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# Development across the Life Span

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# Why Study Human Development?

- Understanding past, present, and future self
- Changes
- Biology, environment, social interactions
- Unique pathways

# Life Span Perspective

Development involves

- Growth and opportunities AND ALSO
- Loss and decline
- Adaptation to the environment continues

“Learning is a lifelong process” ->

development never stops



# Studying Human Development

## Cross-sectional design

- Age differences
- Measuring different age groups at once
- Cohort effects

# Cohort Effects

- When changes within a culture over time significantly alter people's experiences



# Basic Questions in Developmental Studies

- How do nature and nurture shape development?

# Nature and Nurture

Genetically  
predetermination



Environmental  
influences



Skin colors



# Nature and Nurture

Genetically  
predetermination



Environmental  
influences



Muscle

# Periods of Development

Prenatal period

Adolescence

Infancy

Young adulthood

Preschool

Middle-aged

Younger school  
age

adulthood

Older school

Older adulthood

age

(young-old, old-old,  
oldest-old)

# Periods of Development

Prenatal period: Conception to birth



Infancy: Preverbal 0 - 1.5 years



Preschool: 2 - 4 years

Younger school age: 5 - 7 years

Older school age: 8 - 12 years



# Periods of Development

Adolescence



Young adults

Middle-aged adults



Older adults

(young-old, old-old, oldest-old)



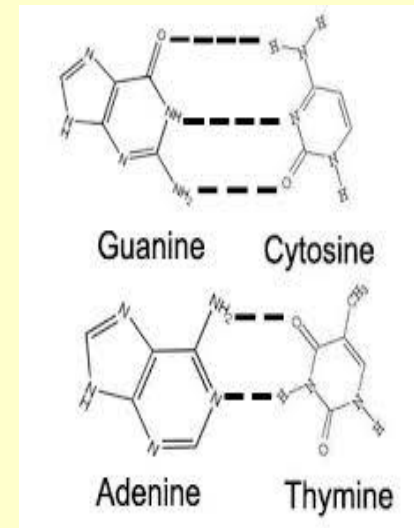
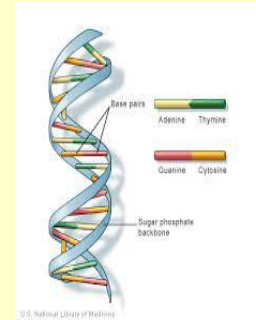
# The Basis of Development

- Begins life as a single fertilized egg
- Interact with environmental influences
- Prenatal development
- Different hormonal environment of male vs female fetus
- Triggered by genes

# Inputs to the Biological System

## Genes

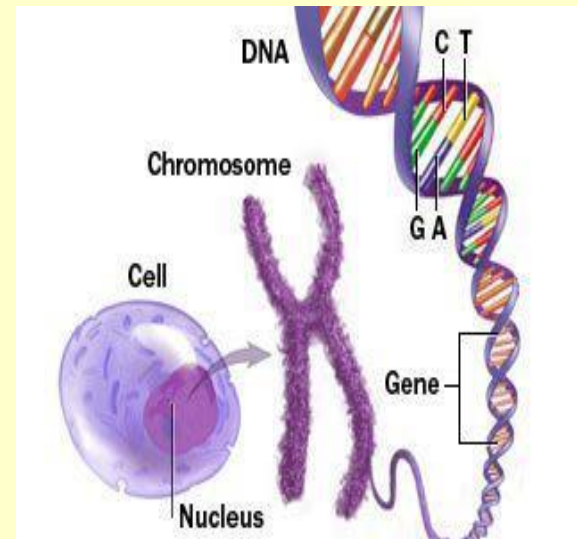
- Inherited instructions for producing proteins (A-T, G-C)
- Regulating on/off of other genes
- DNA (deoxyribonucleic acid)
  - 4 chemical bases
  - Base pairs



# Inputs to the Biological System

## DNA

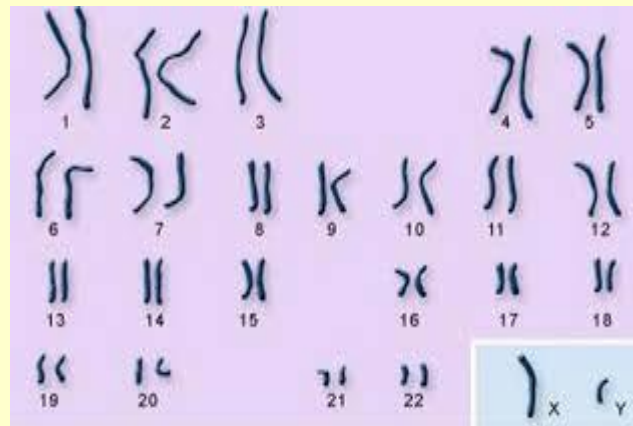
- Stored in chromosomes
- At least 20,000 genes packed in our 46 chromosomes



# Inputs to the Biological System

## Chromosomes

- 23 pairs
- One from a parent in each pair
- Genetic information

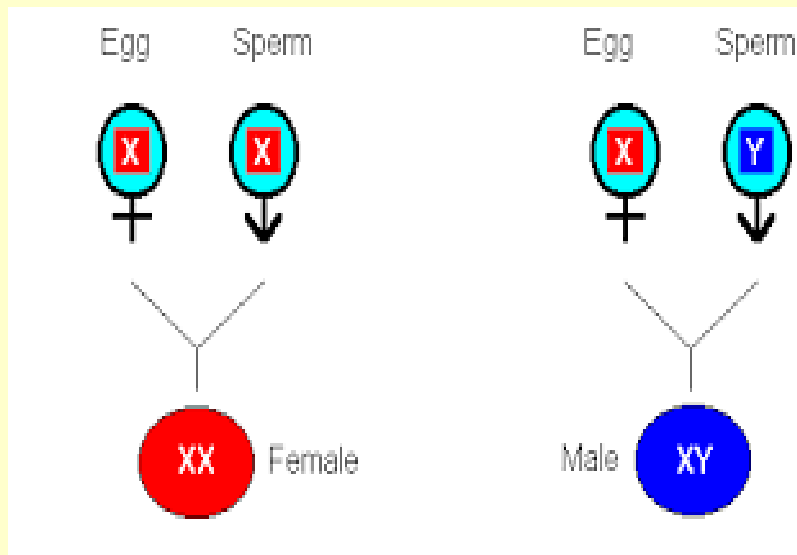


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Keil, 2014

# Inputs to the Biological System

- Sex chromosome



# The Beginning of Development

## Fertilization (conception)

- 50-100 sperm reach the egg, one penetrates the egg
- Fertilized egg >> “Zygote”

# The Beginning of Development

## Identical (monozygotic) twins

- Fertilized egg splits into two separate cells
- Nearly identical genotypes

# The Beginning of Development

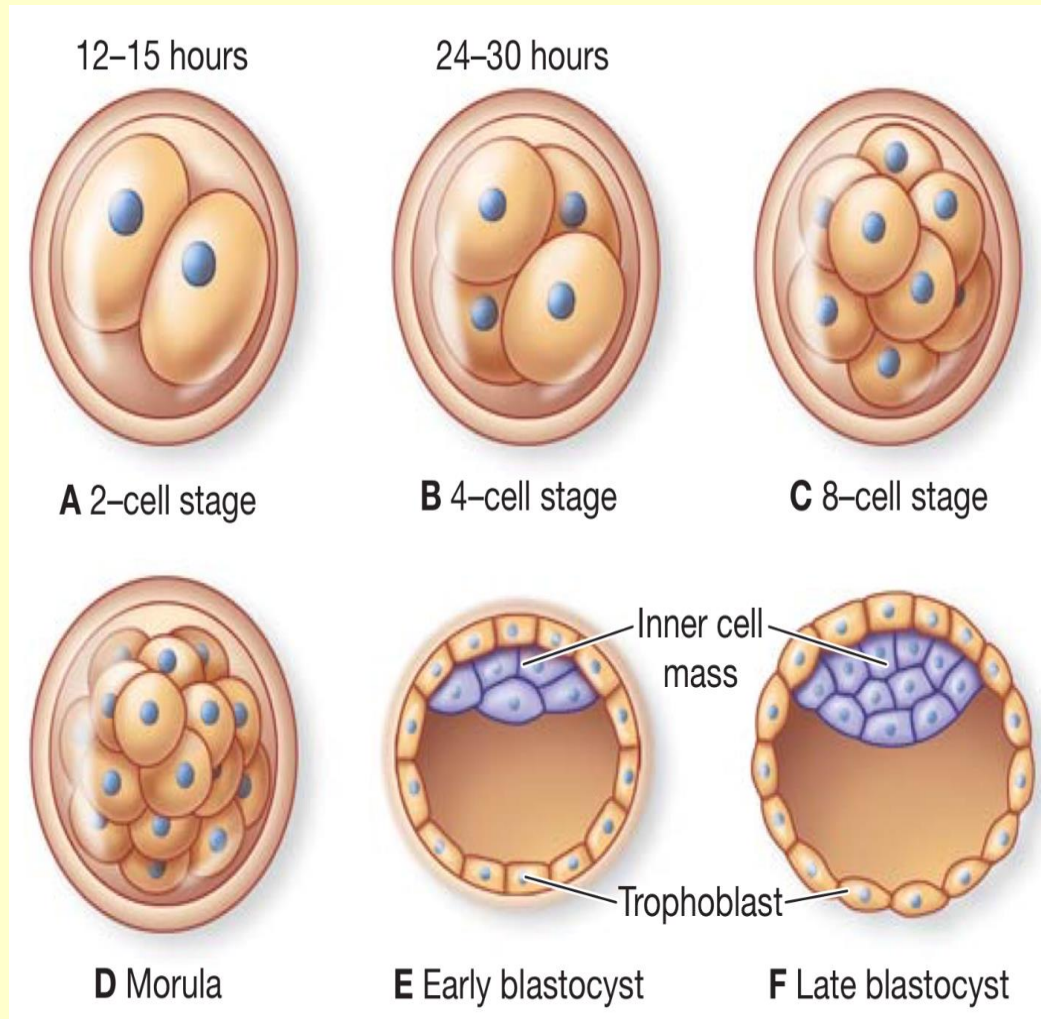
## Fraternal (dizygotic) twins

- Two different sperm fertilize two different eggs
- As genetically similar as any two siblings (50%)

# The Beginning of Development

- First cell divisions within two hours
- Day 4 : Solid ball of cells “morula”
- Day 5: Outer cells “the trophoblast”  
become part of the placenta
  - Smaller inner cells clustered,  
eventually become the embryo
  - Blastocyst

# The Beginning of Development



# The Embryonic Period

- 2-8 weeks after conception
- “Implantation” fertilized egg attaches to the uterine wall
- Embryo
- Heartbeat (18 days)
- Visible legs and arms

# The Fetal Period

- Ninth week until birth
- Fetus



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# The Fetal Period

- 12 weeks: Same anatomical features as in newborns
- 16 weeks: Distinct external body parts
- 20 weeks: Heartbeat detected with a stethoscope
- 28 weeks: Lungs developed
- 6 months: 50% survive if born at this stage



# Newborn

Adjustment to new environment

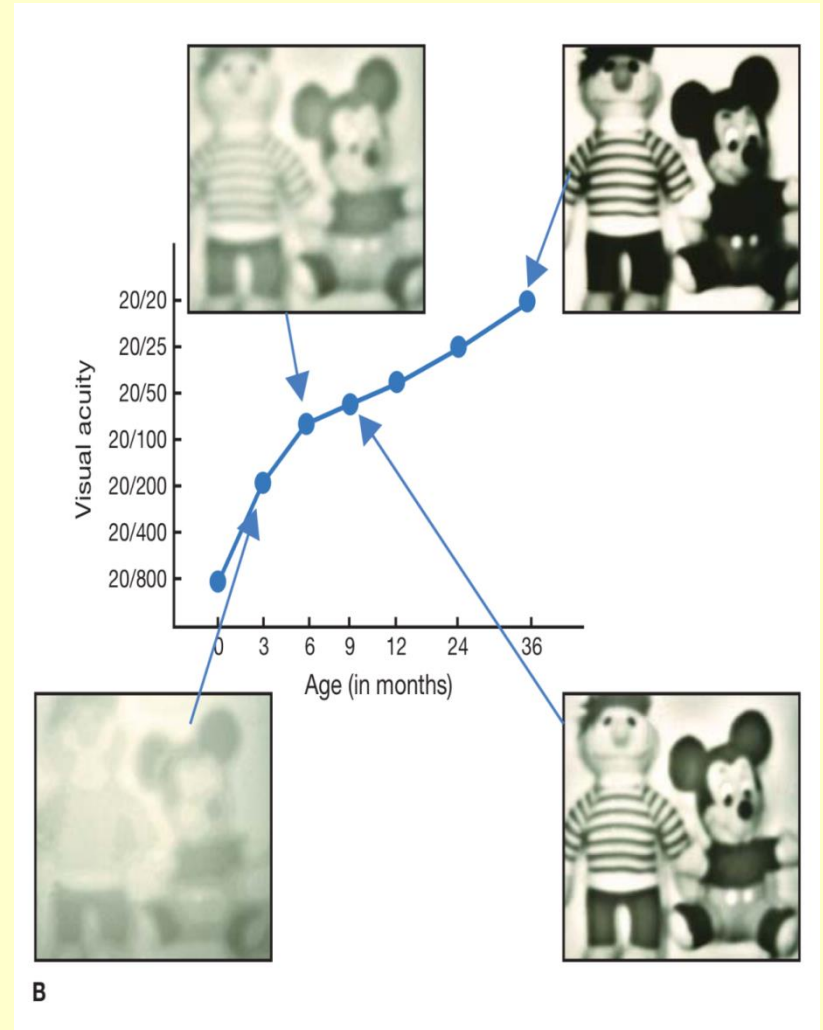
- Respiration, digestion
- Circulation, temperature regulation
- Taste, smell, hearing



(Ciccarelli & White, 2017)

# Visual Acuity of Newborn

- Nearsighted at 6 months
- Astigmatism at 1 year
- Limited portion of the light to the retina

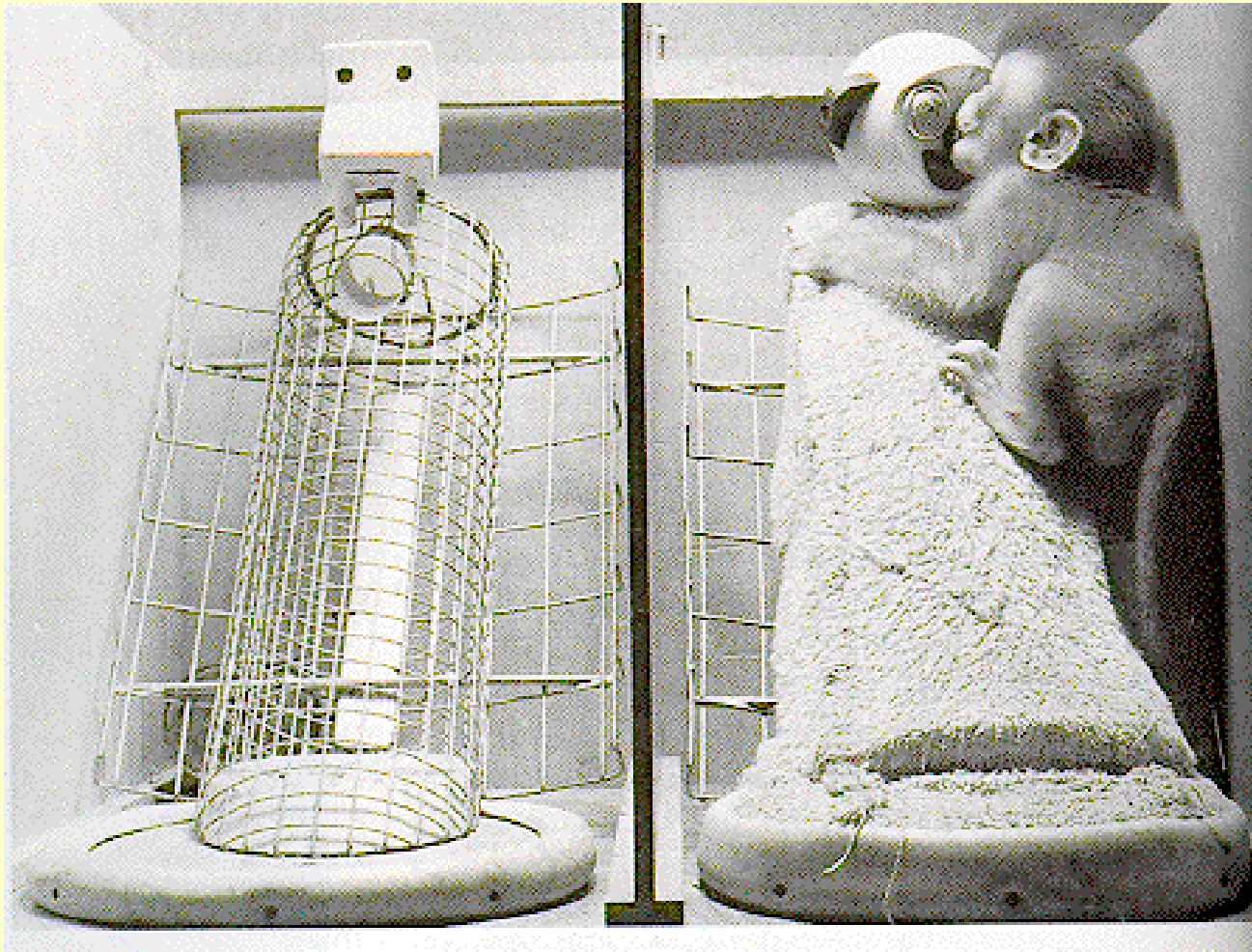


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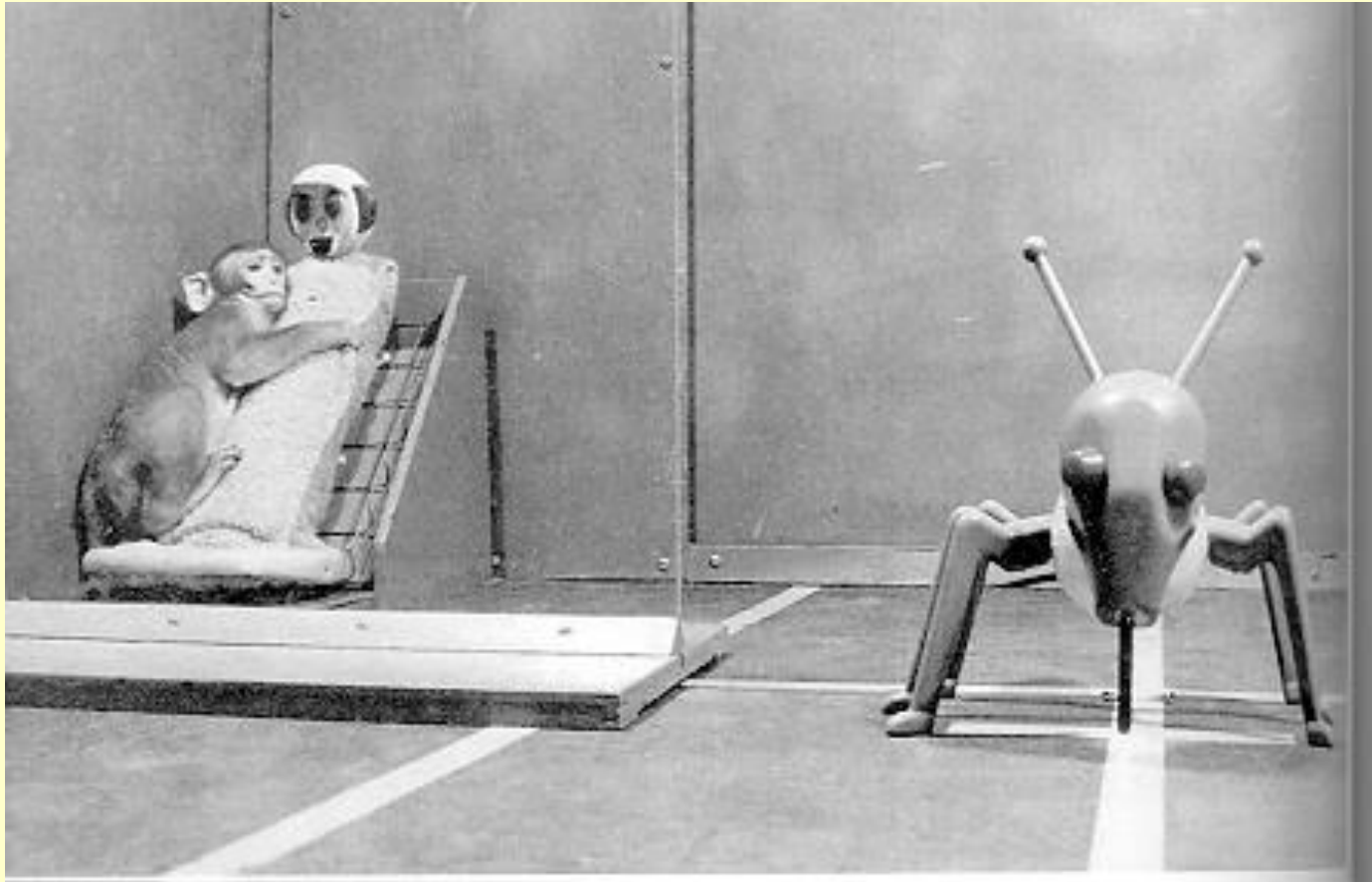
# Development of Social Behavior

- Attachment
  - The positive emotional bond that develops between a child and a particular individual
    - Konrad Lorenz & Imprinting
    - Instinctive emotional bond
- Harry Harlow's study on attachment
  - “Wire monkey versus cloth monkey”

# Harry's Monkeys (from Harlow & Zimmerman)



Infant clinging to cloth mother when scared.



# Cognitive Development in Childhood

Piaget's cognitive developmental theory

- Organization of information
- Adapt to the environment



(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Children as constructivist

- Active through experiences
- Curiosity
- Experiment



<http://www.youtube.com/watch?v=IPJiB-oGMN0>

(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## **Four Stages of Cognitive Development**

### **1. Sensorimotor stage (birth to 2 years)**

- **Primary circular reactions (1 to 4 months)**
  - With their own body

<https://www.youtube.com/watch?v=8DIQ8F5qw50>

(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 1. Sensorimotor stage (birth to 2 years)

- **Secondary circular reactions** (4 to 8 months)
  - Repeat interesting actions
  - With self or others

<https://www.youtube.com/watch?v=oPyTFe4cgWQ>

(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## **Four Stages of Cognitive Development**

### **1. Sensorimotor stage (birth to 2 years)**

- **Tertiary circular reactions (12 to 18 months)**
  - Trial and error experimentation

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 1. Sensorimotor stage (birth to 2 years)

- Object permanence
  - Objects exist when out of sight
  - Prior to 8 months: If I drop my toy and I can't see it....it is gone!
  - 8-12 months: You hid my toy...I'm looking for it the last place I saw it!
  - After a year: You hid my toy...I'm looking for it!

<http://www.youtube.com/watch?v=ue8y-JVhjS0&feature=endscreen&NR=1>

(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 2. Preoperational stage (2 to 7 years)

- Symbolism and pretend play



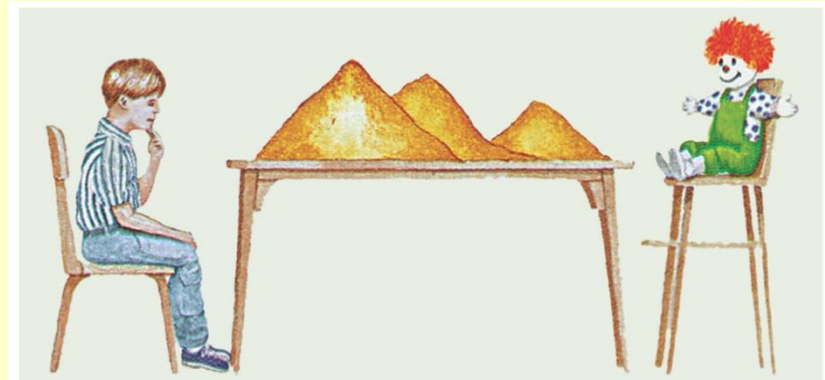
(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 2. Preoperational stage (2 to 7 years)

- Egocentrism
  - View the world from one's own perspective
  - Fail to recognize other's perspective
  - Three-mountain problem



(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 2. Preoperational stage (2 to 7 years)

- Incapable of conservation tasks
  - Difficulty understanding properties of an object
  - Issues with reversibility and compensation



<http://www.youtube.com/watch?v=YtLEWVu815o>

(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 3. Concrete-operational stage (7 to 11 years)

- Seriation
  - Arranging objects in a series,  
based on a dimension (lightest to darkest)



(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 3. Concrete-operational stage (7 to 11 years)

- Transitivity
  - Knowing the relationship between two objects, based on the relationship to a third



(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## **Four Stages of Cognitive Development**

### **4. Formal-operational stage (11 years and older)**

- Think hypothetically
- Systematic search for answers and solutions

<http://www.youtube.com/watch?v=lw36PpYPPZM&lr=1&user=jenningh>

(Shaffer, 2009)

# Piaget's Cognitive Developmental Theory

## Four Stages of Cognitive Development

### 4. Formal-operational stage (11 years and older)

#### – Adolescent egocentrism

- Imaginary audience
  - My life is “on stage”

#### • Personal fable

- My problem is unique, no one would understand it

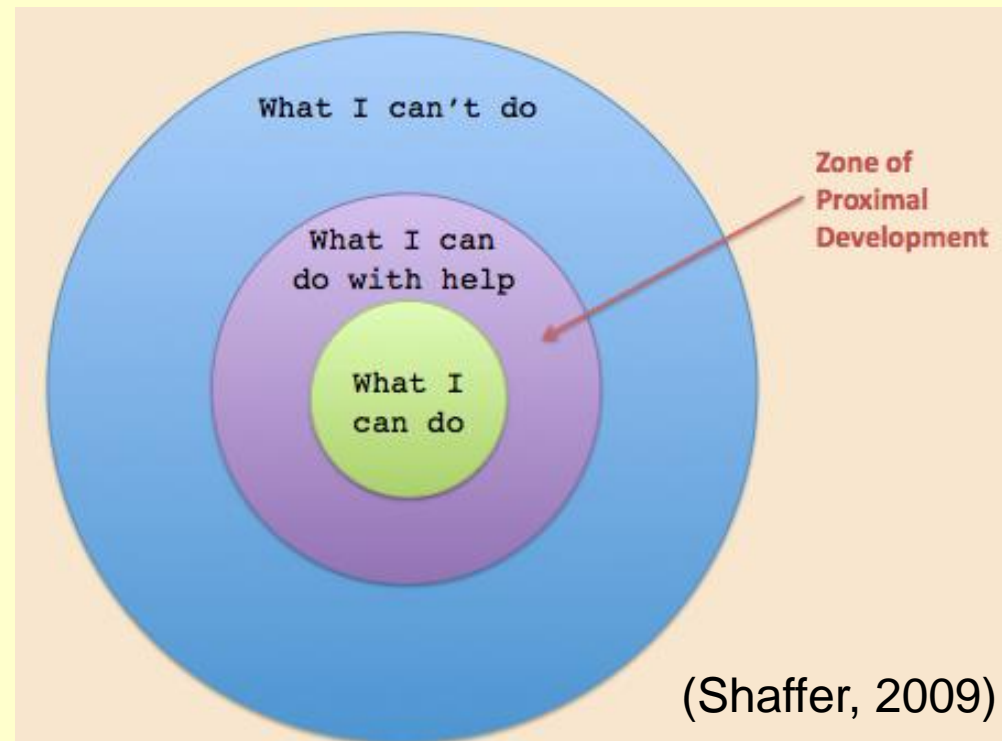
# Cognitive Development in Childhood

## Vygotsky's sociocultural theory

- Development in sociocultural context
- Highlight social interactions
  - Parents
  - Teachers
  - Someone with more experiences

# Vygotsky's sociocultural theory

- Collaborative (guided) learning
- Within zone of proximal development



# Vygotsky's sociocultural theory

- Scoffolding
  - Tailor the support
  - Match current ability

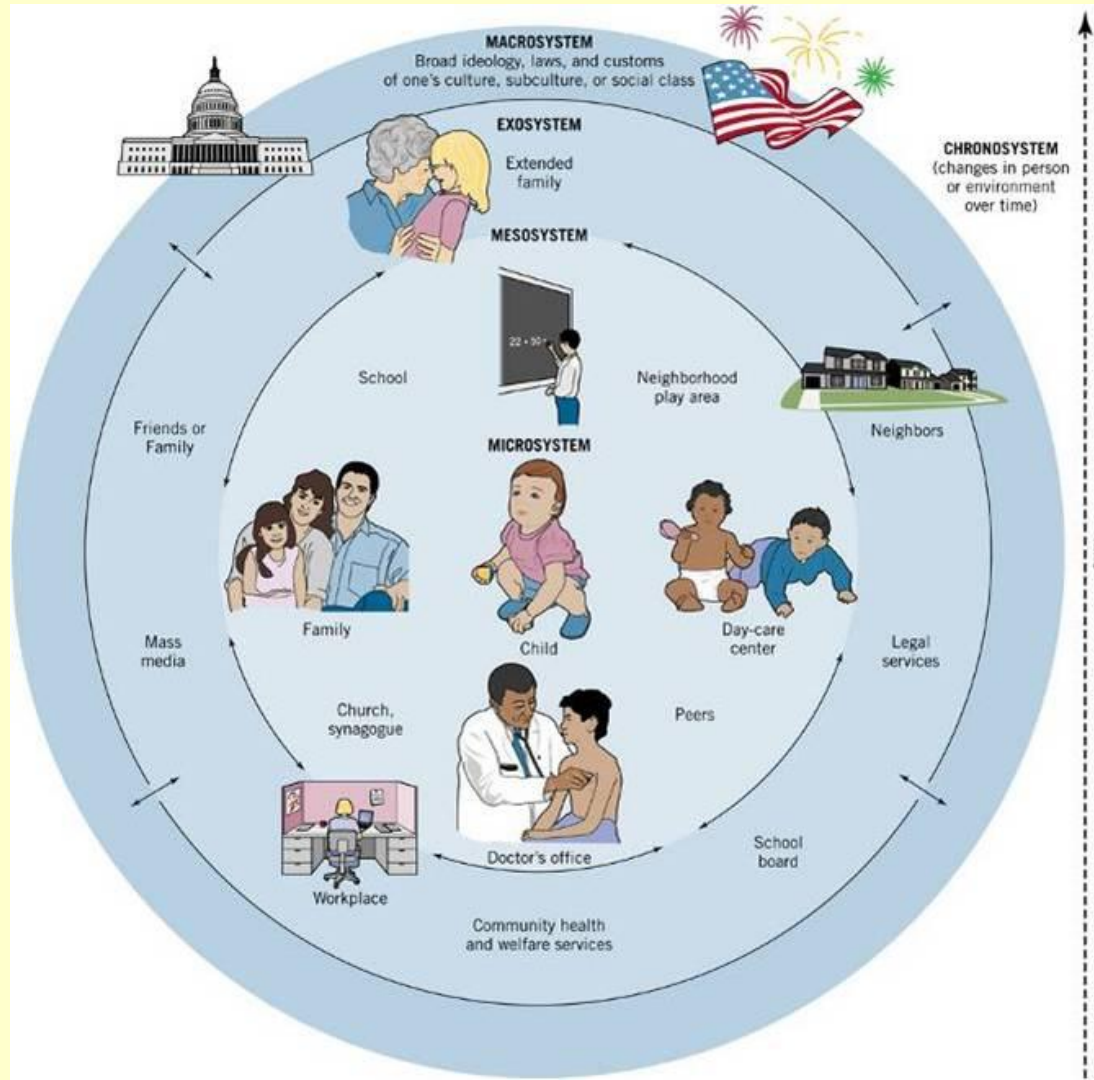


# Context of Development

## Bronfenbrenner's Ecological Systems Theory

- Describe environmental context of development
- Environment as a set of nested structure
- Developing person at the center

# Bronfenbrenner's Ecological Systems Theory



**Interactions**  
Individual x systems  
System x system

# Bronfenbrenner's Ecological Systems Theory

## Microsystem

- Family, daycare, neighbors, school

## Mesosystem

- Interrelations among people in microsystem
- Loving home >> positive peer relationships, academic outcomes

# Bronfenbrenner's Ecological Systems Theory

## Exosystem

- Indirectly influences a person
  - Parents' colleagues, supervisors
  - School board members

## Macrosystem

- Cultural context, social class

# Bronfenbrenner's Ecological Systems Theory

## Chronosystem

- Time element
- Cognitive, biological changes
  - Puberty
  - Brain maturation
  - Chronological age

# Social Development Across Life Span

## Erikson's Theory of Psychosocial development

- Eight Life Crises

1. Basic trust vs. mistrust (birth to 1 year) *Is my world predictable and supportive?*
2. Autonomy vs. shame & doubt (1-3 years) *Can I do things myself or must I always rely on others?*

# Social Development Across Life Span

## Erikson's Theory of Psychosocial development

- Eight Life Crises

3. Initiative vs. guilt (3-6 years) *Am I good or am I bad?*

4. Industry vs. inferiority (6-12 years) *Am I competent or worthless?*

# Social Development Across Life Span

## Erikson's Theory of Psychosocial development

- Eight Life Crises

5. Identity vs. role confusion (12 - 20 years)

6. Intimacy vs. isolation (20 – 40 years)



(Shaffer, 2009)

# Social Development Across Life Span

## Erikson's Theory of Psychosocial development

- Eight Life Crises

7. Generativity vs. stagnation (40 – 65 years)

8. Ego integrity vs. despair (old age)



(Shaffer, 2009)

# Successful Aging

- Selective optimization with compensation (SOC)
- Adaptation
- Plasticity



(Baltes & Baltes, 1990)

# Successful Aging

## Selective

- Positivity effect
- Emotional goal focus
- Close relationship



(Baltes & Baltes, 1990)

# Successful Aging

## Optimization & Compensation

- Daily stressors
- Chronic illness
- Maintenance



(Baltes & Baltes, 1990)

# Successful Aging

## Optimization & Compensation

- Internal resource (proactive behavior)
- External resource (social support)



(Baltes & Baltes, 1990)