Physical Development

...Through the Lifespan
Five Areas of Human Development

P - Physical
I - Intellectual
E - Emotional
S - Social
S - Spiritual
Debates among Developmental Psychologists

- Is Development
  - Continuous OR
  - Discontinuous
Debates among Developmental Psychologists

Is Development

- Automatic, i.e. genetically programmed (NATURE) OR
- Dependent on an environmental trigger (NURTURE)
Continuous vs Discontinuous
Nature vs Nurture
Physical Development

Physical growth is continuous until maturity
There are stages of physical development that produce qualitative differences
Physical development occurs in the same sequence everywhere
Pace of physical development varies by culture.
Continuous vs Discontinuous Nature vs Nurture Intellectual Development

Piaget said intellectual development occurs in stages – so discontinuous

Other theories say it occurs continuously throughout the lifespan

Piaget said it occurs automatically via maturation of the brain.

Other theories say quality of education impacts intellectual development
Continuous vs Discontinuous
Nature vs Nurture
Emotional Development

Erikson believed emotional development occurs in eight stages – so discontinuous.
Behaviorists believe that emotional development is continuously learned.
Most psychologists believe that parenting style, level of attachment between a parent and child and culture impact emotional development.
Continuous vs Discontinuous  
Nature vs Nurture  
Social Development  

Most Psychologists believe that we continuously learn new communication, friendship and social skills.  
Emotional development impacts social experiences, and social development impacts emotional well-being.
Continuous vs Discontinuous
Nature vs Nurture
Spiritual Development

From the Christian Perspective:
Spiritual birth is a prerequisite to spiritual development
Spiritual Development is a life-long process
The Spiritual Disciplines are used by the Holy Spirit to bring spiritual growth
Introduction to Physical Development

Three Principles of Physical Development:

1) Cephalocaudal Principle
2) Proximodistal Principle
3) Default form is female.
Cephalacaudal Principle Illustrated

- 9 weeks
- 12 weeks
- 16 weeks
- 38 weeks

Fertilization age in weeks
Prenatal Development

- Human gestation is 266 days long – 38 weeks (just under 9 months in length)
- Developmental Psychology uses gestational age, which begins counting at conception
- Obstetricians begin counting from the first day of the last menstrual period (LMP)
- This adds 14 days to the length of a pregnancy, as counted by Obstetricians, to 280 days – 40 weeks. (9 months and about two weeks)
Stages of Prenatal Development

- Obstetricians divide a pregnancy into three equal “trimesters.”
- Developmental Psychology divides a pregnancy into three unequal stages:
  - Germinal Stage – fertilization to implantation
  - Embryonic Stage – implantation to 8 weeks
  - Fetal Stage – from 9th week until birth
Prior to Fertilization

- An Ovum is released by an ovary
- Ejaculation – releases 200-800 million sperm
- Only a few dozen sperm survive to reach the ovum
- Sperm and ovum each live about 48 hours after release
- There is a 25% chance of pregnancy, if intercourse occurs during ovulation
Ovulation

- Occurs in fully mature women on the 14th day of her menstrual cycle
  - Younger women can ovulate at any time during the month

- This is the basis for the rhythm method
  - The only method approved by the Catholic Church
  - Involves abstaining for three days before and three days after ovulation
  - Not a reliable form of birth control due to individual variations as to when ovulation actually occurs
Fertilization

- 23 Chromosomes of the Father’s DNA is delivered by the sperm
- 23 Chromosomes of the Mother’s DNA is already present in the ovum
- When fertilization occurs, the two sets combine to produce a brand new, genetically unique cell.
  - It is no longer a “part of the mother’s body”
  - It has its own DNA sequence
The Germinal Stage
Baby is called a “Zygote”

- Zygote goes through rapid cell divisions (mitosis) within hours of fertilization
- Cell division is so rapid, the cells do not have time to grow
- Within 48 hours, the cells organize into a hollow, fluid-filled ball called a Blastocyst, no bigger than the original fertilized ovum
- Germinal Stage lasts 5-7 days.
The Blastocyst

Inner Cell Mass (Embryoblast)

Trophoblast

Blastocoele
Germ Layers of the Zygote

- **Trophoblast** becomes the placenta, amniotic sac and umbilical cord

- The “Inner Cell Mass” differentiates into three germ layers:
  - **Endoderm** – digestive system (including liver & pancreas), lungs, bladder and glands
  - **Mesoderm** – bone, muscle & connective tissue
  - **Ectoderm** – nervous system & skin
Embryonic Stage
Baby is called an “Embryo”

- Begins at implantation in the uterine wall
- Head develops rapidly = ½ body length
- Organogenesis occurs
- Highest risk for teratogens
- Limb buds form
- Heart starts beating during the 4th week and brain wave activity begins by the 6th week
- Heart beat is audible by the 8th week
Fetal Stage
Baby is called a “Fetus”

- Stage lasts from the 9th week until birth
- Primary sex organs develop
- Bones begin to form
- Arms and legs lengthen, fingers and toes develop by the end of the 3rd month
- “Quickening” is felt by the mother in the 4th month
- Lanugo and Vernix covers the fetus by the 5th month
Fetal Stage

Baby is called a “Fetus”

- The eyes are completely formed by the 6th month
- Fetus is viable at 24 weeks (6 months)
- During the 8th and 9th months, subcutaneous fat is laid down
- Initial myelination of the brain occurs
- The lungs are the last organ to mature to full function
- A full-term pregnancy lasts 38 weeks after fertilization (40 weeks from LMP)
Birth

- Occurs in 3 Stages:
  - Stage 1 – Contractions thin out and open the cervix
  - Stage 2 – Baby moves through the birth canal and out of the mother’s body through active pushing along with the contractions
  - Stage 3 – Contractions expel the placenta
Neonatal Reflexes

- Moro Reflex – startle reflex
- Rooting Reflex – moves toward anything that touches the cheek
- Sucking Reflex – sucks on anything placed in its mouth
- Withdrawal – will withdraw from any painful stimulus
Neonatal Reflexes

- Babinski Reflex – will fan the toes when the sole of the foot is stroked
- Palmar Reflex – will hold tightly to anything that touches the open palm
- Stepping Reflex – will alternately raise each leg as if walking, if pressure is applied to the bottom of the foot
- Swimming Reflex – hold breath and swim if submerged
Crying is NOT a reflex

Babies habituate quickly to repetitive noises

Reflexes disappear within a couple of months of birth
Early Childhood Motor Developmental Milestones

- Rolling over at 2-4 months
- Intentional grasping at 4 months
- Crawling at 6-8 months
- Walking at 12-14 months
- Running at 2 years
- Fine motor coordination at 4 years
- Cutting with scissors at 5 years
- Skipping by age 6
Perceptual Development

- Newborns hear normally at birth
  - Prefer mother’s voice
  - Show no preference for father’s voice
- Within days, an infant can track a moving light
- Can see colors within 3 months of birth
- At 2 months, prefers human face as visual stimuli to bulls-eye pattern
  - Fixation time – measure of visual preference
- Depth Perception develops about the same time that a baby begins crawling
  - Visual cliff experiments
Two-Month Old’s Visual Preferences

Disks

Percentage of total fixation time

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Later Childhood

- Ages 6-12 – period of slow, steady growth
- Consolidation and refinement of motor skills learned at earlier ages
- Two years of rapid growth immediately precedes puberty
- Growth spurt begins at age 12 in girls and at age 14 in boys, on average.
Puberty – Sexual Maturity

- Puberty – caused by increased production of testosterone or estrogen

- Within 12 months of the appearance of secondary sex characteristics:
  - Menarche in girls
  - Ejaculation in boys
– Menarche
   ▪ Usually occurs between ages 11 and 14
   ▪ Average age of onset has lowered to 12 years
   ▪ Ovulation does not occur for another year

– Ejaculation
   ▪ Usually occurs between ages 12 and 16
   ▪ Average age of onset is 13.5 years
   ▪ Mature sperm are not present for another year
Secondary Sex Characteristics

- Males
  - Deeper voice
  - Facial hair
  - Pubic hair
  - Larger scrotum and penis
  - Broader shoulders
  - Increased muscle mass
Secondary Sex Characteristics

- Females
  - Deeper voice
  - Breasts
  - Pubic hair
  - Rounder hips
  - Higher body fat %
    - 17% body fat required for menarche to occur
Physical Changes in Middle Adulthood

- Reduced production of androgens and estrogen results in:
  - Loss of muscle mass
  - Slowing metabolism
  - Weight gain
  - Loss of elasticity in the skin – wrinkles
  - Climacteric, 10 years - ending in menopause
  - Reduced male potency
Rising Life Expectancy

![Graph showing the increase in life expectancy from 1900 to 2000. The x-axis represents the year, ranging from 1900 to 2000. The y-axis represents life expectancy, ranging from 45 to 80. The trend line shows a steady increase over time.]
Physical Changes in Late Adulthood

- Women live longer than men by an average of 7 years
  - Ratio of elderly men to elderly women is 2:3
- More than ½ of all elderly have no serious physical limitations
- Loss of bone density
  - Risk of fractures due to brittle bones
- Reduced sensory acuity
  - Loss of visual, hearing, taste and smell acuity is universal
Biological Theories of Aging

- Wear and Tear
  - “It’s not the years, it’s the mileage”
  - Environmental factors – exposure to radiation, disease, pollutants, and quality of nutrition
  - Accumulation of copying errors in the DNA
  - Accumulation of metabolic wastes

- Programmed Senescence
  - Genetic limit to the number of cell divisions
  - Eventually cells reach their limit and no longer replace themselves
Dealing with Death and Dying

- Elizabeth Kubler-Ross – 5 Stages
  - Denial
  - Anger
  - Bargaining with God
  - Depression
  - Acceptance
Recent research shows that these stages are not sequential or linear.

People experience these emotions in varying orders.

People can re-visit emotions experienced at an earlier stage.