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**The cognitive revolution in Europe: taking the developmental perspective seriously:
Comment on G. Miller's "The cognitive revolution: a historical perspective"**

Trends in Cognitive Sciences

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We can only but share Miller's views that cognitive science is born in the 1950s, at a time when psychology, anthropology and linguistics were redefining themselves and computer science and neuroscience as disciplines were coming into existence.

We however think that some statements in the article distort the historical contribution of scientific psychology in the concert of disciplines that have grounded cognitive science. On two occasions, Miller espouses the view that psychology could not participate in the cognitive revolution because this discipline was still trapped in a narrow behaviorism. We would like to stress that this opinion only applies to the American tradition (with some notable exceptions such as the Gestalt oriented school of Tolman and others) and not to the European (including Russian) historical backgrounds, theoretical inquiries and genuine contributions to the emerging field of cognitive sciences.

While behaviorism flourished in the US and until the the time it ended, two prominent developmental psychologists, Piaget in Switzerland and Vygotsky in Russia set the paths for a integrated view of the human mind. Vygotsky, elaborated a socio-historical approach to cognitive development that emphasized the way according to which development is constructed through social interaction, cultural practices, and the internalization of cognitive tools. We will not comment further on this endeavour, but clearly the goals of Vygotsky's enterprises and its long lasting influence indicate how this researcher's projects were in the heart of the cognitive sciences [1].

Piaget (initially trained as a zoologist) and known today as a reputed developmental psychologist was in fact fascinated by one single question, namely the process of the growth of knowledge

with the goal to clarify its meaning as a function of its mode of construction, both in the course of history of scientific ideas and during the development of the infant and the child.

Miller relates the creation in 1960 by Bruner at Harvard of the Center for Cognitive Studies. Five years earlier, Piaget had founded in Geneva the International Center for Genetic Epistemology (ICGE) with the financial support of the Rockefeller Foundation (Piaget humorously narrates in *Insights and Illusions of Philosophy* [2] his negotiations with the Rockefeller Foundation that has supported the Center for 7 successive years). The Center was active for more than 30 years and has gathered scientists from all over the world. Its work resulted in the publications of 36 volumes in a special collection published by the Presses Universitaires de France (Paris). A number of volumes are available in English (e.g., [3] for the most recent one). The very heart of genetic epistemology was interdisciplinary and was clearly stated by Piaget in the following terms "to work in such a discipline it does not suffice to be a psychologist vaguely acquainted with a smattering of philosophy and biology: one must be, moreover, a logician, a mathematician, a physicist, a cybernetist and a historian of sciences, to mention the essential" [2], (p. 44).

The research programs that came out on both sides of the Atlantic (i.e. at the Harvard Center for Cognitive Studies and at the International Center for Genetic Epistemology in Geneva) shared a common certainty : the study of mind could not be achieved by a single discipline and required the contribution of conceptual and methodological tools borrowed in different scientific fields. Now, beyond this historical convergence, the two projects have differed on an crucial dimension. Miller's story of the American cognitive revolution leaves the reader with the impression that interdisciplinarity was conceived of and pursued as a *scientific objective* in itself. By contrast, the interdisciplinary nature of the ICGE project was clearly stated as *a mean* in the service of a broader and theoretically founded research program, namely the study of mind and knowledge as biological products of a developmental process. Stressing this distinction may help explaining historical outcomes of the cognitive revolution and also be informative for the future of cognitive sciences. Despite the multiplicity of the links established between disciplines (see Miller's polygon), there is no doubt that one of the most influential connexion for cognitive revolution occurred between psychology and computer science, the latter providing a long lasting metaphor for the former. No doubt, also, that computerized simulation has represented a very fruitful way for modelling cognitive processes. However, this success contributed to maintaining a relative

confusion between the aim of the cognitive revolution (i.e. rehabilitating the study of mind) and one of its powerful tool (computer simulation). This confusion, along with its reductionist counterparts, led Bruner to withdraw from this perspective during the post-revolution years, stating that the revolution he helped to initiate missed its objective [4]. Computers do not develop, nor do they build representations and meanings, and it is now well recognized that performance match between computer responses and human responses can not represent the absolute criteria for modelling biologically based behaviors [5]. Another approach to cognitive science emerged in Europe during these years. This approach did not only inspire « a small army of followers » (Miller, in press, p. 38) ; more importantly it shaped a complementary perspective on cognition, developmental and cultural in nature. According to such views for which Piaget and Vygotsky were the main proponents, the organization of the human mind is the product of a biologically and culturally mediated process of development. Hence, studying human mind could not be achieved without studying the developmental mechanisms that give rise to cognitive abilities and constrain their organization. This research program was born in the 50's, and is still alive, « taking the developmental perspective seriously » [6].

“The only duty we owe history is to rewrite it”.

Oscar Wilde

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