COMMENTARY

Bounding Culture

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Alison Gopnik, Andrew N. Meltzoff and Patricia K. Kuhl (September 1999), *The Scientists in the Crib — Minds, Brains and How Children Learn*. 1st edition, William Morrow & Co. Hardcover; 279 pages; Dimensions (in inches): 1.00 × 9.66 × 6.45. ISBN: 0688159885.

Cognitive development is a process from an initial knowledge state at birth to a later mature one. The problem of developmental psychology is to describe and explain the intricacies of this process. In "The Scientist in the Crib", Alison Gopnik, Andrew N. Meltzoff and Patricia K. Kuhl approach this problem from the perspective of one theory in developmental psychology — the theory theory.[1]

The book focuses on three "knowledge"[2] domains: other people, the natural world, and language. For each, the authors give a general description of development till the stage where children acquire the basic tenets of adult competence. For instance, knowledge of other people starts with a capacity to represent people and an assumption of similarity between the self and the other. During the first year, children know that it is possible

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[2]I'm using italics for meaning or emphasis, single quotation marks for mention, double quotation marks for quotation or as scare quotes. I put scare quotes here only to alert the reader who has in mind the more restricted classical definition of 'knowledge' as *true justified belief* (Dancy, 1985). However, for the authors, there is no problem: their discussion of philosophical problems in the first chapter supposes a naturalized epistemology — an emphasis on the context of discovery instead of the context of justification.

to share other people's perceptions and feelings. Later, they start to notice differences as well. By the age of two or three, they understand that people can have different desires and perceptions. Finally, by the age of four or five, they reach a representational view of the mind envisaging the possibility of false beliefs. In a nutshell, as a result of this developmental process, children acquire the concepts of perception, emotion, desire and belief basic to adult naïve psychology.

As far as Gopnik et al's explanation of cognitive development is concerned, the first component of their approach is linked to the domain of the cognitive sciences: the mind-brain is a biological computer designed by evolution. More specifically, they argue that evolution has configured innate programs and a capacity to reshape these programs during development. For instance, the initial knowledge state of the mind-brain has a specific program capable of representing people and a simple rule of similarity to manipulate this type of representation, however, during development, the mind-brain is reprogrammed to acquire the basic structure of naïve psychology.

Evolution has also built in a fundamental motivational force — the desire to explain the environment: "Explanation is to cognition as orgasm is to reproduction: it is an intensely pleasurable experience that marks the successful completion of a natural drive" (1999: 163). But this is the foundation of the second component that specifies Gopnik et al's approach: children and scientists engage the same cognitive machinery in developing their knowledge. Even if this hypothesis does not apply to the same extent to all knowledge domains (see the qualifications the authors make about the case of language), it confers the singularity of their theory.

The authors are not arguing that children and scientists are equal in all cognitive respects. Children do not use the type of reflexive thinking and do not advance the same kind of meta-methodological concern with the reliability of the evidence that scientists often do. These contrasts notwithstanding, the essential similarities hold: first, the programs are theoretical structures with predictive and explanatory functions — e.g., naïve psychology has the function of predicting and explaining behavior. Second, the domain-general capacity of reshaping the programs applies to specific domains resulting in domain-specific theories — e.g., naïve

psychology and naïve physics.[3] Third, this capacity is the theory-building capacity of hypotheses formation and confirmation; and the transition between programs is the same process of theory change in science: resistance to initial counter-evidence, accumulation of anomalies with the formation of new hypotheses and experimentation to get confirmation. For instance, two-year-old children initially do not consider the evidence for the hypothesis that people have different desires because their initial program has an explanatory rule of similarity, however after the accrual of counter-evidence, they form this hypothesis. Then, they systematically begin to do things parents don't want them to do in order to get the evidence that would raise the confirmation of the emergent hypothesis. Finally, the transition between programs is a discontinuous process where new theories are acquired and old ones lost, which according to the authors can be neurologically described as the wiring and pruning of synaptic connections. For example, from the initial-similarity-state to the different-desires-state and next to the representational view of the mind, there are two conceptual revolutions.

The most general implication of this hypothesized similarity with science is that cognitive development is essentially a *learning process*. Besides that, it is a *social learning process* since Gopnik et al make the additional evolutionary hypothesis that the process is normally monitored, even if unconsciously, by conspecifics. And it is a *cultural learning process*, since evolution has also built in a strong capacity for culture:

> (. . .) evolution can select learning strategies and cultural abilities just as it selects reflexes and instincts. For human beings, nurture is our nature. The capacity for culture is part of our biology, and the drive to learn is our most important and central instinct (1999: 8).

The merits of this book are of several kinds. It is a pleasure to read, because clear and clever. It is suitable not only for the general public interested in knowing more about their small children, but also for the academic public who wants to be acquainted with developmental psychology. In other words, it is a fabulous general introduction to

[3]For a less radical version of the theory theory, where these two domains are considered core knowledge structures that are the starting point for theorizing, see Carey & Spelke, 1996.

cognitive development from the point of view of the theory theory. In addition, for those interested in the theory theory approach in itself, the authors show emphatically that they propose its most radical version, one that intensely pursues the comparison to science and interprets the affinities literally — it is "theory theory to the max" to borrow an expression from Stephen Stich and Shaun Nichols (1998).

There are already very good discussions of this version of the theory theory as a theory of development and I won't recapitulate them here (see, e.g., the debates in *Philosophy of Science*, 1996: 63, December, and *Mind & Language*, 1998, 13: 3). For those interested in the relation between culture and cognition, one shortcoming of this otherwise excellent book is that the authors do not *explicate* the specificity of cultural learning in their discussion of learning and social learning throughout the book. Rather than a criticism to their work, I would like to suggest a complement: in what follows, I will attempt to connect their discussion of child development with the general domain of the socio-cultural sciences and provide an explicit characterization of cultural learning in relation to learning and social learning.

I start with a necessary condition: the map of semantic possibilities. The word 'culture,' hence the expression 'cultural learning,' is used with a variety of meanings in the psycho-socio-cultural sciences. But if the ambition is one of rational reconstruction, this diversity can be "translated" to the following kind of multilevel part-whole ambiguity[4] (see Fig. 1).

In the first sense, 'culture' refers to the set of Xs that are learned. Here the contrast is to the set of Xs that are mainly determined either by the universal genetic structure of the *Homo sapiens* species or by the specific genetic structure of an individual of the species. But notice that, as far as what is in the mind is concerned, this distinction is not homologous to a mind-versus-brain ontological dualism. As Gopnik et al. say:

> People often seem to split the human mind into two parts: a "natural" neurologically determined part that is shaped by evolution and a "cultural" socially determined part that is shaped by learning. Studying babies makes us realize how deeply misguided these oppositions are. (. . .) Everything about our

[4]A rational reconstruction is not simply an idealized translation. To make an analogy with the notions of reduction and elimination in the philosophy of science, I will eliminate some meanings and reduce others by incorporation in my theoretical perspective.

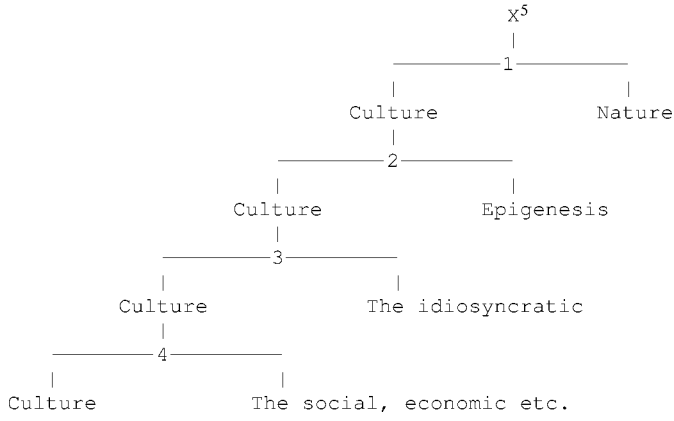

Figure 1.

> minds is the result of what happens in our brains, from the most automatic mechanisms that govern our breathing to the most refined, culturally elaborated details of wedding etiquette and existential angst. (1999: 7)

In this case, cultural learning is equated with the notion of learning in general, either in contrast to what is innate, i.e., what is part of the initial state at birth, or in contrast to what is acquired thereafter by a process of maturation.[6] The authors accept that some kinds of mental representations, like that of people, are innate. Nonetheless, given the fundamental role of learning in their approach, they reject the idea that cognitive development could be explained in terms of maturational processes — they do not accept that the development of knowledge could be compared to the development of dentition, for example. The intuition behind the distinction between learning and maturation is that in learning the acquired property is fundamentally determined by the interaction between the individual and

[5]The range of 'X' includes what is in the mind — mental representations and emotional states in general —, and public productions of the mind — behaviors and public representations in general (Sperber, 1996; Strauss & Quinn, 1997).

[6]I'm not assuming any principled distinction between 'innate' and 'maturation,' but only a pragmatic one in order to better characterize the nuances of the literature. And of course, there can be Xs in the initial state that are a result of learning — for example, Gopnik et al suggest the possibility of newborns' having knowledge of their mother's voice based on the "muted but still audible sounds they hear in the womb" (1999: 28).

the environment.[7] In other words, in learning the specific result could not be predicted taking into account only the information in the genetic code of the organism. In maturation on the other hand, the developmental process, even if dependent on an interaction with the environment, is the unfolding of a genetic blueprint with a more or less fixed timetable of critical periods. When an X is universally acquired with a more or less fixed timetable, it is normally difficult to tell whether it is a result of learning, maturation or both processes. Take the acquisition of the representational concept of belief. In the literature, the modularity view argues for an explanation exclusively in maturational terms (see Scholl & Leslie, 1999) and the theory theory argues contrariwise. Gopnik et al say, for example, that because children can acquire this concept earlier if systematic evidence for its formation is intentionally given, learning is the only plausible explanation. Whether or not this is decisive evidence, the possibility of this type of universally learned Xs delimits by contrast the next meaning of 'culture.'

The second sense of 'culture' is a specification of the previous one. It refers to the complement of the following set in the universe of learning: the Xs that are learned with a more or less fixed timetable by all normal individuals of our species. In other words, it refers to all learned Xs except the ones that are universally learned in a more or less fixed timetable.

In this case, cultural learning is any kind of learning process that is not an epigenetic learning process. Epigenetic learning is a universally convergent process that is a byproduct of the interaction between our normal inferential capacities and very general properties of the environment. If it were possible to change the structure of the environment, a different result would arise. For example, all normal human beings acquire a naïve concept of gravity because our environment gives strong evidence for this; nonetheless someone raised in freefall on a space station would not acquire such a concept. Gopnik et al argue that universally convergent processes in cognitive development are better explained as a result of epigenetic learning:

[7] To rule out philosophical examples like the Chinese pill (the ingestion of which would prompt someone to acquire Chinese) as a case of learning, some non-arbitrary notion of content should constrain the mode of this determination (for a discussion of this point, see Fodor, 1978).

> Young children all seem to create similar theories at about the same age. Some developmental psychologists think that this is evidence for the caterpillar growth view. But it is also just what you would expect if children had the same initial theories, had the same mechanisms for revising those theories, and had lots of very similar evidence. Babies around the world start out with the same ideas about people and objects, and they will have similar experiences of people and objects. In every culture different people will sometimes have different beliefs and desires, and objects will continue to exist after they are hidden (1999: 159-160).[8]

The third sense of 'culture' is a specification of the previous one. It refers to a set of Xs that is somewhat shared by the individuals of a social group A in contrast to what is idiosyncratic in the individuals of A, and is not completely coextensive with any other cultural set of other social groups B, C, etc., therefore defining the particularity of A.[9] Most anthropological definitions of 'culture' would fit this third sense, but it is important to note that sharedness here does not imply harmony between the individuals of A, nor does it imply that culture is a metaphysical entity completely independent of the individuals of A (Hutchins, 1995; Mannheim & Tedlock, 1995; McCauley & Lawson, 1996; Sousa, 1998; Sperber & Hirschfeld, 1999).[10]

In this case, cultural learning is a process that converges in the acquisition of an X that is somewhat shared by a specific social group A.[11] For instance, Gopnik et al show evidence that a newborn has an innate

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[8]The expression 'epigenetic learning' comes from Piaget's tradition. But Piaget did not accept the type of representational nativism implied by innate initial theories. In the cognitive sciences, a view of epigenetic learning more akin to Piaget's anti-nativism is in Elman et al., 1996.

[9]The default social group of reference here is a society, but it could refer to smaller social groups likewise. Note that the noun 'culture' (and 'sub-culture') normally is also used to refer to a social group, i.e., a group of individuals that have a specific (sub-) cultural set.

[10]But it does seem to imply an externalist construal of sharedness that is problematic. For a discussion of sharedness and the ontology of cultural kinds, see Sousa, in preparation.

[11]But an X can also be in the intersection between different cultural sets and even in the intersection of all cultural sets. Cases of such a universal intersection — e.g., the know-how to make fire (Brown, 1991) — are not a problem here as far as they can be "deferentially" shared and therefore are not acquired by all individuals in a more or less fixed timetable — e.g., if I get lost in a jungle without a match, I won't know how to make fire.

capacity to distinguish the sounds of all languages. Then, by hearing the sounds of a specific language, she starts to abstract the prototypical phonemes of the language. As a result, she acquires the shared phonemic competence of her social group and looses the capacity to distinguish the distinctive sounds of other languages of other social groups. Idiosyncratic learning here is simply the process of acquisition of Xs that are not shared in a specific social group.

The fourth sense of 'culture' is a specification of the previous one. It refers to a subset of the cultural set of a specific social group A in contrast to other subsets of A that are social, political, economic etc., all of them also cultural, but in the former sense. This sense is in part a reflex of the division of labor of the social sciences and the consequent partitioning of their object in different dimensions — the cultural, social, economic, political etc. dimensions of a social group A.

There are two broad ways of characterizing this cultural subset or cultural dimension of a social group A. In one way, it is comprised only of mental representations in contrast to public productions in general. This is more or less supposed in distinctions like 'culture' versus 'social structure/organization,' 'the subjective' versus 'the objective,' 'superstructure' versus 'infrastructure,' that exist in the literature: "By culture, we refer to the *subjective* aspect of a society's institutions: the beliefs, values, knowledge, and skills that have been internalized by people of a given society, complementing their external systems of coercion and exchange. This is a narrower definition of culture than is generally used in anthropology" (Inglehart, 1998: 15). In another way, the cultural dimension of the social group A refers to specific pairs of mental representations and public productions in contrast to other pairs that are social, political, economic, etc. One would say, for example, that the ordinary rules of etiquette and their consequent behaviors are part of the cultural dimension of A in contraposition to the political ideas and their consequent voting behavior, that are part of the political dimension of A. Here, the exact scope of the cultural dimension is not always clear, but sometimes social scientists do make such a distinction: "In the United States, for example, many Native Americans have grown up on reservations or under conditions

of urban or rural poverty. They have suffered social, economic, political, and cultural discrimination" (Kottak, 1999: 10).[12]

In this case, cultural learning is the same type of learning process as the one characterized by the third sense of 'culture', except for the restrictions on the range of 'X' — either only mental representations in general or some pairs of mental representations and public productions in particular. And the other social, economic, political etc. distinct types of learning have their range restrained accordingly.

Now, on this semantic map, which is the appropriate characterization of cultural learning? As far as the relation with learning is concerned, the two first senses are too broad: in the first, one loses the distinction between learning and cultural learning; in the second, the distinction between what is shared and what is idiosyncratic in a social group is missing. And the last sense is too narrow: in one version, only one aspect of the causal links between what is in the mind and the public productions of the mind is focalized; in another, only some types of these causal links are highlighted. Ultimately, for those interested in culture and cognition, all learning processes that converge in shared results in specific social groups should be part of the explanandum. The aim is to explain why such convergences occur and to discover to what extent they can contribute to make human beings be different in their minds and public productions of their minds. And as Gopnik et al emphasize, these processes start very early in development:

> One-year-old babies know that they will see something by looking where other people point; they know what they should do to something by watching what other people do; they know how they should feel about something by seeing how other people feel. (...) The babies can use other people to figure out the world. In a very simple way, these one-year-olds are already participating in a culture. They already can take advantage of the discoveries of previous generations (1999: 34).

And as far as the relation between cultural learning and social learning is concerned, the answer is already implicit.[13] Social learning is a learning

[12]Notice that the common sense notion of having culture, i.e. being cultivated, is a further specification of this fourth sense of 'culture'.

[13]The following remarks are inspired by a distinction between the social and the cultural that Dan Sperber makes in his latest work (see Sperber, 1999). But note that if one were

process via the interaction with other individuals (in contrast to individual learning, i.e., a learning process that does not involve the interaction with other individuals). And cultural learning incorporates social learning: only through the interaction with the other members of her society, can a child acquire its specific cultural set. In other words, social learning is a necessary condition for cultural learning. However, it is not a sufficient condition. Not only because epigenetic learning can incorporate social learning, but also because social learning is normally a condition for what is idiosyncratic: human beings forge their individuality only in contrast to other human beings.

Let's return to nature. In another broader sense, the social is not sufficient for the cultural. There are species, like (a species of) chimps, that have some culture, since their social groups have different traditions of techniques for termite-fishing, for example.[14] Nevertheless, there are species, like (a species of) ants, that are social though not cultural, i.e., their social groups do not have cultural sets, their developmental processes do not converge to something shared in a specific social group and different from other social groups. And apparently these are not even learning developmental processes, since they are universally convergent and seem to be mainly genetically determined.

A final caveat: the critical reader should not revive and take seriously the semantic map metaphor, as it were. I'm not supposing well-defined lines as in a real map or in a graph — these fuzzy semantic sets could not be portrayed by Venn diagrams, nor could they exist in a bi-dimensional space since there is no straightforward sense of a departure from nature. My intent is only to envisage the possible semantic journeys of 'culture', indicate in which region it should reside, and complement Gopnik et al's book.

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interested in making a semantic map of the 'social,' it would be, *mutatis mutandis*, the one of 'culture'.

[14]The third sense of 'culture' is the appropriate for cross-species comparison as well. But see Mithen, 1996, for an argument that this is still not sufficient to attribute cultural capacities to chimps.

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