

Book Review

Evolution and Learning: The Baldwin Effect Reconsidered. Edited by Bruce H. Weber and David J. Depew. Cambridge MA: MIT Press, 2003. ISBN 0-262-23229-4. \$45.00 cloth; pp. x 341.

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The Baldwin effect was proposed by J. Mark Baldwin and independently by both Henry Fairfield Osborne & C. Lloyd Morgan just about 100 years ago. In a general way, “the Baldwin effect” refers to the notion that learning can change the environment for a species in such a way as to influence the selective environment for the learned behavior or some closely related character. In the example proposed by Terry Deacon, something like the Baldwin effect accounts for the relatively rapid evolution of language and mind. His suggestion is that once a few members of a population developed the ability to communicate symbolically, the great advantage of such an ability would in itself create intense selection pressure promoting its further evolution. This notion and Daniel Dennett’s related proposal for a role of a Baldwin-like effect in cognitive evolution are together the subject of four of the chapters in this book (two by Deacon, one by Dennett, and a third recording a discussion among Godfrey-Smith, Deacon, and Dennett debating subtle differences between the Dennett and Deacon proposals).

The Baldwin effect is sometimes referred to as the simple notion that, through evolution, unlearned can replace learned behavior. What one soon learns from this book, though, is that not only have views of just what the Baldwin effect is changed over time, there is no agreed on actual example of the Baldwin effect (in any of its many senses). So is it important? That depends on whom you ask. The title of a helpful chapter by Godfrey-Smith identifies people interested in the Baldwin effect nowadays as either “Baldwin boosters” or “Baldwin skeptics”. Both are well represented here, and the reader will have ample opportunity to decide which side to come out on.

Why the contemporary interest in the Baldwin effect, or at least enough interest to have stimulated the 1999 gathering of philosophers, developmental biologists, and evolutionary theorists who contributed to this book? The fact that writers as prominent as Deacon and Dennett have taken it to be an important force in the evolution of mind and language may be answer enough. But to reconstruct its recent

history, as recounted in the introductory chapter by Depew and elsewhere in the book, interest in the Baldwin effect by modern evolutionary theorists dates to a 1953 paper by G. G. Simpson attributing to Baldwin the notion that adaptations which originally require specific experiences to develop in an organism's lifetime (as through learning) can be replaced under some conditions by genetically programmed forms. Intuitively, it is easy to see how, for example, if there is a premium on acquiring a behavior quickly, with minimal experience, selection would favor faster and faster learning until in the limit no learning would be required at all. But at the same time it may seem odd that plasticity should be selected against, so this argument must presuppose that the environment has undergone no further changes which might maintain plasticity.

Despite drawing attention to the Baldwin effect, Simpson, according to Depew, was something of a Baldwin skeptic. Baldwin's effect was rehabilitated, however, by a mathematical model due to Hinton and Nowlan showing that learning could guide evolution, and the notice subsequently given that model by John Maynard Smith. The even more recent interest in the possibility that something like a Baldwin effect could play a role in evolution of mind and language can be traced to these recent discussions.

Among the most cogent statements of Baldwin skeptics here are the chapters by Paul Griffiths, Susan Oyama, and Celia Moore in the section of the book subtitled "Baldwinism and Development." Oyama and Moore both take issue with the simple notion that "learning" and "genetic factors" can – or should – so readily be separated. Learning, after all, takes place in an organism that is already a product of both its genes and its environment. Oyama, in particular, argues strongly for abandoning these simplifications and argues (p. 177) for "the concept of the developmental system: organism-environment complexes changing over developmental or evolutionary time, in which the means or resources for development are inherited but phenotypes are constructed..." Moore's chapter is complementary, in that she provides a brief but comprehensive review of the many phenomena unknown to Baldwin which illustrate how "experience" (in the sense of specific environmental input) can influence behavioral development in many nonobvious ways that would not normally be referred to as "learning."

Despite having spend most of my career in a department that attributes its founding to J. Mark Baldwin, I knew almost nothing about his effect before agreeing to review this book. As a person interested in relationships between evolution and learning, I hoped to learn something of use, but it must be said that there is not a great deal here to stimulate someone not an evolutionary theorist. It is interesting to reflect that other proposals for evolutionary scenarios such as sexual selection, preexisting sensory biases, or the conditions for altruism have spawned detailed investigations of real phylogenies of behavioral systems, whereas contemporary writings on the Baldwin effect (at least to judge from this book) do not seem to have produced even a glimmer of a hypothetical test case other than language evolution. This may reflect the fact that, as pointed out by Depew, there is really no such thing as *the* Baldwin

effect. Still, this book contains stimulating material for those who have taken up the challenge of trying to understand the evolution of language and mind.