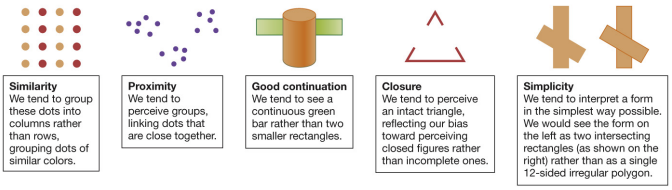
Visual Perception II

PSYC 313 - Lecture 5
Dr. J. Nicol

Perceptual Organization

- The Gestalt psychologists also took an interest in the way we group elements together to create larger objects
- They proposed a number of ***principles of perceptual organization*** that describe how elements in the environment are organized, or grouped together
- The principles are based the fundamental ***law of pragnanz***, which states we perceive and interpret ambiguous or complex images as the simplest form possible, because it is the interpretation that requires the least cognitive effort

Gestalt Principles of Perceptual Organization



Similarity
We tend to group these dots into columns rather than rows, grouping dots of similar colors.

Proximity
We tend to perceive groups, linking dots that are close together.

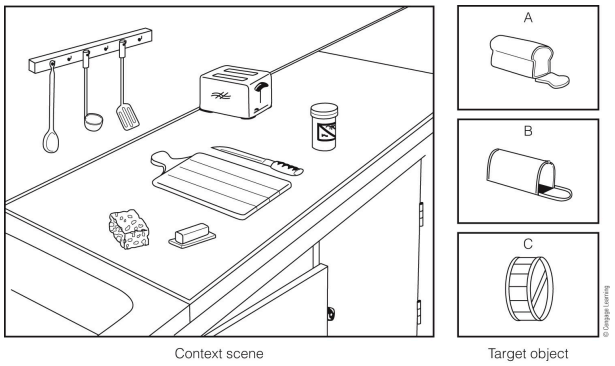
Good continuation
We tend to see a continuous green bar rather than two smaller rectangles.

Closure
We tend to perceive an intact triangle, reflecting our bias toward perceiving closed figures rather than incomplete ones.

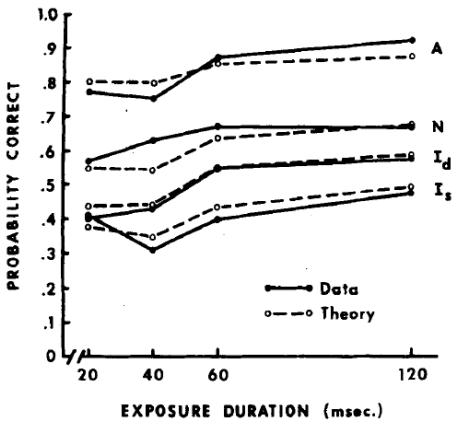
Simplicity
We tend to interpret a form in the simplest way possible. We would see the form on the left as two intersecting rectangles (as shown on the right) rather than as a single 12-sided irregular polygon.

Environmental Regularities

- We have knowledge about regularities in the environment that indicate what types of objects are typically found in specific environments, or the type of functions that specific environments sere
- ***Semantic regularities:*** the characteristics associated with the functions and tasks carried out in different environments

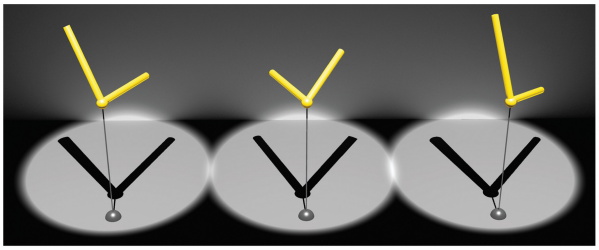


Palmer (1975)



Palmer (1975)

The Inverse Projection Problem



It is challenging to reconstruct a perception of the correct 3-D object when several objects could have cast the same 2-D projection

Binocular disparity: *the visual system uses the difference between the views of the eyes to provide distance information*

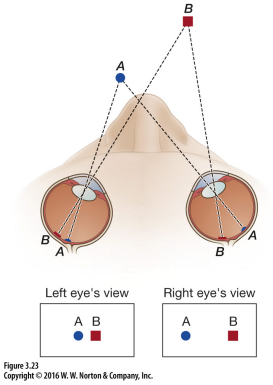


Figure 3.23

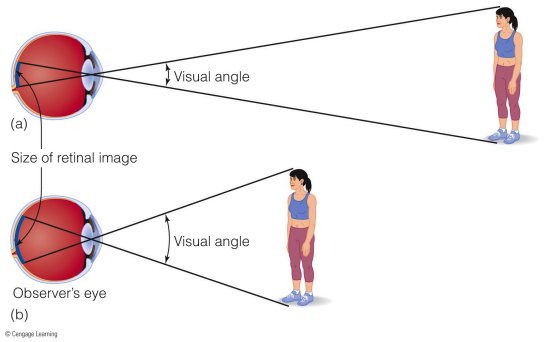
Monocular depth cues *(e.g., linear perspective, texture gradient) are also used by the perceptual system to solve the inverse projection problem*

Gustave Caillebotte (1848–1894)

COGNITION 1e, Figure 3.16

The perceptual system takes the distance of the farther object into account, so it is perceived as its true, larger size

*The **visual angle** of a stimulus determines how large an image it casts on the retina — it depends on both the size of the stimulus and its distance from the perceiver*



***Size constancy:** the perceived sizes of objects are stable despite having different sized retinal images*

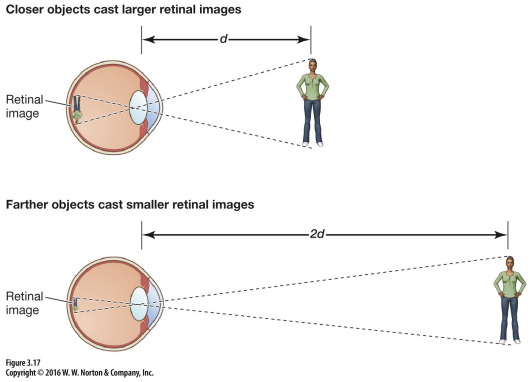
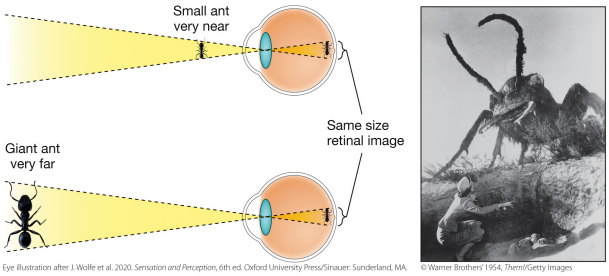


Figure 3.17

A perceptual trade-off between size and distance — the sizes of the images these two stimuli cast on the retina are the same because of the different distances they are from the observer



Eye illustration after J. Wolfe et al. 2020. *Sensation and Perception*, 6th ed. Oxford University Press/Sinauer: Sunderland, MA.

COGNITION 1e, Figure 3.18
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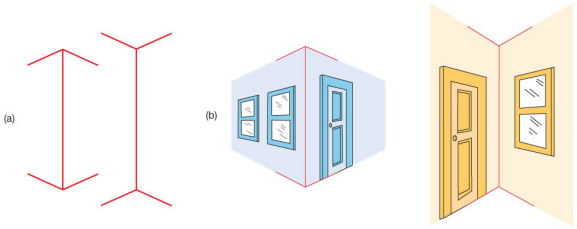
The Müller-Lyer Illusion



Object constancy: *although the same object looks different on the retina depending on its orientation, we are good at recognizing objects despite their orientation*

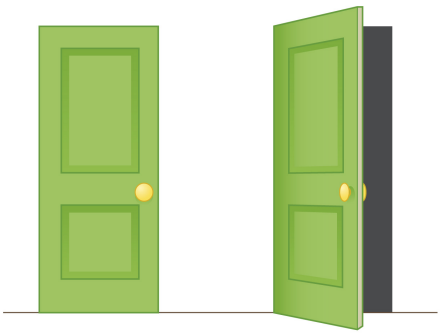
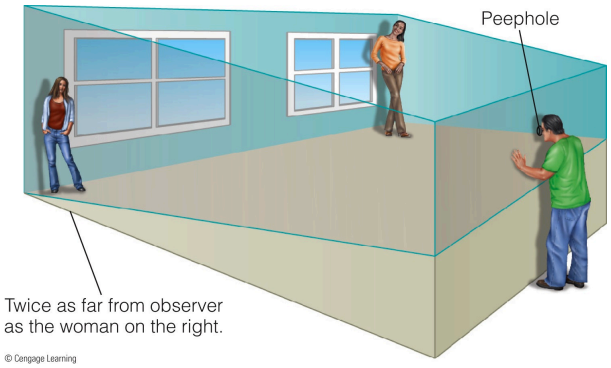
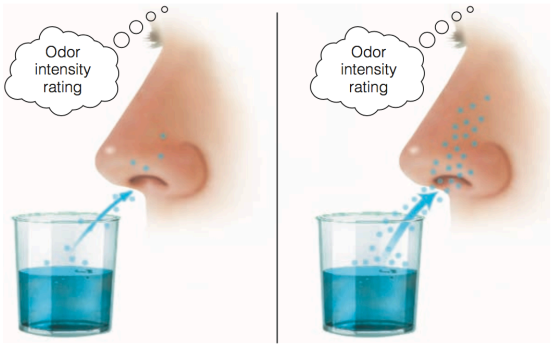


Figure 3.18

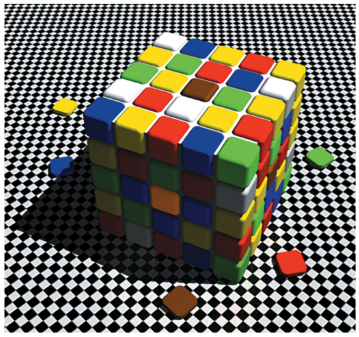




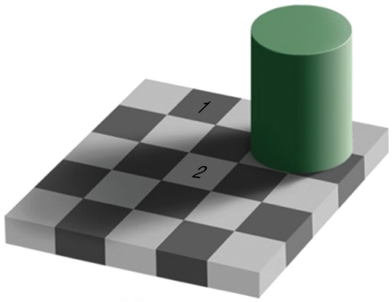
(a) Weak sniff (b) Strong sniff

Teghtsoonian et al. (1978)

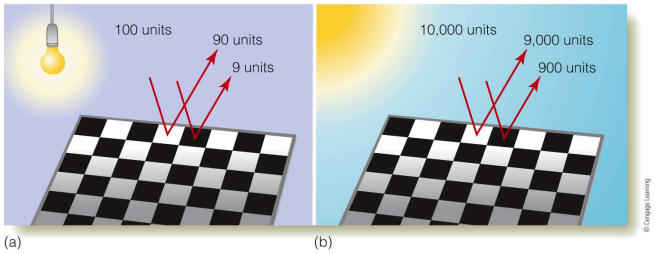
Colour constancy: *the brown and orange squares are the same colour but they are seen differently because the brown one is perceived as being in the sun and the orange one is perceived as being in the shade — the mind automatically makes the adjustment*

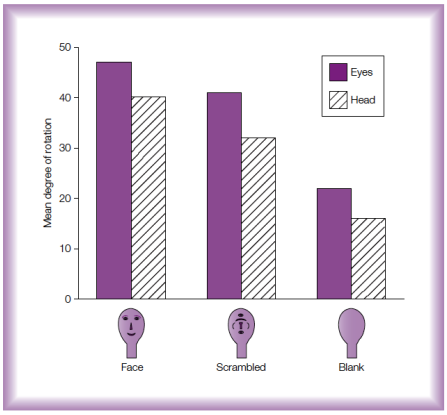


Lightness constancy: *square 2 is in the shade so your mind automatically assumes that it must have less light to reflect back, so even though it activates photoreceptors to the same degree as square 1, your mind assumes square 2 must be brighter and it is perceived that way*

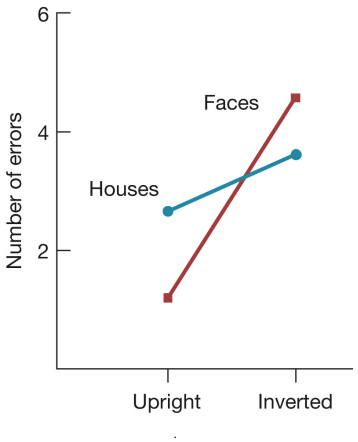


The black squares are still perceived as black when even though they reflect much more light when outside than the white squares did when inside — perception of an objects lightness is related not to the ***amount*** *of light reflected from the object, but to the* ***percentage*** *that is reflected*





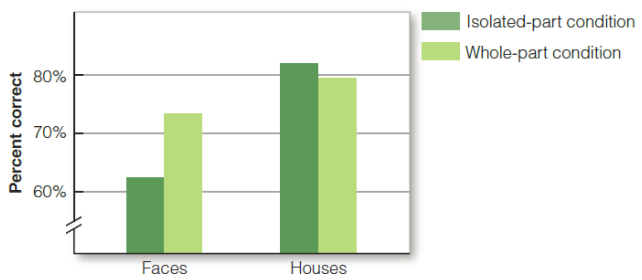
Johnson et al. (1991)



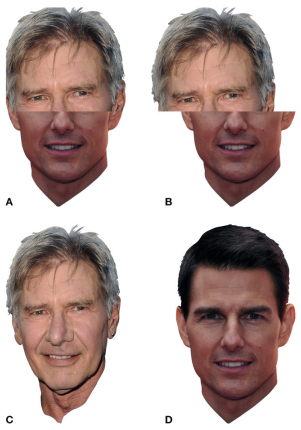
Yin (1969)

Face Perception is Holistic

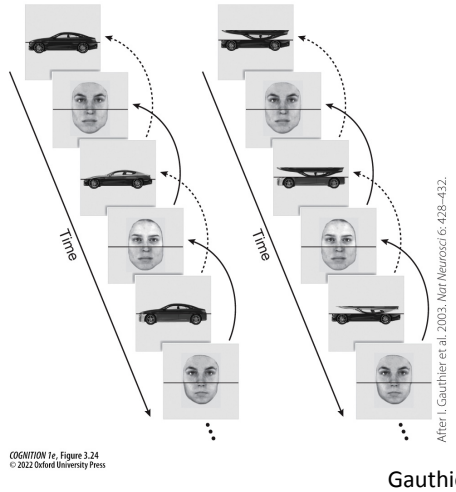
- Some researchers argue that face perception is a special form of perception in a category by itself, distinct from all other forms of visual object recognition (e.g., Kanwisher et al., 1997)
- Face recognition depends on complex relationships created by the overall ***configuration*** of the features of a face
- Features matter but only by virtue of the relationships and configurations they create, these relationships, not the features, that guide face recognition (Wang et al., 2012)



Farah et al. (1998)

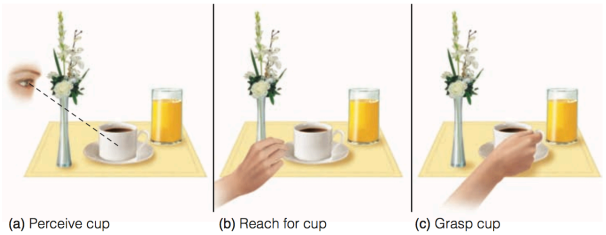


Young et al. (1987)

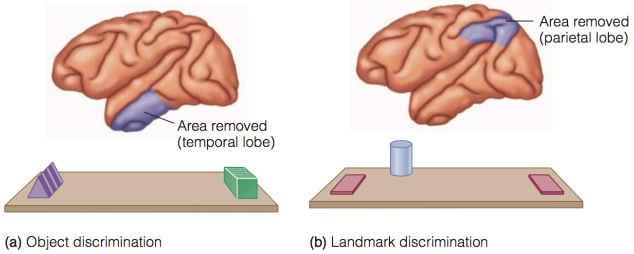


Gauthier et al. (2003)

Perception and Action

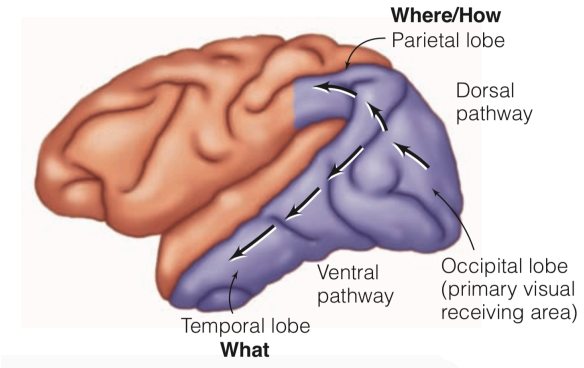


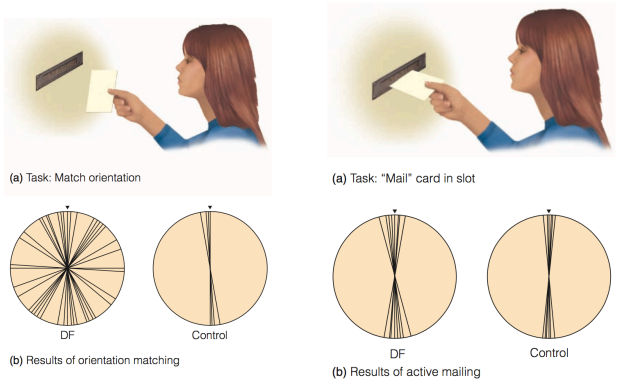
Movement is important to perception because of the coordination that is constantly occurring between perceiving stimuli and action toward these stimuli



Ungerleider & Mishkin (1982)

*Monkey cortex showing the **what pathway** from the occipital lobe into the temporal lobe, and the **where pathway** from the occipital lobe into the parietal lobe*





Milner & Goodale (1995)