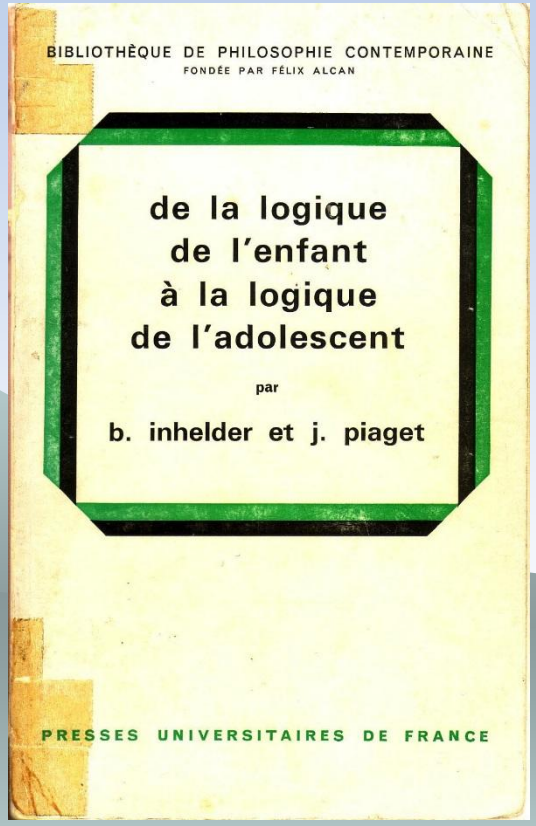
The Resurrection of Inhelder & Piaget's *The Growth of Logical Thinking from Childhood to Adolescence*

Toward a general theory on propositional reasoning

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Inhelder & Piaget (1955). *De la logique de l'enfant à la logique de l'adolescence*. PUF

- The purpose of this presentation is to reappraise Inhelder & Piaget's *The Growth of Logical Thinking from Childhood to Adolescence* (hereafter referred to as GLT).
- GLT is discussing development of propositional reasoning in children and adolescents who are trying to solve physical problems.



The modern major camps on propositional reasoning

- The modern major camps on propositional reasoning
  - The mental model theory presented by P.N.Johnson-Laird (hereafter referred to as MMT; Johnson-Laird & Byrne,1991)
  - The mental logic theory presented by M. Braine (hereafter referred to as MLT; Braine & O'Brien, 1998).
- MMT explains propositional reasoning in terms of drawing up of mental models and their manipulation.
- MLT explains propositional reasoning in terms of inborn mental logics and their application.

Evaluation on Piaget's Theory by MLT and MMT

- Johnson-Laird & Byrne say "The vagueness of his theory masked its inadequacy perhaps even from Piaget himself. The effort to understand it is so great that readers often have no energy left to detect its flaws." (1991, p.23)
- Braine & Rumain say "Piaget's logic clearly cannot develop at adolescence, or at any time - it is too problematic to stand as a psychological model of anything." (1983 p.316)

Evaluation on GLT by modern reasoning researchers

- Modern reasoning researchers find little to inherit from Piaget's theory and dismissed it almost completely. Modern psychologists discuss Piaget's theory only as something of historical interest.
- To the best of my knowledge, there is no North American and European researcher who appraises GLT in terms of a reasoning theory.

Reappraisal of Inhelder & Piaget's GLT

- Piaget's theory on propositional reasoning is, I believe, the most promising one among those that have ever been proposed.
- The core ideas of Piaget's theory on propositional reasoning
  - Operationalism
  - Structuralism
  - Constructivism

The Core Ideas of Piaget‘s Theory I Operationalism

- The entity involved in propositional reasoning is neither a mental logic nor a mental model but a mental operation.
- Mental models in MMT are mental objects on which mental operations take action or those that they produce after taking action.
- What is responsible for reasoning itself is not mental models as a figurative aspect of reasoning but mental operations as its operative aspect.

The Core Ideas of Piaget's Theory II Structuralism

- Propositional operations do not exist individually unlike mental logics or mental models. They are all interconnected with each other and constitute an operational system which Piaget called "une structure d'ensemble".
- Mental logics in MLT are formal formulations which describe some of the relatively stable relations found in the structure of propositional operations.
- What are called mental logics are not immutable instruments taken out of storage when necessary.

The Core Ideas of Piaget's Theory III Constructivism

- Propositional operations are neither innately given nor learned through education, but are constructed gradually through self-organization.
- To explain general development of reasoning ability
  - MLT: the primary and secondary inference schemas
  - MMT: the initial and fleshed-out models

  But we need not these distinctions. Piaget's theory distinguishes only organizational levels in the structure of propositional operations.

Piaget's Theory on propositional reasoning is the most plausible one among those that have ever been proposed

- Operationalism, Structuralism, Constructivism are the core ideas of Piaget's theory on propositional reasoning
- Unfortunately modern reasoning researchers fail to understand the significance of these ideas and dismiss them as implausible ideas.
- Piaget's theory is, I believe, incomparably superior to the other theories and follows the most promising path toward a general theory on propositional reasoning

Toward a general theory on propositional reasoning

- Piaget's theory is a competence theory and does not aim to explain reasoning performance.
- Once an appropriate auxiliary theory is incorporated into Piaget's theory, it can be transformed into a performance theory without changing the original competence theory (Nakagaki, 2005)

  Piaget's theory + The auxiliary theory = MOT
- MOT provides us with indispensable clues in order to solve the current problems modern reasoning researchers are tackling, such as how to explain reasoning biases (Nakagaki, 2008).

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Merci de votre attention

fin de l'exposé

