Infancy & Childhood: Cognitive Development

![Diagram showing brain development from 25 weeks, 30 weeks, 33 weeks, term, and adult stages.]
Nature vs. Nurture Today

1. Operate to make all humans similar
   - Maturation (motor dev): Pattern is the same for everyone (NATURE)
   - Supported by care, nutrition, exercise (NURTURE)

2. Operate to make all humans unique
   - Genetic abilities: intelligence, athletic ability, personality (NATURE)
   - Environmental influences: family, random events, society (NURTURE)

Degree of influence is dependant on the characteristic
   - Height vs. Personality
Motor Development = Maturation

Sit → Crawl → Walk → Run!
Early Neurological Development

**At Birth**
- All brain cells have been formed
- Networks are weak & immature
- The neurological foundations of cognitive abilities have been established

**Early Infancy**
- Cerebellum is the most complex part of the brain
- Allows babies to make associations
  - See Mom=Sucking Reflex
Early Neurological Development

6-12 Months

- Temporal lobe begins development
- Babies can remember & imitate actions.
- Recognize objects in pictures

Later Childhood

- Frontal cortex develops
- Progression of reasoning skills
Jean Piaget’s Theory of Cognitive Development

- Swiss psychologist 1st to study child development.
- laid the ground work for dev. psych
- Proposed development occurs in stages.
- Proposed that children are not “mini-adults” or less intelligent. Different thinkers
- Children are active thinkers & always trying to make sense of the world.
Jean Piaget’s Theory of Cognitive Development

**Schemas**
- Used to help children progress in their cognitive development.
- Schemas form and are modified through experience.

**Assimilation**
- Take info about new objects by trying to fit them into existing schemas.

**Accommodation**
- Children find that a familiar schema cannot be made to fit a new object they CHANGE the schema.
Assimilation or Accommodation?

When little Augustus is given his first vitamin pill, he says, “Yea!!! Candy!!!!”

Baby Fedelia discovers a red chili-pepper on the floor and says “oooooooooo….candy!!!!” After she puts the chili-pepper in her mouth, she realizes that it is not at all like candy. Now when she sees a chili pepper she runs away.
AN INFANT ACCOMMODATING HIS MOUTH TO THE SHAPE OF AN OBJECT
Stage 1: Sensorimotor

- Birth to 2 yrs.
- Mental activity (schemas) confined to sensory & motor functions.
- Cannot form mental representations
- Stages end w/ the dev. of object permanence
Stage 2: Preoperational

- 2-7 yrs.
- Understand/create/use symbolic representations (Pretend Play)
- Begin to make intuitive guesses
- **Animism** is evident in thinking
- **Egocentrism** is evident in thinking
Piaget’s Stages of Cognitive Development

Stage 3: Concrete Operational

- 7-11 yrs.
- Develop **conservation** abilities.
- Thinking is no longer dominated by appearance of objects.
- Perform simple mental manipulations
- Think logically about concrete objects
Piaget’s Stages of Cognitive Development

Stage 4: Formal Operational

- 11 yrs. & up
- Engage in hypothetical thinking
- Reason & think about possible strategies
- Understand impact of the past/present/future.
- Question social institutions & what the world ought to be
- Consider consequences
Mnemonic:
Stinking Pigs Can’t Fly
Into which stage of Piaget’s developmental theory do each of the following fit:

1. A child sees a box of crayons that contains candles. He believes his mother, who has never seen the box before will also believe there are candles in the box. ____________________

2. A child does not understand that just because a blanket covers his favorite toy, the toy is still present. ____________________

3. The ability to do a liquid conservation test. ____________________

4. The ability to pretend. ____________________

5. The ability to add, subtract, and do multiplication tables. ____________________

6. A child understands the abstract thinking and reasoning. ____________________
Modifying Piaget’s Theory
What new research suggests...

- Changes from one stage to the next are less consistent & less global.
- 3 year olds can differentiate real & pretend
- Children are not always egocentric
- Preoperational children can do conservation tasks
Issues with Sensorimotor

(a) Objects placed in case
(b) Screen comes up
(c) Empty hand enters
(d) One object removed

Then either: possible outcome
(e) Screen drops revealing 1 object

or: impossible outcome
(f) Screen drops revealing 2 objects
Issues with Sensorimotor...

Habituation Events

Test Events

Possible Event

Impossible Event
Problems with Preoperational

- Theory of Mind
- Ability to infer other’s mental states
- b/w age 3.5-4.5
Development depends on more than general level…

1. How easy the task is
2. How familiar children are with objects
3. How well they understand language being used
4. What experiences they have had in similar situation
Cognitive Development happens in “waves...”

- Children develop different ways of thinking at different frequencies.

- Development is not fixed or permanent.

- Children tend to try many different solutions to problems, then gradually select the best.
Information Processing

- Focuses on gradual increases in children’s mental capacities

- As children get older, processing abilities gradually get better
  - Attention span increases with age
  - Short term memory storage increases with age

- Both nature & nurture account for these processes
  - Brain Maturation
  - Experience and exposure to information
Lev Vygotsky's Zone of Proximal Development

- SOCIAL WORLD is primary factor in cognitive development

- Acquire cognitive skills through interactions with parents, peers, & other agents of culture.

- W/o this- mind would not develop beyond animals
Zone of Proximal Development
"The Sweet Spot"

Can do alone
ZPD
Just can't do yet

Things the child can do all on their own.

The Zone of Proximal Development: Things the child can do with a bit of help (scaffolding), such as when prompted with leading questions, or watching an example setter. This is the space where learning and growth occur.

Things the child just can't do yet, regardless of scaffolding. For instance, advanced mathematics for a five year old.
Lev Vygotsky’s ZPD

Level of difficulty

Student’s depth of understanding

ZONE OF PROXIMAL DEVELOPMENT
Improving or Endangering Cognitive Development

• Delays in development can occur without…
  • Sensory Stimulation, Loving Interactions, Communication

• Evidence comes from children in Russian & Romanian orphanages
  • I.Q. scores tend to be, on average, 15 points lower

• Delays can also be seen in less extreme conditions of deprivation including neglect, malnourishment & chaos found in low income households

• **Improving** cognitive development seems to occur when parents…
  • Interact with their children (reading to them at a very young age)
  • Guide them in their learning (rather than just giving them the answer or solving the problem)