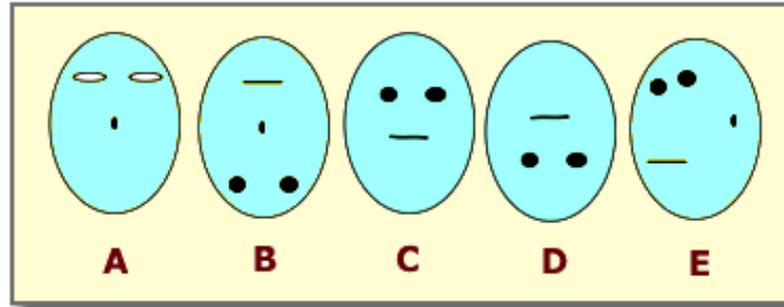


## Class 19: Development of Vision: Infants & Early Experience

### A. Infants & Vision



- Newly born infants **will look at faces** (both realistic & distorted ones) as long as the **eyes are at the top of the face**. In the figure above, infants would tend not to pay attention to faces B or D. Even E would attract their attention despite the distortion of the parts of the face itself.
- Infants have **difficulty looking away from moving objects to stationary ones**. The ability to shift attention from a moving object to another moving object develops from 4 to 6 months of age. But, even at 6-7 years of age, children have difficulty attending to stationary objects when there is a moving object in sight.
- The ability to pay attention to completely stationary objects while there is motion in the visual field only comes as we move into adolescence. The prefrontal cortex has to grow and gain executive control over the attention processes.

Think of some implications of these notions in terms of how we raise our kids.

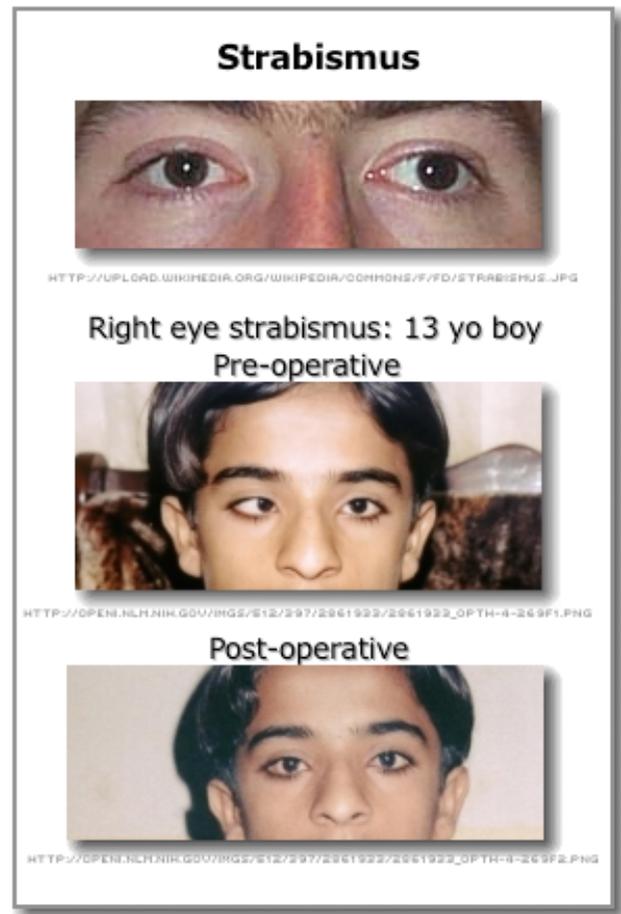
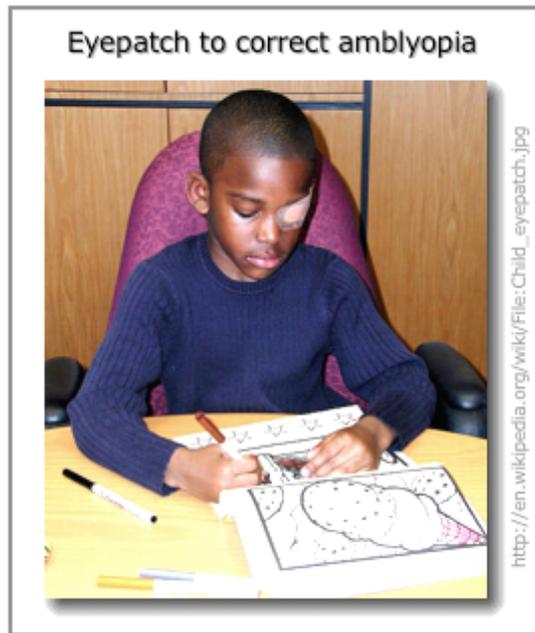
Watching TV while doing homework?

Classroom windows looking out on athletic fields?

### B. Early Experience: Its Impact on Visual Development

- Visual experience is needed to “fine tune” or train the visual system to see the world accurately.
- Kittens who have one eye sewn shut during development gradually lose connections in the visual cortex and will not be able to see out of the eye later on. This is not true if both eyes are sewn shut for up to 3 weeks after birth. However, longer deprivation leads to sluggish or inexact visual processing in later life
- These data suggest that there is a **sensitive or critical period** when experience has lasting effects upon the nervous system’s development

- **Strabismus** = eyes do not point in the same direction. Children born with this condition **do not develop stereoscopic depth perception.**
- Medical intervention early enough with strabismus or **amblyopia** (lazy eye) will help vision develop properly. The treatment requires the use of a **patch over the eye** that works



- Playing action video games has shown promise in treating lazy eye since these games require coordinated attention from both eyes.
- Impaired vision in infancy, e.g., due to cataracts, will lead to long-term visual defects in adulthood if not corrected early enough. Even if vision is restored, some individuals will continue to have significant problems seeing details. During infancy, the cortical neurons become sensitive to lines and details of varying orientations (horizontal, vertical, etc.). Without this experience, the cortex fails to develop and experience in later life will not overcome the deficiencies.
- Children born with cataracts but corrected after age 7 will show gradual improvement, but still **significant impairment for motion perception and depth perception.**