Developmental Psychology

- Developmental psychologists study
  - ontogenic changes
  - that occur across time
  - in an orderly fashion
- Definition
  - Progressive changes in interactions between the behavior of individuals and the events in their environment
  - Progressive:
    - Systematic rather than haphazard
    - Successive rather than independent changes

Initial Ontogenic Development

- Sperm meets egg
  - 23 female chromosomes (50% genes)
  - 23 male chromosomes (50% genes)

- Ovum period
  - Zygote
  - Splits several times
  - Blastocyst
Initial Ontogenic Development

• Embryonic period
  – Implanted in uterine lining
  – Embryonic cells start to differentiate into three layers
    • Ectoderm: becomes the skin, nails, hair
    • Mesoderm: muscles, skeleton, circulatory systems, and inner skin
    • Endoderm: glands, vital organs, trachea
  – Embryo resides in the amniotic sac

Initial Ontogenic Development

• Fetal Period (6 – 8 weeks)
  – Bone cells appear and reflex movement occurs.
  – 95% of body parts have been differentiated
  – Kicking, swallowing, and head turning detected after the fourth or fifth month.

Teratogens

• Agents that produce abnormal prenatal development
  – infectious agents
  – physical agents
  – maternal health factors
  – environmental chemicals
  – drugs
Teratogens

• Infectious agents such as rubella
  – Mother experiences respiratory problems
  – Transplacental infection in the first trimester of pregnancy
  – Defects include
    • Cardiac and ocular lesions
    • Deafness
    • Microcephaly
    • Mental retardation
    • Generalized growth retardation

Teratogens

• Physical Agents
  – Hyperthermia (from fever, hot tubs, saunas) can cause congenital malformations and embryonic resorption
  – Defects include
    • Mental retardation
    • Spina bifida
    • Changes in muscle tone
    • Limb defects
    • Microcephaly
    • clubfoot

Teratogens

• Medical conditions
  – Pre-existing Diabetes
    • Birth defects include
      – Heart defects
      – Neural tube defect (brain or spinal cord)
  – Gestational Diabetes
    • Birth defects include
      – Macrosomia (Large body)
Teratogens

- Environmental chemicals like mercury
  - Mercury from pollution
  - Birth defects include:
    - Brain damage
    - Mental retardation
    - Incoordination
    - Blindness
    - Seizures
    - Inability to speak

- Prescription drugs like accutane
  - High risk of fetal malformations with small doses early in pregnancy
  - Birth defects include:
    - Hydrocephaly (enlargement of the fluid-filled spaces in the brain)
    - Microcephaly (small head)
    - Mental retardation
    - Ear and eye abnormalities
    - Cleft lip and palate and other facial abnormalities
    - Heart defects

- Recreational drugs like alcohol
  - Fetal Alcohol Syndrome typically found in women who drink heavily
  - Dose dependent effect – no safe amount
  - Birth defects include:
    - Distinct pattern of facial abnormalities
    - Growth deficiency
    - Central nervous system dysfunction
    - Poor motor skills and hand-eye coordination
    - Behavioral and learning problems, including difficulties with memory, attention and judgment
Teratogens

- Fetal Alcohol Syndrome

Teratogens

- New genetic combinations (blastocysts, embryos, fetuses) must interact with the environment instantaneously
- These interactions have a big impact on all future behavioral patterns

Genetic Disorders

- Phenylketonuria
  - Caused by recessive gene in Chromosome 12
  - Deficient enzyme phenylalanine hydroxylase that changes phenylalanine into a harmless tyrosine
  - Toxic levels of phenylalanine causes mental retardation, organ damage, & unusual posture
  - Some effects reversed with early treatment
Genetic Disorders

- Down Syndrome
  - Caused by an extra 21 chromosome more common in > 35 years old mothers
  - Physical appearance
    - Flat facial profile, Slanted eyes, Abnormal ear, inner eye folds, Enlarged tongue, weak muscle tone
  - Mental retardation
  - Early death from heart and respiratory diseases

Sex-Linked Disorders

- Female 23rd pair
- Male 23rd pair

Sex-linked Genetic Disorders

- XXY: Klinefelter’s Syndrome:
  - Phenotype: male
  - Slight female secondary characteristic (i.e., larger breasts)
  - Sterile, impotent
  - Sometimes mentally deficient
**Sex-linked Genetic Disorders**

- **XO: Turner**
  - Phenotype: Female
  - Short stature
  - Misdeveloped ovaries
  - Arms that turn out slightly at the elbow
  - Low hairline in the back of the head
  - Prone to heart, kidney and thyroid problems
  - Skeletal disorders such as scoliosis or dislocated hips
  - Hearing disturbances

- **XXX, Trisomy X**
  - Phenotype: Female
  - Usually are fertile
  - Early menopause
  - Quiet and passive as infants
  - Delayed development in motor function, speech, & maturation
  - Slightly lower IQ
  - A little taller
    - longer legs, normal torso

- **XYY**
  - Phenotype: Male
  - Taller
  - Acne
  - Active at younger age
  - Delayed mental maturation

**Infant Reflexes**

- **Blink**: elicited by light flash, close eyelids, permanent development, protects the eyes.
- **Knee jerk**: tap on tendon, quick extension of knee, more pronounced in first 2 days of life, absent with muscular disease or exaggerated in hyperexcitable infants.
Infant Reflexes

• Babinski reflex: stroke side of foot from heel to toes, dorsal flexing big toe, usually disappears at end of first year, absent with spine defects.
• Withdrawal reflex: pinprick to infants foot, leg flexion, strong in first 10 days of life and weaker later, absent with sciatic nerve damage.

Infant Reflexes

• Plantar or toe grasp: pressure inside balls of feet, plantar flexion of all toes, disappears between 8 – 12 months.
• Palmar grasp: pressure against palm, infant grasps object, disappears at three to four months, weak in depressed babies.

Infant Reflexes

• Moro reflex: stimulus can be loud sound, head drop, body drop, arms are thrown out and then brought together, disappears in 6 – 7 months, weak reflex indicates CNS disturbance.
• Stepping: baby supported in upright position, rhythmic stepping, walking develops by 15 months.
Infant Reflexes

- Rooting: cheek of infant stimulated, baby turns heads, disappears at 3 – 4 months.
- Suckling: index finger inserted about 3 – 4 centimeters into mouth, rhythmical sucking, sucking irregular in first 3 – 4 days.
- Babkin reflex: pressure applied top both palms when baby is on back, mouth opens, eyes close, head returns to middle, disappears in 3 – 4 months.

Initial Development

- Genetic factors affect new organisms at conception and for the rest of life.
- Environmental factors affect new organisms at conception and for the rest of life.
- Phylogenic genetic environment interactions set the stage for ontogenic genetic environment interactions.