

Genetic Epistemology

Knowledge and Biology in the work
of Jean Piaget

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The Biological Problem of Knowledge

- “Whoever achieves understanding of the baboon will do more for metaphysics than Locke did, which is to say he will do more for philosophy in general, including the problem of knowledge.” *Notebooks on Evolution* (1837-39)
C.Darwin.

Basic Cognitive Functions

- **Cognitive functions** may concern the entire animal kingdom.
 - **Reflex and instinctive actions:** are allied to a chain of actions whose *programming* is inherited.
 - **Perception:** can be seen to intervene in instinctive behavior as well as in kindred behavior.
 - **Acquired behavior:** In this last group which extends from the Protozoa to right up to the human mind distinctions are usually made between conditioned behavior, the formation of habits of varying complexity, various types of *memory*, and various levels of *intelligence*.

Intelligence & Knowledge

- The term **intelligence** has no meaning of its own. It refers to particular behavior in the context of a given development stage. For example:
 - **Memory:** Various kinds of behavior that make use of something acquired previously.
 - **Evocative memory:** Develops around the age of two years probably represents the figurative aspect (recollection of images) of the conservation of *schemata*.

Knowledge

- Active view of processes through which we acquire knowledge:
 - **Assimilation:** the integration into previous structures, which may remain unaffected or else modified to a greater or lesser degree by this very integration, but without any continuity with the former state—that is without being destroyed by simply adapting themselves to the new situation.

Schemata

- *Schemata* is a concept used by Piaget to describe the structuring that results from the process of assimilation.
 - *Action schemata*: whatever can be transposed, generalized, or differentiated from one situation to another.
 - *Order schemata*: The kind of behavior involved in the act of arranging in order.

Equilibration and autoregulation

- Regulation proceeds from simple inherited mechanism to more complex forms of behavior.
- All learning by trial and error presupposes feedback structures of such a kind that the lesson learned by each trial has a chain reaction on those that follow, each referring to the point of departure and having a progressive anticipation of success or failure.

Equilibration and autoregulation

- Operations of thought, such as logical-mathematical thought can be considered as a vast auto-regulatory system which gives autonomy and coherence to the process of thought.

Autoregulation

- Piaget does not consider memory and logic to be two distinct departments:
 - the essential data are the perceptual sensori-motor schemata;
 - the conservation of these schemata is what constitutes memory, and their organization is what constitutes logic.

Autoregulation

- Conservation cannot take place without organization.
- Organization cannot take place without conservation.
- There is no absolute beginning but rather a system that is built by a progression of *equilibration* and *autoregulation*.

Equilibrium

- *Homeostasis*: Functional equilibrium
- *Homeorrhesis*: Coercive compensations that bring the organism back to a state of functional equilibrium.

Rhythm

- *Diachronic*: (from linguistics) Changes between successive points in time.
- *Synchronic*: (also from linguistics) Having reference to things as they exist at one point in time.

Conclusion

- Life is essentially auto-regulation.
- Knowledge is not a copy of the environment but a system of real interactions reflecting the auto-regulatory organization of life.

Technological applications

- Learning systems.
- Artificial intelligence systems.