Chapter 7: Evolutionary dynamics theory and method

Daria Roithmayr

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The father of modern evolutionary theory, Charles Darwin, pointed out long ago that group living is an adaptive strategy for species such as humans. Groups are critical to human survival and reproduction. For ancestral humans, groups provided a buffer against hostile environments and facilitated access to many resources that were essential to reproductive fitness. Some of these methods—such as the methods of experimental psychology—are familiar to most researchers of group dynamics. Many researchers are also familiar with mathematical models and computer simulations of group outcomes, and these methods are an important tool in evolutionary psychological inquiries. Consider, for instance, game models of the evolution of cooperation (Nowak & Sigmund, 1998). Evolutionary game theory is the generic approach to evolutionary dynamics and contains as a special case constant selection. Game theory was invented by John von Neumann and Oskar Morgenstern. They wanted to design a mathematical theory to study human behavior in strategic and economic decisions. Von Neumann was a Hungarian-born mathematician working at the Institute for Advanced Study, where he invented and revolutionized several fields of mathematics. We have already... Despite tremendous progress in molecular biology and medicine, our methods to combat infectious diseases are limited. There are successful vaccines against a number of agents, but all attempts have so far failed. Evolution, theory in biology postulating that the various types of plants, animals, and other living things on Earth have their origin in other preexisting types and that the distinguishable differences are due to modifications in successive generations. It is one of the keystones of modern biological theory. The geologic time scale from 650 million years ago to the present, showing major evolutionary events. Encyclopædia Britannica, Inc. The virtually infinite variations on life are the fruit of the evolutionary process.