Sensory and Perceptual Development

CHAPTERS 4 & 5
Sensation and Perception in Infancy

- Process of integrating disjointed sensations into meaningful patterns through perception
  - Sensory input
  - Perception – how we organize and interpret sensation
Development of visual acuity and peripheral vision

- Neonates are nearsighted
  - Greatest gains in visual acuity between birth and 6 months
  - By about 3 to 5 years of age, approximate adult levels
- Neonates show little to no visual accommodation
  - Focus on objects 7-9 inches away
- Neonates have poor peripheral vision
  - Perceive stimuli within 30 degree angle
  - By 7 weeks increases to 45 degrees
  - By 6 months of age, equal to adult
- Convergence
  - Not occur until 7 or 8 weeks
Visual Preferences...

- Neonates attend longer to stripes than blobs
  - By 8 to 12 weeks, prefer curved lines over straight

- Infants prefer faces
  - Discriminate maternal and stranger faces
  - Pay most attention to edges
Figure 5.11 Eye Movements of 1- and 2-Month Olds
How do researchers determine whether infants will “go off the deep end”?

- **Depth Perception**
  - Develops around 6 months (onset of crawling)

- **Research using the Visual Cliff**
  - Gibson and Walk (1960)
  - Relationship between crawling and fear of heights

![Figure 5.12 The Visual Cliff](image)
What are perceptual constancies?

- **Perceptual constancy** – perception of object remains stable although sensations may differ under various conditions
  - **Size constancy** – perception of object’s size remains stable although retinal size may differ
    - Appears by 2 1/2 to 3 months
  - **Shape constancy** – perception of object’s shape remains stable although shape on retina may change
    - Appears by 4 to 5 months
How does the sense of hearing develop in infancy?

- Neonates can orient toward direction of a sound
  - 18 months locate sounds as well as adults
- By 3 1/2 months discriminate caregivers’ voices
  - Neonates responsive to sounds and rhythms of speech
- Infants perceive most speech sounds present in world languages
  - By 10 to 12 months, lose capacity to discriminate sounds not found in native language
- Infant hearing can be too acute!
  - Habituation
**And the other Senses...**

- **Smell**
  - Well developed at birth
  - Demonstrate aversion for noxious and preference for pleasant odors
  - Recognize familiar odors

- **Taste**
  - Sensitive to different tastes
  - Demonstrate facial expressions to basic tastes
  - Prefer sweet tastes

- **Touch**
  - Sensitive to touch
  - Touch elicits many reflex behaviours
  - Pain
    - Neonates less sensitive to pain
Do children play an active or passive role in perceptual development?

- Neonates perception is largely passive
- Later, intentional action replaces capture
  - Systematic search replaces unsystematic
  - Attention becomes selective
  - Irrelevant information gets ignored
What is the evidence for the roles of nature and nurture in perceptual development?

- Sensory changes are linked to maturation of nervous system (Nature)
  - Sensory integration and sensitivities
- Experience also plays a role (Nurture)
  - Critical periods
    - Newborn kittens with patched eye – become blind in that eye
- Nature and nurture interact to shape perceptual development.
Chapter 6
Infancy: Cognitive Development
Piaget’s Sensorimotor Stage of Cognitive Development (0-2yrs)

- Focus on development of children’s way of perceiving and mentally representing the world
- Development through sensory and motor activity
- Birth through 24 months
- Progress from reflex responses to goal oriented behaviour
  - Form mental representations
  - Hold complex pictures of past events in mind
  - Solve problems by mental trial and error
The substages of sensorimotor development?

- **Simple Reflexes (0-1 mo.)**
  - Modify reflexes based on experience

- **Primary Circular Reactions (1-4 mos.)**
  - Primary = focus on infant’s own body
  - Circular = repeated behaviours

- **Secondary Circular Reactions (4-8 mos.)**
  - Secondary = focus on objects or environmental events
  - Track moving objects until they disappear from view

- **Coordination of Secondary Schemes (8-12 mos.)**
  - Coordinate schemes to attain specific goals
  - Begin to imitate others

- **Tertiary Circular Reactions (12-18 mos.)**
  - Deliberate trial and error behaviours

- **Invention of New Means Through Mental Combinations (18-24 mos.)**
  - External exploration is replaced by mental exploration
How does object permanence develop?

- Neonates show no response to objects not within their immediate grasp
- 2 months - show surprise when a screen is lifted after an object was placed behind a screen and now is not there
- 6 months - try to retrieve a preferred object partially hidden
- 8 to 12 months - try to retrieve objects completely hidden
  - Commit “A not B” error
- After 12 months no longer show “A not B” error
- More recent research – object permanence in some form as early as 2 ½ - 3 ½ months
What are the limitations of Piaget’s theory?

- Stages are more gradual than discontinuous
- Underestimate infants’ competence
  - Emergence of object permanence
  - Deferred imitation
  - Computational concepts
## Information processing in infancy

- **Memory**
  - Neonates show memory for previously exposed stimuli
  - By 12 months dramatic improvement in encoding and retrieval

- **Rovee-Collier (1993) studies of infant memory**

- **Imitation**
  - Deferred imitation – 9 months
  - Neonates imitate adults who stick out their tongue
    - Not present in older infants
    - May indicate reflexive response
Individual Differences in Intelligence Among Infants

- Scales of infant development or intelligence
  - Bayley Scales of Infant Development (Table 6.1)
    - Consists of adaptive behaviour, cognitive, language, motor, and social-emotional development domains
    - Addition of adaptive scale and social-emotional scale to Bayley-III reflects broader understanding of cognitive functioning

- Screening for difficulties
  - Brazelton Neonatal Behavioral Assessment Scale
  - Denver Developmental Screening Test
How well do infant scales predict later intellectual performance?

- Overall infant scale scores do not predict school grades or IQ of schoolchildren
- Visual recognition memory – ability to discriminate previously seen objects from novel objects
  - May remain consistent from infancy through later childhood
  - Good predictive validity for IQ and language ability
Sleep patterns in neonates?

- Neonates spend about 16 hours per day in sleep
  - Typical infants have six cycles of waking and sleeping
- Rapid-eye-movement (REM) Sleep
  - Provides stimulation for brain development
  - Neonates spend 50% time in REM sleep
  - Decreases in percentage of REM
    - 6 months – 30%
    - 2 to 3 years – 20 to 25%
- Non-rapid-eye-movement (non-REM) Sleep
Why do babies cry?

- Pain and discomfort
- Universal, expressive and functional communication
  - expressive response to unpleasant feelings
  - stimulates caregiver response
- Distinct causes and patterns of cries
  - Hunger, anger, pain
  - Peaks of crying in late afternoon and early evening
- Crying produces physiological response in others
What is SIDS?

- Sudden Infant Death Syndrome – crib death
  - Strikes while the baby is sleeping
  - Most common cause of death in infants between 1 and 12 months
  - Most likely to occur between 2 and 5 months
    - Period when reflexive behaviour is weakening
  - Causes of SIDS remains obscure
    - Risk factors: stomach sleeping, premature, low birth weight, males, lower SES, babies of mothers who smoked or used narcotics during pregnancy