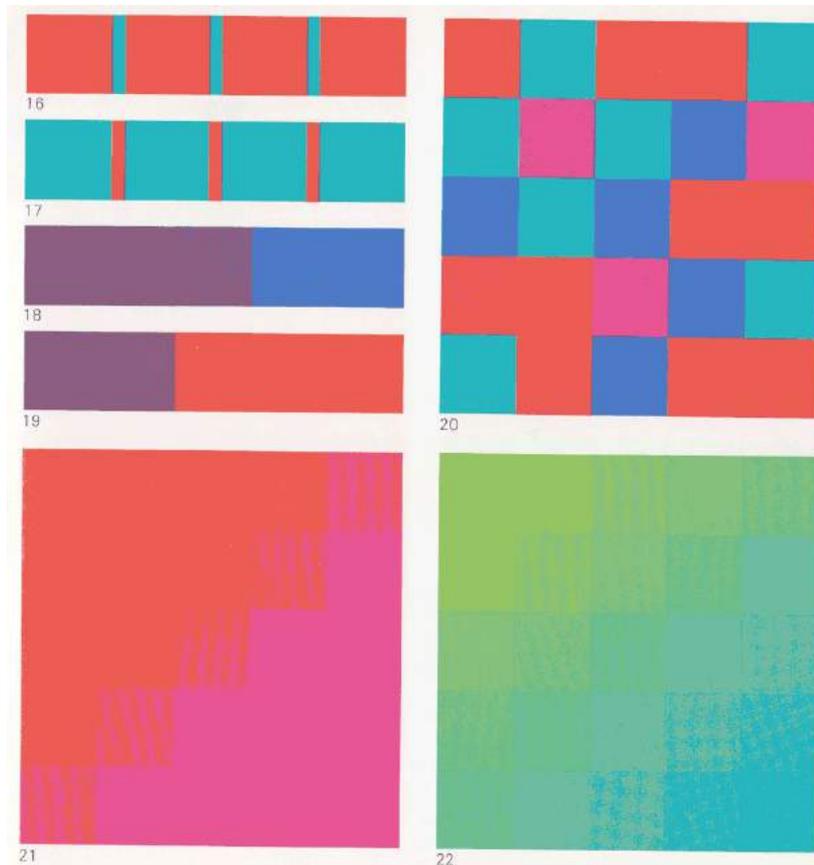
18 Red-violet seems warm relative to blue

19 Red-violet seems cold relative to orange

20 Checkered composition contrasting cold and warm colors

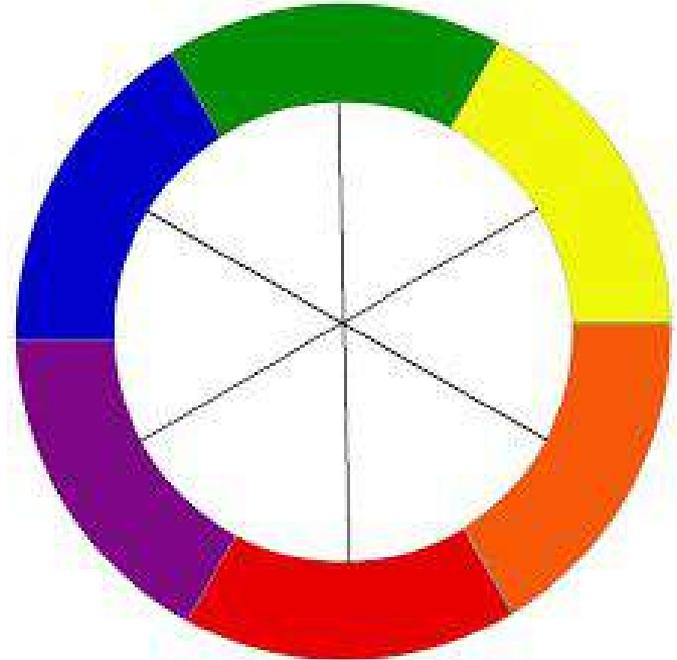
21 Cold-warm modulation in red

22 Cold-warm modulation in green



4. Complementary contrast

- Two colors are complementary if their pigments, mixed together produce a neutral gray-black.
- Physically, light of two complementary colors, mixed together, will yield white.
- There is always but one color complementary to a given color. In the color circle, complementary colors are diametrically opposite each other.



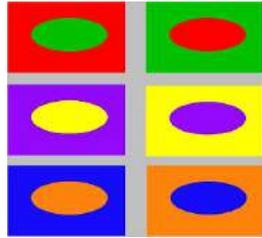
4. Complementary contrast

Examples of complementary pairs are:

1. **red**, **green**

2. **yellow**, **violet**

3. **blue**, **orange**

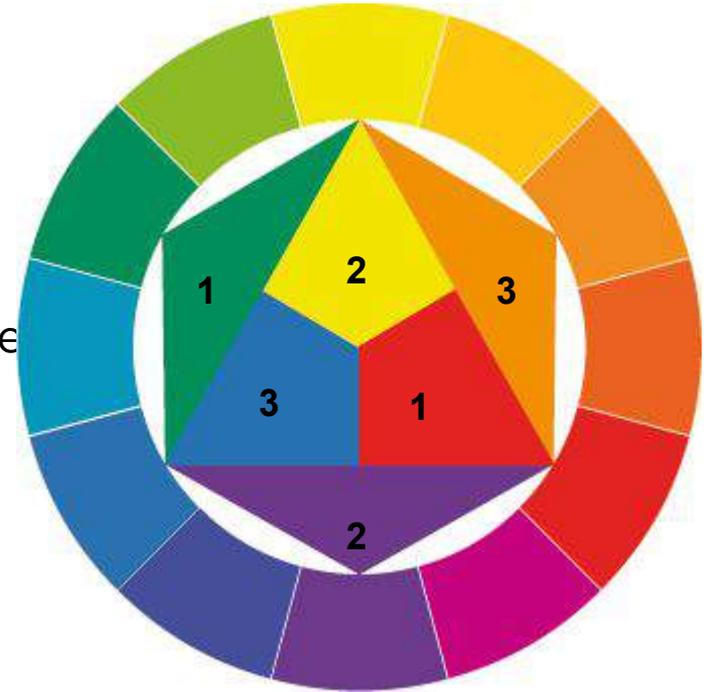


In analyzing these pairs of complementaries, all three primaries - yellow, red, blue are always present:

red, **green** = **red**, **yellow** + **blue**

yellow, **violet** = **yellow**, **red** + **blue**

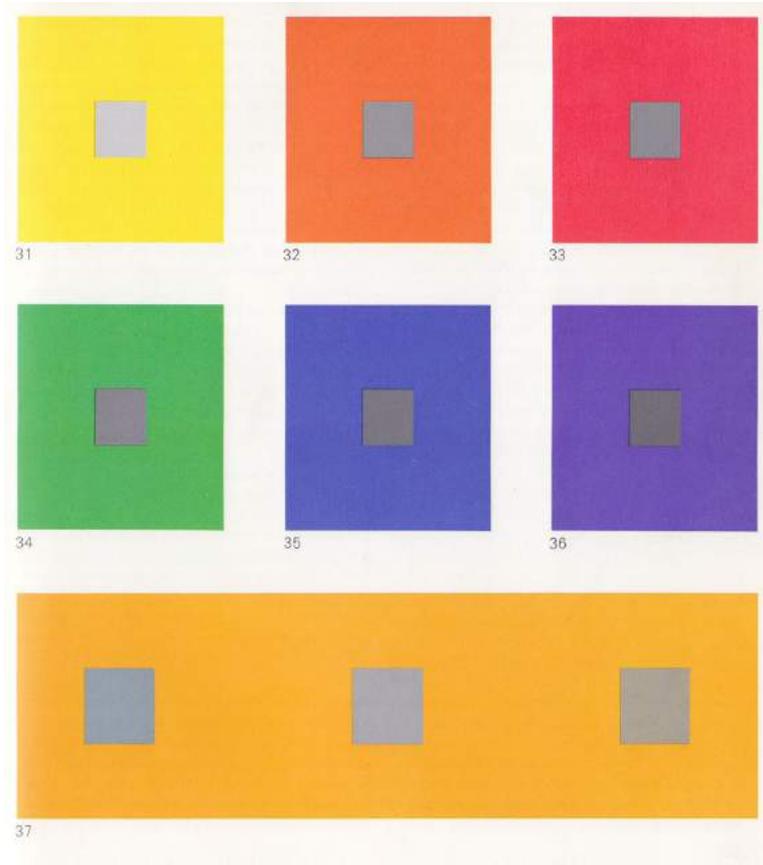
blue, **orange** = **blue**, **yellow** + **red**



In the color circle, complementary colors are diametrically opposite each other.

5. Simultaneous contrast

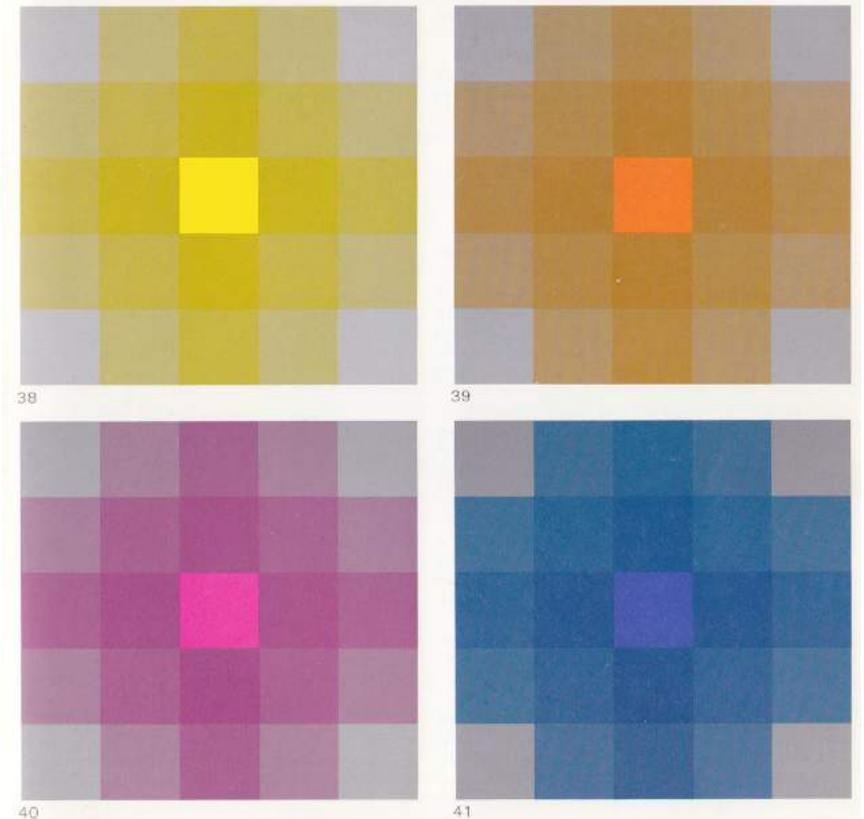
-Simultaneous contrast results from the fact that for any given color the eye simultaneously requires the complementary color, and generates it spontaneously if it is not already present.



6. Contrast of saturation

-Saturation, or quality, relates to the degree of purity of a color.

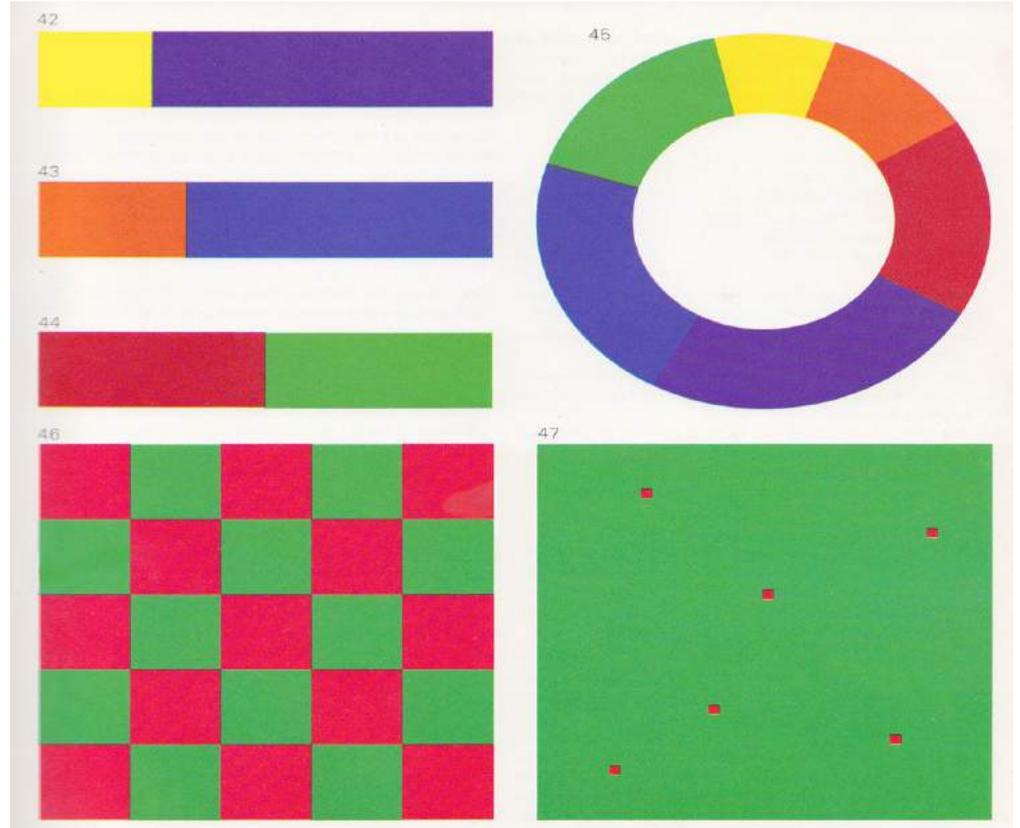
-Contrast of saturation is the contrast between pure,intense colors and dull, diluted colors



7. Contrast of extension

-Contrast of extension involves the relative areas of two or more color patches.

-It is the contrast between much and little, or great and small.



Simultaneous Colour Contrast

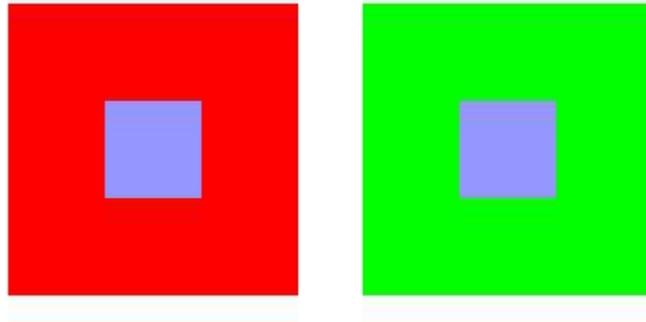
We rarely see colours in isolation



This visual effect occurs when one colour is placed upon/next to each other

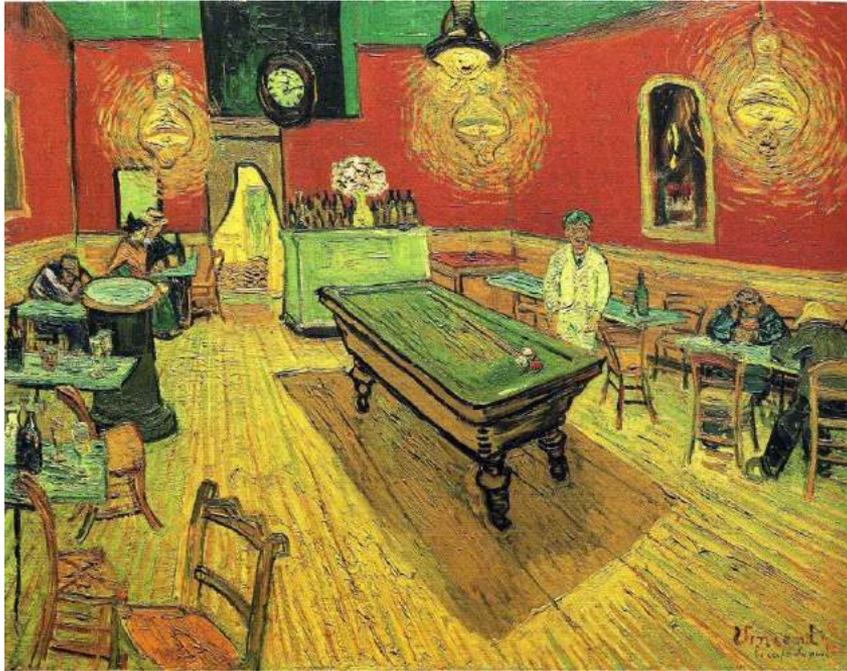
- Each effect varying with value, saturation and hue
- Varies with perception (effects of the colour schemes)

Often generating an ***after-image*** of that is in the hue complementary to the original one

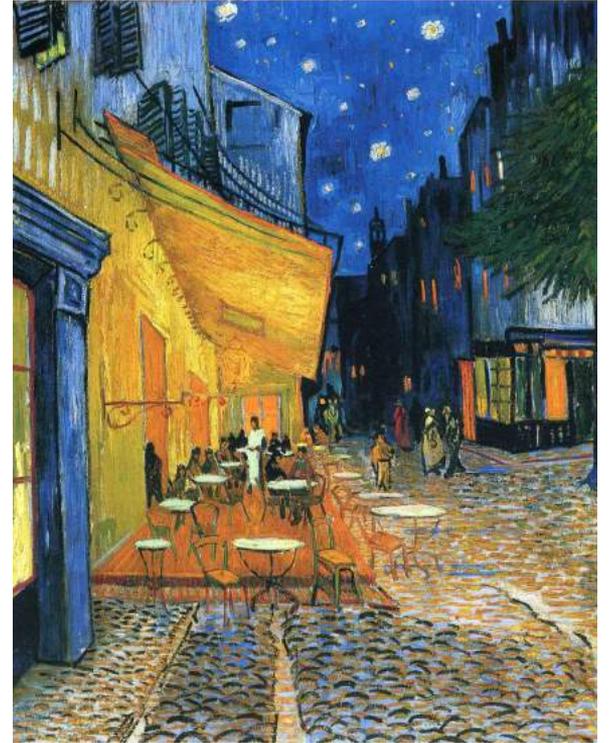


Simultaneous Colour Contrast

Can be used to create an intensified color experience giving impression of vibrant and luminous color.



Vincent van Gogh, The Night Cafe, 1888



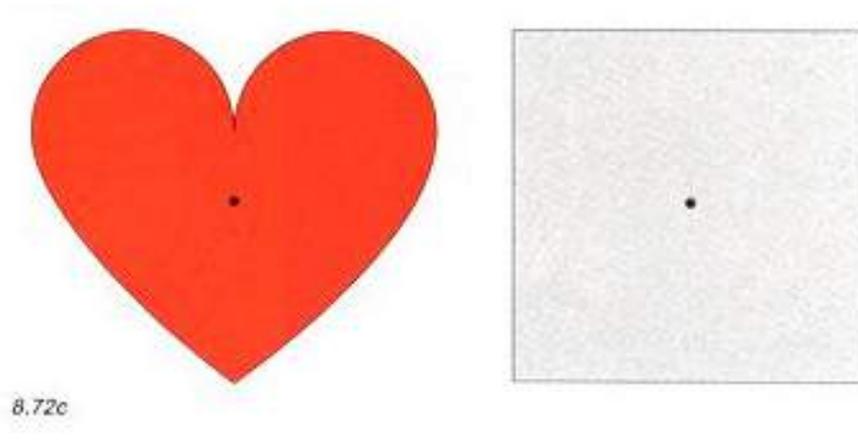
Vincent van Gogh, Terrace of a Cafe at Night (Place du Forum), 1888

After-Image Phenomenon

An optical illusion that our retinal impressions retain despite the removal of our visual stimulus

Positive After-Image (similar images are formed as the original)

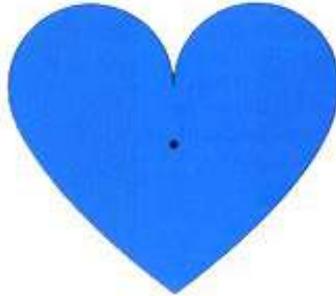
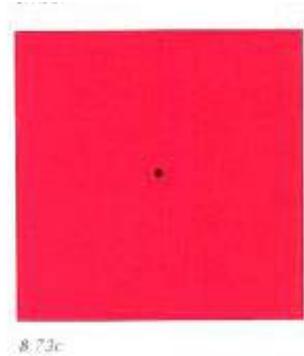
Negative After-image (use of complementary colours)



Successive Contrast

What happens when it is a coloured background instead of a neutral grey one?

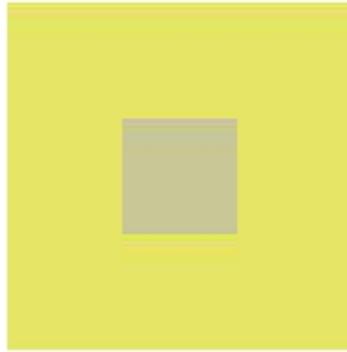
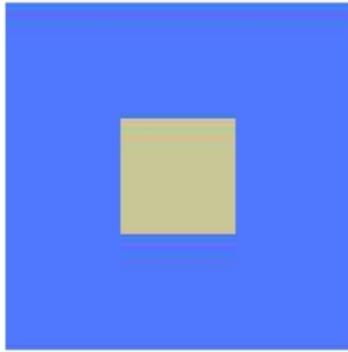
Take a look at the heart, then the square.



Simultaneous Contrast - Changes in Hue

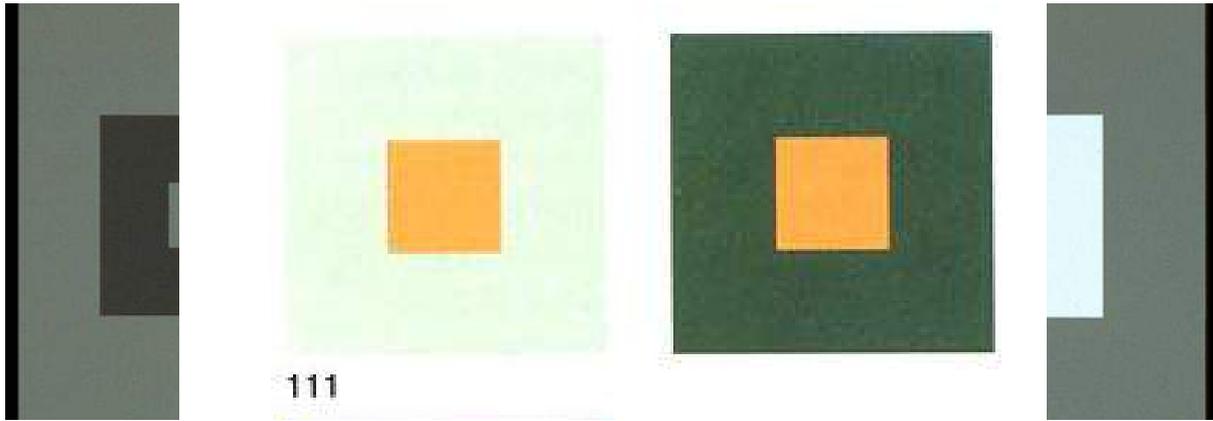
The colours we see are easily affected by the colours around them

A surrounded square is affected by the afterimage of the surrounding colour



Simultaneous Contrast - Change in Value

Occurs when the surrounded colour is much lighter/darker than the surrounding colour



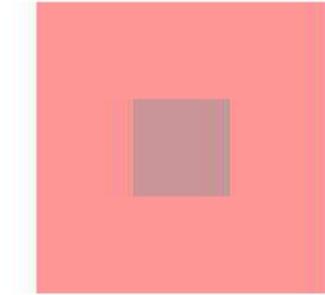
When surrounding colour is dark; the surrounded colour appears light.

And vice versa

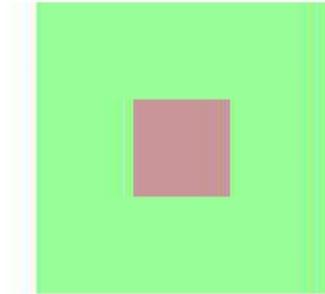
Simultaneous Contrast - Changes in Chroma/Saturation



Two complementary colours



Two non-complementary colours



Which Simultaneous Contrast effect is this?

Hue



Value



Chroma



Colour Relationships

- Sizing
- Luminosity
- Colour Balance and proportions

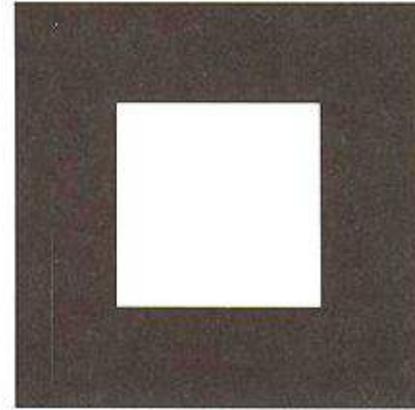
Sizing

Colours affect how we perceive relative sizes

Appearances and sizes are altered based on the

Colours we put together

8.77c



8.78a



8.78b

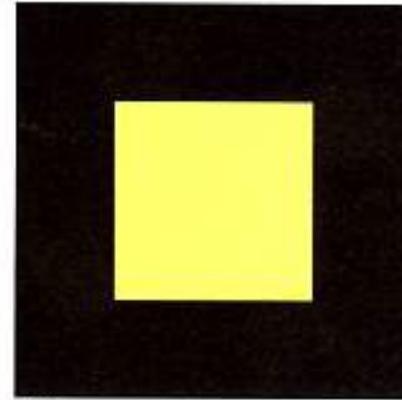
Luminosity

Luminosity: Strength of colour

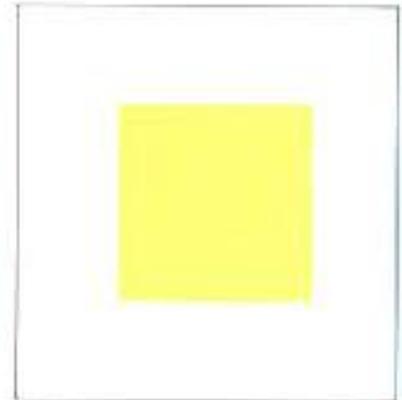
Changes in Luminosity and intensity as they

Vary with hue of background as well as

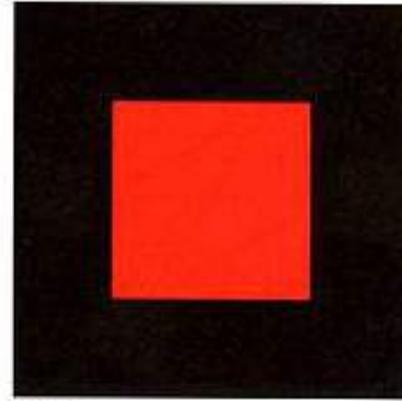
the surrounded colour



8.79a



8.79b



8.80a



8.80b

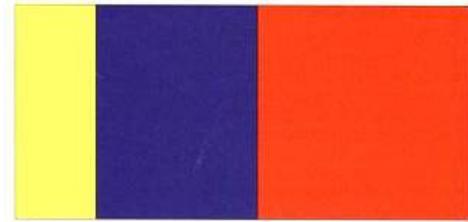
Colour Proportion

Relative proportion of hue/value used

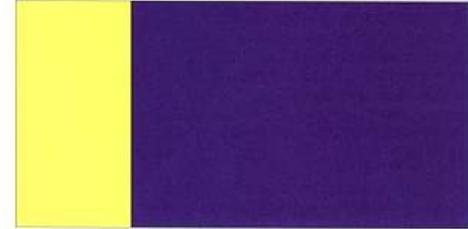
Deciding based on composition, aim of work

Varying in dominant colours; minor colours,

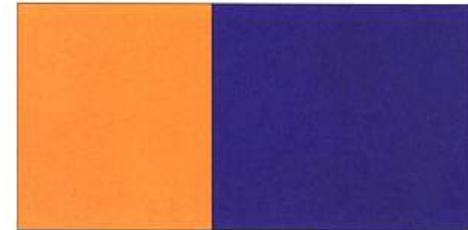
use of number of colours



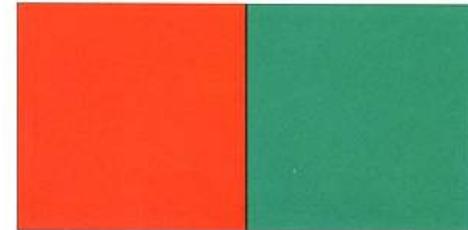
8.88



8.89a



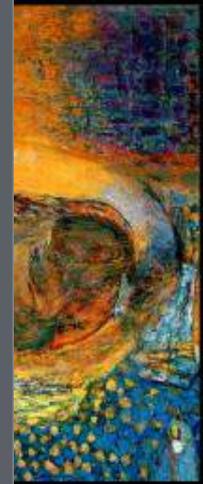
8.89b



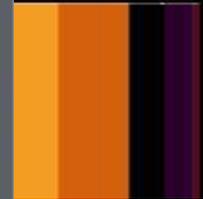
8.89c

Colour Proportions

Its application

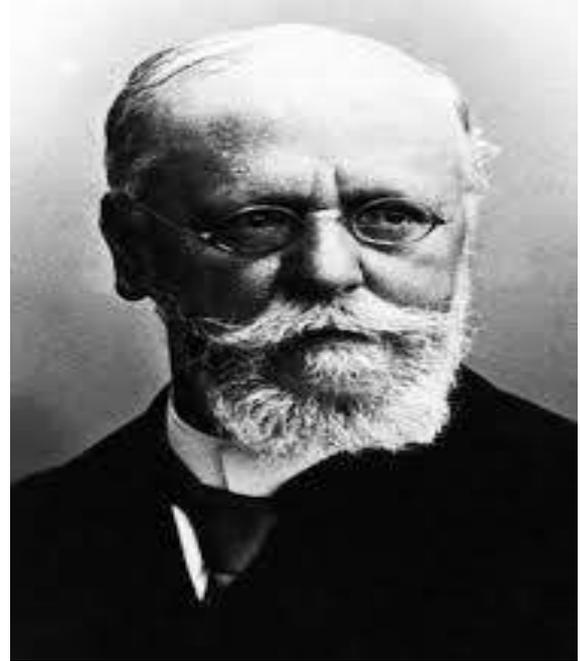


Pierre Bonnard
*Nude in a
Bathtub*
1937
(post-
Impressionist



Bezold Effect

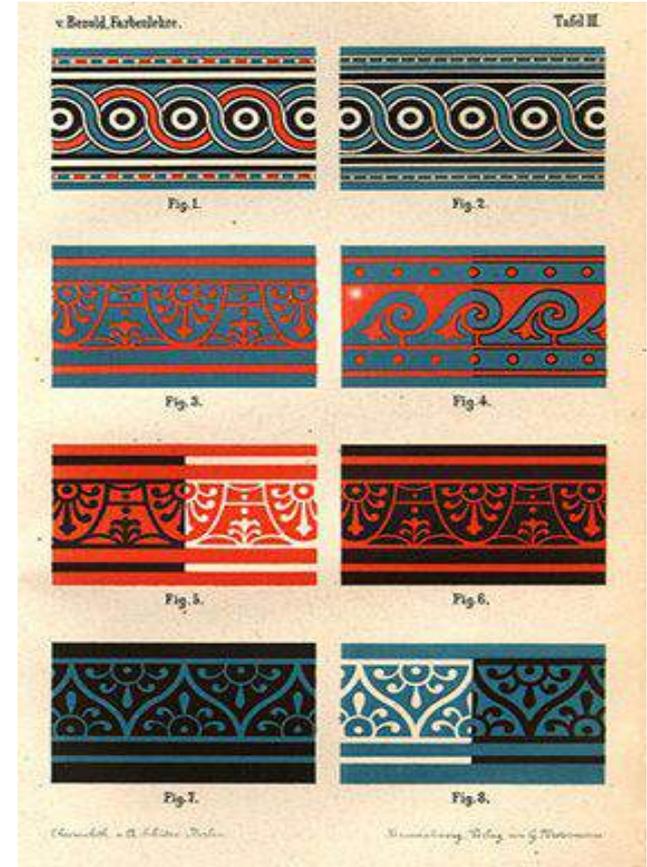
-The **Bezold effect** is an optical illusion, named after a German professor of meteorology, Wilhelm von Bezold(1837–1907), who discovered that a color may appear different depending on its relation to adjacent colors.



Bezold Effect

-The professor had taken up a home decor project, designing a rug for his home.

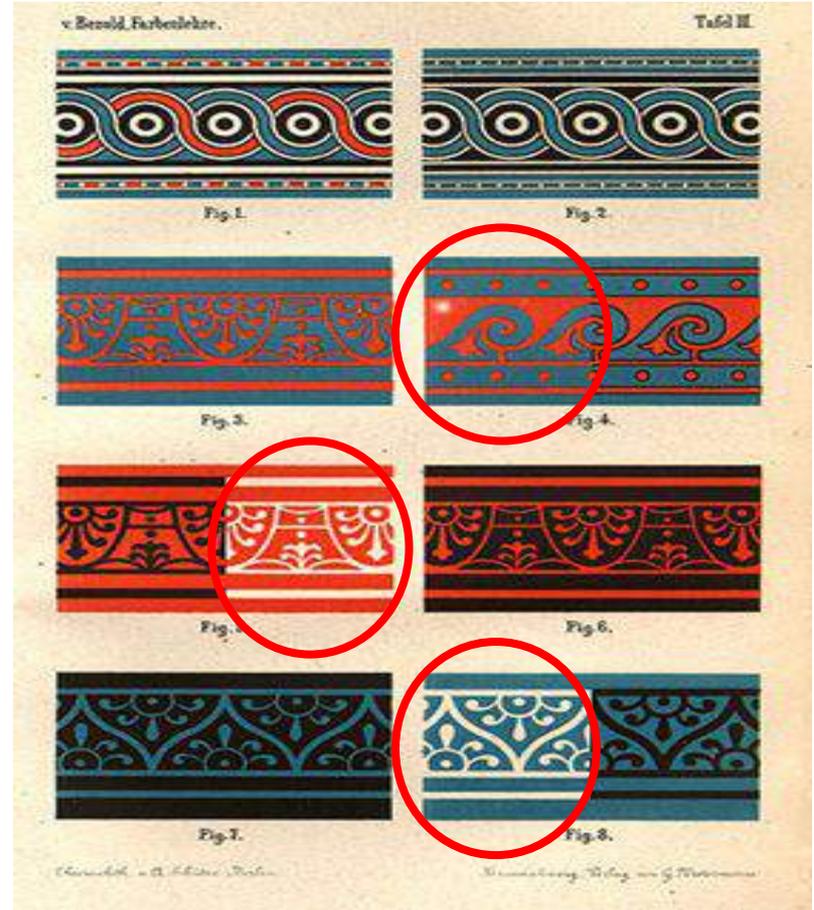
-He was stumped on the colors he wanted to include in the rug and his experiment of adding and subtracting colors led him to discover the effect created by one change of color on the remaining colors in the rug design.



Bezold Effect

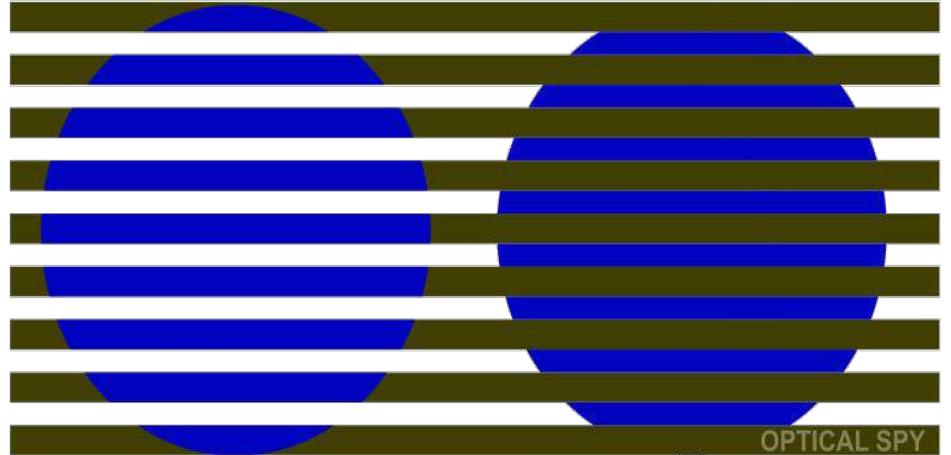
-Bezold Effect happens when small areas of color are interspersed. An assimilation effect called the von Bezold spreading effect, similar to spatial color mixing, is achieved.

-The opposite effect is observed when large areas of color are placed adjacent to each other, resulting in color contrast.

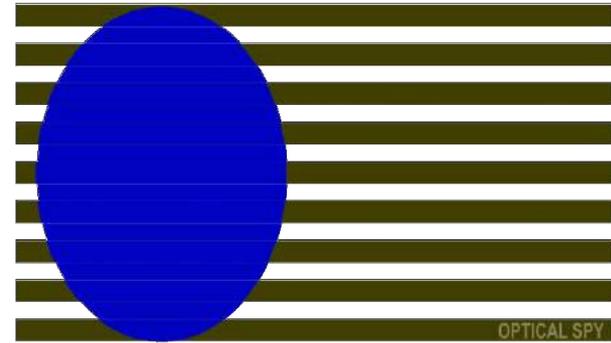
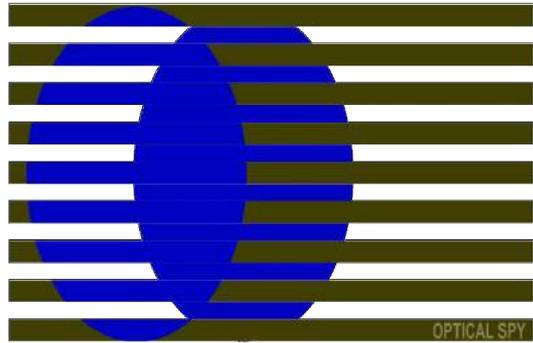
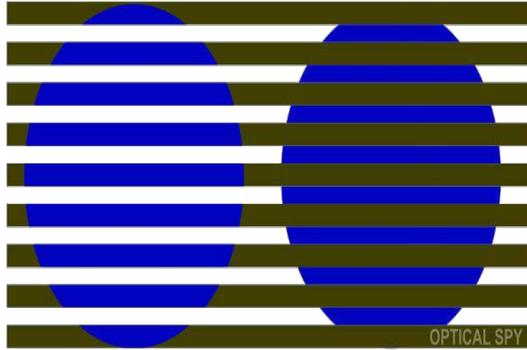


Bezold Effect

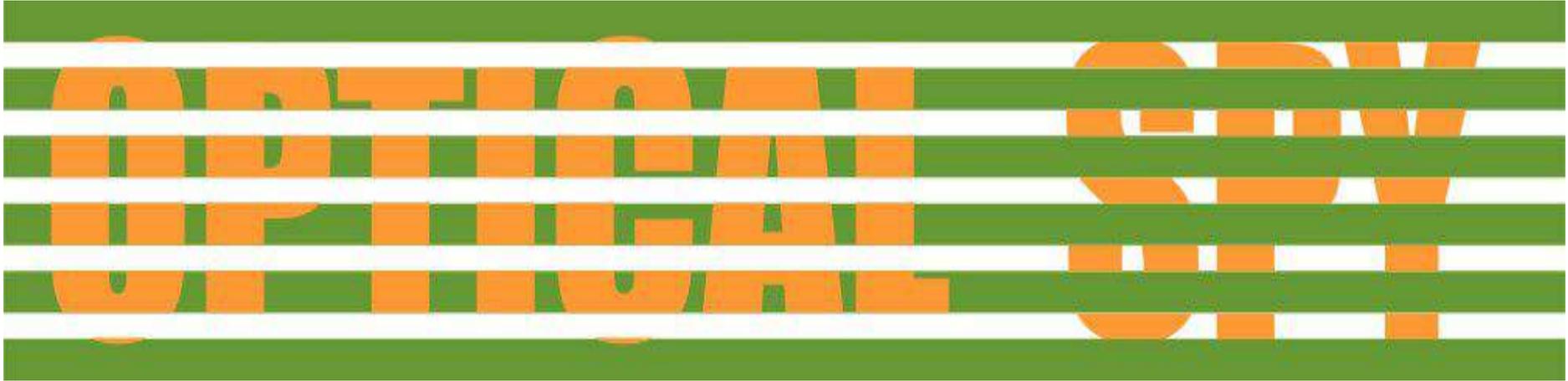
- A blue grating placed on the white phase appears to be lighter than as it is
- while one placed on the brown phase appears to be darker as it is.
- though they are identical in lightness.



Bezold Effect



Bezold Effect



The words are both exactly the same shade of orange, but because of Bezold Effect, the word SPY looks darker than the word OPTICAL

The end – Thank you!

:)

References:

<https://luminous-landscape.com/composing-with-color-part-2/>
<http://images.en.yibada.com/data/thumbs/full/21730/685/0/0/0/the-controversial-blue-black-or-white-gold-dress.jpg>
<http://www.telegraph.co.uk/culture/art/10767459/Seeing-red-The-mind-bending-power-of-colour.html>
<http://www.webexhibits.org/colorart/contrast.html>
<http://artseverydayliving.com/blog/2014/06/arts-everyday-living-midnight-cafes/>
<http://www.psy.ritsumei.ac.jp/~akitaoka/shikisai2005.html>
<https://global.britannica.com/topic/afterimage>
http://www.harding.edu/gclayton/color/assignments/cht02_examples01.html
<https://www.sitepoint.com/color-theory-101-2/>
<http://ateliertally.com/colour-affect-lives-colour-art/>
<http://ateliertally.com/colour-affect-lives-theories-colour/>
<http://char.txa.cornell.edu/language/element/color/color.htm>
http://facweb.cs.depaul.edu/sgrais/color_context.htm
<http://www.loveofgraphics.com/graphicdesign/color/colorcontrast/>
<http://www.cse.dmu.ac.uk/~sexton/WWWPages/Colour/lmg0061.jpg>
<http://www.colorcube.com/illusions/scindctn.htm>
<http://char.txa.cornell.edu/language/element/color/color.htm>
<http://www.color-theory-phenomena.nl/11.03.htm>
<https://guymanningphotography.wordpress.com/tag/17-effects-of-simultaneous-contrast/>
<https://thestylenote.files.wordpress.com/2013/03/color-wheel.jpg>
<https://pumpkincat210.files.wordpress.com/2010/04/ct22.jpg>
http://www.utdallas.edu/~melacy/pages/2D_Design/Itten_ColorContrasts/IttenColorContrasts.htm
<http://www.opticalspy.com/spy-blog/the-bezold-effect>
https://monoskop.org/images/4/46/Itten_Johannes_The_Elements_of_Color.pdf