

TABLE 5.3 Formal Models in the Study of Human Biological and Cultural Evolution

THEORETICAL PERSPECTIVE	KEY FEATURES
Sociobiology	<ul style="list-style-type: none"> <li>• Defined by E. O. Wilson (1980), one of its founders, as “the systematic study of the biological basis of all social behavior” (322). Originally focused on explaining the evolution of <i>altruism</i>—the willingness to give up benefits for oneself to help someone else. Sociobiologists argued that altruism makes sense if we pay attention not to individuals but to the genes they carry.</li> <li>• Organisms share the most genes with their close relatives; therefore, sociobiologists hypothesize, natural selection will preserve altruistic behaviors if the altruists sacrifice themselves for close kin, a concept known as <i>kin selection</i>. Some anthropologists adopted the sociobiological approach to human societies, whereas others viewed sociobiology as a pernicious perspective that threatened to resurrect nineteenth-century racism.</li> </ul>
Behavioral ecology	<ul style="list-style-type: none"> <li>• A school of thought based on sociobiological reasoning that accepts the importance of natural selection on human adaptations, but rejects sociobiology’s genetic determinism. Behavioral ecologists accept the view that human adaptations depend on cultural learning rather than on genetic control, but they insist that the cultural behavior human beings develop is closely circumscribed by the selection pressures imposed on us by the ecological features of the environments in which human populations have lived (see Cheverud 2004; Sussman and Garber 2004).</li> </ul>
Evolutionary psychology	<ul style="list-style-type: none"> <li>• Like earlier sociobiologists, evolutionary psychologists insist that human adaptations are phenotypes under close genetic control. Unlike earlier sociobiologists, however, evolutionary psychologists do not invoke natural selection on genes to explain human behavior patterns as adaptations to present-day conditions. Rather, they argue that natural selection on human genes was most significant millions of years ago, in the environment in which our ancestors lived when they were first evolving away from the other African apes (called the “environment of evolutionary adaptedness,” or EEA).</li> <li>• Evolutionary psychologists argue that natural selection in the EEA produced a human brain consisting of a set of sealed-off “mental modules,” each of which was designed by natural selection to solve a different adaptive problem (see Barkow et al. 1992).</li> </ul>
Gene–culture coevolution	<ul style="list-style-type: none"> <li>• An analysis of the origin and significance of culture in human evolution that is critical of standard sociobiological accounts. The version developed by Robert Boyd and Peter Richerson (1985) argues that human behavior is shaped by two inheritance systems, one genetic and one cultural. Cultural traits are passed on by learning, not via the chromosomes, but since these traits vary, are passed on from individual to individual, and confer differential fitness on those who use them, they can undergo natural selection (76).</li> <li>• The two inheritance systems are interconnected: human biological evolution creates the possibility for cultural creativity and learning, whereas human cultural traditions created the environment that allows human biological processes to continue, even as culture creates selection pressures of its own that shape human biological evolution. This is why the process is called <i>gene–culture coevolution</i> (see also Cavalli-Sforza and Feldman 1981, Durham, 1991).</li> </ul>
Cultural group selection	<ul style="list-style-type: none"> <li>• Sociobiologists argue that group selection cannot occur as the outcome of natural selection operating on genes unless group members are biological kin who share genes (see <i>kin selection</i>, above). If group members do not share genes, the good of the individual and the good of the group no longer coincide; this means that individuals who sacrificed themselves for other group members would take their “group selection” genes with them to the grave.</li> <li>• But if behaviors are shaped by cultural inheritance rather than genetic inheritance (as in gene–culture coevolution) this argument may not hold. When the forces of cultural learning are powerful enough, the fitness of an individual may come to depend on the behaviors of other individuals in a local group. This is known as cultural group selection. Once the forces of cultural transmission take hold, it is usually easier and cheaper to behave the way the group dictates than it is to strike out on one’s own (D. S. Wilson 2002, Richerson and Boyd 2005).</li> </ul>
Niche construction	<ul style="list-style-type: none"> <li>• Odling-Smee, Laland, and Feldman (2003) argue that human evolution depends not just on our genetic heritage and our cultural heritage but also on an additional heritage of modified selection pressures that we pass on to our descendants in the form of a constructed niche. They use the concept of “artifact” to represent these environmental modifications: artifacts include birds’ nests and rodents’ burrows as well as human artifacts like clothing and furnaces. Odling-Smee et al. argue that their “triple-inheritance” theory offers a more satisfactory explanation of the evolutionary histories of organisms than do accounts focusing on genes and culture alone.</li> </ul>