The Cambridge Encyclopedia of CHILD DEVELOPMENT

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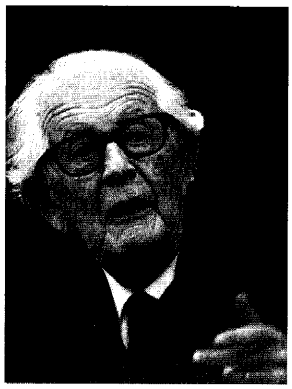
CAMBRIDGE
UNIVERSITY PRESS

Jean Piaget (1896–1980)

PIERRE MOUNOUD



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Given the abundant literature on Jean Piaget's life and work (Montangero, 2001), we concentrate here on crucial aspects of his theory on cognitive development that too often have been misinterpreted. To begin with:

- Piaget introduced a structuralist and constructivist approach to developmental psychology. His major contribution was to interpret children's behavior in terms of structures and transformations. Transformations are conceived as actions (physically or mentally produced) modifying the object's positions or its dimensions. Structures are the coordination of a set of objects' positions or dimensions and actions.
- Coordination may, for example, entail a relationship between a set of displacements of an object (e.g., placing an object inside, under, or behind another one) and its various localizations (to be contained, recovered, hidden); or the coordination of a set of transformations of a collection of objects (e.g., spacing and re-grouping) and its numerical invariance.
- At the core of Piaget's theory, there is the idea of the construction of new structures as ". . . a passing from a simpler to a more complex structure, this process . . . being endless" (Piaget, 1968/1971, pp. 54/62). These changes (i.e., "passing") are realized by means of adaptive processes such as abstractions and reconstructions.

These ideas remain relevant today. For example, Ungerleider & Mishkin (1982) have introduced a distinction between two broad streams of projections of visual pathways: a ventral stream playing a critical role in the identification and recognition of objects and a dorsal stream mediating the localization of those same objects. A successful integration of these two streams is actually considered as the origin of adaptive goal-directed behavior. This perspective sounds very close to Piaget's ideas.

We shall now illustrate the constructivist aspect of Piaget's theory, taking as an example the development of object permanence, inseparable from the structuration of space in terms of displacements, in order to specify how such construction is only possible if starting from previous structures related to the same type of problems (Piaget, 1968/1971). This construction takes place during the first eighteen months of life.

In the standard tasks, the infant has to look for an object hidden under or behind another one. Infants' difficulties are related to the organization of the successive displacements and locations taken by the object. They are misled by the tasks. They try, for example, to reach for the object in the direction of its initial location when in fact it has been displaced to a different location, or they search for it at the location where previously found.

According to Piaget, the progressive changes in behavior are made possible by the previously constituted structures enabling the infant to solve similar problems of object permanence at other levels of organization. Looking at the reflex behavior of the neonate for evidence of these primitive structures, Piaget considered that various reflex schemes could realize simple forms of permanence, which he qualified as "practical" (Piaget, 1937/1955, pp. 182/210). For instance, the rooting reflex is a behavior that allows the newborn to capture the mother's breast in order to maintain its practical permanence. In a similar way, oculomotor reflexes can be defined as the capacity to keep the permanence of visual contact with a moving object by means of visual tracking and capture. It is a form of coordination between object displacements and eye-head rotations.

We have considered two levels of object permanence dealing with the organization of space in terms of displacements, one at the level of the reflex schemes and the other one at the level of the sensorimotor schemes, as referred to by Piaget. Changes from one level to another are realized by abstractive and reconstructive processes. The new structures do not result from a simple re-description or generalization of the previous one, but instead from "convergent reconstructions with overtaking (dépassement)" or "reflective abstraction" (see Piaget, 1967/1971, pp. 366, 376 / 320, 329, for a definition). Thus, we can understand that recent discoveries related to the complexity of primary structures (e.g., numerical knowledge in infants)

do not necessarily contradict Piaget's constructivist theory.

In conclusion, Piaget's view on cognitive development is characterized by the construction of new structures that are based on previous ones. However, recent progress in infancy research shows that these primary structures are more sophisticated than initially thought by Piaget. These sophisticated primary structures foreshadow future structures without entirely predetermining them.