Piaget’s Genetic Epistemology & Sensorimotor Intelligence

- Genetic Epistemology – Integration of Development with Philosophy (Biology & Psychology)
- Large Community of Collaborators
- 3 Key Concepts
  - Action & Adaptation
  - Logic: Source of Necessary Truth
  - Stage & Epigenesis
- Stages & Equilibration

Cognitive Revolution: Jean Piaget & Genetic Epistemology

- How Do We Come to Know, In Development and History?
- An Epigenetic Framework
- Key Figure: Defining Issues for Field

Genetic Epistemology

- "Genetic" as in Genesis: Development
- "Epistemology": The Study of Knowledge
- Link to Kant & Baldwin: Universals of Knowledge Come from Acting in World.
  - Universals are not simply innate but constructed by people.

Piaget’s Talent at Observation

- Amazing Number of Surprising Findings that Replicate!
- Example: Conservation
Method: Clinical Interview

- Qualitative Method
- Goal: Relating to Individual
- Piaget as Master Interviewer
- Early Theory: Social Foundations of Development in Perspective Taking

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3 Key Concepts

1. **Action**: controlled transformation in world (or represented in mind)

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**Adaptation: Hand Grasping Pencil**

importance of *Adaptation* of action to objects/events

adapted action
His Personal Background

- Born in 1896 in Neuchatel, Switzerland.
  - ✓ Distant Cousins Founded Famous Piaget Watch Company.
  - x Distant Cousins Founded Famous Piaget Watch Company.
- Died in 1980 in Geneva at age 84.
- ✓ Over 60 years of research and theory on genetic epistemology.

Personal Background: Religious Crisis

Logic replaces Religion.
Logic replaces Religion as source of TRUTH

If P, then Q.

5 + 7 = 12
12 - 7 = 5

Building His System

1. Biology & Philosophy
2. 5 early books: "Working Papers"
   - The Child's Conception of the World
   - The Moral Judgment of the Child
   - The Child's Conception of Number
   - The Origins of Intelligence in Children
   - The Child's Construction of Reality
3. Theory built later, starting with Origins of Intelligence
4. Wealth of Observations

Collaborations

- Good at Spotting Important Ideas, Discoveries
- Public Collaborators: Inhelder, Sinclair, Bovet
- Hidden: Valentine Piaget, Alina Szeminska

Key Concepts

2. Logic:
   a system that is internally consistent (& reversible) & so avoids contradiction

action: 5 + 7 = 12
reversing 12 - 7 = 5
action:
Intelligence is Logic of the Mind

2 + 3 = 5
5 - 2 = 3

consistency
reversibility

Key Concepts

3. Stage
descriptive slices of development

stage 4. formal-operational int.
stage 3. concrete-operational int.
stage 2. preoperational intelligence
stage 1. sensorimotor intelligence

or stronger meaning of Stage

major reorganizations—
achieving a new Equilibrium
arising from a new Logic

action: 5 + 7 = 12
reversing action: 12 - 7 = 5

Epigenesis:
Major Transformation
as in construction of a new skill:

Sensorimotor Intelligence

Based in Actions & Perceptions

Mammals & Birds Have S-M Intelligence.
Perception

Representations Include Language, Pretend, Images (Internalized Imitations)

- "Pick up teddy."
- "See teddy."
- Child makes teddy walk, eat, talk.
- Child pictures or imitates teddy in his mind.

Preoperational Intelligence

based in Representations (internalized actions & perceptions)

Concrete Operational Intelligence

based in Operations (internalized reversible actions), including arithmetic:

- action: $5 + 9 = 14$
- reversing $14 - 9 = 5$
- action:
Formal Operational intelligence

based in
Operations on Operations

Example: Variable $X$ is an unknown operation, such as adding a number to get a sum. Algebra involves operating on $X$ to determine values.

One of Piaget’s Favorite Examples of Operations on Operations

✓ All possible combinations:
  ✓ Operating on the obtained combinations (concrete operations) to figure out all possible ones.
  ✓ Such as combining coins: penny, nickel, dime, quarter.
  ✓ You must go systematically through all possibilities: 1, 2, 3, & 4 at a time.
  ✓ If you do it by trial and error, like an 8-year-old, you leave out some.
Yesterday, scientists found a 3-year old skull of an animal with 5 feet & 2 heads that died 100 years ago.

What's wrong with this statement?
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