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Piaget and The Foundation of Knowledge

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CALL FOR PAPERS AND WORKSHOP PROPOSALS FOR TENTH SYMPOSIUM

Format details for the submission of paper, symposium, and workshop proposals for presentation at the tenth annual symposium of the Society are contained on page 13 of this issue of the **Genetic Epistemologist**. The **deadline** for submission is **January 2, 1980.**

FUTURE OF PIAGETIAN PSYCHOLOGY

The four papers which follow were presented on 16 March of this year at the Society for Research in Child Development meetings in San Francisco. They were part of a symposium carrying the above title. Since the genesis of this symposium was somewhat unusual, perhaps a few words of introduction would not be amiss.

This year, as an experiment, the SRCD Program Committee made three additions to the program in an attempt to liven things up. (This is not to say that the program was ever dull in the past!) First, there were eight invited "orientation lectures" dealing with current issues in fields such as ethology, language development, and socialization. Second, there were four invited "special topics lectures" delivered by **Eleanor Maccoby, Marcel Kinsbourne, William Meredith,** and **Robert McCall.** Finally, there were six invited symposia on themes that, for some reason, were considered to be high-profile by the Program Committee. The present symposium was one of these.

The task of putting together the roster of topics and people for the symposium fell to me. There are, of course, many hot areas of investigation within Piagetian theory. So a dearth of topics and people was hardly a problem. Instead, the difficulty was selectivity. According to the rules, the number of presentations had to be limited to a minimum of three and a maximum of four. Although it may be possible to boil other theories down to three or four key areas, it is impossible with Piaget. The only reasonable alternative strategy that I could think of was to isolate three or four areas that, on the basis of my reading of the literature, show high levels of current activity and are likely to remain productive for the foreseeable future.

The areas that ultimately were chosen are infancy (Uzgiris), applications to curriculum development (Murray), theoretical models (Gelman), and learning (Brainerd). Although these areas all satisfy the criterion that I described, they certainly reflect my own biases about what is and is not important in contemporary neo-Piagetian work. This is most especially true of learning. Of those areas that were left out, I particularly regret not being able to include concept-sequence research, cross-cultural work, stage-structure, information processing analyses of Piagetian tasks, applications of Piaget to retardation, and extensions of Piaget to the domain of individual differences. See what I mean about selectivity?

C. J. BRAINERD

WHY WE WILL CONTINUE TO READ PIAGET[1]

Rochel Gelman
University of Pennsylvania

When I got down to thinking about what I might say today, I wondered what had possessed me to accept an invitation to participate in this symposium. I found myself asking, "How do I know what the future will hold regarding Piagetian theory? I don't even know the future of my own work!" Such thoughts were underscored by a look back at what I was doing and thinking some fifteen years ago. I, like many other psychologists in the United States and Canada, was very much involved in Hullian theory. And the simple fact is that I no longer consult the writings of Hull--a fact that I assume is not unique about me as a scholar. This confrontation with my past led me to change the question before us today to another one: Will I and others continue to consult the writings of Piaget some fifteen years from today? I think so and will share my reasons with you. But first a note of caution.

Although I think some of Piaget's contributions will influence and be known by the cognitive developmentalist working fifteen years hence, I do not think that the future is going to be kind to all features of Piagetian theory as we know it today.

[1]Support for the preparation of the paper came from grants from NSF (BNS 03327) and NICHD (HD 10965).

To illustrate why, I consider the work of Piaget from different perspectives.

The Logic Model

Consider one of Piaget's major theoretical efforts, the development of logic models to describe concrete and formal operations. I find it hard to believe that the logic model, as we know it, will survive the tests of time.

Take Osherson's (1974) work on the role of the grouping model as an account of the way elementary-school aged children solve problems involving length and class concepts. Osherson developed a theory for rendering testable Grize's axiomatization of concrete operations. The same set of derivations were translated into length and classification tasks. Then children's observed patterns of success on these two sets of tasks were compared to those predicted from the logic model. It turned out that the theory of groupings worked quite well for length tasks. Unfortunately the same was not true for classification tasks. For me, these results are sobering. Despite an overall comparable success rate on the two tasks, the errors made were not comparable. If a common formalism is not appropriate for modeling the behaviors in these very similar task domains, it is unlikely that the same formalism will be appropriate for modeling the different task domains of conservation, seriation and classification.

It is not just Osherson's work that challenges the validity of the logic model for concrete operations. It's a serious question as to whether there is a linking relationship between conservation and compensation (Acredelo & Acredelo, 1979; Brainerd, 1976; Gelman & Weinberg, 1972). Then, there is the fact that children often pass number conservation tasks before they succeed on class-inclusion and other classification tasks. But number conservation is treated theoretically in the model of concrete operations in a way that presumes the availability of classification structures (Piaget, 1952). Parenthetically, it is noteworthy that Piaget (1977) has offered an alternative account of number conservation.

So, if I focus simply on the facts about the way the logic model deals with some of the standard Piagetian tasks, I see the theory to be in trouble. What's the future of this aspect of the theory? I'm not sure. If we get down to the business of altering the formal descriptions of the phenomena, we could find a formalism that is closely related to the present one. But we could also find that new formalisms will be needed. I suspect the latter will be the case and therefore venture to guess that the present model will have some historical significance and that future models will not be based on the current one. This is because I do not see how any unified logic model will deal with the data. This brings me to the issue of stage.

The Stage Theory

There was a time when I thought it reasonable to accept the idea that a common cognitive structure underlies a diverse set of cognitive abilities, e.g., conservation, seriation, classification, perspective-taking--to name a few. Moreover, it seemed reasonable to entertain the notion that an overarching qualitative change characterized the difference in cognitive abilities of the preschool child and the 6 to 7 year old child. I no longer hold these views. To illustrate why, I want to focus on three different kinds of tasks: perspective-taking, transitive inference, and number.

I think there is little, if any, reason to continue to entertain the notion of a stage theory for the development of perspective-taking abilities. Instead it looks as if the development of perspective-taking starts very early and is something children keep getting better and better at Shatz (1978) has argued this for communication abilities. The work of Flavell and his collaborators points to the fact that a similar argument can be made for visual perspective-taking (e.g., Lempers, Flavell, & Flavell, 1977). It's not that there is no development in these domains; there is. But it does not seem to involve stage-like qualitative transitions. A similar state of affairs seems to apply for transitive inference tasks. Trabasso and his colleagues highlight the role of memorial and semantic problems in these tasks. What's more they fail to find preschool children using one structure and older children another structure. Indeed, the same underlying structure applies to the solutions of young children, school-aged children, and adults (Trabasso, 1975).

Although the evidence is such as to make it hard to maintain a stage theoretic position regarding perspective-taking and transitive inference abilities, the same is not true for numerical reasoning abilities. Yes, young children have richer numerical abilities than we once saw. The evidence is that their counting abilities are guided by principles of counting such as one-one correspondence, stable-ordering and cardinality (Gelman & Gallistel, 1978). Further, young children can, under certain conditions, reason about numbers. It is possible to show that they know that addition and subtraction are number-relevant transformations and that displacement and item substitution are number-irrelevant transformations. These are the findings of the "magic" tasks (e.g., Gelman, 1977). This is true *if one condition holds*, i.e., the child can achieve a specific numerical representation. This is in turn related to the young child's dependence on a counting algorithm (Gelman & Gallistel, 1978).

It is noteworthy, that one *cannot* obtain a specific representation of an infinitely large set of items. Nor can one count to represent zero or negative numbers. These are defined in terms

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of operations. Thus a child who must reason about specific numbers which are represented via the application of a counting algorithm is at a qualitative disadvantage when compared to a child who can reason about unspecified x's and y's and understands zero and negative numbers. Thus, it is reasonable to suggest that the development of number concepts passes through qualitatively different stages.

I consider these three examples because they help me make a general point. This is that as we get close up to concepts of young children, we are likely to find that they reflect different structures. We will not have one grand stage theory. The development of some concepts might pass through stages; however, there are some that clearly do not.

All of my comments to this point might be taken as reasons for being pessimistic about the future of Piagetian theory. Yet I am sure that Piagetian works will continue to influence students of cognitive development. And I submit this will be true even if there is no way to retrieve the logic model or maintain a notion of a massive stage shift from preoperational to concrete operational thought. This is because Piaget has given us some fundamental theoretical insights as well as some fundamental phenomena.

The General Theory

Piaget's theory of cognition and its development gives us some key ideas about the nature of cognition, ideas that I submit we cannot do without. One of these is that cognitive development involves "an evolving relation between child and environment" (De Lisi, 1979, pp. 1-2). Insofar as this is an alternative to the Kantian and Empiricist accounts of knowledge acquisition, it cannot be ignored. Since De Lisi deals with this issue in the previous issue of *The Genetic Epistemologist,* I won't dwell on it. Instead, I'll turn to related key Piagetian notions.

Piaget was the first to point out the role of transformations in a theory of cognition. The world is known not only in terms of static representations of it; we "know" how transformations will affect objects or classes of objects. Likewise our representations include knowledge of those transformations that do and do not change certain properties of an object or class of objects. How such knowledge develops is a central concern of Piagetian theory. Since I cannot imagine anyone denying the central role of transformations in a theory of cognition, I think we will continue to be influenced by Piaget's ideas and related observations on the object concept, conservations, etc.

I also find in Piaget the most lucid treatment for the view that we represent reality in terms of schemata. As far as I can tell current students of adult cognition (e.g., Schank & Abelson, 1977; Rumelhardt & Ortony, 1976) are reinventing schema theory. From my reading of these works, I find myself thinking, "If only they would read Piaget."

Finally, there are the concepts of assimilation and accommodation. It is hard, if not impossible, to explain the young child's tendency to count *on their own* without the notion of assimilation. A 2-1/2 year old may say "2-6" when counting a 2-item array and "2-6-10" when counting a 3-item array. The fact that young children invent their own count lists can be explained if we assume that counting principles (or schemata) are guiding the search for (or assimilation of) lists in the environment. Likewise, the shift from the use of idiosyncratic count lists to the conventional ones in a given community makes sense if we recognize the workings of accommodation (Gelman & Gallistel, 1978). I use preschool counting as an example of where we need the concepts of assimilation and accommodation because I know it so well, and not because it is the only one I can think of. Indeed, it seems to me that the more we learn about cognitive development, the more we will recognize the ever-present roles of assimilation and accommodation.

The Phenomena

Piaget is centrally concerned with the child's construction of reality. As did philosophers before him, he focused on the acquisition of concepts of objects, time, space, causality, quantity, and so on. It is inconceivable to me that we will continue to study cognitive development and ignore these concepts. To do so would be to give up an interest in the way the child comes to represent and understand his world. But it is not just because Piaget chose some of the key phenomena to study that I see us reading his works at least fifteen years from now. Piaget has been and continues to be an astute observer of children. He gives us some of the most reliable phenomena in psychology. Even the most skeptical reader of Piaget has to deal with the remarkable reliability of Piaget's tasks of conservation, seriation, class-inclusion, etc. There may be a change in how we explain these observations; still they must be explained. For they are amongst the phenomena that make it possible to claim there is a field of cognitive development. Given this I believe we will be reading Piaget for *at least* fifteen years hence.

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