

# How Does Our Thinking Change With Age?

Chapter 6:  
Cognitive Developmental Approaches



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Get out some paper...class survey!  
What would you do?

If you were given a third eye to put anywhere on your body where would you put the extra eye and why?



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It was once accepted that because babies cannot speak, then they must not think.

Jean Piaget examined the development of thought in children.



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### How does thought develop?

- Piaget's theory focuses on how people think rather than what they think.
- Piaget believed that children play an active role in their cognitive development.

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### Piaget's Three Basic Assumptions

1. Children's constructive processes are generating hypotheses, performing experiments, and drawing conclusions
  - The child as a scientist
2. Children learn many important lessons on their own, rather than depending on instruction from adults or older children
3. Children are intrinsically motivated to learn and do not need rewards from adults to do so

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### Piagetian Approach

- Piaget proposed a "stage approach" to development and he claimed that all children pass through a series of four universal stages in a fixed order from birth through adolescence
  - Sensorimotor (birth to 2 years)
  - Preoperational (2 to 7 years)
  - Concrete operational (7 to 12 years)
  - Formal operational (12 years and beyond)

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Piaget believed that infants spend a LOT of time trying to make sense of the world.

- A *schema* (*theory*) is a mental structure, a way of organizing and categorizing thoughts and experiences.
  - Schemas allow children to make comparable generalizations.
- Can be developed or modified through Assimilation or accomodation.

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■ *Assimilation* incorporates new experiences into existing mental structures and behaviors

■ *Example*: a baby who is familiar with grasping will soon discover that the grasping works for toys as well as blocks, balls, and other small objects.



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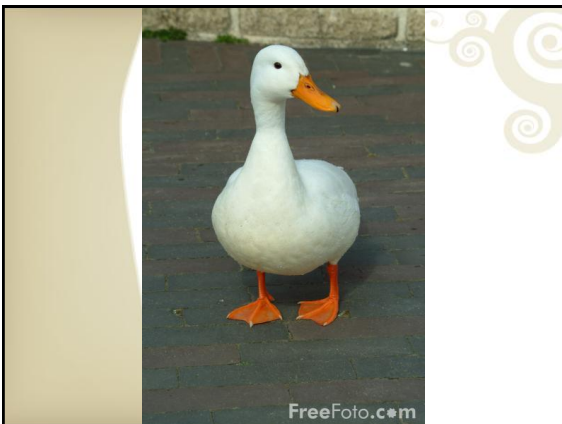
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### Wait...I changed my mind!

- Accommodation occurs when a child's theories are modified based on an experience
- Example- The baby with a theory of dogs is surprised the first time she sees a cat- it resembles a dog, but meows instead of barks and rubs up against her rather than licking
- The baby must REVISE her previous theory to include this new kind of animal

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### Why is this process important?

- As adaptation continues, the child organizes his/her schemata into more *complex* mental representations, linking one schema with another.

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- Assimilation and accommodation are usually in balance (equilibrium), but periodically the balance is upset which results in disequilibrium

- Children restore equilibrium by replacing obsolete theories with new more advanced theory.

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**Piaget's Stages of Cognitive Development (Part I)**

**SENSORIMOTOR STAGE**

(Age 0-2)  
The child begins to interact with the environment.



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Sensorimotor thinking involves adapting to the environment, understanding objects, and becoming able to use symbols.

This form of thought begins with the infant experiencing the world through their reflexes

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Sensorimotor Intelligence

- The intelligence of infants during the first period of cognitive development when babies think by using their senses and motor skills
  - Piaget believed that in this stage, the infant progresses from simple reflex actions to symbolic processing
- As infant uses his/her reflexes - the reflexes become more coordinated
  - Infants begin to modify their reflexes to make them more adaptive and reflexes become modified by experience

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### Simple Reflexes

- During the first month of life, the various reflexes that determine the infant's interactions with the world are at the center of its cognitive life
  - As infant uses his/her reflexes – the reflexes become more coordinated
- Infants begin to modify their reflexes to make them more adaptive and reflexes become modified by experience
  - Example – thumb sucking

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### Sensorimotor Period

- On your own....Review the 6 substages of the Sensorimotor period.

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### Sensorimotor Period

Substages	Age Range	Focus
1 Simple Reflexes	Birth to 1 month	Exercising reflexes
2 First habits and Primary circular reactions	1 to 4 months	Learning to adapt
3 Secondary circular reactions	4 to 8 months	Making interesting events
4 Coordination of Secondary Reactions	8 to 12 months	Using means to achieve ends
5 Tertiary Circular Reactions, Novelty, and Curiosity	12 to 18 months	Experimenting
6 Internalization of Schemes	18 months to 2 years	Beginnings of Symbolic thought

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Primary circular reactions

For example,  
an infant might combine grasping an  
object with sucking on it, or staring at  
something with touch



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Secondary circular reactions

Infants begin to interact with  
people and objects to produce  
exciting experiences

For example, realizing that a rattle  
makes noise -they shake their arms  
and laugh whenever someone puts a  
rattle in their hand



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Coordination of Secondary Reactions  
Babies think about a goal and understand how to reach it

A baby who enjoys baths  
may crawl into the bath tub with a  
bar of soap and remove all her  
clothes to communicate to Mom  
that she wants a bath.



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## Major Advancement

### ■ Object Permanence

- The realization that an object or person continues to exist when out of sight
- Third substage: Infants will look for something they've dropped but if they cannot see it, they act as if it no longer exists
  - Out of sight - out of mind
- Sixth substage: Object permanence is fully achieved

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## Assess the infant's object permanence

- Five month-old Jack is playing with your car keys, but now you want to leave. You distract the infant and take your keys.
  - How does the infant react?
  - What does this suggest?




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The infant responds by doing NOTHING. The infant will not even look for the keys. He will act as though the keys do not even exist anymore- because he DOES NOT have object permanence

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Click on the picture to watch a video on object permanence



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Piaget's Stages of Cognitive Development (Part II)

PREOPERATIONAL STAGE

(Age 2-6 or 7)  
The child begins to represent the world symbolically.



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Preoperational Period (2-7years)

- The period in which children become able to represent their experiences in language, mental imagery, and symbolic thought
- Limitations of the Preoperational Period:
  - Egocentrism
  - Animism
  - Centration
  - Lack of conservation

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Infants develop the ability to use symbols and engage in pretend play



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Me, Me, Me....

- A key element in the preoperational stage is *egocentrism*, which is the inability to perceive a situation from another's point of view.
  - Children in this stage, cannot put themselves in another person's position
- Over the course of the preoperational period, egocentric speech becomes less common.

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Example of Egocentrism

- Three-year-old Jamila loves talking to Grandma Powell on the telephone. When Grandma Powell asks a question, Jamila often replies by nodding her head. Jamila's dad has explained that Grandma Powell can't see her nodding, that she needs to say "yes" or "no." But, no luck. Jamila invariably returns to head-nodding.



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## Cognitive Advances

- Use of symbols
  - Children can imagine that objects or people have properties other than those they actually have
  - Using a fork as a comb, a block as a car, a stick as a sword
- Understanding of identities
  - Children are aware that superficial alterations do not change the nature of things
  - A teacher dressed up as a pirate is still his teacher underneath the costume
- Understanding of cause and effect
  - Children realize that events have causes

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## Cognitive Advances Continued...

- Ability to classify
  - Children organize objects, people, and events into meaningful categories
- Empathy
  - Children become more able to imagine how others might feel
- Theory of mind
  - Children become more aware of mental activity and the functioning of the mind

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## Limitations according to Piaget

- Centration is the child's tendency to narrowly focus on one aspect of a situation and neglect others
  - The psychological equivalent of tunnel vision
- Irreversibility
  - Children fail to understand that some operations or actions can be reversed, restoring the original situation

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## Concrete Operational Stage

- A milestone of this stage is understanding Conservation
- This ability allows children to recognize that objects can be transformed visually or physically, yet still be the same in number, weight, substance, or volume




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## Conservation Tasks

Type of Conservation	Starting Configuration	Transformation	Final Configuration
Liquid quantity	 Is there the same amount of water in each glass?	Four water from one glass into a shorter, wider glass.	 Now is there the same amount of water in each glass, or does one have more?
Number	 Are there the same number of pennies in each row?	Stretch out the top row of pennies, push together the bottom row.	 Now are there the same number of pennies in each row, or does one row have more?
Length	 Are these sticks the same length?	Move one stick to the left and the other to the right.	 Now are the sticks the same length, or is one longer?
Mass	 Does each ball have the same amount of clay?	Roll one ball so that it looks like a sausage.	 Now does each piece have the same amount of clay, or does one have more?
Area	 Does each cow have the same amount of grass to eat?	Spread out the squares in one field.	 Now does each cow have the same amount to eat, or does one cow have more?

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## Horizontal décalage

The inability to transfer learning about one type of conservation to other types, which cause a child to master different types of conservation tasks at different ages

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At the latter end of the stage, Decentration begins. This is a change from a self-oriented view to recognizing the view of others.

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### Did You Get It?

- A child in this stage saw a classmate crying and someone asked, “why is Marcus crying?” What is the child displaying?
- The child responds by saying, “I don’t know...I’m OK.” **Egocentrism**
- With the same scenario, a child responds, “Marcus is sad” **Decentration**

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### Piaget's Stages of Cognitive Development (Part III)

**CONCRETE OPERATIONAL STAGE**

(Age 7–11 or 12)  
The child learns rules such as conservation.



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## Concrete Operational Period

- The period in which children become able to reason logically about concrete objects and events.
  - They become more adult-like and less childlike
- Children first use *mental operations* to solve and to reason
- Addition, subtraction, multiplication, and division are familiar arithmetic operations that concrete operational children use

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## Classifying Objects, Ideas and People

- Children can also classify or divide things into different sets or subsets and consider their interrelationships.
- *Classification* is the process of organizing things into groups according to some property they have in common such as shape, color, or both
  - Children that can categorize can analyze problems, derive correct solutions and ask follow-up questions
- Concrete operations allow children to order objects in terms of more than one dimension.
  - Example: size, shape, volume

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## Reversibility

- The concrete operational child can operate an action, and then go back to the original condition.
  - $3 + 2 = 5$  and  $5 - 2 = 3$
- *Reciprocity* is another logical principle in which two things may change in opposite ways, in order to balance each other out.
  - $4 \times 6$  is the same as  $2 \times 12$
- This is relevant to the development of mathematical processes

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## Reasoning

### ■ Inductive Reasoning

- Type of logical reasoning that moves from particular observations about members of a class to a general conclusion about that class

### ■ Deductive Reasoning

- Type of logical reasoning that moves from a general premise about a class to a conclusion about a particular member or members of the class

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## Test Your Knowledge...

Inductive or Deductive Reasoning?

- My dog barks. Jason's dog barks. Carla's dog barks. Therefore, all dogs bark.

Inductive Reasoning

- All dogs bark. Brutus is a dog. Therefore, Brutus barks.

Deductive Reasoning

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### Piaget's Stages of Cognitive Development (Part IV)

**FORMAL OPERATIONAL STAGE**

(Age 12-adulthood)  
The adolescent can transcend concrete situations and think about the future.




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### Formal Operational Stage 12+

- In this stage, the individual can think hypothetically, consider future possibilities, and use deductive logic
  - Children understand that reality is not the only possibility
  - Capable of deductive reasoning

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### Do adolescents think like adults yet?

- Teenagers have more skillful selective attention, expanded memory, and ability to understand and learn more complex topics
- The development of hypothetical thought emerges during this period.
  - This type of thought involves reasoning about imagined possibilities.
  - Teenagers can ignore the “real” and think about what is possible.

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### More complex reasoning

- During adolescence, teens are more able to think hypothetically, which allows for Hypothetical-deductive reasoning.
  - This is the ability to draw hypotheses or “best-guesses” to best solve a problem.
- In other words, from specific proven laws or rules we can deduce certain truths.




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### What does your thinking say about you?

- Concrete Operational Child (9-year-old)
  - All of these children placed their third eye on the forehead between their two natural eyes
  
- Formal Operational Child (12-year-old)
  - These children gave a wide variety of answers with imaginative rationales
  - Some answered palm of the hand or inside the mouth and explained why.



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### The return of egocentrism!

- Most teens who reach formal operational thought are worried about how others see them, they are constantly consumed with conflicting feelings.
  
- Analyzing private thoughts and feelings reflect the enhanced capacity for self-centeredness, which characterizes this period of life.

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Adolescents don't think quite the same as children or adults...their thinking is distorted due to their egocentrism!



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### Everyone is always watching me!

- The teenager's false belief that others are intensely interested in their appearance and behavior is called the imaginary audience.
- A logical lapse that occurs from the influence of egocentrism
- They act and feel as if they are on stage with the world watching.

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### The Imaginary Audience

- This is one explanation for teen's obsession with their hair, clothing, and everything else for that matter before going out in public.
- Teens often accuse parents of spying on them and monitoring their every move.

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This also explains their need to fit in with their peer group.



"Would you jump off a bridge if everyone did?"

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### The Personal Fable

- Another false belief that teens exhibit is the *personal fable*, which is the belief that he or she is destined to have a unique, heroic or even legendary life.
- Teens believe that they are so special and unique that no one can understand them.
  - “Bad things happen to others...not us!”

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### Think and review on your own...

Is there a fifth stage of cognitive development?

Analyze the Post-Formal Operational Stage of cognitive development

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### Modern Theories of Cognitive Development

The Sociocultural Perspective:  
Vygotsky's Theory

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### Four Weaknesses of Piaget's Approach

1. The stage model depicts children's thinking as being more consistent than it is
2. Infants and young children are more cognitively competent than Piaget recognized
3. Piaget's approach underestimates the contribution of the social world to cognitive development
4. Piaget's approach is vague about the cognitive processes that give rise to children's thinking and about the mechanisms that produce cognitive growth

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