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Evolution as a general theoretical framework for economics and public policy

David Sloan Wilson[a,b,*], John M. Gowdy[c]

[a] Department of Biology, Binghamton University, Binghamton, New York 13902, United States
[b] Department of Anthropology, Binghamton University, Binghamton, New York 13902, United States
[c] Department of Economics, Rensselaer Polytechnic Institute, Troy, New York 12180, United States

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ABSTRACT

Economic and evolutionary thinking have been entwined throughout their histories, but evolutionary theory does not function as a general theoretical framework for economics and public policy, as it does for the biological sciences. In this lead article for a special issue of the *Journal of Economic Behavior and Organization*, we first describe how evolution functions as a general theoretical framework in the biological sciences. Then we consider four reasons why evolution might not need to be consulted for human-related subjects such as economics and public policy. We conclude that these reasons can be valid in particular cases, but they fail for any sizeable human-related subject area. Hence evolution can and should become a general theoretical framework for economics and public policy. The other articles in the special issue help to substantiate this claim.

Economic and evolutionary thinking have been entwined throughout their histories (Beinhocker, 2006; Hodgson, 1993, 2007; Hodgson and Thorbjorn, 2010). Darwin, the founder of evolutionary theory, was inspired by Smith and Malthus, two founders of economic theory. Veblen, one of the most influential economic thinkers of the late 19th century, wrote an article titled "Why is Economics Not an Evolutionary Science?" in Veblen (1898). Fast forwarding to the present, virtually all economists assume that their ideas are consistent with evolutionary theory, along with the laws of physics and chemistry. Various branches of economics explicitly draw upon evolutionary theory to varying degrees (Gowdy and Van den Bergh, 2003; Hodgson, 2007), and one even calls itself "evolutionary economics" (Nelson and Winter, 1982; Witt, 2003, 2008a,b)

Yet, evolutionary theory does not play the same role in economics that it does in the biological sciences, where it provides a single framework for studying all aspects of life. The generality of evolutionary theory did not emerge gradually but was apparent from the beginning, as the diverse interests of both Darwin and Alfred Russell Wallace attest. It was repeatedly affirmed during the course of the 20th century, enabling the geneticist Dobzahansky to state in 1973 that "Nothing in biology makes sense except in the light of evolution". Today, there is exponential growth in biological knowledge, but all of it continues to be organized by a single theoretical framework that can be easily learned and applied to any particular subject.

Knowledge about humans did not become organized in the same way as biological knowledge during the course of the 20th century—but the reasons are primarily historical rather than conceptual. Every branch of human-related knowledge had its own encounter with Darwin's theory (Hodgson and Thorbjorn, 2010; Richards, 1987). Many of the early formulations proved to be incorrect—even grossly incorrect in retrospect—such as the view that cultural evolution is a linear progression from "savages" to "civilization" (Carniero, 2003). Many of the policies informed by evolution also turned

* Corresponding author.
E-mail address: dwilson@binghamton.edu (D.S. Wilson).

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out to be ill-considered in retrospect, to put it mildly (Hofstadter, 1959/1992; Leonard, 2009). As a result, evolution became stigmatized in many human-related disciplines. A common formulation was that evolution could explain the rest of life, our physical bodies, and a few basic urges such as to eat and have sex, but had little to say about our rich behavioral and cultural diversity. Even when evolution was not marginalized, the particular way that it became incorporated varied among disciplines. The history of evolutionary thinking in relation to economics is just a chapter of this larger history.

During the last few decades, there has been a resurgence of interest in using evolution as a general theoretical framework for the study of our species, similar to the way that it functions in the biological sciences. One reason that the current effort is likely to succeed, despite the failures of the past, is due to advances in the study of biocultural coevolution (e.g., Jablonka and Lamb, 2006; Richerson and Boyd, 2005; Wilson, 2011; Wilson et al., in press-a). The human capacity for open-ended behavioral and cultural change can no longer be regarded as outside the orbit of evolutionary theory. Instead, it is a sophisticated set of adaptations that evolved by genetic evolution and often constitutes an evolutionary process its own right. Furthermore, human genetic and cultural evolution have been influencing each other throughout our history of a species. Our genes are a product of our cultures, no less than our cultures as a product of our genes. A sophisticated knowledge of biocultural coevolution is required to make sense of our current cultural institutions and to manage cultural change to achieve positive outcomes (Wilson et al., in press-a).

This article, which is part of a special issue of the *Journal of Economic Behavior and Organization*, has two objectives: The first is to concisely describe how evolutionary theory functions as a general theoretical framework in the biological sciences, as a model for how it might function for economics and public policy formulation. The second is to consider reasons why evolution might *not* prove useful for the study of human behavior and culture, even if they are products of biocultural coevolution. Based on conversations with literally hundreds of colleagues, we know that many are as open-minded about evolution as they are about physics and chemistry. What they want to know is how evolution can add value to the study of their particular discipline, such as neoclassical, behavioral, or institutional economics. Based on these conversations, we have identified four plausible reasons why evolution might *not* add value:

(1) Human-related subjects have been studied by very smart people for a very long time. If science and scholarship result in the accumulation of knowledge, then people who start out employing different assumptions and perspectives will eventually reach the same conclusions. If so, then approaching a longstanding subject from an evolutionary perspective will merely affirm what has already been discovered. The evolutionary perspective won't be wrong, but it will usually reinvent the wheel.
(2) The concept of design long predates the concept of evolution. The fact that an object or process is well designed for a purpose can be established without knowing about the designing process. An insect that mimics a leaf is well designed to avoid detection by predators. Who cares if it is a product of evolution or a supernatural agent? Similarly, if a corporation or market process functions efficiently, who cares if they are products of biocultural coevolution?
(3) A reasonable research strategy is to study what is, without worrying much about how it got that way. After all, something like the brain is available to be studied in minute detail, whereas how it got that way is more speculative. Why speculate when you can study the real thing?
(4) All branches of knowledge should ideally be consistent with each other, but every branch need not be consulted for the study of any particular branch. Evolutionists rarely feel the need to consult quantum physics, and perhaps evolution rarely needs to be consulted for the study of many traits, in humans and nonhumans alike.

These are good arguments, posed by smart and open-minded people, so they deserve respectful consideration. We will show that while each has a measure of legitimacy—even within the biological sciences—they fail for the study of any sizeable human-related subject. As a result, evolution can indeed function as a general theoretical framework for economics and public policy, in the same way as for the biological sciences. The remaining articles will show how the "tools" in the evolutionary "toolkit" can be applied to specific topics that are centrally relevant to economics and public policy.

1. How evolutionary theory functions as a general theoretical framework in the biological sciences: the other Tinbergen and his four questions

Many economists know the name of Jan Tinbergen, who shared the first Nobel Prize in Economics with Ragnar Frisch in 1969 for his work on dynamic models of economic processes (Solow, 2004). Many evolutionists know the name of Niko Tinbergen, Jan's younger brother, who shared the Nobel Prize in Medicine with Konrad Lorenz and Karl von Frisch in 1973 for his foundational work on ethology, the study of animal behavior.

A 1963 article by Niko Tinbergen titled "On the Aims and Methods of Ethology" has become a classic for summarizing how evolutionary theory provides a framework for studying all biological subjects. Tinbergen stressed that four questions need to be addressed for all products of evolution.

(1) What is the *function* of the trait, or why does it otherwise exist compared to the many traits that could exist in the lineage? The process of natural selection winnows a small subset of traits that adapt organisms to their environments from a much larger set of traits. Evolutionists call this *ultimate causation*. It provides a powerful (but not infallible) way of inferring the properties of organisms, knowing only a little about the environmental context. For example, we can