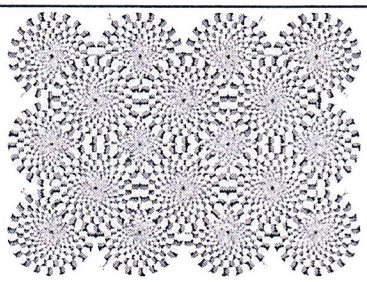

Art is not in the eye of the beholder but in the brain.

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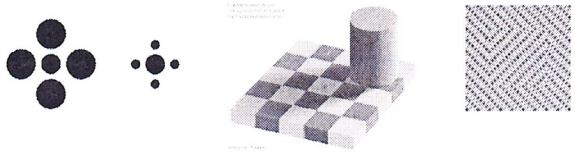
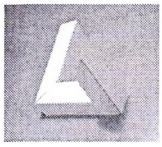
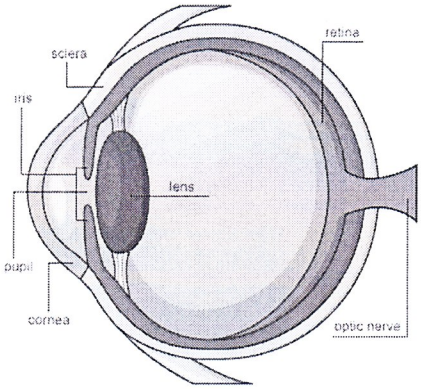
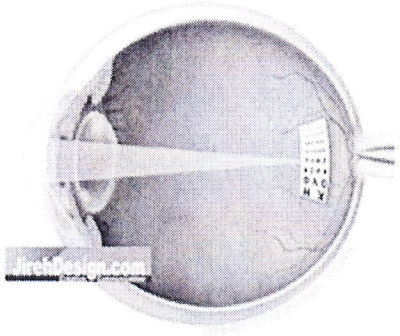


The "what" and "where" visual systems and what happens when they don't agree!

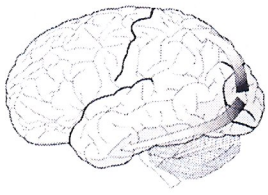


What people see is not a camera image nor is it simply "looking" at an image on the retina. Information-light signals-come in through the retina but is actually processed in the brain.





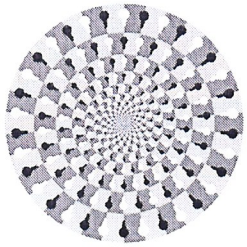
When the visual pathway hits the visual cortex in the back of the brain- the two pathways split with the "where" system going to the right to the occipital lobe and the "what" system going to the left to the parietal lobe. The dorsal stream (green) and the ventral stream (purple) are shown. The dorsal stream is the "where" system and the ventral system is the "what" system.



Dorsal stream-"where" system

Ventral stream-"what" system

Optical Illusions-What happens when the "what" and the "where" system don't work well together

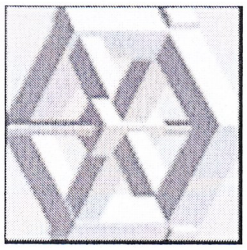


- This processing in the brain create interesting effects. Some of these effects have been used in art for centuries. We make assumptions, unconscious inferences and conclusions based on prior experiences. Optical illusions are when our processing of images are wrong.

The "where" system and the "what" system

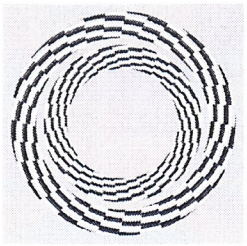
- The "where" system
  - figure/ground segregation
  - spatial organization
  - motion perception
  - depth perspective
  - color blind
  - evloutionary older
- The "what" system
  - object recognition
  - face recognition
  - color perception
  - found only in primates

The 2 systems are different in the ways in which they process the light signals (images).



- There are four fundamental differences
- Color selectivity
- Contrast sensitivity
- Speed
- Acuity or resolution

Differences in systems

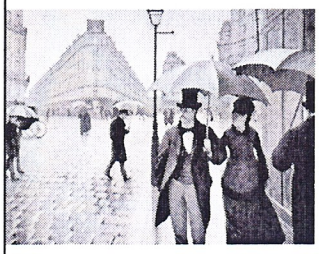


- While these are two different systems with diverse functions and abilities, they do work in conjunction with each other. Because of their different abilities and functions, they can create illusions when they work together. This is what creates optical illusions and what some of the artists of the 1960's focused on when creating Opt Art.

Perspective: From 3D to 2D

- Artists use 7 techniques to show illusions of depth.
- The brain uses 6 cues to perceive depth.
- Out of the 7 artist techniques, 6 can be found in the brain cues. Of the 6 brain uses, artists generally use only 4.

Illusions of depth-art



- 1. Size
- 2. Position
- 3. Overlap
- 4. Color (also called atmospheric perspective)
- 5. Details
- 6. Shading
- 7. Linear Perspective

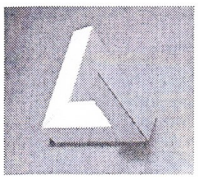
Ways the brain processes depth

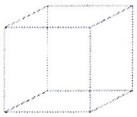
1. Perspective
2. Shading
3. Occlusion
4. Haze
5. Stereopsis
6. Relative motion

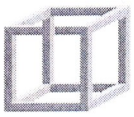
Depth Optical Illusions

*Depth optical illusions occur when our biologically ingrained dimensional processing perceives a solution to a visual problem that is in fact incorrect or has more than one possible correct interpretation.

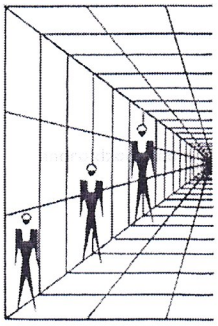
*We have all seen optical illusions that illustrate the first option (impossible objects are examples). Necker's cube is a wonderful example of the second option. Necker's cube is the three dimensional cube that is drawn so that it is see-through. Some people will see only one solution, typically the bottom, left corner as closer to the viewer, but many will find that once they see the two possibilities-either bottom, left corner as closer OR top, right corner as closer, they brain will bounce back and forth with the two equally correct possibilities.



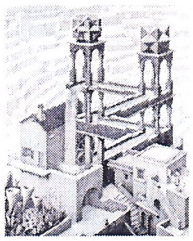


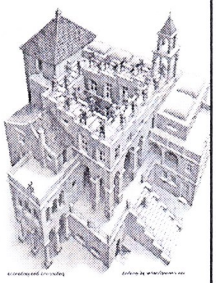


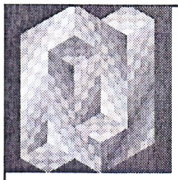
- For example, our brain is programmed to think things higher are farther away. So when you see this illusion, our brains overrides what we see and tells us the figure on the right is the biggest but the three figures are all the same size.

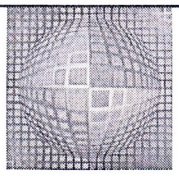


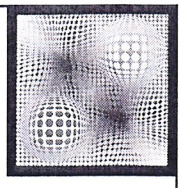
Impossible Objects
M. C. Escher





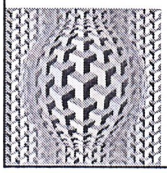


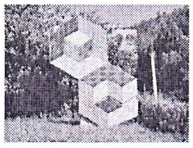


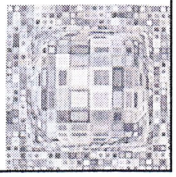


Victor Vasarely

Interested in illusion of depth-creating a three dimensionality on a 2D surface and visual ambiguity.

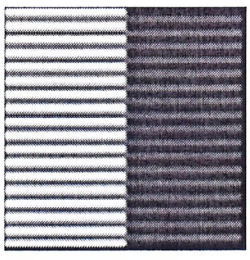






Color Optical Illusions

When both visual systems can see an object, that object will be seen or perceived "normally". This is the case, of course, for the vast majority of things. It will appear to be correct, move appropriately, be stable and be three-dimensional. Problems or, from the point of view of artists, interesting things occur when the two visual systems are not equal in their response to an object. This is what causes many optical illusions, especially color optical illusions.



Color vs. Luminance

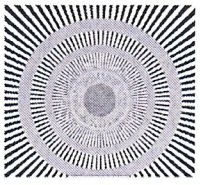
- The "where" system sees luminance (value-the lightness of brightness of a color)
- The "what" system sees color
- These facts can either work well together or create special visual effects

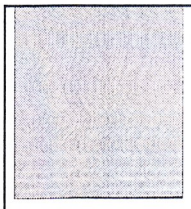
How the Impressionists used the "what" and the "where" system

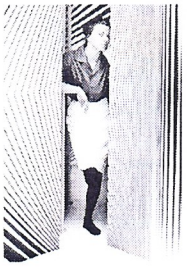
- The Impressionists were able to capture a shimmering quality in many of their paintings by using colors that have little or no value or luminance contrast. The "where" system can't see the appropriate depth of these colors. The placement of the colors (which are seen by the "what" system) don't have a clear position or stability, according to the "where" system, and then appear to jump or shimmer.

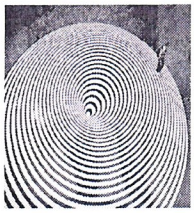
Optical Illusions of Movement

- One type of optical illusions occur when high luminance (value) colors are placed next to low luminance (value) colors- in other words strong contrast.
- The closer the placement, the stronger the effect
- When high luminance colors are placed next to low luminance colors, the juxtaposition leads to strong illusions of movement. This is what the artists of the Op Art Movement tapped into. In general, repetitive high-contrast lines will induce motion. Many Op Artists have used this technique, as in including *Enigma* by Isia Leviant and Bridget Riley's *Fall*.

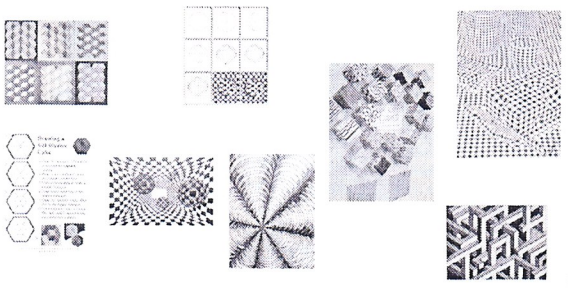








Bridget Riley
Interested in extreme contrast which creates illusions of movement and afterimages



There are dozens of lessons on the internet dealing with Op Art. Pinterest is a good way to find good ideas.

To get full copy of this unit, google brain and Kimberly Turner and Yale, or go to the Yale National Infinitive website and look under curriculum units.