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Evolution, selection and cognition: From "learning" to parameter setting in biology and in the study of language

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Abstract

Most biologists and some cognitive scientists have independently reached the conclusion that there is no such thing as learning in the traditional "instructive" sense. This is, admittedly, a somewhat extreme thesis, but I defend it herein the light of data and theories jointly extracted from biology, especially from evolutionary theory and immunology, and from modern generative grammar. I also point out that the general demise of learning is uncontroversial in the biological sciences, while a similar consensus has not yet been reached in psychology and in linguistics at large. Since many arguments presently offered in defense of learning and in defense of "general intelligence" are often based on a distorted picture of human biological evolution, I devote some sections of this paper to a critique of "adaptationism," providing also a sketch of a better evolutionary theory (one based on "exaptation"). Moreover, since certain

standard arguments presented today as "knock-down" in psychology, in linguistics and in artificial intelligence are a perfect replica of those once voiced

Summary

La plupart des biologistes et certains cognitivistes sont arrivés indépendamment à la conclusion que l'apprentissage, au sens instructiviste et traditionnel du terme, n'existait pas. Cette thèse peut sembler extrême, mais je la défend ici à la lumière de données et de théories provenant d'une part de la biologie, en particulier de la théorie de l'évolution et de l'immunologie, et d'autre part, de la grammaire générative moderne. Je souligne également que la chute de l'apprentissage est incontestée dans les sciences biologiques, alors qu'un consensus similaire n'a pas encore été atteint en psychologie ni en linguistique. Puisque de nombreux arguments offerts à l'heure actuelle en faveur de l'apprentissage et d'une capacité d' "intelligence générale" s'appuient souvent sur une image déformée de l'évolution humaine, je vous propose quelques sections de cet article à une critique de l' "adaptationnisme", en donnant également les éléments d'une meilleure théorie de l'évolution (fondée sur l' "exaptation"). De plus, certains arguments en psychologie et en intelligence artificielle présentés aujourd'hui comme indubitables sont en fait une réplique exacte des anciens arguments en faveur de l'instruction et contre la sélection en biologie; je m'appuie sur ces erreurs du passé en tirant des leçons pour le présent et le futur.



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This work is part of a research project that I have developed at the Center for Cognitive Science of MIT as a visiting scientist in the academic years 1985â€“86, 86â€“87 and 87â€“88, thanks to a grant from the Alfred P. Sloan Foundation and two successive grants from the Kapor Family Foundation. My sincere gratitude is here expressed to these institutions. The central ideas that have guided the present inquiry have been mostly inspired by the work of Noam Chomsky, Jerry Fodor and Jim Higginbotham and by numerous personal exchanges with each of them. Many a lesson have I learned from (or, perhaps, I should say: many parameters have been fixed for me by) Morris Halle, Kenneth Hale, Jay Keyser, Jacques Mehler and Steven Pinker on the cognitive front, and from Stephen J. Gould and Richard C. Lewontin on the evolutionary front.

Much of this material has been presented and discussed during a graduate course that Steve Gould and I taught at Harvard, in the History of Science Department, during two successive Spring Terms in 1987 and 1988. I am grateful to the department and to Steve for having made this possible. Steve Gould, Morris Halle, Steven Pinker and two anonymous reviewers have offered me precious comments on, and cogent criticism of, a previous draft. I also benefited greatly from Dan Dennett's spirited disagreement with almost everything I say here.

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