

## SOCIAL EVOLUTION

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It is a matter of dispute how far back evolutionary explanations of social order should be traced. Evolutionary ideas certainly appear in the work of the ancient Greek philosophers, but it seems reasonable to identify the origins of modern evolutionary thinking in the eighteenth-century natural histories of civil society such as Rousseau's *Discourse on the Origin and Foundations of Inequality Among Men* (1750: Pt III), Adam Ferguson's *An Essay on the History of Civil Society* (1767), and Adam Smith's *Wealth of Nations* (1776: Bk III). In these eighteenth-century works, the explanation of current social institutions as an unplanned and generally adaptive development out of earlier and simpler arrangements gained traction. Germany too had a tradition of *Naturphilosophie* employing general evolutionary ideas, as well as Hegelian-influenced thinking on the development of societies. In 1863, four years after Darwin's *On the Origin of Species*, August Schleicher's *Die Darwinsche Theorie und die Sprachwissenschaft*, drew on these traditions as well as Darwin's book to present an evolutionary account of the development of families of languages (Taub 1993), an endeavor that was carried on by a number of scholars in the later part of the nineteenth century.

## 1. Spencer

Although Herbert Spencer is generally known as a "Social Darwinist" his early evolutionary account predates *Origin of Species*. In an 1857 article in the *Westminster Review* Spencer sketches a comprehensive account of evolution of the inorganic, organic, and human and social realms. "In respect to that progress which individual organisms display in the course of their evolution," Spencer argues, the investigations of "Wolff, Goethe, and von Baer, have established the truth that the series of changes gone through during the development of a seed into a tree, or an ovum into an animal, constitute an advance from homogeneity of structure to heterogeneity of structure" (1857: ¶2). He continues:

On passing from Humanity under its individual form, to Humanity as socially embodied, we find the general law still more variously exemplified. The change from the homogeneous to the heterogeneous is displayed in the progress of civilization as a whole, as well as in the progress of every nation; and is still going on with increasing rapidity. As we see in existing barbarous tribes, society in its first and lowest form is a homogeneous aggregation of individuals having like powers and like functions: the only marked difference of function being that which accompanies difference of sex. Every man is warrior, hunter, fisherman,

tool-maker, builder; every woman performs the same drudgeries. Very early, however, in the course of social evolution, there arises an incipient differentiation between the governing and the governed ... no sooner does the originally-homogeneous social mass differentiate into the governed and the governing parts, than this last exhibits an incipient differentiation into religious and secular—Church and State; while at the same time there begins to be differentiated from both, that less definite species of government which rules our daily intercourse—a species of government which, as we may see in heralds' colleges, in books of the peerage, in masters of ceremonies, is not without a certain embodiment of its own. Each of these is itself subject to successive differentiations. ... Simultaneously there has been going on a second differentiation of a more familiar kind; that, namely, by which the mass of the community has been segregated into distinct classes and orders of workers. While the governing part has undergone the complex development above detailed, the governed part has undergone an equally complex development, which has resulted in that minute division of labour characterizing advanced nations.

(Spencer 1857: ¶¶ 8–9)

This account is not selectionist, in the sense of postulating a filtering mechanism (such as “survival of the fittest”) that eliminates, say, societies that are not heterogeneous in favor of those that are. Instead, Spencer conceives of evolution as a law of increasing complexity of all things based on the “all-pervading principle” that “[e]very active force produces more than one change—every cause produces more than one effect” (1857: ¶22). Evolution, then, is a process of increasing complexity over time.

In his 1860 essay on “The Social Organism” Spencer makes much of the idea that societies, like individual organisms, “spontaneously evolved” to form complex systems of interaction characterized by the division of labor (1860: ¶3). For Spencer, the “social organism” is itself subject to evolutionary developments as a separate entity from its constituent individuals, though individual and social organisms have distinct characteristics. Some have taken Spencer’s belief in a developing social organism as evidence that Spencer was willing to sacrifice individuals for the sake of the greater social whole, but this is a mistake. In these initial statements of his social evolutionary views, competition between individuals and families for survival is not the driving force of social evolution: it is a manifestation of the inner workings of all organisms toward more complex internal organizations and mutual dependence between the constituent elements. Ultimately, there is nothing very Darwinian in this account. Instead, it is an expression of a universal metaphysical principle characterizing all order, a general theory of development. Moreover, the idea that societies could be understood as organisms with their own evolutionary tendencies was widespread in late nineteenth- and early twentieth-century thought, from Spencer to left-leaning reformers such as L.T. Hobhouse and even to anarchists like Peter Kropotkin (Gaus 1983: ch. 2). Evolution was in the air and developmental thinking can be found in a variety of different fields from Hegel at the beginning of the nineteenth century through Marx, Schopenhauer, and Nietzsche, in philosophy to the British Whig historians such as Trevelyan and Acton, and even into the understanding of the mind itself in the writing of Freud. It was an age obsessed with understanding the progress of history and making sense of the historical laws of development, even independent of the influence of Darwin. Indeed, Darwin can be seen, as one of the most important

and successful of these evolutionary thinkers of the period, but in no sense was his approach unique.

## 2. Darwin

Darwin, unlike Spencer, was notoriously cautious in applying evolutionary principles to humans, and only does so in a systematic way in *The Descent of Man* in 1871 and, to a lesser extent, in *The Expression of the Emotions in Man and Animals* in 1872. In both works, he provides an evolutionary account of the development and importance of sympathy and moral sense. In a crucial passage he seems to appeal both to direct reciprocity (Darwin 1871: ch. 5) and group selection (Darwin 1871: ch. 3) in explaining the rise of sympathy:

[a] we are led by the hope of receiving good in return to perform acts of sympathetic kindness to others; and there can be no doubt that the feeling of sympathy is much strengthened by habit. In however complex a manner this feeling may have originated, as it is one of high importance to all those animals which aid and defend each other, it will have been increased, through natural selection; [b] for those communities, which included the greatest number of the most sympathetic members, would flourish best and rear the greatest number of offspring.  
(Darwin 1871: 82)

Darwin's passage raises a theoretical point that should be emphasized. Note that claim [a] is consistent with an account of natural selection that operates only at the level of individual organisms: those who help others when they can expect help in return out-compete non-reciprocating egoists in the struggle for existence. Organism A's act  $\phi$  of helping B is to the evolutionary advantage of A if the expected benefits from future help by B exceed the costs of  $\phi$  to A (Henrich and Henrich 2007: 42; Hamilton 1964). So on this analysis sympathy, which can lead one to help another, does not produce (from an evolutionary point of view) genuine altruism, since  $\phi$  is to A's long-term advantage. On the other hand at [b] Darwin appears to be positing a group selection mechanism; communities composed of sympathetic individuals will outperform communities of egoists without sympathy. Here we confront great controversy. Although group selectionist accounts were widely accepted in the nineteenth century and the early part of the twentieth century, in the 1970s the idea was discredited and, indeed, identified as a simple and manifest error. The problem is obvious: even if a group of sympathetic individuals outperform a group of non-sympathetic egoists, a non-sympathetic egoist within a group of sympathetic individuals will outperform the rest of their group. The free-riding non-reciprocator receives all the benefits of living in a sympathetic reciprocating group, but never has to bear any of the costs of reciprocating, in the sense of sacrificing some of its own fitness to help other group members. If such defectors thrive in the group, they will eventually dominate it, outcompeting the reciprocators. In the last few decades, however, evolutionary theorists have reevaluated the possibility of group selection; under certain conditions it is certainly a possibility and could, indeed, be an important factor in evolution (Sober and Wilson 1999; Okasha 2006; Richerson and Boyd 2005; Bowles and Gintis 2011; Wilson 2012). It is important, however, to distinguish between group selection in cultural evolution and group selection in biological evolution: the former is considerably less controversial.

### 3. The Late Nineteenth-Century Debate: Competitive or Cooperative Evolution?

The great debate in social and political philosophy in the late nineteenth century was not whether Darwin's views were applicable to the study of society, but whether the study of social evolution appropriately stresses competition among individuals within a society, or the cooperative nature of successful societies—ideas, as we have just seen, that can be found side-by-side in Darwin. Although Darwin was always generally cautious in his pronouncements, especially when they involved the application of his theory to human society, his views tended toward the competitive side of the debate. It is important to stress in this regard that Darwin's key idea of the "struggle for existence" was itself taken over from Thomas Malthus's 1798 essay on population, which stressed that social life is always a struggle between increasing population and the constraints on food supply. To give food to a non-producer over a producer was not only to increase the burdens on the food producers in their struggle for existence, but also to handicap society in its efforts to produce as a whole (Malthus 1798: ch. III, ¶6; Ritchie 1891: 2). In a letter Darwin remarks "What a foolish idea seems to prevail in Germany on the connection between Socialism and Evolution through Natural Selection" (F. Darwin 1887: 237). Yet, in the end, Darwin also provides support for a more cooperative reading :

Important as the struggle for existence has been and even still is, yet as far as the highest part of man's nature is concerned there are other agencies more important. For the moral qualities are advanced, either directly or indirectly, much more through the effects of habit, the reasoning powers, instruction, religion, &c., than through natural selection; though to this latter agency the social instincts, which afforded the basis for the development of the moral sense, may be safely attributed.

(Darwin 1871: 404)

Besides Spencer, who certainly became associated with the competitive interpretation, perhaps the most famous exponent of this view was William Graham Sumner. According to Sumner, "man is born under the necessity of sustaining the existence he has received by an onerous struggle against nature, both to win what is essential to his life, and to ward off what is prejudicial to it" (1860: ¶2). The crux of this argument, though, is essentially Malthusian: our struggle is against nature and only derivatively against each other, as we "are struggling each to win from nature the material goods necessary to support life, and are carrying on this struggle side by side" (Sumner 1881: ¶11). To Sumner, socialism was simply a sentimental philosophy that denied unpalatable reality. For Sumner as for Spencer, the study of sociology was to help us cope with hard reality with which nature confronts us. With Sumner we see an especially clear example of a fairly swift move from an account of social evolution to social policy, which could not negate the inherent competition among individuals.

The late nineteenth-century response by those friendly to socialism was generally not to dismiss the relevance of evolutionary analysis to social and political philosophy, but to insist on the social-cooperative interpretation. In his important *Darwinism and Politics* (1891), D. G. Ritchie insisted that while an individual struggle for material existence might characterize lower levels of evolution, in advanced civilizations social evolution is moved by the selection of ideas as embodied in institutions that make for a coopera-

tive order. Socialism, according to Ritchie, was the sort of arrangement that, in contrast to the *laissez faire* of Spencer and Sumner, is favored in advanced civilizations. L. T. Hobhouse, one of the founders of the “new liberalism,” stressed the case for expanded poor relief, unemployment insurance, and old-age pensions. He also took an explicitly cooperative view of social evolution. Like Ritchie he insisted that the “higher” phases of social evolution are guided by a mental evolution—the evolution of a social mind. He argued, “the turning point in the evolution of thought ... is reached when the conception of the development of humanity enters into explicit consciousness as the directing principle of human endeavor” (Hobhouse 1911: 155; see also Hobhouse 1901). Hobhouse’s conception of the development of societies and thought towards higher stages of cooperation and more reflective consciousness greatly influenced his student, Morris Ginsberg, who advocated evolutionary sociology in the first half of the twentieth century. Ginsberg believed that the outcome of social evolution is that “men have become increasingly conscious of a fundamental unity of purpose and a good common to all mankind” (1931: 223). Although Ritchie sought to make much of his account consistent with a Darwinian orientation, this is not true of many other similar thinkers. For the most part, these cooperative accounts are explicitly non-Darwinian; social evolution is viewed as a principle of development or “growth” in ways that are not radically different from Spencer’s pre-Darwinian formulation.

#### 4. F. A. Hayek

Although Ginsberg and a few others championed social evolutionary thought through the 1930s and later, willingness to apply evolutionary analysis to societies and social policy radically dropped off after World War I, and even more dramatically after the rise of fascism. The ideas of struggle for existence or survival of the fittest were often depicted as imperialistic or aggressively nationalistic ideas; combined with the association of the social application of Darwinian principles with eugenics, social evolutionary thought was generally thought to be discredited in the early and mid-twentieth century (Hodgson and Thorbjørn 2010: 16). During the 1950s, when the idea of social evolution was deeply unpopular, Hayek started to revive the approach in his University of Chicago interdisciplinary seminar. Participants in the seminar included the geneticist Sewall Wright, himself a group selectionist (Caldwell 2004: 299). This was the beginning of a number of works by Hayek in the 1960s and 1970s, wherein he developed a sophisticated analysis of the relation between complex phenomena, spontaneous orders, and cultural evolution (Gaus 2006). These accounts employed selectionist ideas but were not directly Darwinian.

Hayek repeatedly refers to “the twin ideas of evolution and spontaneous order” (Hayek 1967c: 77; 1978: 250; 1973: 23, 158; 1988: 146). The starting point is Hayek’s work on complex phenomena; in contrast to the relatively simple phenomena studied by classical mechanics, biological organisms and social orders are complex systems that give rise to emergent properties, which can only be predicted within very broad ranges (Hayek 1967b). Throughout his long career—and certainly since the 1950s—Hayek’s overriding concern was the analysis of the emergent property he called “the order of actions”:

It is the resulting overall order of actions but not the regularity of the actions of the separate individuals as such which is important for the preservation of the group; and a certain kind of overall order may in the same manner contribute

to the survival of the members of the group whatever the particular rules of individual conduct that bring it about.

(1967c: 68)

Hayek's fundamental claim is that the survival of a society depends on the emergent property of orderly cooperation of different individuals, which has a complex relation to the rules of conduct individuals follow. Some theories of spontaneous order (e.g. economics) explain how the complex order of social actions can be self-organizing and self-maintaining—they are essentially what Hayek calls “models” of the complex phenomenon of the social order of actions, providing general accounts of how the elements relate (Hayek 1967a: 14ff.). But to understand the workings of a complex social order of actions—spontaneously organized and self-regulating complex phenomena—is, still, essentially a static explanation. Hayek is so attracted to evolutionary accounts of the order of actions because they hold out the promise of providing general explanations of the alteration and development of complex orders without needing the assumption that anyone fully understands the working of the order. As Hayek sees it, evolutionary accounts provide the real alternative to design or “constructivist theories” (Hayek 1973: ch. 1). Evolutionary accounts articulate precisely the type of explanations based on the principles of change, rather than the prediction of system states, that are appropriate to complex systems (Hayek 1967b: 31ff.). In biology, Darwinian theory allows us to understand the principles that regulate the development of species, shows us that some developments are outside the possible range of possible values (e.g. that horses will suddenly give birth to winged offspring), but it is unable to generate specific predictions about the future of individuals or species (Hayek 1967b). Hayek believes that the same types of explanations are appropriate in other complex systems such as the economy or society as a whole.

In Hayek's social evolutionary analysis, then, the *explanandum* (that which is to be explained) is the rise and development of an emergent property, namely, the social order of actions. As Hayek says, “the selection process will operate on the order as a whole” (1967c: 71). This social order of actions is what Hayek calls the “Great Society”: an overall spontaneous order of adaptations that allows for coordinated action (Hayek 1973: 2ff.). The *explanans* (that which does the explaining) is an evolutionary account whereby the rules and institutions that give rise to this order (i.e., this emergent property) are selected via a competition within and among social orders. The emergent property, we have seen, arises out of a system of rules; therefore, their constituent rules and institutions determine the competition among these social orders as they operate in specific environments. Constituent rules and institutions differentiate social orders; variation in the rules and institutions can provide a competitive advantage in the competition between social orders, leading to selection of a social order of actions with certain sets of rules.

Hayek suggests a number of selection mechanisms, one of which is group survival:

[t]he rules of conduct have ... evolved because the groups who practiced them were more successful and displaced others. They were rules which, given the environment in which men lived, secured that a greater number of the groups or individuals who practiced them would survive.

(Hayek 1973: 18; see also Hayek 1988: 25)

This passage presents difficulties. By simply talking of “groups,” and then adding at the close that “greater number of the groups or individuals” survive, Hayek appears to be

directly falling prey to problems of group selection and collective action. It looks as if Hayek is claiming that an individual's chance of survival is maximized if she belongs to a group that maximizes its own chance of survival (Hayek 1967c: 72). But this raises familiar problems of collective action and the rationality of free-riding that we saw in Section 2. If individuals are confronting prisoner's dilemmas, it might be rational for each person not to do the thing that is good for the group, even though this leads to a situation that is disadvantageous for all. One of the lessons of game theory is that what is good for the group might not be rational for any particular person in the group.

Hayek also, however, writes that a person's "thinking and acting are governed by rules which have by a *process of selection been evolved in the society in which he lives*" (Hayek 1973: 11, emphasis added). Understood thus, it looks now as if his project is to explain how each rule (not the order of actions itself) evolved within the society. That this project might rely not only on the rule's ability to produce a competitive order of actions, but the rule's attractiveness to individuals who live under it, is suggested by Hayek's remark that "[t]he competition on which the process of selection rests must be understood in the widest sense. It involves competition between organized and unorganized groups *no less than competition between individuals*" (Hayek 1960: 37, emphasis added). This stress on individual competition and the evolution of *rules* suggests that, instead of a competition between social orders, Hayek has in mind a competition between individuals within a social order that leads to the *selection and evolution of rules*. So we seem to have two evolutionary competitions, pressuring rules from two different directions: (a) A competition exists between social orders that are, as it were, carriers of rules (as individual organisms are carriers of genes). The rules give a social order a certain competitive advantage, but the rules are only selected insofar as they are part of the evolved social order of actions. (b) There is also a competition between individuals and groups within a social order, and *this* competition selects certain rules as conducive to individual/group success.

## 5. Game Theoretic Modeling of Evolution

Although Hayek and Darwin saw quite clearly the implications of their evolutionary approach to understanding human institutions, they lacked the analytical tools to fully explore their central insights. Hayek's goal, as we have seen, was to develop a dynamic analysis of social evolution that could replace what he considered to be outmoded forms of social theory. Advances in the understanding of biological evolution in the mid-twentieth century were combined with advances in mathematical techniques, most notably in game theory and the modeling of complex, dynamic systems. The first development of the ideas that would become evolutionary game theory were made by, quite possibly, the most important biologist in the twentieth century, R. A. Fisher. His work on sex ratios in *The Genetical Theory of Natural Selection*, a key book in the development of the modern evolutionary synthesis of genetics with natural selection, developed the basic idea of evolutionary equilibrium as a kind of competitive stability (Fisher 1930). Competitive stability could be modeled in game theoretic terms. This insight led to the development of evolutionary game theory.

The irony, as John Maynard Smith points out on the opening page of his monumental *Evolution and the Theory of Games* is that "game theory is more readily applied to biology than to the field of economic behavior for which it was originally designed" (1982: vii). This is because the basic solution concept of traditional game theory, the

Nash Equilibrium, has some drawbacks in terms of modeling individual rational strategic behavior. As Maynard Smith notes, there are good reasons to doubt that humans will behave rationally in the way that traditional game theory suggests (1982: vii). Furthermore, the unrealistic requirements of common knowledge required in traditional game theory make it unsuitable as the basis of an empirical, prediction-based science of human behavior (Sugden 1991).

When applied to a biological context, however, game theory is a powerful tool. Instead of analyzing the rational strategy for an individual agent, we look at stable strategies across populations. This has several implications. *First*, the payoffs to the game which, in traditional game theory, were expressed in the somewhat murky notion of individual utility are transformed into the much more straightforward idea of replication rates. Successful strategies propagate themselves at a higher rate than unsuccessful ones. This solves the perennial problem of interpersonal comparisons of utility by locating payoffs along a single dimension of reproductive success. *Second*, the idea of a mixed-strategy, a key component to the power of the Nash existence theorem (which shows that all finite games have at least one Nash Equilibrium), was never well motivated in the case of individual single-play games. As many have pointed out, it is hard to see what rationally accessible reason a person could have for actually playing mixed-strategy equilibria (Pettit 1996: 291–3). At the population level, however, this problem is solved by understanding mixed strategies as populations divided into different strategies. To have one-third of a population be composed of strategy A agents and two-thirds of the population be composed of strategy B agents makes sense in a way that an individual agent playing strategy A with a one-third probability and B with a two-thirds probability in a single-play game does not. *Third*, the fundamental solution concept of evolutionary game theory, the “evolutionarily stable strategy” (ESS) seems more robust than the various solution concepts in traditional game theory.

The ESS is, again, based on population level dynamics. As Maynard Smith puts it, “evolutionary game theory is a way of thinking about evolution at the phenotypic level when fitness of particular phenotypes depend on their frequency in the population” (1982: 1). In evolutionary game theory, phenotypes are represented as particular strategies. Each strategy has a given payoff in terms of fitness when paired against any other strategy in a population, including itself. A strategy is an ESS if, as Herbert Gintis puts it, “a whole population using that strategy cannot be invaded by a small group with a mutant [phenotype]” (Gintis 2009b: 229). Similarly, a social “phenotype,” a set of social norms, rules, or practices, will be evolutionarily stable if a group of mutant innovators cannot move the entire population away from the equilibrium strategy.

To better see this, consider the classic Hawk–Dove game given in Figure 1:

	Hawk	Dove
Hawk	–5	0
Dove	0	5

Figure 1 A Specific Hawk–Dove Game



Suppose that Hawks and Doves are phenotypes in the population. A Hawk always battles for territory until either it is injured or its opponent retreats. A Dove engages in display battle: if it meets a Hawk it quickly retreats without injury; if it meets another Dove, there is a 0.5 probability that it will retreat—in no case does it sustain injury. The expected payoff of a Hawk playing another Hawk is  $-5$ ; the expected payoff of a Hawk meeting a Dove is  $10$ ; the expected payoff of a Dove meeting a Hawk is  $0$ ; and the expected payoff of a Dove meeting a Dove is  $5$ , with payoffs representing differential reproduction of the phenotype in the next generation. Though the players do not vary their strategies (and so they cannot make “moves” in the sense of traditional game theory), we can understand the population as “moving” in the sense that if being a Hawk has a higher expected payoff than being a Dove, the population will move towards more Hawks and fewer Doves. In evolutionary terms we can think of this as a *replicator dynamic* in which those strategies that tend to have higher average payoffs increase in the population and so displace lower payoff strategies (Skyrms 1996). Neither an all-Hawk nor an all-Dove strategy is evolutionarily stable. For a population of all Hawks the average expected payoff of the population is  $-5$ ; since a mutant Dove would have a payoff of  $0$  it would outperform the population average and increase. For a population of all Doves, the average population payoff is  $5$ ; a mutant Hawk would receive a payoff of  $10$ , thus again outperforming the average of the Dove population. In Figure 1 an evolutionarily stable equilibrium would be a mixed population evenly split between Doves and Hawks. At that mix the average Hawk and average Dove payoffs are the same ( $2.5$ ), and so neither population can grow at the expense of the other. This is equivalent to a Nash Equilibrium of mixed strategies.

The basic tools of evolutionary game theory can be extremely powerful, modeling the dynamics of social evolution in ways that Hayek could never have imagined. Indeed, some have gone so far as to argue that evolutionary game theory is essential to a unified understanding of the social and behavioral sciences (Gintis 2009a). The basic hope is that, given this powerful analytical tool, social theorists can model the complex world of social interaction and the development of different social evolutionary equilibria. Much work has already been done along these lines and evolutionary game theory has helped clarify important social practices such as the development of social norms (Bicchieri 2006), property in both animal and human populations (Gintis 2007), and altruism (Trivers 1971) among others.

## 6. The Co-evolution of Genes and Culture

Another set of powerful formal models of cultural evolution based on population dynamics has been developed by Robert Boyd and Peter Richerson (1985, 2005). Boyd and Richerson’s approach seeks “a systematic framework” accounting “for all the processes by which the distribution of beliefs, attitudes and values in a population are modified” (1985: 11–12). The aim is to model cultural evolution in terms of demographic dynamics, accounting for social, ecological and psychological processes. On their analysis the *forces of cultural evolution* can be divided into (a) the inertial, (b) those that induce variation, and (c) those resulting from natural selection (Richerson and Boyd 2005: 68). The *inertial forces* are those that induce towards stability, such as the accurate copying of ideas and models from one person to the next, which accurately replicate cultural forms. In contrast, *cultural factors that induce variation* lead to cultural changes, and can be subdivided into random and decision-making variations. Random

variations include, say, simple errors in copying cultural forms leading to mutations, as well as a cultural version of genetic drift (if a society has some skill that is practiced by a small group and, by chance, this group dies off in a generation, the society will lose that cultural form). Boyd and Richerson place great stress on decision-making factors that induce variation. What they call “guided variation” involves social learning and invention which are successfully reproduced. Some individual, confronting a problem, might discover a superior method that is then copied by others. On their view, however, a great amount of cultural variation stems from “biased transmission,” where certain sorts of cultural forms are more likely to be reproduced than others. For example, cultural ideas and practices followed by high-prestige individuals are more likely to be copied, as are more common forms, or simply those that are simpler and easier to remember.

Fundamental to Boyd and Richerson’s view is the hypothesis of the co-evolution of culture and genes (see also Henrich and Henrich 2007: ch. 2). The variation of cultural forms is affected by their interaction with natural selection: cultural forms that have advantages in natural selection (say, language) can spread. According to the crucial co-evolution thesis, the relation between natural selection and cultural evolution is reciprocal: natural selection primes us for some culture variations, which might be favored by natural selection, yet those cultural forms change the environment in which natural selection operates.

Boyd and Richerson’s account is straightforwardly selectionist, with selection operating at both individual and group levels, on both cultural and biological dimensions. Thus some cultural form (say, a new way of farming), might be selected because individuals who employ it are seen to do better, and so are copied by others, but also because groups that employ the method outperform groups that do not, and so eventually are copied by, or eliminate, other groups (Boyd and Richerson 2005: ch. 11). Furthermore, as we have just seen, a form may spread because it is seen as useful (and so selected by at the cultural level), but it may also spread because it gives those who use it a biological evolutionary advantage (and so selected by natural selection).

An especially important part of the work of Boyd and Richerson, as well as Gintis, Ernst Fehr and others has been the analysis of the evolution of cooperation in large groups (Boyd and Richerson 2005: pt. 3; Gintis, Bowles, Boyd and Fehr 2005; Henrich and Henrich 2007; Bowles and Gintis 2011). In many ways the beginning of rigorous analysis of the evolution of cooperation was Robert Axelrod’s (1984) analysis of tit-for-tat in iterated prisoner’s dilemmas. Axelrod showed that if we model cooperation in terms of direct reciprocity (each person reciprocates with other individuals who have cooperated with her, but refuses cooperation with those who have not cooperated with her), then strategies such as tit-for-tat can account for the evolution of cooperation among egoists. From the perspective of game theory, Binmore (2005) has effectively shown that the family of possible strategies in equilibrium is *much* larger than tit-for-tat and its near variants. The crucial findings of Boyd, Richerson and others, however, is that direct reciprocity, which places heavy information demands on those who employ it, is not a plausible model for the evolution of cooperation in large groups (Boyd and Richerson 2005: chs. 8–10; Henrich and Henrich 2007: chs. 6–7; Gaus 2011: ch. 2; Bowles and Gintis 2011: chs. 5–6). It seems that the most plausible hypothesis is that the evolution of large-scale human cooperation is best explained by the evolution of “altruistic punishers” or what might be called “rule-following punishers”—individuals who follow norms when most others do so, and who are also willing

to expend resources to punish non-cooperators. Groups of such rule-following punishers outcompete groups composed of more egoist individuals and also resist invasion by defectors (Gaus 2011: ch. 3). This explanation, if correct, provides an answer to the problem that Darwin posed in 1871 about the possibility of morals and cooperation co-evolving.

Despite the power of the co-evolutionary account of cultural evolution proposed by Boyd and Richerson, there is some controversy over what exactly an account of cultural evolution is about. That is, what is culture and how is it transmitted? In many ways, this controversy is the cultural evolutionary version of the traditional “levels of selection” debate in the philosophy of biology. This debate arises because of the abstract nature of the idea of natural selection. This, combined with the hierarchical nature of biological organisms and the complex nature of adaptation, makes it unclear what should be considered the replicator that is selected in certain cases (Okasha 2006: ch. 1). The fuzzy nature of what constitutes culture, norms, principles, and social rules makes this problem even more acute. In his groundbreaking 1976 defense of gene level selection, *The Selfish Gene*, Dawkins first introduced the idea of the “meme” which acts as the analogue to the gene in social evolution (1976: ch. 11). Dawkins insists that cultural evolution is driven by gene-like memes at the genotypic level (see also Blackmore 1999; Distin 2005).

Dan Sperber proposes a model of cultural evolution based on what he calls “epidemiology of representations” (Sperber 1996: 1). Sperber’s goal is to build a naturalistic theory of culture and its evolution through an epidemiological model that explains “population-scale macro phenomena ... as the cumulative effect of micro-processes” (Sperber 1996: 2). Sperber disagrees with Dawkins and, to a certain extent, with Boyd and Richerson, that cultural evolution can be understood along Darwinian lines. For Sperber, culture is made up of micro-level mental representations in the minds of all of the individuals within a social unit (Sperber 1996: 70–1). Furthermore, “the human mind is susceptible to cultural representations in the same way as the human organism is susceptible to disease” (Sperber 1996: 57). Some cultural representations are more “contagious” and have more staying power than others. The debate between the Sperberian account of cultural evolution and Boyd and Richerson has many dimensions, but the main thread of the controversy is over the unit and process of cultural transmission. Sperber argues that we need to understand the genotypic process of cultural evolution; in this case the mental representations of culture, to understand how culture changes and is maintained. Gene-culture co-evolution is “too slow a process” according to Sperber to explain cultural changes over the last couple of thousand years (Sperber 1996: 114). Instead of co-evolution, we should focus on the psychological nature of the transmission and stability of representations from one person to another. Following a theory of mental representations heavily informed by the work of Chomsky and Fodor, Sperber builds a basically “Lamarckian” account of social evolution from the inside out, that is, from the nature of genotypic mental representations to culture as a whole. Boyd and Richerson, on the other hand, have developed a “Darwinian” model of social evolution that is more interested in explaining phenotypic selection while remaining silent on genotypic causes (Richerson and Boyd 2005: 80–1). Far from privileging one approach over the other, it seems fruitful to pursue both lines of research simultaneously. Either one will prove more explanatorily productive than the other or they will converge; in either case the pursuit will have been useful.

## 7. Conclusion

The study of the nature of social evolution manifests our desire to understand how we arrived where we are and, on some views, perhaps where we are headed. The contemporary interest in social evolutionary models is not only part of the twenty-first century's resurgent general Darwinism, but a deeper recognition of the complexity of social orders and the search for adequate explanatory approaches. A better understanding of the nature of social evolution is important for political and moral philosophers because it can help draw the limits of the feasible; it shows us the contingency of our particular social and moral institutions, while providing a framework for showing why all societies arrive at types of institutions that perform certain crucial functions.

Much is still unresolved. The debate over competitive vs. cooperative evolution that was started in the nineteenth century is still raging—and this is connected to the larger debate over the levels of selection. As we have seen, there is still controversy over the relation between, and relative importance of, biological and social evolution in analyzing culture. In many ways, then, the field of social evolution is just beginning (once again), with many different promising research programs.

## Related Topics

Late Nineteenth- and Early Twentieth-Century British Thought, Rational Choice Theory

## References

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- Axelrod, Robert (1984) *The Evolution of Cooperation*, New York: Basic Books.
- Bicchieri, Cristina (2006) *The Grammar of Society: The Nature and Dynamics of Social Norms*, Cambridge: Cambridge University Press.
- Binmore, Ken (2005) *Natural Justice*, Oxford: Oxford University Press.
- Blackmore, Susan (1999) *The Meme Machine*, Oxford: Oxford University Press.
- Bowles, Samuel and Herbert Gintis (2011) *The Cooperative Species: Human Reciprocity and its Evolution*, Princeton, NJ: Princeton University Press.
- Boyd, Robert and Peter J. Richerson (1985) *Culture and the Evolutionary Process*, Chicago, IL: University of Chicago Press.
- (2005) *The Origin and Evolution of Cultures*, Oxford: Oxford University Press.
- Caldwell, Bruce (2004) *Hayek's Challenge*, Chicago, IL: University of Chicago Press.
- Darwin, Charles (1871) [1981] *The Descent of Man, and Selection Related to Sex*, introd. John Tyler Bonner and Robert M. May, Princeton, NJ: Princeton University Press.
- (1872) [2002] *The Expression of the Emotions in Man and Animals*, introd. Paul Ekman, Oxford: Oxford University Press.
- Darwin, Francis (ed.) (1887) *The Life and Letters of Charles Darwin, Including an Autobiographical Chapter*, London: John Murray, volume 3.
- Dawkins, Richard (1976) *The Selfish Gene*, Oxford: Oxford University Press.
- Distin, Kate (2005) *The Selfish Meme*, Cambridge: Cambridge University Press.
- Ferguson, Adam (1767) [1995] *An Essay on the History of Civil Society*, ed. Fania Oz-Salzberger, Cambridge: Cambridge University Press.
- Fisher, Roald J. (1930) *The Genetical Theory of Natural Selection*, Oxford: Clarendon Press.
- Gaus, Gerald F. (1983) *The Modern Liberal Theory of Man*, New York: St. Martin's.
- (2006) "The Evolution of Society and Mind: Hayek's System of Ideas," in *The Cambridge Companion to Hayek*, ed. Ed Feser, Cambridge: Cambridge University Press.
- (2011) *The Order of Public Reason: A Theory of Freedom and Morality in a Diverse and Bounded World*, Cambridge: Cambridge University Press.
- Ginsberg, Morris (1931) "The Concept of Evolution in Sociology," *Proceedings of the Aristotelian Society*, ns 31 (1930–1): 201–224.

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- Gintis, Herbert (2007) "The Evolution of Private Property," *Journal of Economic Behavior and Organization* 64(1): 1–16.
- (2009a) *The Bounds of Reason: Game Theory and the Unification of the Behavioral Sciences*, Princeton, NJ: Princeton University Press.
- (2009b) *Game Theory Evolving: A Problem-Centered Introduction to Modeling Strategic Interaction*, Princeton, NJ: Princeton University Press.
- , Samuel Bowles, Robert Boyd and Ernst Fehr (2005) *Moral Sentiments and Material Interests: The Foundations of Cooperation in Human Life*, Cambridge, MA: MIT Press.
- Hamilton, W. D. (1964) "The Genetical Evolution of Social Behaviour I," *Journal of Theoretical Biology* 7: 1–16.
- Hayek, F. A. (1960) *The Constitution of Liberty*, London: Routledge.
- (1967a) "Degrees of Explanation," in F. A. Hayek, *Studies in Philosophy, Politics, and Economics*, Chicago, IL: University of Chicago Press, pp. 3–21.
- (1967b) "The Theory of Complex Phenomena," in F. A. Hayek, *Studies in Philosophy, and Economics*, Chicago, IL: University of Chicago Press, pp. 22–42.
- (1967c) "Notes on the Evolution of Systems of Rules of Conduct," in F. A. Hayek, *Studies in Philosophy, Politics, and Economics*, Chicago, IL: University of Chicago Press, pp. 66–81.
- (1973) *Law, Legislation, and Liberty*, vol. 1: *Rules and Order*, Chicago, IL: University of Chicago Press.
- (1978) "Dr. Bernard Mandeville," in F. A. Hayek, *New Studies in Politics, Economics and the History of Ideas*, London: Routledge, pp. 249–266.
- (1988) *The Fatal Conceit*, ed. W. W. Bartley III, Chicago, IL: University of Chicago Press.
- Henrich, Natalie and Joseph Henrich (2007) *Why Humans Cooperate*, Oxford: Oxford University Press.
- Hobhouse, L. T. (1901) *Mind in Evolution*, London: Macmillan.
- (1911) *Social Evolution and Political Theory*, New York, Columbia University Press.
- Hodgson, Geoffrey and Thorbjørn Knudsen (2010) *Darwin's Conjecture*, Chicago, IL: University of Chicago Press.
- Malthus, Thomas Robert (1798) *An Essay on the Principle of Population, as it Affects the Future Improvement of Society, with Remarks on the Speculations of Mr. Godwin, M. Condorcet, and Other Writers*, London: J. Johnson.
- Okasha, Samir (2006) *Evolution and Levels of Selection*, Oxford: Oxford University Press.
- Pettit, Philip (1996) *The Common Mind: An Essay on Psychology, Society, and Politics*, Oxford: Oxford University Press.
- Richerson, Peter J. and Robert Boyd (2005) *Not by Genes Alone: How Culture Transformed Human Evolution*, Chicago, IL: University of Chicago Press.
- Ritchie, D. G. (1891) *Darwinism and Politics*, London: Swan Sonnenschein.
- Rousseau, Jean Jacques (1750) [1997] *Discourse on the Origin and Foundations of Inequality Among Men*, ed. & trans. Victor Gourevitch, Cambridge: Cambridge University Press.
- Skyrms, Brian (1996) *Evolution of the Social Contract*, Cambridge: Cambridge University Press.
- Smith, Adam (1776) [1976] *An Inquiry Into the Nature and Causes of the Wealth of Nations*, ed. R. H. Campbell, A. S. Skinner and W. B. Todd, Oxford: Clarendon Press.
- Smith, John Maynard (1982) *Evolution and the Theory of Games*, Cambridge: Cambridge University Press.
- Sober, Elliot and David Sloan Wilson (1999) *Unto Others: The Evolution and Psychology of Unselfish Behavior*, Cambridge, MA: Harvard University Press.
- Spencer, Herbert (1857) [1891] "Progress: Its Law and Cause," in *Essays: Scientific, Political, and Speculative. Library Edition, containing Seven Essays not before republished, and various other Additions*, London: Williams and Norgate.
- Sperber, Dan (1996) *Explaining Culture: A Naturalistic Approach*, Oxford: Blackwell Publishers.
- Sugden, Robert (1991) "Rational Choice: A Survey of Contributions from Economics and Philosophy," *The Economic Journal* 101(407): 751–785.
- Sumner, William Graham (1860) [1914] "The Challenge of Facts," in William Graham Sumner, *The Challenge of Facts and other Essays*, ed. Albert Galloway Keller, New Haven, CT: Yale University Press.
- (1881) [1919] "Sociology," in *War and Other Essays*, ed. Albert Galloway Keller, New Haven, CT: Yale University Press.
- Taub, Liba (1993) "Evolutionary Ideas and 'Empirical' Methods: The Analogy between Language and Species in Works by Lyell and Schleicher," *The British Journal for the History of Science* 26: 171–193.
- Trivers, Robert (1971) "The Evolution of Reciprocal Altruism," *The Quarterly Review of Biology* 46(1): 35–57.
- Wilson, Edward (2012) *The Social Conquest of the Earth*, New York: Liveright.