

Continuing commentary

On Charles J. Brainerd (1978) The stage question in cognitive-developmental theory. BBS 1:175-213.

Abstract of the original article: The term "stage" appears to be used in three general senses in theories of behavioral development: (a) as a metaphor; (b) as a description of behaviors that undergo age change; (c) as an explanation of age-related changes in behavior. Although most existing stage models are purely descriptive, a few of them purport to have explanatory power. One such model, Piaget's stages of cognitive development, is considered in this paper.

To be viewed as potentially explanatory, a stage model must describe some behaviors that undergo age change, posit antecedent variables believed to cause the changes, and provide procedures whereby the behavioral changes and the antecedent variables can be independently measured. Piaget's stages seem to satisfy some but not all of these requirements. Piaget's stages describe many age-related changes in behavior, and some antecedent variables have been proposed. However, procedures do not exist for measuring the two factors independently. In lieu of such procedures, Piaget has outlined a "program" of five empirical criteria whereby the reality of his stages can ostensibly be verified. Some objections to these criteria are considered.

The five criteria in Piaget's program are invariant sequence, cognitive structure, integration, consolidation, and equilibration. Three of the criteria (invariant sequence, integration, and consolidation) lead to the same sorts of empirical predictions (culturally universal sequences in the acquisition of certain behaviors). Such predictions are subject to the objection that Piagetian invariant sequences are often measurement sequences. A measurement sequence is said to occur when some later-appearing behavior consists of some earlier-appearing behavior plus additional things. The cognitive structure criterion is subject to at least three criticisms: First, it yields, at most, descriptions of behavior; second, these are often nothing more than descriptions of task structure; third, they cannot be regarded as unique to the given stages for which they are posited. The fifth criterion, equilibration, generates some predictions that might be considered as *prima facie* evidence for the existence of stages. However, these predictions conflict with the current data base on Piaget's stages.

It is concluded that there is no compelling support for Piaget's hypothesis that his cognitive stages do more than describe age-related changes in behavior. Since explanatory statements involving stages appear with some regularity in Piagetian and neo-Piagetian writings, there are grounds for supposing this conclusion to be nontrivial.

From the study of psychological stages to the understanding of the processes involved in the cognitive development of child and pupil

Anne-Nelly Perret-Clermont

University of Neuchâtel, Switzerland and Faculté de Psychologie et des Sciences de l'Éducation, University of Geneva, 1211 Geneva 4, Switzerland

Piaget's theory and procedure: An approach derived from biology. Piaget and his collaborators study the development of intelligence by considering it to consist of the construction of a set of mental operations allowing the individual to adapt to his environment.

This approach - as Piaget himself has often suggested - is profoundly inspired by the biological perspective from which it was born. It has adopted some of that perspective's features, particularly the interest in the *forms* that the organism takes during its development. We suggest that this kind of interest is revealed in the attention that Piaget has devoted to describing the different stages of elaboration of cognitive structures. In Piaget's perspective the stages of development must be characterized by forms (that is, structures) of thought.

Let us state immediately, since Brainerd (1978a; 1978b) adds to his critique of the notion of stages a reflection on its pedagogical implications, that Piaget originally investigated the problem of knowledge as a biologist and epistemologist and not as an educator. It seems that from the beginning Piaget considered himself an observer and not someone committed in the way an educator is. Consequently he was not inclined to take into consideration - nor, hence, to evaluate - the eventual consequences of an educational commitment.

From the study of forms (and stages) to that of processes. We can note, however, that just as the science of biology, in

exploring experimental possibilities went beyond its initial interest in simple observation of forms to attempts to unravel the *processes* at work, so have Piaget and his collaborators, who during the last decade seem to have abandoned the description of stages and their characteristics in order to study the processes at work in development. They have described these processes in terms of autoregulation and equilibration (Inhelder, Sinclair & Bovet 1974; Piaget 1975).

We agree with these authors that the study of the processes at the origin of intellectual growth is essential to understanding its forms - and its eventual stages. This is why, in this commentary, we will not be concerned with Piaget's approach to the description of stages but with what seems to us a more fundamental problem: Piaget's view of the *mechanisms* that produce such stages. Let us recall that Piaget presents the stages he describes as "universal," as something like a cognitive developmental characteristic of the human species; he does not seem puzzled by the possible ethnocentric biases in the fact that the intercultural studies conducted by his school always seem to show a developmental superiority of urban middle-class occidental children compared to their peers of other social backgrounds. This is attributable, we believe, to Piaget's conception of the impact of social factors on cognitive growth: in Piaget's theory social factors may facilitate or slow down development, but they cannot directly enhance development. The experimental study of this question, we believe, could open the way to a better understanding of the nature of operational thought.

A process presently neglected by Piaget's experimental work: Social interaction as a causal factor of development. In their recent work, Piaget and his collaborators present the cognitive development of the child as arising essentially from the processes of autoregulation built into the subject as well as from

the dynamics of the structures themselves. But in various experiments we have conducted during these last years we have obtained data revealing a reductionistic aspect to this conception: Indeed we have shown that it is primarily when a cognitive conflict is *socially experienced* that important cognitive restructuring can be observed (Doise, Mugny & Perret-Clermont 1975; Perret-Clermont, Mugny & Doise 1976; Perret-Clermont 1980; Mugny, Perret-Clermont & Doise, in press). Precise comparisons of different experimental conditions have shown that it is mainly when two individuals with two different points of view are brought to interact on the same task (or to solve the same problem) that the necessity to coordinate actions (or points of view) emerges and provokes a sociocognitive conflict between the partners. This sociocognitive conflict gives rise to new cognitive elaborations, the consequences of which are noted on two levels: that of a collective performance superior to individual performance and that of subsequent progress at the level of the operational structure of the individual's thought.

The cognitive conditions of this conflict seem to have been relatively widely studied (see, for instance, Inhelder, Sinclair & Bovet 1974; Kuhn 1972; Lefebvre & Pinard 1972; 1974; Perret-Clermont 1980). But little is known of the *social* conditions of this conflict; these should be important to study, for, in our opinion, it is not at all evident that all sociocognitive conflicts (or conflicts in general) are always necessarily resolved by operational restructuring: other solutions are possible, such as nonperception or avoidance of the conflict, compliance with the other's point of view, submission, and so on. Under what social conditions is a sociocognitive conflict at the basis of an intellectual elaboration of the operational type? The answer to this question could help us understand how "universal" the cognitive structures described by Piaget are.

What are the social necessities that induce subjects to elaborate an operational solution to their sociocognitive conflicts? Research presently being carried out with some colleagues (Dionnet, Jacq, Lévy) suggests that the social relevance of a situation for the child can facilitate his cognitive structuring of the task and of the notions involved.

We mentioned previously that an understanding of the processes responsible for cognitive growth could lead to better comprehension of the forms into which they develop. If such is the case, it should be possible to formulate this last question within the framework of a debate on "stages." And this we will try to do here.

The examination of the question of stages: The operative structures described by Piaget would be the product of specific social interactions relative to tasks whose characteristics would seem to be perceived differently according to the level of development of the individuals concerned. Brainerd suggests that the operational structures to which Piaget refers are in fact merely "task descriptions." But then how can one explain that we arrive at a particular description of the task? Is this description trivial and immediately evident for all individuals? Brainerd does not propose any other description of the tasks concerned. Is this type of operational description of the task self-evident to the adult? But then how are we to explain that what is evident to the psychologist does not seem to be evident in the same way to the young child he is questioning (at least until a certain age, which varies according to cultural context)? Our question then becomes, What are the interindividual relationships that lead the child to elaborate the behaviors that Piaget calls "operational"? The answer to this question is important for optimizing pedagogical strategies.

Educational relevance of the issue. By definition, the educator is always in a situation of social interaction with his students. Therefore it is one of his duties to examine to what extent the modalities of social interaction that he imposes upon them (and that he induces them to experience among themselves) are sufficient to induce - or to inhibit - cognitive

elaborations. Can he observe that the students progress in their understanding of the task he proposes? If the educator wanted to make that observation by referring to Piaget's stages it is evident that he would be using an instrument that is inadequate because it is too global. But his observations he could make as Piaget did. It seems to us that Piaget's constructivist and interactionist approach, if it takes into consideration the role of the social context in which the child develops, could help us understand not only how to choose the moment for an educational intervention but also how to define the type of intervention and how to modify it according to its results.

ACKNOWLEDGMENT

Most of the research cited here has been conducted with the financial support of the Fonds National de la Recherche Scientifique (projects 1-343-0.76 and 1-706-078).

NOTE

1. Are all the behaviors of this type elaborated simultaneously or is it a question of parallel - or independent - development? This is the main question in the present debate on "décalage" which would certainly be clarified by an identification of the causes of development.