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Culture and Cognitive Development from a Piagetian Perspective

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Jean Piaget was a genius. Considering his enormous contributions, I would not hesitate to say he was much like Einstein, or Freud. At least we can say that without his many contributions, we would not have the same understanding of the cognitive development of humans. To be his student was fascinating, because there was this aura around the master (in French: "le patron"). He was challenging, because he expected a lot from those who worked and studied with him, and he did not make access to his theory very easy. He was amusing, had a series of quaint habits (such as answering his mail while lecturing or being several hours early to catch a plane) and he was also frustrating at times (for example, he might call at six in the morning to ask for a report on the latest study).

Studying psychology in Geneva for several years, as I did, necessarily meant studying Piagetian developmental psychology—or in more ab-

struse words, "genetic epistemology." Genetic, not because he studied genes, but because Piaget was interested in the *genesis*, the formation and development, of reasoning and thinking, and *epistemology* because he was passionately interested in the history and philosophy of science. He saw developmental psychology as a method and as the best way to study how scientific reasoning came about in Western culture.

Nowadays, while there may still be some declared or pure Freudians, there are hardly any "orthodox" Piagetians left; the newer research and theory building (that nevertheless acknowledges the master's influence) flies under the "neo-Piagetian" flag (Dasen & de Ribaupierre, 1987). Yet the basic Piagetian ideas continue to be influential in education as well as psychology. Essential to cognitive psychology and artificial intelligence is the careful study of thought processes rather than just test scores. Piaget introduced the so-called "clinical method" to the study of cognition: around some task to be solved, he would have an open, non-standardized, dialogue with the child, much like a clinical psychologist may talk with a patient. The outcome would be a dynamic description of the child's thinking processes rather than a simple and static score on a psychological test, such as a score on an I.Q. test. A basic tenet of Piaget's theory is that these processes change qualitatively with age, in a succession of hierarchical stages (and substages). The stages necessarily appear in a fixed order, since

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any one stage is based on the previous one. In a way, Piaget was a cartographer of the mind; his procedures helped him construct a map of the child's cognitive processes.

CROSS-CULTURAL PSYCHOLOGY: THE WORLD AS A LABORATORY

Because of Piaget's particular methodology (questioning a few children at length), his theory was established on very small samples. All of Piaget's theory of development in infancy (the so-called sensori-motor intelligence stage) was based on the careful observation of his own three children. For later stages, the research was mainly carried out in schools in the city of Geneva. Yet Piaget was not really interested in any particular children, of any particular nationality or social class; he was, in fact, interested in the reasoning of humans, and he assumed that what he was discovering in Switzerland with just a few children would be universal.

Was Piaget right in his assumption about the universality of these processes? Yes, to some extent—but no, not completely. For roughly twenty years, between about 1965 and 1985, researchers went to various, often exotic, cultural settings to answer this question. It is one of the goals of the cross-cultural, comparative method to put theories to what amounts to the "ultimate" test: Which aspects are indeed universal? Which must be understood in culture-relative terms only? Without empirical evidence, without convincing data, it is impossible to come up with clear answers to these questions. Within any single setting, too many variables are confounded, i.e., inextricably linked. For example, chronological age and environmental stimulation (such as schooling) are frequently bound together very tightly. In the setting where Piaget and his colleagues were doing their research, all children are schooled at the same age. What, then, produces the observed major shifts in behaviour, chronological age or schooling? To answer this question, cross-cultural research is needed, research in settings where children of a given age have differing amounts of schooling, including some who do not go to school at all.

Arranging such experimentation is more easily said than done. How do you study unschooled children? How do you make sure the sampling is not biased (because those who go to school are selected differently from those who don't)? How do you test

unschooled children who are not used to being questioned? How do you make sure they understand your questions? All these and many other methodological questions make for very difficult

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and time-consuming research. Wouldn't it simplify things to stay in the laboratory, or in some comfortable classroom? These settings are certainly safer and easier, but may be less interesting! Are you ready for a field-trip amongst hunters and gatherers?

The Eco-Cultural Framework: Nomadic and Sedentary People

My first cross-cultural research took me as far from Geneva as one can go, to remote parts of the desert in central Australia. It is there that I studied child development among the first inhabitants of that continent: Australian Aborigines, those who lived there "since the origins" (or what they themselves call the "dreamtime"), which in archaeological terms is at least 30,000 years. Aborigines have survived in an extremely harsh environment, gathering a large variety of plant foods, hunting, moving constantly from one place where water could be found to another, over a very large territory. Their material culture is extremely simple. Except for a few personal objects (such as the men's weapons and the women's digging stick), there are no goods to be owned, no produce to be stored or sold. On the other hand, they have an active spiritual life, one that includes elaborate (but egalitarian) social structures, rituals, myths, and symbolic art forms. Their value-system, and especially their relationship to the environment, is about as far removed from that of Western, industrial society as Alice Springs is from Geneva.

What about the cognitive development of Australian Aboriginal children? Would it follow the same stages as those Piaget found in Geneva? Would it proceed at the same speed? Or could it be radically different?

For this study with schooled Aboriginal children aged 8 to 14 years, Piagetian tasks were used in mainly two domains of so-called "concrete operational" reasoning: quantification and space. In the area of quantification, a typical Piagetian task is the conservation of liquids: Two identical glasses are filled with equal amounts of water, then the liquid in one of the glasses is poured into a container of a different shape, for example a long and narrow one. The young child, who pays attention to only one feature at a time, is struck by the height of the water in the second glass, and believes it now contains a larger amount to drink. Piaget called this a "non-conservation" or "pre-operational" answer. With concrete operational reasoning, the child will say that the amount of water does not change, that the water in the new glass may rise higher but is also narrower. The change from one type of reasoning to the other is not a sudden one, but occurs through intermediate substages, and in Geneva this shift occurs between the ages 5 and 7.

In Australian Aboriginal children, the same type of reasoning occurred, with the same stages and substages, but the shift was found to take place between 10 and 13 years; a fairly large proportion of adolescents and adults also gave non-conservation answers. This was also true with other conservation tasks, dealing with concepts of weight and volume.

Piagetian tasks were also used in the domain of spatial reasoning. In one of these, the child is confronted with two landscape models, one of which is turned around by 180 degrees; the task is to locate an object (like a doll, or a toy sheep) on one model, and then find the same spot on the second one. In another spatial task, a bottle is half filled with water, and is tilted into various positions, with a screen hiding the water-level; outline drawings of the bottle are produced and the child is asked to draw in the water-level.

With these tasks, the Australian Aboriginal children again displayed reasoning that followed the sequence of substages Piaget had described. But contrary to children in Geneva, who usually find these spatial tasks to be much more difficult than the conservation tasks, the Aboriginal children found them to be easier. Another way to express this finding is that, for the Aboriginal children, concrete operational reasoning in the spatial domain develops more rapidly than it does in the area of quantification. How can that be?

Considering Aboriginal culture, this actually makes good sense: Aborigines, at least in the tradi-

tional setting, do not quantify things. To find water is important for survival, but the exact quantity of it matters little; if the hunt has been successful, the meat is shared, but not according to quantity or weight: each particular part of the animal has to go to a particular person, depending on kinship relationships (e.g. the best piece to the mother-in-law). Also, counting things is unusual: number words exist up to five, beyond which it is "many." In contrast to this, finding one's way about is very important: water holes have to be found at the end of each journey, and while members of a family may go different routes during the day, they find each other in the evening. The acquisition of a vast array of spatial knowledge is helped by the mythology, the "dreamtime" stories, that attribute a meaning to each feature of the landscape, and to routes travelled by the ancestral spirits; it is also reflected in the artwork that often symbolically depicts locations and the paths between them.

Thus, the relative rate of cognitive development in different domains, such as space and quantification, reflects what is highly valued in the culture, and what is less valued, and also what is needed, what is adaptive. That Aborigines may not feel a need to quantify things may, at first, seem strange to Westerners, who place such a high value on quantification, and on material possessions. For an orthodox Piagetian developmental psychologist, it takes some serious anthropological decentration to admit that the conservation of quantity may not be essential! Cross-cultural research points to the importance of the *context* in which the developmental changes and adaptations take place. In other words the settings, child-rearing customs and parental ethnotheories that make up the developmental niche are central.

These findings were later replicated in a study with Inuit (Eskimo) children, another traditionally nomadic people, whose subsistence was based more on hunting than it was on gathering. On the other hand, in two groups of sedentary, agricultural people (the Ebri and the Baoulé of Côte d'Ivoire, West Africa), children were found to move rapidly through the stages in the domain of quantification, and much more slowly in spatial reasoning. This finding is again in congruence with an eco-cultural analysis of what is needed, valued, more easily expressed in the language, and promoted in child-rearing practices. The general eco-cultural perspective alluded to here has been developed over the years by John Berry, and serves as a theo-

retical framework of two textbooks in cross-cultural psychology in which more details can be found (Segall, Dasen, Berry, & Poortinga, 1990; Berry, Poortinga, Segall, & Dasen, 1992).

However, cross-cultural findings on Piagetian cognitive development are not quite as simple as presented here. Further distinctions have to be made, for example between the spontaneous performance of a task and the underlying competence this is supposed to reflect. Moreover, methodological problems occur, and frequently the effects of some factors (such as schooling) are more complex than initially expected. All these refinements have been dealt with in other reviews (e.g. Dasen & Heron, 1981) and books (e.g. Dasen, 1977) and need not concern us here.

Some Theoretical Implications

The theoretical implications of the many cross-cultural findings accumulated over the years by using a perspective based on Piaget's theories are the following:

1. The qualitative aspects of concrete operational cognitive development (the type of reasoning, the sequence of stages) are indeed universal. The affirmation of universality now rests on a large body of empirical facts rather than being claimed *a priori*.
2. The rates of cognitive development in various domains are not uniform, but depend on eco-cultural (and other environmental) factors. A similar lack of domain consistency was later found to be true for all children, even in Western settings. Comparative studies often serve as a magnifying glass: they draw attention to phenomena that may go unnoticed in a monocultural setting.
3. This implies that it is not possible to attribute to any individual a single stage of cognitive development (i.e. as a summary measure, such as an IQ).
4. *A fortiori*, it does not make sense to attribute such a single stage to a group. For example, it may not be said that Australian Aborigines are at the pre-operational stage because most of them spontaneously give non-conservation answers. For one thing, their reasoning is likely to be at the concrete operational stage for spatial concepts.
5. The eco-cultural framework within which the data are interpreted precludes attributing value judgments to developmental sequences: it is not necessarily "better" to give a conservation rather than a non-conservation answer, at least not for an

Australian Aborigine in the traditional setting. In the new settings brought about by acculturation (for example, at school), it may indeed be more adaptive to handle quantification concepts with ease; in this case, they could be taught explicitly—and the more materialistic value system at the same time!

Practical Implications

Not everybody will be fortunate enough to meet an Australian Aborigine, an Inuit, or a Baoulé. But cross-cultural research also has implications for issues in Western, industrial settings. What could this research mean to, say, a teacher in a multicultural classroom in the United States, Canada, or Switzerland?

First of all, the eco-cultural framework would lead the teacher to look for the presence of skills brought along from the pupil's previous settings, instead of deploring only the absence of the particular skills required by the school. In other words, the framework leads to a "difference hypothesis" rather than a "deficit hypothesis." This does not preclude intervention measures, but determines their orientation. The deficit hypothesis leads to compensatory education, a "remedial" approach that implies a forceful assimilation to the dominant norms. The difference hypothesis, on the other hand, will lead to building on existing strengths, and provide the necessary skills without a derogatory value judgment on their absence.

Given this general outlook, the teacher's conception of the school as an institution might also change. If some pupils have problems, it may be not because they have some deficit, but because the school is not meeting their needs and characteristics. Maybe the school still has a monocultural philosophy, maybe only the dominant language (that of the majority, or the so-called national language) is deemed appropriate. Whether or not these speculations have some truth value obviously depends on each particular context.

A More Emic, or Relativistic, Perspective

The research described above has used, as a point of departure, a theory (and its attendant techniques) that originated in the West. The cross-cultural method served to test this theory for its universality, and to change it so as to take cultural variables into account. This approach is sometimes labeled the "etic" approach—"imposed etic" if the

theory is exported and applied as such, and "derived etic" if it can be shown to be locally relevant—which is what I would claim to be true for Piagetian concrete operational reasoning.

The fact that this reasoning occurs potentially everywhere does not mean that it is what is most valued everywhere. Even more so, hypothetico-deductive scientific reasoning, Piaget's last, so-called "formal" stage, is not necessarily what is most valued in every community, not even within Western societies. In fact, the development of formal reasoning (as strictly defined by Piaget) seems to be strongly dependent on secondary schooling. When Piaget studied formal reasoning in Geneva, he did so in schools that were highly selective, attended by only about five percent of the population in that age group. It needed studies with other samples to discover that formal reasoning is not as pervasive as initially thought.

I would still claim that some form of highly abstract reasoning occurs everywhere, but possibly taking different forms or cognitive styles. Recent research in Côte d'Ivoire by Tapé Gozé suggests that the abstract reasoning valued in the African world view is "experiential," symbolic, global, inductive, analogical, end oriented, and seeks to answer the question "why," as opposed to formal reasoning, which is experimental, analytical, deductive, digital, causality oriented, and asks "how."

Such a typology can be explored without returning to a sort of "great divide" theory, popular in the earlier parts of the century where dichotomies such as logical/pre-logical or civilized/primitive were often used. Replacing such ethnocentric thinking and theorizing is the much more fair idea of cognitive styles or learning styles.

Studies that are carried out within their own cultural context, with theories and methods indigenous to that context, are sometimes called "emic." While there are obvious advantages to this approach in terms of cultural validity, an extreme cultural relativism precludes any comparison, and hence excludes the possibility of finding out what is common to humanity. This is why more emic (indigenous, culturally relative) research may be a desirable goal, but cannot be the exclusive goal of cross-cultural psychology.

In our study of the concept of *n'glouèlè* among the Baoulé of Côte d'Ivoire, we found that this superordinate concept of intelligence referred to both "technological" aspects (cognitive alacrity) and "social" aspects (cooperative social responsibility). In the Baoulé parental belief system about the goals of

child development and education, the social aspects were clearly more valued than the technological ones. Cognitive skills are valued only if they are used for the good of the social group, not for individual promotion. When we asked the parents to evaluate their children in terms of that local definition of intelligence, there was, overall, no relationship between that assessment and the children's results on the Piagetian tasks, and even some statistically significant negative correlations with the spatial tasks. In other words, what the Baoulé parents value most in their children is not the same as, or is even the opposite of, what these Piagetian tasks measure.

CONCLUSION

We have seen that Piaget's theory has withstood the trial of cross-cultural testing rather well. The main aspect, namely the hierarchical sequence of stages and substages, was found to be universal. On the other hand, cultural differences were found in the relative rate of development of concepts in different domains (such as quantification or space). Another way to express these findings is that the *deep* structures, the basic cognitive processes, are indeed universal, while at the *surface* level, the way these basic processes are brought to bear on specific contents, in specific contexts, is influenced by culture. Universality and cultural diversity are not opposites, but are complementary aspects of all human behavior and development.

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