

Jean Piaget and Objectivity

Genetic Epistemology's Place in a View from Nowhere

Summary

According to Thomas Nagel, a **self-transcendent conception of objectivity** ideally explains:

- (1) what the world is like;
- (2) what we are like;
- (3) why the world appears to beings like us in certain respects as it is and in certain respects as it isn't;
- (4) how beings like us can arrive at such a conception. [1] (p. 74)

Genetic epistemology accounts for (4)

Specific Focus

'We tend to use our rational capacities to construct theories, without at the same time constructing epistemological accounts of how those capacities work ... What we want is to reach a position as independent as possible of who we are and where we started, but a position that can also explain how we got there.' [1] (p.74)

The Logic and Algebra of Theories

- Received (logical) view: a theory is any logically closed set of propositions [2] (p. 42)
- Algebraic view: A *filter* \mathbf{F} is a subset of a *Boolean algebra* \mathbf{B} satisfying:
 - (i) $1 \in \mathbf{F}$,
 - (ii) if $p \in \mathbf{F}$ and $q \in \mathbf{F}$, then $p \wedge q \in \mathbf{F}$,
 - (iii) if $p \in \mathbf{F}$ and $q \in \mathbf{B}$, then $p \vee q \in \mathbf{F}$ [3] (p.70).

From a logical viewpoint, \mathbf{F} represents the structure of a theory [4] (p. 17).

Decentration in the Development of Intelligence

Centration denotes fixation of specific aspects of objects and actions; *Decentration* corrects the distortions of centration by coordinating them [5] (p. 71).

Sensorimotor Stage

'In order to construct a space, a time, a universe of causes and of sensorimotor or practical objects, the child has had to free himself from his perceptual and motor egocentricity; by a series of successive decentralisations he has managed to organise an empirical group of physical displacements, by localising his own body and his own movements amid the whole mass of others.' [5] (p. 121)

Pre-operational Stage

'Intuition, at first dominated by the immediate relations between the phenomenon and the subject's viewpoint, evolves towards decentralisation. Each distortion, when carried to an extreme, involves the re-emergence of the relations previously ignored. Each relation established favours the possibility of a reversal. Each *détour* leads to interactions which supplement the various points of view. Every decentralisation of an intuition thus takes the form of a regulation, which is a move towards reversibility, transitive combinativity and associativity, and thus, in short, to conservation through the co-ordination of different viewpoints.' [5] (p. 138)

Concrete-Operational Stage

Operations of a Grouping:

1. two successive actions can be combined into one;
2. the action-schema already at work in intuitive thought becomes reversible;
3. the same point can be reached by two different paths without being altered;
4. a return to the starting-point finds the starting-point unchanged;
5. when the same action is repeated, it either adds nothing to itself or else is a new action with a cumulative effect. In these we recognize transitive combinativity, reversibility, associativity and identity, with (in 5) either logical tautology or numerical iteration, all of which characterize logical "groupings" or arithmetical "groups". [5] (p. 141)

'the detailed working of operations [of a grouping] simply expresses ... the combined conditions of a co-ordination of successive viewpoints of the subject (with possible reversal in time and anticipation of their sequel) and a co-ordination of perceptible or representable modifications of objects (in the past, in the present, or in the course of subsequent events).' [5] (p. 142)

Formal-Operational Stage

'Formal thought ... consists in reflecting ... on operations and therefore operating on operations or on their results and consequently effecting a second-degree grouping of operations.' [5] (p.148)

'the subject becomes capable of reasoning in a hypothetico-deductive manner, i.e., on the basis of simple assumptions which have no necessary relation to reality or to the subject's beliefs, and from the time when he relies on the necessary validity of an inference ... as opposed to agreement of the conclusions with experience.' [5] (p. 148)

The Interpropositional Grouping

It is the second-degree grouping characterizing hypothetico-deductive thought at the formal-operational stage of development

- Its operations can be derived from those of a Boolean algebra, and they operate on the structural possibilities as elements
- Structural Possibilities of Two Bivalent Propositions

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
$p \cdot q$	-	$p \cdot q$	-	-	$p \cdot q$	$p \cdot q$	-	$p \cdot q$	-	$p \cdot q$	-	$p \cdot q$	-	$p \cdot q$	-
$p \cdot \bar{q}$	-	$p \cdot \bar{q}$	-	$p \cdot \bar{q}$	-	-	$p \cdot \bar{q}$	$p \cdot \bar{q}$	-	-	$p \cdot \bar{q}$	$p \cdot \bar{q}$	-	-	$p \cdot \bar{q}$
$\bar{p} \cdot q$	-	$\bar{p} \cdot q$	-	$\bar{p} \cdot q$	-	$\bar{p} \cdot q$	-	-	$\bar{p} \cdot q$	-	$\bar{p} \cdot q$	-	$\bar{p} \cdot q$	$\bar{p} \cdot q$	-
$\bar{p} \cdot \bar{q}$	-	-	$\bar{p} \cdot \bar{q}$	$\bar{p} \cdot \bar{q}$	-	$\bar{p} \cdot \bar{q}$	-	$\bar{p} \cdot \bar{q}$	-	$\bar{p} \cdot \bar{q}$	-	-	$\bar{p} \cdot \bar{q}$	-	$\bar{p} \cdot \bar{q}$
p^*q	0	$p \vee q$	$\bar{p} \cdot \bar{q}$	$p q$	$p \supset q$	$p \supset q$	$\bar{p} \supset q$	$q \supset p$	$q \supset p$	$p \equiv q$	$p \wedge q$	$p q$	$\bar{p} q$	$q p$	$q p$

Conjunctions comprise the columns and connecting them disjunctively generates a disjunctive-normal form, which is abbreviated as a logical operator in the bottom row [6 Based on Table 100] (p. 214)

Boolean Congruence

- congruence relations glue elements of an algebra together
- a Boolean algebra \mathbf{B} can be reduced to its *quotient algebra* \mathbf{B}/\mathbf{F} , read \mathbf{B} modulo \mathbf{F} , via the congruence relation induced by a filter \mathbf{F} of \mathbf{B} .

Regarding the interpropositional grouping as the quotient algebra induced by a *Boolean congruence*; i.e., a congruence relation that converts the sentences of some theory into a Boolean algebra, the complete affirmation, p^*q , corresponds to 1, the unit element of the quotient algebra \mathbf{B}/\mathbf{F} , and the set of sentences equivalent to 1 corresponds to a filter \mathbf{F} . [3] (pp. 80-1)

Conclusion

- Decentration characterises the development of the interpropositional grouping.
- The interpropositional grouping represents an archetypical theory from an algebraic point of view.
- Piaget's genetic epistemology tells us how we arrive at our rational capacities to construct theories.

Genetic epistemology's place in a self-transcendent conception of objectivity lies in giving an account of how we arrive at our rational capacities to construct theories (4).

Ramifications

Since groupings represent the simultaneous coordination of viewpoints, the interpropositional grouping and therefore the archetypical theory is not a view from nowhere but rather the view that takes all possible viewpoints into account simultaneously.

References

1. Nagel, T. *The View From Nowhere*; OUP, 1986; ISBN 978-0-19-503668-8.
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3. Halmos, P.R.; Givant, S. *Logic as Algebra*; The Mathematical Association of America: 1998; Vol. 21; ISBN 978-0-88385-327-6.
4. Halmos, P.R. *Algebraic Logic*; Dover Edition; Dover Publications Inc.: 2016.
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6. Piaget, J. *Essai de Logique Opératoire*; Grize, J.-B., Ed.; Dunod: Paris, 1972.