Piaget’s theory of intellectual development views infants as how infants explore the world, & relate to people

Infancy
- The first developmental stage
- 0 - 2 ½ years
- sensori-motor intelligence
  - (Freud: the oral & anal stages)

<table>
<thead>
<tr>
<th>Age</th>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth - 2</td>
<td>Sensori-motor</td>
<td>Achievements consist largely of coordinating sensory perceptions and simple motor behaviors. Infants come to recognize the existence of a world outside themselves and begin to interact with it in deliberate ways.</td>
</tr>
<tr>
<td>2 - 6</td>
<td>Preoperational</td>
<td>Can use symbols, including mental images, words, and gestures. Often fail to distinguish their point of view from that of others, become overly captured by surface appearances, and are often confused about causal relationships.</td>
</tr>
<tr>
<td>6 - 12</td>
<td>Concrete Operational</td>
<td>Become capable of mental operations that allow them to combine, separate, order, and transform objects and actions. They are still carried out, however, in the presence of the objects and events being thought about.</td>
</tr>
<tr>
<td>12 - 19</td>
<td>Formal Operational</td>
<td>Acquire the ability to think systematically about all logical relations within a problem; display keen interest in abstract ideas and in the process of thinking itself.</td>
</tr>
</tbody>
</table>
Overview of this Week

- Biological Changes
- Sensori-Motor Intelligence
- Constructing Reality
- The Attachment Relationship

Overview of Chapter 5

- Physical Growth
- Brain Development
- Motor Development
- Cognitive Development: The Great Debate
- Conceptual Development
- The Growth of Attention and Memory

Overview of Chapter 6

- The Nature of Infant Emotions
- The Infant-Caregiver Emotional Relationship
- The Changing Nature of Communication
- A Sense of Self
- Developing Trust and Autonomy

Biological Changes During Infancy

- Size and Shape
- Bone and Muscle
- The Brain
Size and Shape

- Triple in weight... (7 → 21 lbs.)
- Add 10 inches height... (20 → 30 in.)
- Change in body proportions...
  - At birth, head is 70% of adult size and accounts for 25% total body length
  - Legs at birth are not much longer than their heads; by adulthood, legs account for about half of total height
  - Result in lowering the center of gravity (balance, walking)

Weight

Height

Changes in Body Proportions
Brain Development
- **2½ - 4 months**: Surge in visual cortex
- **6 months**: Spurt in motor cortex
- **7 - 9 months**: Rapid growth of frontal cortex (used in integrating information)
  - Prefrontal area plays a particularly important role in the development of voluntary behavior (e.g., impulse inhibition)

Sensori-Motor Intelligence
Hiding a Little Object

Hiding an object
get baby's own apple

The A-Not-B Error
Hiding an Object

The A-not-B error

You know that...
The A-not-B error

Sensorimotor substage 6:
Object Permanence

- Understanding that objects:
  - have substance
  - maintain their identity when they change location
  - continue to exist (ordinarily) when out of sight – otherwise, “out of sight is out of mind”
Six Substages of Object Permanence

1. Infant does not search for objects that have been removed from sight.
2. Infant orientates to the place where an object was last seen.
3. Infant will reach for a partially hidden object but stops if it disappears.
4. Infant will search for a completely hidden object; keeps searching in the original location of the object even if it is moved to another location in full view of the infant.
5. Infant will search for an object after seeing it moved but not if it is moved out of sight.
6. Infant will search systematically for a hidden object, certain that it exists somewhere.

The Child's Construction of Reality

Development is a process of adaptation.
Adaptation is “a twofold process involving assimilation and accommodation.”

Assimilation
The reflexes present at birth
e.g. sucking
to the infant, everything is a
'suckable' - assimilation
but soon, the infant adapts, finding
new ways to suck on different objects
- accommodation

The first schemas?
- The reflexes present at birth
- e.g. sucking
- to the infant, everything is a
  'suckable' - assimilation
- but soon, the infant adapts, finding
  new ways to suck on different objects
  - accommodation

How do assimilation and accommodation work?
- Adaptation involves both assimilation
  and accommodation
- assimilation is conservative
- accommodation is learning
- too much assimilation is boring
- too much accommodation is confusing
- the balance is equilibration
Piaget’s Theory of Development

A balancing act between assimilation and accommodation...

Leads to developmental change...

Equilibration

Q: At what age do assimilation and accommodation stop?

Each Sensorimotor Substage has a different kind of schema:

<table>
<thead>
<tr>
<th>Sub</th>
<th>Age (M)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 1 ½</td>
<td>Reflex schemas</td>
</tr>
<tr>
<td>2</td>
<td>1 ½ – 4</td>
<td>Primary circular reactions</td>
</tr>
<tr>
<td>3</td>
<td>4 – 8</td>
<td>Secondary circular reactions</td>
</tr>
<tr>
<td>4</td>
<td>8 – 12</td>
<td>Coordinated secondary circular reactions</td>
</tr>
<tr>
<td>5</td>
<td>12 – 18</td>
<td>Tertiary circular reactions</td>
</tr>
<tr>
<td>6</td>
<td>18 – 24</td>
<td>Beginning of symbolic representation</td>
</tr>
</tbody>
</table>
Sensorimotor Substages 1 & 2

<table>
<thead>
<tr>
<th>Sub</th>
<th>Age (M)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 – 1 ½</td>
<td><strong>Reflex schemas:</strong> Involuntary rooting, sucking, grasping, looking</td>
</tr>
<tr>
<td>2</td>
<td>1 ½ – 4</td>
<td><strong>Primary circular reactions:</strong> Repetition of actions on or close to the body that in themselves are pleasurable (e.g., blowing bubbles)</td>
</tr>
</tbody>
</table>

Sensorimotor Substages 3 & 4

<table>
<thead>
<tr>
<th>Sub</th>
<th>Age (M)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4 – 8</td>
<td><strong>Secondary circular reactions:</strong> Dawning awareness that actions can produce unintended changes in the environment, and can produce interesting effects (e.g. hitting a mobile)</td>
</tr>
<tr>
<td>4</td>
<td>8 – 12</td>
<td><strong>Coordinated secondary circular reactions:</strong> Combining schemas to achieve a desired effect (intentionality; early problem solving) (e.g., lifting a cup to pick up an object)</td>
</tr>
</tbody>
</table>

Sensorimotor Substages 5 & 6

<table>
<thead>
<tr>
<th>Sub</th>
<th>Age (M)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>12 – 18</td>
<td><strong>Tertiary circular reactions:</strong> Deliberate variation of problem-solving means, with experimentation to see what the consequences will be (e.g. dropping from different heights)</td>
</tr>
<tr>
<td>6</td>
<td>18 – 24</td>
<td><strong>Beginning of symbolic representation:</strong> Images and words start to stand for familiar objects; new means of problem solving through symbolic combinations (e.g. opening and closing mouth...)</td>
</tr>
</tbody>
</table>

The End of Infancy

**Capacity for Mental Representation**

Sensori-Motor substage 6 by 30 months of age
Evidence of Mental Representation

1. Ability to imagine an object not physically present
   Shown by systematic search for hidden objects

2. Systematic problem-solving

3. Pretend play

4. Imitating events after they have occurred

5. Categorization

6. Understanding visual models

2. Systematic Problem-Solving

Infant in substage 5
   capable of deliberate problem solving, but using trial and error

Infant in substage 6
   represents the sequence of actions before acting (i.e., uses mental action)

3. Pretend Play

Symbolic play (pretend or fantasy play)
   Play in which one object stands for another (e.g., banana for a telephone, railing for a road)
   Makes its appearance during the second year

4. Deferred Imitation

Imitating events after they have occurred
   (Controversy over when it first appears)

Toward end of 2nd year, a new ability to “imitate” actions that adults intend to do, but do not actually complete

Demonstrates the ability to represent the mental states of other people
5. Ability to Categorize

- **12 months**: More likely to touch the toy they picked up than other toys that had the same shape
- **18 months**: Create a small workspace in front of them and put 2 or 3 objects of the same kind in it
- **24 months**: Divide objects into two distinct categories, working on one category at a time
- **30 months**: Simultaneously coordinate work on two major categories and create sub-categories in which the objects are grouped according to color as well

6. Pictures and Models

- **2 years**: Can rarely use pictorial information to find an object hidden in the room
- **2 ½ years**: Can use a picture, but not a model of the room to find the object
- **3 years**: Can use the model as a representation of the room to find the hidden object...
The infant’s interactions with the environment are mediated by adults.

The infant’s objects are cultural artifacts.

The infant’s environment is social.

What Piaget ignored:

- The infant’s social relationships
- Primary Intersubjectivity (3m)
- Attachment (9m)
- A New Sense of Self in Relationships (24m)

Very young infants show an extraordinary responsiveness to other people and seem to need others to respond to them around 3 months of age.
The 7-9 Months Bio-Social-Behavioral Shift

Transitions and Stages

<table>
<thead>
<tr>
<th>Transition</th>
<th>Developmental Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conception</td>
<td>Prenatal period</td>
</tr>
<tr>
<td>Birth</td>
<td>Early infancy</td>
</tr>
<tr>
<td>2½ months</td>
<td>Middle infancy</td>
</tr>
<tr>
<td>7-9 months</td>
<td>Late infancy</td>
</tr>
<tr>
<td>24-30 months</td>
<td>Early childhood</td>
</tr>
<tr>
<td>5-7 years</td>
<td>Middle childhood</td>
</tr>
<tr>
<td>11-12 years</td>
<td>Adolescence</td>
</tr>
<tr>
<td>19-21 years</td>
<td>Adulthood</td>
</tr>
</tbody>
</table>

Locomotion

- **Walking**: Requires development, integration, and practice of component skills
  - Upright posture
  - Leg alternation
  - Weight shifting
  - Sense of balance
- Begins around the **age of 7-9 months**
  - Fundamental change in the infant's relationships with their environment
Locomotion

Indicators of a New Social Relationship at 7-9 m

- Wariness of Strangers
- New Emotional Responses to Caregiver
  - Seeks to be near the primary caregiver and shows distress when they are separated, happiness when reunited
- Secondary Intersubjectivity
  - Primary: face-to-face communication (e.g., social smiling)
  - Secondary: shared communication that refers to objects and other people beyond the dyad (e.g., looks when mother points)

Characteristics of the Shift

<table>
<thead>
<tr>
<th>Biological</th>
<th>Growth of muscles and hardening of bones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Myelination of motor neurons to lower trunk, legs, hands</td>
</tr>
<tr>
<td></td>
<td>Myelination of cerebellum, hippocampus, frontal lobes</td>
</tr>
<tr>
<td></td>
<td>New form of EEG activity in cortex</td>
</tr>
<tr>
<td>Social</td>
<td>Wariness of strangers</td>
</tr>
<tr>
<td></td>
<td>New emotional response to caregiver (attachment)</td>
</tr>
<tr>
<td></td>
<td>Secondary intersubjectivity</td>
</tr>
<tr>
<td></td>
<td>Social referencing</td>
</tr>
<tr>
<td>Behavioral</td>
<td>Onset of crawling</td>
</tr>
<tr>
<td></td>
<td>Fear of heights</td>
</tr>
<tr>
<td></td>
<td>Coordinated reaching and grasping</td>
</tr>
<tr>
<td></td>
<td>A-not-B error</td>
</tr>
<tr>
<td></td>
<td>Recall memory</td>
</tr>
<tr>
<td></td>
<td>Babbling and jargoning</td>
</tr>
</tbody>
</table>

Development of the Attachment Relationship
**video: attachment**
- Is a child's mother necessarily the person most responsible for childcare?
- What kind of relationship does a child form with their caregiver?
- What makes quality day care?

**John Bowlby's work**
- Study of children separated from their families placed in institutions during and after World War II
- He observed a common pattern:
  - Fear and anger
  - Despair & depression
  - Indifference to people
- I.e., protest, despair, detachment

**Animal Research**
- Harlow, 1959
Animal Research

- The cloth mother, which does not provide nourishment, acts as a **secure base**, whereas the wire mother, which does provide nourishment, does not.
- This **contradicts drive-reduction** theories of attachment (Freud).

![Harlow's Monkeys and Attachment](image)

Animal Research

- **Soothing tactile sensations** provide a baby with a sense of **security** that is more important to the formation of attachment than food.
- But they are **not sufficient**.
- **Social interactions** seem to be necessary for healthy emotional development.

The Attachment System
Attachment

- An emotional bond most prominent in infants from 6-18 months of age, evidenced by separation anxiety, wariness...
- Explanations
  - **Freud**: Caused by reduction of hunger drive (not substantiated, however, by research...)
  - **Erikson**: Become attached to people who reliably attend to their needs and who otherwise foster a sense of trust
  - **Bowlby**: Provides a balance between an infant’s need for safety and varied learning experiences

Human Research

- Mary Ainsworth and the “strange situation”
- Types: secure, anxious/avoidant, anxious/resistant...

The Strange Situation

Parent is seated while baby plays with toys.

3 minutes.
Distress at Separation

Mary Ainsworth

- Baltimore Study
- **Secure**: 72% seek proximity
- **Insecure**
  - **Avoidant**: 15% avoid contact
  - **Resistant**: 10% seek proximity, then resist it

Types of Attachment

- **Secure**
  - Child reacts positively to a stranger as long as mother is present
  - Becomes upset when mother leaves and is unlikely to be consoled by a stranger
  - Calms down as soon as mother reappears
- **Anxious/avoidant**
  - Child is indifferent to where mother is sitting
  - May or may not cry when mother leaves
  - Is as likely to be comforted by a stranger as by mother
  - Is indifferent when mother returns
- **Anxious/resistant**
  - Child stays close to mother and appears anxious even when mother is near
  - Becomes very upset when mother leaves but is not comforted by her return
  - Simultaneously seeks renewed contact with mother and resists her efforts to comfort

Separation Anxiety
Causes of Variation in Patterns of Attachment

- **Caregiver behaviors**
  - Sensitivity to the child’s signals
  - Responsivity

- **Characteristics of the child**
  - Infants who had spent more time playing with objects than interacting sociably with their mothers were more likely to display signs of insecure attachment later on

- **Family influences**
  - Maternal depression and marital discord appear to be related to lower levels of secure attachment

- **Cultural influences**
  - Psychologists disagree: some say that what makes a secure relationship varies across cultures; others say that attachment is universal
A New Sense of Self
(24m)

Self-recognition
Self as actor
Sense of standards
Secondary emotions

1. Self-Recognition

Mirror

- 3 months: Little or no interest
- 4 months: Will reach out and touch mirror image
- 10 months: Will reach behind them if a toy is slowly lowered behind their back while they are looking in the mirror, but will not try to rub off a red spot that has been surreptitiously applied to their nose
- 18 months: Will reach for their own nose when they see the red spot; when asked, “Who’s that?” will answer “Me”
2. Self as Actor

- **18-24 months**
  - Utterances with an explicit reference to self:
    - “Did it!”
    - “Becky finished.”
    - “Uh-oh. I fix.”

3. Sense of Standards

- **Around 2 years of age**
  - Upset if ear of teddy bear is missing, or there’s mud on their dress
  - Say “Yucky” & “Fix it”
  - Self-imposed goals: such as using all available blocks or fitting every doll into baby carriage
  - Actively seek adults’ help in reaching goals and

4. Primary and Secondary Emotions

- 6 primary emotions can still be seen at the first birthday
  - Joy, fear, anger, surprise, sadness, disgust
  - These bear a simple, direct relation to the events that elicit them

**Emergence of Secondary Emotions**

- **18-24 months**: Experience new secondary emotions
  - Embarrassment, pride, shame, guilt, envy, etc.
    - (e.g., self-satisfied smile, hang head, cover face, try to hide)
  - These depend on infant’s new abilities to recognize, talk about, and think about themselves in relation to other people (e.g., in terms of some social standard, rule, or desired goal)
  - Also known as “social” or “self-conscious” emotions
The End of Infancy

Another bio-social-behavioral shift

Between the ages of 24 & 30 months

Transitions and Stages

<table>
<thead>
<tr>
<th>Transition</th>
<th>Developmental Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conception</td>
<td>Prenatal period</td>
</tr>
<tr>
<td>Birth</td>
<td>Early infancy</td>
</tr>
<tr>
<td>2 ½ months</td>
<td>Middle infancy</td>
</tr>
<tr>
<td>7-9 months</td>
<td>Late infancy</td>
</tr>
<tr>
<td>24-30 months</td>
<td>Early childhood</td>
</tr>
<tr>
<td>5-7 years</td>
<td>Middle childhood</td>
</tr>
<tr>
<td>11-12 years</td>
<td>Adolescence</td>
</tr>
<tr>
<td>19-21 years</td>
<td>Adulthood</td>
</tr>
</tbody>
</table>

Characteristics of the Shift

<table>
<thead>
<tr>
<th>Biological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myelination of connections among brain areas</td>
</tr>
<tr>
<td>Leveling off of brain growth</td>
</tr>
<tr>
<td>Maturation of brain areas in roughly equal degrees</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decline of distress at separation</td>
</tr>
<tr>
<td>Distinctive sense of self</td>
</tr>
<tr>
<td>Acceptance of adult standards</td>
</tr>
<tr>
<td>Emergence of secondary emotions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Behavioral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking becomes well coordinated</td>
</tr>
<tr>
<td>Manual dexterity enables infant to pick up small objects</td>
</tr>
<tr>
<td>Control over bladder and bowels</td>
</tr>
<tr>
<td>More complex and planned problem solving</td>
</tr>
<tr>
<td>Symbolic play and expression of basic words &amp; phrases</td>
</tr>
<tr>
<td>Conceptual representations and complex categories</td>
</tr>
<tr>
<td>Smile accompanying mastery</td>
</tr>
</tbody>
</table>

Main Points

- Human infants need other people, for their physical needs, but also for their social and intellectual development.
- Infants are prepared for social relationships
- ‘Primary intersubjectivity’ (2m) illustrates this
- The ‘attachment relationship’ (7-9m+) allows a balance between security and exploration
- The end of infancy is marked by a decline in distress at separation, and signs of a new sense of self
More Main Points

- Through assimilation and accommodation, reflexes develop into more complicated schemas (6 substages)
- Infants construct a practical understanding of the physical world (sensorimotor intelligence)
- The A-not-B error provides a window into the world of infancy
- By the end of infancy, mental representation is possible