

## WEEK 2: THEORIES OF COGNITIVE DEVELOPMENT LECTURE

**4th Century BC** is the beginning of The Nature-Nurture Debate

**Plato** believes that we are born with knowledge

**Aristotle** believes that knowledge is learned through experience

*I think our field's intellectual history really traces back to Plato and Aristotle who helped set the stage for thinking about how knowledge develops. Plato argued that knowledge is innate whereas Aristotle argued that knowledge is learned through experience.*

**John Locke**

-Tabula Rasa or a blank slate emphasized Nurture

-Importance of early strict parenting

**Jean-Jacques Rousseau**

-Greater emphasis on "nature".

-Children are innately good

-Children learn through spontaneous interactions with objects and people rather than interactions.

*Locke argued that children are born a blank slate, essentially emphasizing the importance of nurture in shaping development.*

*In contrast, Rousseau argued that some things are innate – notably, that we are born good.*

*The field of Child Development as a scientific enterprise really began during the 19th and early 20th century. In part this was a response to the times – social reform around industrialization and whether children should be made to work in factory for many hours a day. The public wanted to understand if this could cause harm to the child. As well, Darwin's diary of his own child's development ignited interest in scientifically documenting how children develop – people were captivated by his descriptions of how his child's thinking changed over time.*

**Sigmund Freud**

The thing with Freud is that he introduced us to the idea that we should study the unconscious mind (implicit processes) and this has eventually become a focus in developmental psychology. As well, Freud emphasized the importance of early emotional experiences – fueling interest among others in actually studying that period of development.

### **G- Stanley Hall**

- Earned 1st Ph.D in Psychology in America

- Founded 1st Psychological Journal in America

- Founded Psychological Association

- Wrote the 1st textbook in adolescence that organized current thinking at the time that formalized the study of child development.

### **John Watson**

- The study of observable and quantifiable aspects of behaviourism and excludes subjective phenomena like emotions, thoughts and motives.

- Heavily influenced by Ivan Pavlov's work on conditioning.

-Development is controlled by environmental conditions particularly rewards and punishments..

-**Watson** had a profound effect early on in the field. Advocating for behaviorism, he felt all knowledge develops through experience – particularly through conditioning.

-He essentially viewed all of development as the result of conditioning and felt he could turn any child into any kind of person by shaping that person's experiences.

### **Behaviorism's Operant Conditioning**

*Behaviour that is rewarded will increase.*

*Behaviour that is not rewarded or punished will decrease*

**Skinner's view of development** was a response to the times (the view that all things must be shaped by the environment – we can control our destiny).

### **Watson's Little Albert Study**

This view of development was a response to the times (the view that all things must be shaped by the environment – we can control our destiny).

*Development is not just about change in knowledge or the content of thoughts, but also how the underlying cognitive processes may change and grow.*

## **Constraints on Development**

### *Socio Cultural and Cognitive Constraints*

**Socio Cultural Constraints** is the accounting for knowledge development we need to consider both kinds of constraints/influences. Here are examples of major sociocultural constraints we think about in developmental research:

**Physical** = home, school, urban vs. rural neighborhood etc.

**Social** = parents, siblings, teachers, friends, peers, etc.

**Economic** = national wealth, societal wealth, family wealth

**Cultural** = language, values, traditions, attitudes/beliefs, laws, political structure, technology, etc.

**Historical** = influences all these other factors, e.g. traditional practices, policies, economy, technology etc.

## **Cognitive Constraints**

*Development is not just about operant and classical conditioning as behaviourists thought.*

*Cognitive Maturation is substantial changes across development in how a child processes information.*

## **Jean Piaget**

Moving beyond behaviourism

Founded field of cognitive development

Broad theory to account for the changes in children's thinking

Piaget is credited with founding the field of cognitive development – emphasizing the importance of study how cognitive reasoning changes. Moreover, he developed the first significant theory of development that tried to account for the changes we observe from infancy through adulthood.

## **Constructivism**

Children construct knowledge on the basis of their experiences with the world.

Children proceed through stages of development

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**ASSIMILATION-** is the process by which children translate information into a form they can understand. Example: a dog

**Accommodation-** is a process by which children revise current knowledge structures in response to new experiences. Example: A four-legged creature.

When children encounter an object that violates that knowledge structure (a 3-legged dog for example), they revise their belief – being a dog is not just about having 4 legs.

**Equilibration** is a process by which children balance assimilation and accommodation to create stable understanding.

These are the 3 processes Piaget said infants have from birth to help guide learning. With equilibration Piaget says children somehow (without specifying the how) flexibly adjust being using assimilation and accommodation when experiencing new things.

## **Piaget's Theory of Cognitive Development**

### **Sensorimotor Stage (birth to years)**

Infants have:

- Basic motor systems or reflexes
- Sensory Perceptual Systems
- Learning Mechanism of Assimilation

*According to Piaget, infants live primarily in the here-and-now*



## **Sensorimotor** *from birth to 2 years old*

Sometimes this stage of development is described as the blooming buzzing confusion. Piaget's stages of development try to characterize what children can and cannot do during specific periods in terms of cognitive reasoning. For the sensorimotor period he argues that children live in the "here and now" meaning they are thought to only be able to reason about things that they have direct perceptual access to (things they can see, touch, smell, hear, taste)

### **Sensorimotor of Object Permanence**

According to Piaget, out of sight out of mind describes sensorimotor reasoning. Cover an object up and infants don't seem to act like they think the object is still there (e.g., persistent reaching for it). Again, for Piaget children live in the here and the now during the sensorimotor period.

## **Preoperational** *2 to 7 years old*

- Toddler begin to represent experiences in language, imagery and symbolic thoughts
- Cannot perform operations or reversible mental activities

- Focus on a single, perceptually salient aspect of an event or centration

**Preoperational failures of conservation,** conservation of liquid quantity,  
Conservation of solid quantity . Conservation of number

Piaget often spoke about stages of development in terms of what children couldn't do at a given stage (and what skill/ability they would gain at a later stage). One such inability during the preoperational stage concerns failures of conservation – which is partly influenced by their inability to perform reversible mental operations and their susceptibility to centration in their thinking. What the video below to have a look at this in action.

## **2. Preoperational Failure of Transitivity**

Piaget often focused on what kids can't do at a given stage of development. Here, he argues that during the preoperational period children can't perform transitive inferences (if A is greater than B and B is greater than C, he argues they can't deduce that A is also greater than C). This kind of reasoning is really important for logical reasoning (something he says children don't really have at this stage).

### **3. Preoperational failures of egocentricity**

#### **The Mountain Problem**

– a task demonstrating children’s egocentric reasoning in the preoperational period. Piaget argued that children struggled enormously with taking another’s perspective. With the mountain problem you’ll see that the preoperational child (unlike the concrete operational child) thinks that whatever he can see the researcher can also see even though a mountain blocks her view from seeing what he can see.

#### **The False Belief**

Here, we can watch a video illustrating Piaget’s Mountain Problem – a task demonstrating children’s egocentric reasoning in the preoperational period. Piaget argued that children struggled enormously with taking another’s perspective. With the mountain problem you’ll see that the preoperational child (unlike the concrete operational child) thinks that whatever he can see the researcher can also see even though a mountain blocks her view from seeing what he can see.

#### **4. The Preoperational failures of appearance versus reality**

Appearance really drives children's responses at this stage. Even though kids are told what it is, they still respond as if they're guided by what it looks like.

According to Piaget, children at this stage would judge this individual to be a female because there are more physical characteristics stereotypical of a female that are displayed. Surface level changes affect how children reason about the individual according to Piaget.

#### **Concrete Operational** *7 to 12 years old*

- Children can reason logically about concrete objects and events.
- However, they have difficulty thinking in purely abstract terms in combining information systematically.
- Concrete operational example of deductive reasoning. Logical reasoning is a main accomplishment at this stage.

The main thing Piaget says is that children at this stage don't systematically test hypotheses.

### **Concrete Operational** *12 years old and beyond*

- Children and adults can think about abstractions and hypothetical.
- Can perform systematic experiments to draw conclusion about the world.

According to Piaget, NOT all typically developing children reach this stage. Also, for Piaget, once you get to a new stage you don't "go back". It's important to understand what each of the stages say kids can/can't do, and what ages they refer to. Also, important to understand some of the primary challenges to Piaget's stage theory that we will review shortly.

### **Problems with Piaget**

- Competence or performance distinction
- Problems of Constructivism or poverty of experience
- Problems with stages or inconsistency of experience

**Competence or performance distinction** is about how we, as researchers, interpret a child's failure on a given task. Is it because they lack the competence (or understanding, as Piaget thought), or is it a performance issue (the task itself was too difficult or confusing). This is a core issue throughout developmental psychology. Think about your own experience taking exams. Sometimes you may have felt your performance was an accurate reflection of what you understood. At other times you may have felt like your performance did not adequately reveal what you understood (perhaps you got little sleep that night, perhaps the questions were worded in a very confusing way).

**Problems of Constructivism** or Poverty of experience is the core idea here is that Piaget had argued children can only reason about things that they have learned about through experience. After all, he was a constructivist – he believed knowledge was gained through experience. The poverty of experience is a direct challenge to Piaget – it basically says that if you can show a child has knowledge about the world BEFORE Piaget would have said they could have had the necessary experiences to have learned that knowledge (hence, poverty (or absence) of experience), then this would be a theoretical problem for Piaget's theory. It turns out, children seem to actually show knowledge BEFORE they had relevant experiences for Piaget to credit them with an understanding

**Spelke and Baillargeon** both argued that Piaget got it wrong when it came to claims about what they could and couldn't reason about, particularly during the sensorimotor period. Both argued that children had innate knowledge – that it was possible for infants to know things about the world before having the kinds of experiences Piaget would have said were necessary to have learned those things.

### **Problems with Object Permanence in infants**

Both are credited with developing novel methods for testing what infants “know”. Whereas Piaget argued that children in the sensorimotor period can only reason about the “here and the now” - that which they have direct perceptual access to, Spelke and Baillargeon demonstrated through measuring infants' looking behavior that when an object was covered-up they still expected it to be there. Evidence for this was that infants looked especially surprised when the occlude was removed and the object was gone – as though they expected an object to still exist once the occlude was removed. Infants couldn't do this if they weren't able to reason about an object that was out of sight.

## **Problems with Experience**

Infants know a lot about the physical world before they are capable of operating it.

## **Coherence, Continuity, Contact**

Infants also expect objects to persist even when out of site (partially or fully). They expect that two objects cannot occupy the same physical space at the same time and they expect that (inanimate) objects cannot move on their own unless acted upon by another object or agent (principle of contact causality). All of this, Piaget would have said, was unknowable at this stage of development. Why did Piaget think this?

**Inconsistency of the timeline** is the central ideas here is that Piaget argued that these stages of development were rigid – there were precise ages when children were in a given stage and the abilities kids did and didn't have were specific to each stage. Turns out that later on, researchers discovered that children seemed to succeed on tasks Piaget would say they shouldn't given their stage of development. We can explore why that is shortly.



## **Problems with Preoperational Failures of Conversation**

For Piaget – you shouldn't see success on some tasks earlier than on other tasks measuring the same underlying cognitive ability (e.g., conservation). It turns out, though, that researchers subsequently found that children could pass the number task years before Piaget said they should be able to.

### **Motivation matters!**

**Preoperational stage** children can pass some tests when you use motivating stimuli (e.g., candy). This is why children are able to pass this task years before Piaget thought they could (it wasn't that they lacked the competence as Piaget thought, but rather it was a performance issue).

Success with M&Ms when child can receive one of the lines. Failure on the same task when the objects are not exciting pieces of candy.

## **Problems with Preoperational failures of Egocentricity**

- Children do not always behave egocentrically
- The challenge here is that while Piaget thought children's thinking is always egocentric, it turns out that isn't the case.

**Framing of question matters!** Children can behave in non-egocentric ways depending on the complexity of the question you ask them.

## **False Belief**

When measures don't require verbal responses a child shows better success. So, instead of asking where will Sally look for her ball, you could measure where the child looks as an indicator of where she thinks Sally herself will look for the ball.

## **Adults Errors of Egocentricity and False Consensus Effect**

Piaget largely argues that development is a discontinuous process – the stage changes are abrupt. However, the one thing he suggests is continuous are those 3 learning mechanisms of assimilation, accommodation and equilibration.

## **WEEK 2: THEORIES OF COGNITIVE DEVELOPMENT TEXTBOOK**

### **Theories of Cognitive development**

#### **Piaget's Theory**

#### **Children as “scientists”**

**Discontinuous process** = *transitions are discontinuous intellectual leap*

-Qualitative change: different age children think in qualitatively different ways

-Broad applicability: each stage influences child's across diverse topics

-Brief transition: fluctuate between old and new stage

-Invariant sequence: everyone goes through same stages in same order

**Sensorimotor stage (birth -2):** intelligence is expressed through sensory & motor abilities

-Gain knowledge by exploring the world w/ motor functions

-Intelligence is bound to immediate perception & action

-Infants are born with many reflexes that they use to explore the world w/

o EX. Sucking, grasping, flailing...

Then they begin accommodating their action to the environment

Reflexes serve as building blocks for complex behaviors

First few months = centered around their body

Later on = more involved with their surroundings (repetition of action on environment i.e. banging table)

8 months lack object permanence: knowledge that object continues to exist even though it is not in sight

A not B error: tendency to reach for hidden object where it was last found rather than in new hidden location

Deferred imitation (18-24 months): repetition of other's behavior a substantial time after it originally occurred

**Preoperational stage (2-7):** represent experience in language, mental imagery & symbolic thought