Course Business

- Websites are live
  - Ebook is posted
- Homework will be due next Tuesday
  - Homework is open-book and worth 25% of final grade!
- Audio recording is okay!

Any questions?
**Practice Question 1:**

Jason wakes up sick and believes he has the flu. Which of the following is the most important thing Jason should do for our class?

- A) Drop out of school
- B) Wash his hands before class
- C) Wear a face mask in class
- D) Stay home until he is better for 3 weeks
- E) Stay home until he is better for 24 hours

**Practice Question 2:**

Which of the following plots shows a **POSITIVE** correlation between Variable 1 and Variable 2?

**6/20/2013 Outline**

- Course business
- Biological Beginnings to Human Development
  - The evolutionary perspective
  - Genetic foundations of development
  - Reproductive challenges
  - The nature-nurture debate
- Prenatal Development and Birth
  - Prenatal development
  - Birth
  - Postpartum issues

**Natural Selection**

- **Natural selection** - Evolutionary process by which those individuals of a species that are best adapted are the ones that survive and reproduce

**Evolutionary Psychology**

- Study of psychology that emphasizes adaptation, reproduction, and competition in shaping mental processes and behavior
**Evolutionary Perspective**

- Human development and Evolutionary Psychology
  - Natural selection primarily operates during the first half of life
    - Well adapted individuals reproduce early
    - Disadvantaged individuals don’t reproduce

**Evolutionary perspective of Development**

- Older adults
  - Weaken biologically
  - Need culture-based resources
    - Cognitive skills, literacy, medical technology, and social support

**Biological Beginnings: Outline**

- The evolutionary perspective
- Genetic foundations of development
  - The collaborative gene
  - Genes and chromosomes
  - Genetic principles
  - Chromosomal and gene-linked abnormalities
- Reproductive challenges and choices
- Gene-environment interaction: The nature-nurture debate

**The Collaborative Gene**

- Human life begins as a single cell
- Nucleus of each cell contains chromosomes
  - Chromosomes: bundles of DNA
  - DNA: A complex molecule that contains genetic information
- DNA contains Genes: Units of hereditary information, are short segments of DNA
**Genes**
- Activity of genes is affected by their environment
- Stress, radiation, and temperature can influence gene expression
- Exposure to radiation changed the rate of DNA synthesis in cells

**Genes and Chromosomes**
- Mitosis, meiosis, and fertilization
  - **Mitosis**: Regular reproduction of cells
  - **Meiosis**: Special form of cell division that forms *sperm* and *eggs* (gametes)
  - **Fertilization**: A stage in reproduction when an egg and a sperm fuse to create a single cell, called a zygote
    - Zygote: A single cell formed through fertilization

**Genetic Difference Between Males and Females**
- Sources of variability
  - Combining the **genes** of two parents in offspring increases genetic variety
    - Some DNA comes from Dad, some comes from Mom
  - Twins
    - **Identical twins** (monozygotic twins)
      - Develop from a single zygote that splits into two genetically identical replicas, each of which becomes a person
    - **Fraternal twins** (dizygotic twins)
      - Develop when two eggs are fertilized by different sperm, creating two zygotes that are ordinary siblings
**Genetic Terms & Principles**

- **Genotype**: Actual Genetic heritage
- **Phenotype**: Way an individual’s genotype is *expressed* in observed and measurable characteristics

- Dominant-recessive genes principle
  - One gene of a pair always exerts its effects (dominant), overriding the potential influence of the other gene (recessive)

**Dealing with Genetic Abnormalities**

- Every individual carries DNA variations that might predispose the person to serious physical disease or mental disorder

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Treatment</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down syndrome</td>
<td>An extra chromosome causes child to severe retardation and physical abnormalities.</td>
<td>Surgery, early intervention, infant stimulation, and special learning programs</td>
<td>1 in 1,000 births at age 20, 1 in 500 births at age 35, 1 in 50 births at age 45</td>
</tr>
<tr>
<td>Kleinfelter syndrome (XYY)</td>
<td>An extra X chromosome causes physical abnormalities.</td>
<td>Hormone therapy can be effective</td>
<td>1 in 600 male births</td>
</tr>
<tr>
<td>Fragile X syndrome</td>
<td>An abnormality in the X chromosome can cause mental retardation, learning disabilities, or short attention span.</td>
<td>Special education, speech and language therapy</td>
<td>More common in males than females</td>
</tr>
<tr>
<td>Turner syndrome (XO)</td>
<td>A missing X chromosome in females can cause mental retardation and sexual underdevelopment.</td>
<td>Hormone therapy in childhood and puberty</td>
<td>1 in 2,500 female births</td>
</tr>
<tr>
<td>XXX syndrome</td>
<td>An extra Y chromosome can cause above average height.</td>
<td>No special treatment required</td>
<td>1 in 1,000 male births</td>
</tr>
</tbody>
</table>

**Biological Beginnings: Outline**

- The evolutionary perspective
- Genetic foundations of development
- Reproductive challenges and choices
  - Prenatal diagnostic tests
  - Infertility and reproductive technology
  - Choices
- Gene-environment interaction: The nature-nurture debate

**Prenatal Diagnostic Tests**

- Ultrasound sonography
  - Heart health
  - Sex determination
- Brain imaging techniques
- Maternal blood screening
  - Genetic testing of fetus
    - Chorionic villus sampling
    - Noninvasive prenatal diagnosis (NIPD)
**Infertility and Reproductive Technology**

- Infertility - Inability to conceive a child after 12 months of regular intercourse without contraception
- Can arise due to female or male factors (~50/50)
- Can be treated with IVF
  - *in vitro* fertilization (IVF) - Eggs and sperm are combined in a laboratory dish
  - Fertilized egg is transferred into the woman’s uterus
  - Success rate of IVF depends on the mother’s age

**Choices if IVF is not an option**

- Adoption
  - Social and legal process that establishes parent-child relationship between persons unrelated at birth
- Sperm donation
  - heterosexual couples with male infertility
  - same-sex female couples

**Biological Beginnings: Outline**

- The evolutionary perspective
- Genetic foundations of development
- Reproductive challenges and choices
- Gene-environment interaction: The nature-nurture debate
  - Behavioral genetics
  - Heredity-environment correlations
  - Shared and nonshared environmental experiences
  - The epigenetic view and gene x environment (g x e) interaction
  - Conclusions about heredity-environment interaction

**What is Behavior Genetics?**

- Examines the relation between behavior and genetics!

**Behavior Genetics: two main approaches**

- Twin study: Similarity of identical and fraternal twins is compared
- Adoption study: Seek to discover whether, in behavior and psychological characteristics, adopted children are:
  - More like their adoptive parents, who provided a home environment
  - More like their biological parents, who contributed their heredity
Shared and Nonshared Environmental Experiences

- Shared environmental experiences: Siblings’ common environmental experiences
  - Their parents’ personalities and intellectual orientation
  - Family’s socioeconomic status
  - Neighborhood in which they live

Heredity-Environment Interaction: Nature vs Nurture debate

- Hereditary view: Development is the result of a particular genetic profile in a particular environment
- Epigenetic view: Development is the result of an ongoing, bidirectional interchange between genes and environment (Genes X Environment interaction)

Any questions?

2/5/2013 Outline

- Course business
- The Nature of Development (a quick review)
- The Scientific study of Development
  - Scientific Method Basics
  - Introduction to Human Development research
- Biological Beginnings to Human Development
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Prenatal Development and Birth

- **Prenatal development**
  - The course of prenatal development
  - Teratology and hazards to prenatal development
  - Prenatal care
  - Normal prenatal development

- **Birth**
  - The birth process
  - Assessing the newborn
  - Preterm and low birth weight infants

- **The postpartum period**
  - Physical adjustments
  - Emotional and psychological adjustments
  - Bonding

The Course of Prenatal Development

- **3 Periods: Germinal, embryonic, and fetal**
  - **Germinal period**: Takes place in the first two weeks after conception

  - **Embryonic period**: Occurs two to eight weeks after conception
    - Embryo - Mass of cells
    - Three layers of cells – Endoderm, mesoderm, ectoderm
    - Organogenesis: Organ formation that takes place during the first two months of prenatal development

  - **Fetal period**: From Two months after conception and birth in typical pregnancies
**Prenatal Trimesters**

- **First Trimester (1st 3 months)**
  - Beginning of development
  - Brain, heart, and other organs begin to form
  - Weights 1 oz
- **Second Trimester (2nd 3 months)**
  - Weighs 1-1.5 lbs
  - Skin, hair, and fingernails begin to form
  - Self initiated movement
- **Third Trimester (3rd 3 months)**
  - Weighs > 5 lbs
  - Breathing movements
  - Immune system starts working

**Hazards to Prenatal Development: Teratogen**

- Teratogen (te-rat-o-gen): Agent that causes a birth defect
- Teratogen influence
  - Dose
  - Genetic susceptibility
  - Time of exposure
- Teratology (tera-tol-ogy) - Field of study that investigates the causes of birth defects

**Teratology and Hazards to Prenatal Development**

- Prescription drugs
  - Tetracycline (antibiotic)
  - Hormones - environmental estrogens (BPA)
  - Accutane (acne treatment)
- Nonprescription drugs
  - Diet pills and high dosages of aspirin

**Teratology and Hazards to Prenatal Development**

- Psychoactive drugs
  - Excessive caffeine
  - Alcohol
    - Fetal alcohol spectrum disorders: Appear in the offspring of mothers who drink alcohol heavily during pregnancy
  - Nicotine
  - Cocaine
  - Methamphetamine
  - Heroin

**Fetal Alcohol Syndrome**

- Low nasal bridge
- Deformed palate bones
- Short fingers
- Immature phalanges
- Thin upper lip
Other Hazards to Prenatal Development

- Maternal diseases
  - Syphilis (bacterial STD)
  - Genital herpes (get vaccinated!)
  - AIDS
- Other maternal factors
  - Maternal diet and nutrition
  - Maternal age
  - Emotional states and stress

Prenatal Development and Birth

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Birth Process

- Stages of birth – Three stages
  - 1st stage - Uterine contractions are 15 to 20 minutes apart and last up to 1 minute
  - 2nd stage - Begins when the baby’s head starts to move through the cervix and birth canal
    - Ends when the baby completely emerges from the mother’s body
  - 3rd stage
    - Afterbirth: When the placenta, umbilical cord, and other membranes are detached and expelled

Birth Process

- In the United States, 99 percent of births take place in hospitals
  - Natural birth
  - Cesarian section (C-section, surgical removal)
- Apgar scale: Assessing the health of newborns at one and five minutes after birth
  - Evaluates an infant’s heart rate, respiratory effort, muscle tone, body color, and reflex irritability
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Assessing the Newborn

• Brazelton Neonatal Behavioral Assessment Scale (NBAS): Used in the first month of life to assess the newborn’s:
  – Neurological development, reflexes, and reactions to people and objects

Assessing the Newborn

• Neonatal Intensive Care Unit Neurobehavioral Scale (NNNS): Assessment of the newborn’s
  – Behavior, neurological and stress responses, and regulatory capacities

Preterm and Low Birth Weight Infants

• Preterm and small for date infants
  – Preterm infants: Born before the completion of 37 weeks of gestation
  – Low birth weight infants: Weighs less than 5½ pounds at birth
  – Small for date infants: Infants’ birth weights are below normal when the length of pregnancy is considered
Prenatal Development and Birth

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Postpartum (after pregnancy) Period

- Postpartum Period after childbirth lasts until:
  - Mother’s body has completed its adjustment and has returned to a nearly prepregnant state
  - Characterized by hormonal changes and fatigue

- Sometimes:
  - Postpartum Blues (common, lasts 1-2 weeks)
  - Postpartum Depression (severe, last many months)

Emotional and Psychological Adjustments

- Postpartum depression: Strong feelings of sadness, anxiety, or despair
  - Have trouble coping with daily tasks in the postpartum period
  - Treatment - Antidepressant drugs, psychotherapy, and regular exercise

![Postpartum blues](image)
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