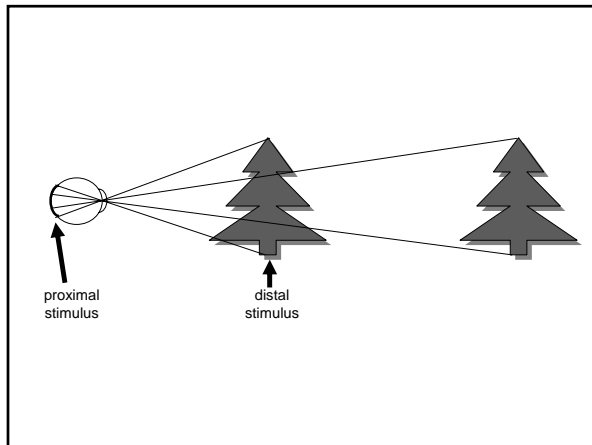


Relations between Perceptions

- Size & Distance –

$$S = k(R \times D)$$

- How are R & D related?



What do we actually see?



What if we perceived size based on retinal image?

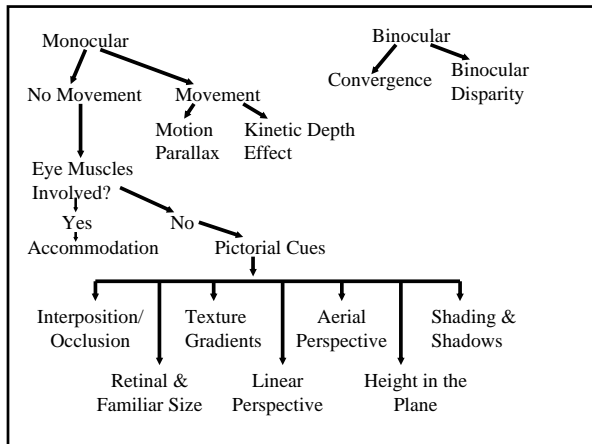


Size Constancy

- the assignment of a constant size to an object in consciousness, no matter how far away the object is, or how small its retinal image is.

Perceived Distance

- distance/depth cues

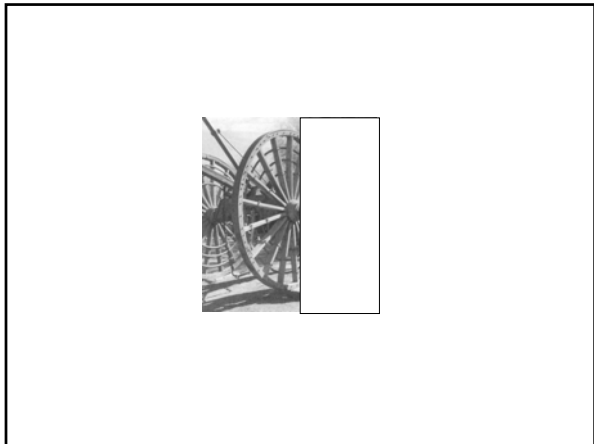


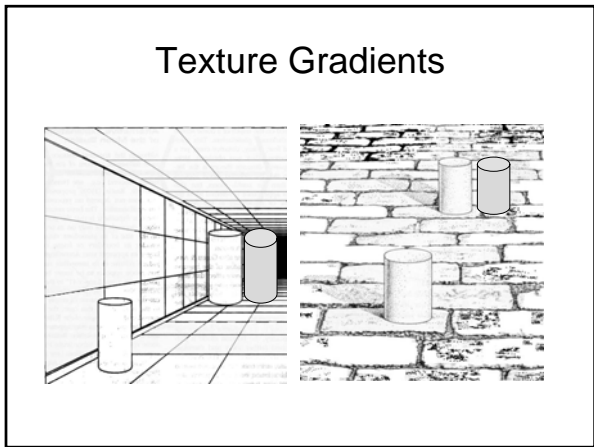
Perceived Distance

- distance/depth cues
- generally the more depth cues, the more accurate our size constancy is

Familiar Size

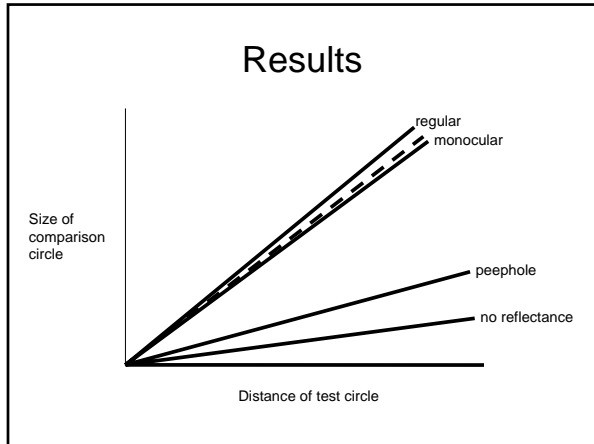
- remember coin example
 - same retinal size
 - knowledge tells us different actual size
 - must be at different distances
- familiar objects can also provide cues for size perception

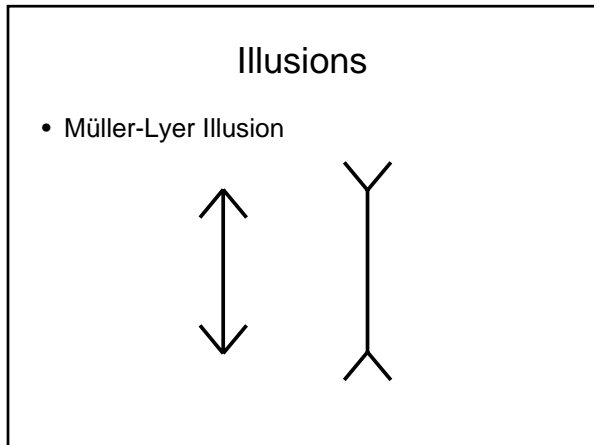


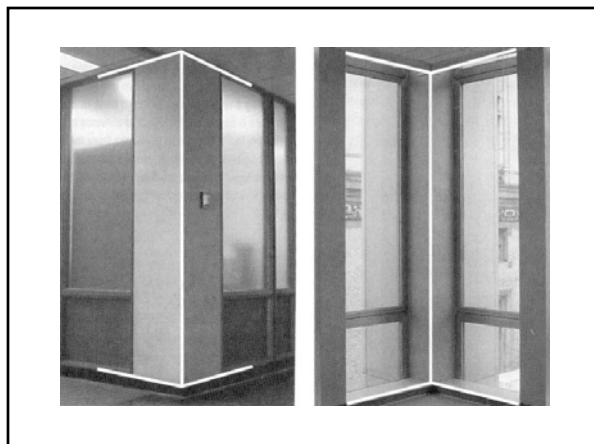


Holway & Boring (1941)

- participant at intersection of two hallways
- adjusted size of a comparison circle (10')
- test circle (10' – 120')
- size of retinal image always the same

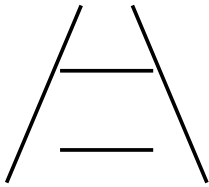


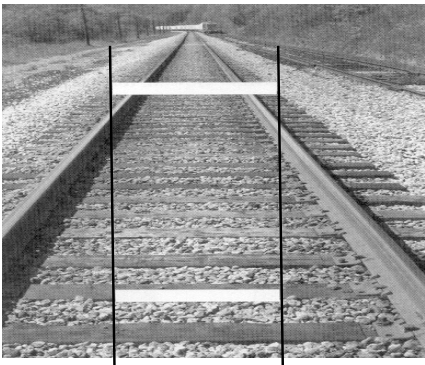




Illusions

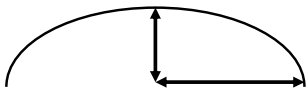
- Ponzo Illusion





Illusions

- Moon Illusion
 - perceive sky to be closer than horizon

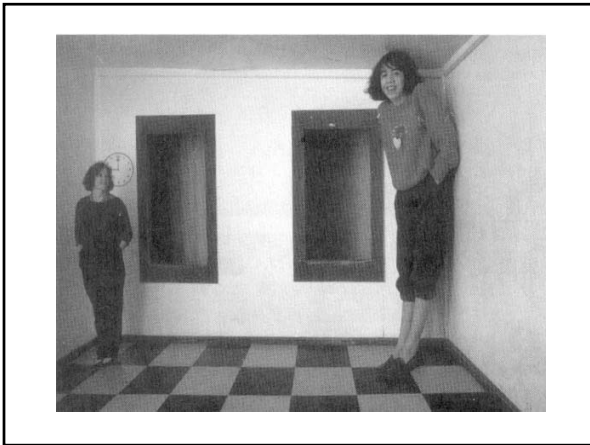


– retinal size is the same

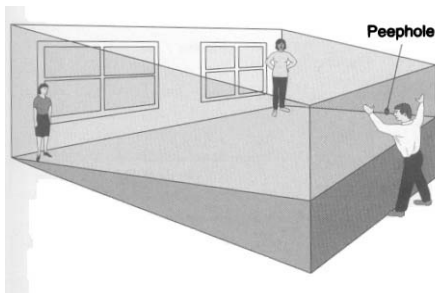
$$S = R \times D$$

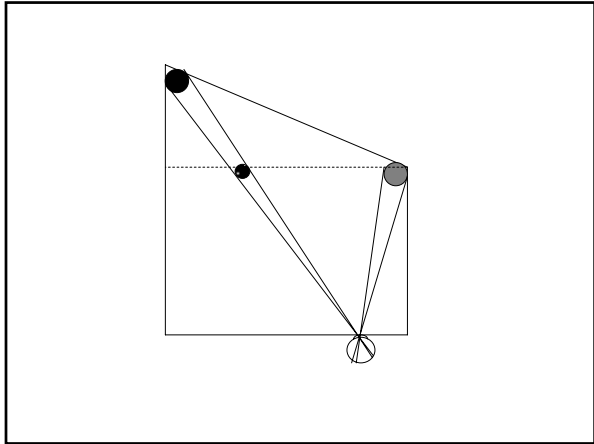
Ames Illusion

- previous illusions R was the same and perceived D seemed to change resulting in the illusion
- what about if perceived D is kept the same and R changes?



How is this illusion created?





Size constancy within objects

- edges within an object change their relative distance to us as we rotate the object or move relative to it
- likewise the retinal image changes

Shape Constancy

- the relative constancy of the perceived shape of an object despite variations in its orientation

Colour Constancy

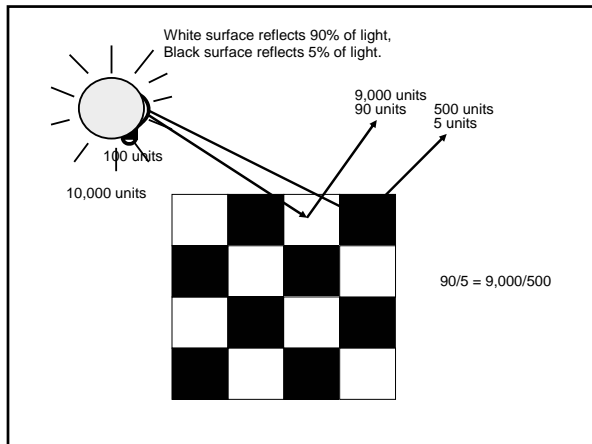
- our ability to abstract a relatively constant colour of an object despite variations in the colour of the illumination falling on it
- sunlight vs. tungsten (light bulb) light

Explanations

- memory – common objects have a known colour regardless of illumination
- chromatic adaptation – exposure to a particular wavelength of light decreases sensitivity to wavelengths similar to it
- comparison to surroundings – factor out illumination by using a ratio principle

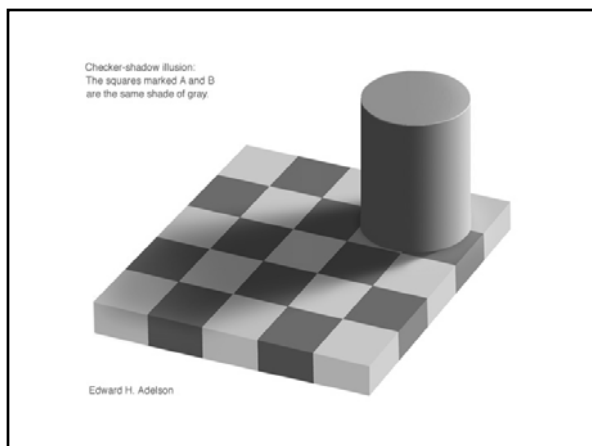
Whiteness Constancy

- achromatic (black -> white)
- lightness/whiteness – the apparent reflectance (albedo) of a surface
 - black reflects little
 - gray reflects an intermediate amount
 - white reflects a lot
- not dependent on the actual amount of light reaching your eye



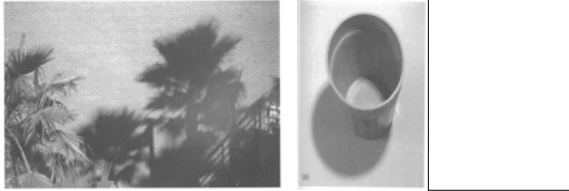
Edges

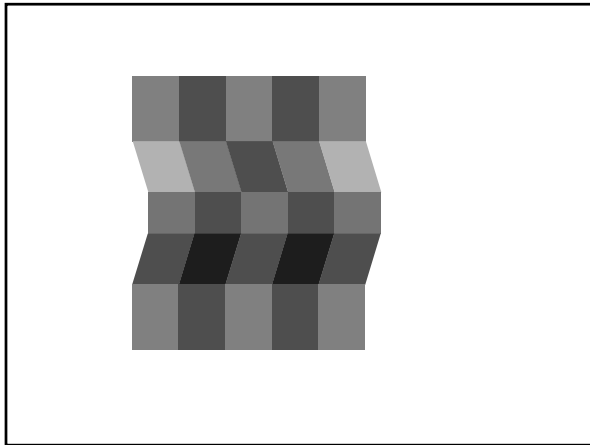
- reflectance edge – edge where reflectance of two surfaces changes
- illumination edge – edge where illumination changes
- visual system has to determine if a change in the amount of light reaching the retina is due to a reflectance edge (whiteness change) or illumination edge (shadow)

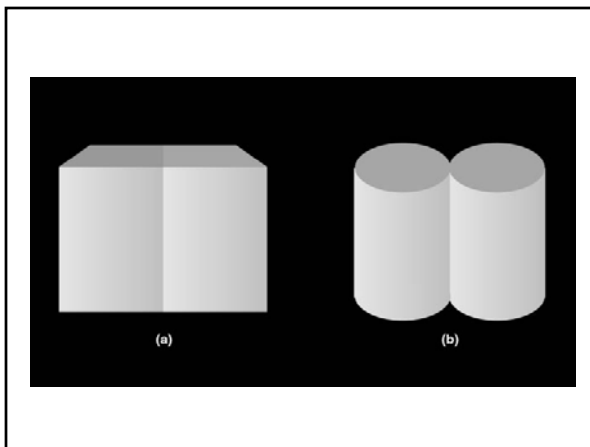


Identifying Illumination Edges

- meaningful shape
- penumbra
- change in surface direction







Summary

Objects:

- seem to be the same size when we view them from different distances
- seem to be the same shape when we view them from different angles
- seem to be the same colour when we view them in different lighting
