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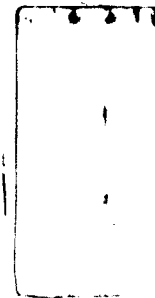
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The Evolution of Norms: An Anthropological View

by

ROBERT BOYD and PETER J. RICHEYSON*

This paper briefly describes Darwinian models of the evolution of norms and other aspects of culture. Such models assume that culture is a system of inheritance in which beliefs and values that affect behavior are transmitted from individual to individual by social learning. Cultural change occurs because various processes cause some cultural variants to spread and others to diminish. Some processes cause the spread of beliefs that lead to behavior not predicted by models based on self-interested rationality. (JEL: A12)

1. Introduction

The title of this paper is somewhat misleading. It is about the evolution of norms, but as you will see, the view of norms that we will describe and defend is very far from the norms of anthropology. While there are many different views of norms within anthropology, most anthropologists would probably agree that norms are an essential component of every culture. A culture's norms determine which behaviors are permissible and which are forbidden, what things are desirable and what things are to be avoided, what is good and what is evil. Because norms determine what is good and what is desirable, they determine how people in the culture will behave. Most anthropologists also believe that, like other aspects of culture, people readily adopt any arbitrary norm – men may be required to wear trousers and women skirts or men skirts and women trousers, horse flesh may be a supreme delicacy or excite only disgust, marriage between cousins may be a heinous crime or the only correct form of marriage. To exaggerate only slightly, humans are an empty vessel into which culture is poured. For these anthropologists, the studies of the evolution of norms have involved the description of historical patterns of change, and how these patterns are correlated with changes in subsistence and political organization, rather than the processes that cause norms to change through time (CAMPBELL [1965], [1975]). In recent years, some anthropologists have emphasized that people are not simply rule bound robots who carry out the dictates of their culture. Rather people are seen to strategize within the confines

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of their culture's norms, using those norms that are to their own advantage. According to this view, changes in norms are driven, at least in part, by the conflict between strategizing individuals. While individuals have some autonomy in this view, it is still the case that norms come first and people follow.

This general view of norms has held sway in anthropology and sociology for many years. In anthropology it goes back to the 19th century founders of the discipline such as Tylor, was adopted in the twentieth century by the founders of the modern discipline such as Boas and Radcliffe-Brown (INGOLD [1985]), and continues to dominate through the work of prestigious contemporary figures such as SAHLINS [1976]. Similar views of norms have an equally long history in sociology being defended by the 19th century founding fathers of sociology such as Durkheim and Weber, and continued to dominate through the writing of people like Parsons.

Game theorists from philosophy (ULLMANN-MARGALIT [1977]) and economics (SCHOTTER [1981], SUGDEN [1985], BINMORE [1994]) offer us a different picture. Norms, they say, are the solution to coordination games. Norms are built up from the choices of rational, self-interested individuals. Social life involves the interaction of many individuals whose interests conflict. For example, you are better off if others in your group cooperate to defend the group against its rapacious neighbors, (and of course, cooperate to rob and murder its neighbors as well). However, each individual would like to avoid being killed in battle. According to the game-theoretic view of norms, people solve these problems through a system of norms – men are expected to participate in defense of their group, to punish those who fail defend the group, and punish those who do not punish when it is appropriate. The folk theorem (compound-ed by the fact that the same logic applies to many other dimensions of social life) guarantees that there are an astronomical number of possible equilibria at which different norms are enforced, and the problem that faces individuals is coordinating on the correct equilibrium. Culture, according to BINMORE [1994], is just the knowledge necessary to achieve such coordination. Norms, and therefore culture, evolve when societies shift from one coordination equilibrium to another.

The game theorist's view of norms has much to recommend when compared with the received view in anthropology. There seems to be little doubt that a great deal of human behavior is motivated by self-interest, yet most anthropologists and sociologists have no explanation for why self-interested people pay any attention to norms, and as a result cannot easily reconcile their view with the fact human beings are the products of organic evolution. Everything that we know about how evolution shapes social behavior suggests that people should be selfish and nepotistic. It seems that any psychological mechanisms that allow people to be programmed to behave in any arbitrary way should long ago have been eliminated by natural selection. Many anthropologists believe that the fact that human behavior is controlled by culturally imposed norms has freed humans from the constraints of organic evolution, but because they have

no way of reconciling the existence of norms with the choices of individuals, they cannot defend this belief with a cogent argument. The game theoretic view also has the great advantage of being based on a body of rigorous mathematical theory so that one can actually check to see whether its conclusions follow from its assumptions.

2. A Darwinian Model of the Evolution of Norms

Here we sketch a third view of the evolution of norms, one that traces its intellectual parentage to evolutionary biology, not one of the social sciences. Over the past two decades, a number of scholars have attempted to understand the processes of cultural evolution in Darwinian terms (CAMPBELL [1965], [1975]; CLOAK [1975]; DURHAM [1976]; DAWKINS [1976], RUYLE [1973], PULLIAM and DUNFORD [1980]; LUMSDEN and WILSON [1981]; BOYD and RICHERSON [1985]; RICHERSON and BOYD [1989]; CAVALLI-SFORZA and FELDMAN [1973], [1981], [1983]; ROGERS [1989]). The idea that unifies this body of work is that culture constitutes a system of inheritance. People acquire beliefs, attitudes, and values both by teaching and by observing the behavior of others. Culture is not behavior; culture is information stored in human brains that, together with individuals' genes and their environments, determines their behavior. We refer to alternative culturally transmitted items of information as "memes." Norms, on this view, are those memes which influence standards of behavior. Since memes are communicated from one person to another, individuals sample from and contribute to an evolving meme pool, much as they do an evolving gene pool.

This view of culture implies that cultural evolution should be modeled as a population process. To understand why people behave as they do in a particular environment, we must know the nature of the skills, beliefs, attitudes, and values that they have acquired from others by cultural inheritance. To do this we must account for the processes that affect cultural variation as individuals acquire memes, use the acquired information to guide behavior, and act as models for others. What processes increase or decrease the proportion of people in a society who hold particular ideas about how to behave? We thus seek to understand the cultural analogs of the forces of natural selection, mutation, and drift that drive genetic evolution.

Because cultural evolution results from the gradual change of a variable population we say that it is *Darwinian*. The eminent biologist Ernst MAYR [1982] has argued that Darwin's most fundamental contribution to biology was what MAYR [1982] calls "population thinking." Before Darwin, species were thought to be essential, unchanging types, in the same category as geometric figures and chemical elements. Darwin saw that species were populations of organisms that carried a variable pool of inherited information through time, and that to understand the evolution of species, biologists had to account for

the processes that changed the nature of that inherited information. DARWIN [1871] thought that three processes were most important: natural selection, sexual selection, and the "inherited effects of use and disuse." We now know that the latter process is not important in organic evolution – unlike Darwin, we do not believe that the sons of blacksmiths inherit their fathers' mighty biceps. Modern biologists think of important many processes that Darwin never dreamed of, segregation, recombination, gene conversion, meiotic drive and so on. Nonetheless, contemporary biologists call their theory Darwinian because it incorporates Darwin's fundamental insight, population thinking.

2.1 An Empirical Digression

Before describing how we go about building this kind of theory, we would like to briefly digress and present a concrete example of culturally transmitted norms so that the ensuing discussion is not entirely hypothetical. Sonya Salomon and her co-workers have conducted a number of studies investigating the effect of ethnic background on farmers in the American middle west. Early settlers of this area included immigrants from different parts of Europe who brought with them the language, values, and other customs of their native land. Today, most overt traces of ethnic origin, are gone – you cannot guess peoples' origin from their language or dress. However, Salomon has shown that people from different ethnic backgrounds have different beliefs about farming and family. As a result farmers from different ethnic background may make very different decisions about farm management even though they have similar farms on nearly identical soils only a few miles apart.

One study (SALOMON [1985]) focused on two farming communities in southern Illinois. One of these, "Freiburg" (a pseudonym), is inhabited by the descendants of Westphalian Catholics who arrived in the area during the 1840's. The second, "Libertyville" (also a pseudonym) was settled by people from other parts of the US, mainly Kentucky, Ohio, and Indiana, when the railroad arrived in 1870. These two communities are only about 30 km apart and have been carefully matched for similar soil types. In each community Salomon collected quantitative data on demography, farming practices, and land tenure. She also intensively studied a sample of families by participant observation.

The people in these two communities have different values about family, property and farm practice, and these differences seem consistent with their ethnic origins. The farmers of Freiburg tend to value farming as a way of life, and they want at least one son or daughter continue as a farmer. According to one of SALOMON's [1985, 329] informants

"The money's immaterial. I want a comfortable living for myself, the main thing is that's it's something I've put together and I want to see it stay together... I'd like to come back in 500 years and see if my great-great grandchildren still have it."

As a result, people are very reluctant to sell land. In Freiburg, wills specify that the farm will go to a child who will farm the land and use farm proceeds to buy out his or her siblings. Parents put considerable pressure on children to become farmers, but place little importance on education. Salomon argues that these "yeoman" values are similar to those observed among peasant farmers in Europe and elsewhere. In contrast, the "Yankee" farmers of Libertyville regard their farms as profit making businesses. They buy, or rent land depending on economic conditions, and if the price is right, they sell. After a Yankee farmer sold out a good price, his neighbor commented "you don't make that kind of money selling beans." Many Yankee farmers would prefer their children to continue farming, but they see it as an individual decision. Some families help their children enter farming, but many do not, and they generally place a strong value on education.

The difference in values between Freiburg and Libertyville leads to different farm practices despite proximity of the two towns and the similarity of their soils. Farms are substantially larger in Libertyville – the mean size of farm operations is 518 acres compared to 276 acres in Freiburg. The Libertyville farms are larger because Yankee farmers rent more land. German operators are conservative, mainly farming the land they own, while Yankee farmers aggressively expand their operations by renting. The two communities also show striking differences in farm operations. In Libertyville, as in most of Southern Illinois, farmers specialize in grain production – it is the primary source of income for 77% of the farmers in Libertyville. In Freiburg grain production is the most important source of income for 44%. Instead many Germans mix grain production with dairying or livestock raising, activities that are almost absent in Libertyville. Because animal operations are labor intensive, they allow Germans to accommodate their larger families on limited acreage consistent with the German farming goals. Yankee farmers decided against dairying and stock raising because "... we could make more money from the land without all that work" (SALOMON [1984, 334]).

The differing values of German and Yankee farmers lead to differing patterns of land ownership in the two communities. In Freiburg land rarely comes up for sale, and when it does, the price is high compared to neighboring areas. SALOMON [1984] argues that Germans are willing to pay more for land because they are not maximizing profit – they also want to provide land for their children. As a result, land is virtually never sold to non-Germans. In 1899, 90% of the land in Freiburg was owned by Germans, and by 1982 the number was 97%. Moreover, in 1953 Germans began purchasing land in an area about 23 km to the south, and by 1982, 2,074 acres in this area were owned by Freiburg families an almost 40% increase in the land owned by members of the Freiburg community. In Libertyville land comes up for sale more often and at a lower price. The proportion of land owned by Yankee farmers has fluctuated from about 80% to 63% and back to 79% in the period 1899–1982. Moreover, consistent with the fact that Yankees view land as a commodity, absentee land

ownership is more common in Libertyville – 56% of the land is owned by local people compared with 79% in Freiburg.

Similar patterns of ethnic variation exist elsewhere in Illinois. In another study, SALOMON [1979], [1980], [1984]; SALOMON, GEGENBACHER and PENAS [1986] spent five years studying five ethnically distinct communities in east central Illinois – German, Irish, Swedish, Yankee, and mixed German-Yankee. The German and Yankee communities exhibit the same contrasts as in the southern Illinois study. The German community, "Heartland," was settled by Lutherans from east Friesland. Like the descendants of Westphalian Catholics in Freiburg, Heartlanders place a strong value on land, and on continuing the family farm from one generation to the next. The values observed in the Yankee community, "Emerson," are much like those in Libertyville. The values result in many of the same patterns of land tenure. Germans have steadily expanded the fraction of the land that they own in Heartland. In 1890 about 40% of tracts were owned by Germans and by 1978 it was about 80%. In Emerson the fraction of land owned by Yankees has held more or less steady around 75%. The turnover of land is also much higher in Emerson than in Heartland (50% per 50 years versus 20%) as was the fraction of absentee owners (73% versus 32%).

The patterns of ethnic variation *within* the farm communities studied by Salomon are similar to those *among* communities. For example, SALOMON [1984] studied the community of "Prairie Gem" which was settled by a mixture of Yankees and immigrants from many regions of Germany. In 1890 Germans owned about 20% of the land; by 1978 they owned about 60%. In 1978, 66% of the absentees owners were Yankees, and only 43% of the resident owners were Yankees. Thus, Yankees and Germans living side by side in the same community behave differently.

2.2 Modeling Cultural Change as a Population Process

To see how we apply Darwinian methods to understand cultural evolution, let us consider a simple, hypothetical example inspired by the German and Yankee farmers of Illinois. This is not a real model of cultural change in Illinois. It is a "toy model" meant to illustrate the logic of Darwinian methods in a simple but concrete example.

First, we must define the problem. What are the boundaries of the population? And, what memes are present in the population? Let us assume that basic values about farm and family are only acquired from members of the local community. This means that we can take the community as our population. If we were interested in the evolution of some other trait, say preferences for recorded music, the population would need to be different because these preferences are strongly influenced by people outside of the community. Let us also assume that there are only two memes; people either have yeoman values or

entrepreneurial ones. Any real situation would be much more complicated, but for now let's keep things as simple as possible.

The next step is to specify how the memes under consideration are transmitted from one generation to the next. How and from whom do people acquire beliefs? And, what processes cause some beliefs to increase while others to decline? Figure 1 summarizes the processes that we suppose are important. Let us consider what happens at each stage of the cultural "life cycle."

Children initially acquire the beliefs of their biological parents. Children growing up in families with two parents with yeoman values acquire yeoman values, children with two entrepreneurial parents acquire entrepreneurial values, and children whose parents differ have some chance of acquiring either value depending on which parent is more influential. Let us assume that averaged over all such mixed families, half the children acquire yeoman values and half acquire entrepreneurial values. This means that transmission from parents to offspring leaves the population unchanged. The same fraction of children hold entrepreneurial values as among their parents. We say that such transmission is *unbiased*.

Next, as children grow older they are exposed to people other than their parents, and these people may cause them to modify their beliefs. Suppose that young adults get experience with other farm operations (perhaps as result of

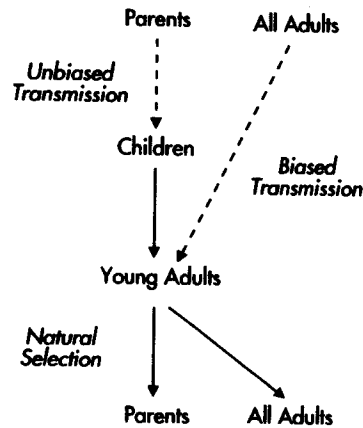


Figure 1

A diagram of the life cycle described in the text. Children acquire beliefs and values about farming from their parents. Then as they grow older their beliefs and values may also be affected by other adults. Next as adults, they marry and choose a career. Those who abandon farming and leave the community have no further effect on the values in the community.

participating in youth organizations like FFA or 4H) and see how different values work themselves out in practice. They observe that farmers with yeoman values work longer hours, make less money, but have closer family ties than do their entrepreneurial counterparts. These observations cause some young adults to adopt new values – some switch from yeoman values to entrepreneurial ones, while others do the reverse. Let us suppose that on average a close family is not seen to compensate for long days and low wages so that more young adults switch from yeoman to entrepreneurial values than the reverse. This is an example of what we call *biased cultural transmission* which occurs when people are predisposed to acquire some memes rather than others.

Inevitably, young adults grow up. Some get a farm and remain in the community, while others abandon farming to become doctors and lawyers in Chicago or Los Angeles. The data suggest that people who hold yeoman values are more likely to remain in the community – they believe that farming is a valuable way of life and are willing to pay higher prices for land to maintain that way of life. People who hold entrepreneurial values are more likely to leave. Farming is a notoriously difficult way to make a living, and they must compete for land with their yeoman neighbors who are willing to do with less. Since only adults who remain in the community influence the values of the next generation, selective emigration has the effect of increasing the proportion of the community holding yeoman values. We refer to this as the effect of *natural selection* on cultural variation. Finally, people get married and have children. According to Salomon, the descendants of German immigrants have substantially larger families than those descended from Yankees. Let us suppose that this difference in family size results from the same beliefs that cause differences in farm management and inheritance patterns. Since children initially acquire their values from their parents, this means that differential reproduction also leads to the spread of yeoman values in the community. This process is another form of natural selection.

So far we have seen how various processes lead to cultural change within a single generation. Usually we are interested in what the community will be like in the long run. To answer this question we construct a simple mathematical model that expresses the net effect of all the processes in a single generation, and then iterate the model from generation to generation to determine the long-run outcome. In the present case, there are three possibilities. It could be that the effect of biased transmission is very strong – almost everyone who starts out with yeoman values switches to entrepreneurial ones and almost everyone who starts with entrepreneurial values stays that way. Then entrepreneurial values will spread because people are predisposed to choose such values, and this effect is stronger than the other two processes. On the other hand it could be that biased transmission is relatively weak – some people switch from one set of values to another, but most people retain the values that they learned from their parents. Then, yeoman values will spread in the community, both because people with such values are more likely to stay in the community, and because

they have larger families. This in fact is what seems to be happening in the communities that Salomon studied. Finally, it could be that direction of bias depends on the norms of the community. If people holding Yankee values are shunned in the German community, then children growing up there may choose German values, while children growing up in the Yankee community might do the opposite. If the resulting bias were strong enough to overcome selection, the two communities will evolve in opposite directions.

Notice that this picture of cultural evolution incorporates both the anthropologist's concern with cultural traditions, and the individualist's postulate that people make consistent, often self-interested, decisions. The population approach to cultural evolution provides a natural framework in which to examine the interaction of these two aspects of human behavior, rather than forcing a choice between them.

2.3 The Forces of Cultural Evolution

We call the distinct processes which cause the culture to change *forces* of cultural evolution. In this example there are two forces – biased transmission which causes entrepreneurial values to increase and natural selection which causes yeoman values to increase. We think that there are a number of other distinct forces besides biased transmission and natural selection, but we will not discuss them here (see BOYD and RICHERSON [1985], [1987]). Instead we concentrate on only these two because they exemplify two distinct classes of forces – those that arise because people's psychology makes them more likely to acquire some memes rather than others, and those that result from what happens to people who carry different memes.

Biased Transmission. Biased cultural transmission occurs when people preferentially adopt some memes rather than others. Think of it as comparison shopping. People are exposed to alternative ideas or values and then choose among them (although the choice may not be a conscious one).

The diffusion of innovations provides a well studied example of how biased transmission can work. In both traditional and contemporary societies, innovations spread as the result of personal contact. People adopt an innovation like the cultivation of sweet potatoes, a new world crop that spread to many societies in Oceania, after observing the behavior of a friend or neighbor who has already adopted the innovation. Once they have observed the innovation first hand, people's decision about whether to adopt the innovation is strongly affected by the perceived advantage of new technology relative to old one. Are sweet potatoes a better staple than yams? If they seem to be, then people will tend to adopt and the innovation will spread (see ROGERS [1983] for many examples). The decision to adopt is also affected by the prestige of the people who have already adopted. This leads to a variety of biased transmission that we call "indirect bias" which we will not consider in detail here (see BOYD and RICHERSON [1985, ch. 8]).

Because biased transmission results from the comparison of alternative memes, the rate of cultural change that results from biased transmission depends on the variability in the population. This effect is illustrated by the spread of innovations. Initially, the spread of innovations is slow because very few people have adopted the innovation, and as a result few other people are in a position to compare the innovation with their existing behavior. Then as the innovation becomes more common, more people are exposed to it and are able to compare, and as a result the rate of spread accelerates. Finally, as the old behavior becomes rare, there are fewer people making the comparison and the rate of spread slows. The S-shaped trajectory of adoption that results from this effect has been documented in many cases. This effect is very important for understanding the maintenance of cultural variation among neighboring groups linked by migration because biased transmission can maintain such differences only up to a threshold level of migration. Above the threshold, migration reduces variation, which weakens bias which further reduces variation and the end result is the elimination of cultural differences.

The rate at which a population can change by biased transmission also depends on how hard it is to evaluate alternative behaviors. If a new crop variety has substantially higher yields than existing crops, then it will be easy for farmers to detect the difference. In this way the knowledge of sweet potato cultivation spread from the New World to the highlands of New Guinea by sometime in the 1700's (YEN [1974]), even though Europeans who acted as intermediaries were ignorant of the fact that people lived in the highlands until the 1930's. However, the benefits of many other very desirable traits may be hard to detect. The practice of boiling drinking water substantially reduces infant mortality due to diarrhea. Nonetheless, the practice may fail to spread because its effects are confounded by many other sources of diarrhea, because it conflicts with folk medical theory, and because the microbial causative agents killed by boiling are invisible. It may often be the case that it will be difficult to determine which variant is best, even if different variants have very different fitnesses. Traits whose net beneficial effects are only apparent when averaged over substantial periods of time may be especially difficult to evaluate.

The strength and direction of biased transmission always depends on what is going on in the brains of imitators. The role of psychology in the explanation for why biased transmission increases the frequency of entrepreneurial values lies in the values of young adults. Why do they value cash and comfort over family? Such choices are influenced by universal human propensities that are ultimately the products of natural selection. We expect people to prefer memes that yield health, long life, control over the environment, healthy happy children – all the things that were correlated with reproductive success over the course of human evolutionary history. Such psychological predispositions sometimes may be quite specific, as seems to be the case for the referents of color terms. Such choices may also be affected by other memes – cash and comfort might win in contemporary Illinois but family loyalty in rural China.

Natural Selection of Cultural Variations. The logic of natural selection applies to culturally transmitted variation every bit as much as it applies to genetic variation. For natural selection to occur:

1. People must vary because they have acquired different beliefs or values by social learning.
2. This variation must affect people's behavior in ways that effect the probability that they transmit their beliefs to others.
3. The total number of memes that can exist in the population must be limited in some way. Or in other words, memes must compete.

Then it follows that, all other things being equal, beliefs that cause people to behave in ways that make it more likely that their beliefs are transmitted will increase. If the behaviors that are shaped by the beliefs acquired by imitation are important ones, they may affect many aspects of individuals' lives: whom they meet, how long they live, how many children they have, or whether they get tenure. All of these factors could affect the probability that an individual becomes available as a model for others.

To the extent that people acquire beliefs from their parents, natural selection acts on culture in almost exactly the same way it does on genes. For example, a people's religious beliefs affect both their survival and reproduction. JANSSEN and HAUSER [1981] compared the fertility of a large sample of people living in Wisconsin. Catholics (both men and women) had about 0.5 more children, on average, than did non-Catholics. Since people included in the sample averaged about 2.75 children, this represents almost a 20% difference in family size. Similarly, MCEVOY and LAND [1981] report that members of the Reformed Latter-Day Saints Church of Missouri have age adjusted mortalities about 20% lower than matched control populations belonging to other religions. It also turns out that people's religious beliefs are strongly correlated with the beliefs of their parents, and behavior genetic studies indicate that religious affiliation (whether you are a Mormon or a Catholic) is culturally transmitted. Thus, beliefs that lead to high fertility and low mortality will increase, because people holding such beliefs are more likely to survive to adulthood (the Missouri Mormons had lower rates of violent death) and have larger families if they do, and because the children in these families will tend to have the same beliefs as their parents.

People often acquire beliefs and values from individuals other than their parents. Whenever individuals are culturally influenced by grandparents, teachers, peers and so on, natural selection acting on cultural variation can favor the increase of behaviors that increase the chance of attaining such non parental roles. When the traits that maximize success in becoming a parent are different from those which maximize success as a teacher, priest, or grandparent, natural selection acting on cultural variation can cause genetically maladaptive traits to spread. Since we expect that many of the evolved predispositions that drive biased transmission to favor memes that enhance reproductive success, it may

often be that this kind of natural selection acts in opposition to biased transmission.

In this way we can understand how cultures come to adopt practices that seem to run counter to any evolved psychology. Consider one of the most bizarre practices in the ethnographic record: the existence of whole populations of people who devote more time to, and are much prouder of, the number of scholarly papers they have published than the number of children they have produced. To see how, consider the young assistant professor just beginning her career. Entering a new university she needs to acquire many new beliefs or modify old ones acquired as a graduate student. She needs to know how hard to work on teaching, the standards by which committee work is judged, how much time should be devoted to students, and how much to research. The beliefs she adopts will strongly affect how much of her time she devotes to career advancement, and how much she devotes to family and recreation. In making their choice, many assistant professors may choose to imitate the behavior of older and more experienced faculty. The survival of assistant professors in a university depends on how much time they devote to work. Overachievers get tenure, and underachievers don't. Thus tenured faculty who are available for imitation within a university represent a biased sample of the original population. Imitating tenured faculty will cause our new assistant professor to aspire to high standards in research, and perhaps to neglect her family.

Of course our young assistant professor will also attempt to evaluate beliefs about the proper amount of time devoted to career according to her own preferences. Such evaluation will lead to biased transmission. If the bias is strong, the effect of selection on the pool of models will have little effect. It is very plausible however that bias will be weak in this case. Because the world is complicated and poorly understood and the effects of many decisions are experienced over the course of a lifetime, this estimate will be imperfect. In deciding how much time to devote to their families, the young assistant professor must not only estimate the immediate affect on her career and home life, but the long run effects on their children's adolescent behavior. In such cases the information available to individuals may be very poor indeed, and it is plausible that they are best off relying almost entirely on traditional beliefs, and if they do, the selective process that winnows tenured faculty will have an important effect on how faculty behave.

2.4 Cultural Evolution and Organic Evolution

We have devoted much of our effort to trying to understand how the processes acting on organic evolution might have acted to shape the organic substrate that underpins cultural evolution. In particular, we have tried to understand the circumstances in which natural selection will favor a reliance on unbiased cultural transmission. Answering this question is important because, as we have

just seen, some cultural processes can lead to interesting evolutionary outcomes that cannot be easily predicted based on simple self-interest, but only if human behavior is strongly influenced by the cultural history of the group, and less strongly influenced by the natural or social environment. Thus, we would like to know whether there are circumstances in which natural selection will favor a reliance on cultural transmission, or put more bluntly, can natural selection favor doing something "just because" other people are doing it.

We have attempted to answer this question by analyzing mathematical models of the evolution of imitation (BOYD and RICHERSON [1985], [1988], [1989]). These models are all similar. A population lives in a variable environment. The individuals who make up the population gather information about which behavior is best in the current environment. However, because this information is imperfect, and because brain power is limited, people make errors. Individuals can also imitate members of the previous generation. We assume that genetic variation affects the relative importance of individuals' learning and imitation in determining the individuals' adult phenotype, and that natural selection adjusts this relative importance. The models differ in how learning, environment, and genetic variation are modeled.

All these models tell the same story. Selection favors a heavy reliance on imitation whenever

1. learning is difficult or costly, and
2. environments are not too variable.

The skepticism of hard nosed materialists might make you think some exotic combination of conditions is necessary for culture to be adaptive. In fact the conditions are quite commonsensical. If it is easy to accurately determine the best behavior, then it is stupid to imitate, just do it. Similarly, if the environment changes rapidly, there is no sense in copying what has worked in the past, because what worked in the past will be of little help today. For imitation to be beneficial, the environment must change slowly enough that the accumulation of imperfect, learned information over many generations is better than relying on individual learning.

3. A Comparison With Other Views

We would like to conclude by comparing the Darwinian view of norms with the anthropological and the game theoretic views of norms.

The Darwinian view shares much with the game theoretic view of the evolution of norms. It starts with individuals and builds norms up from the choices of those individuals. Like the game theoretic view, individuals are usually assumed to be selfish, although this is regarded as a corollary of the more fundamental assumption that human psychology is the product of organic evolution. Like the game theoretic view, the Darwinian view sets great store by

the expression of theory in mathematical terms (although that emphasis has not been evident here). Authors like Binmore and Sugden even argue that the beliefs and norms that actually govern behavior evolve through a process of cultural transmission in which biased transmission is the overwhelmingly most important evolutionary force. People are seen to grope toward game theoretic equilibria by observing the behavior of others and selecting beliefs attitudes that seem best.

There are a number of differences that are mainly a matter of emphasis. Darwinians have been more interested in the relation of cultural evolution to organic evolution, which leads to a greater emphasis on the evolution of memes affecting technology and subsistence and a reduced emphasis on social behavior. Some Darwinian authors (especially CAVALLI-SFORZA and FELDMAN [1981]) have been much more concerned with the dynamics of evolving cultural systems, particularly the role of random processes analogous to genetic drift, than in the properties of equilibria. Others (BOYD and RICHERSON [1987]) have been interested in spatially disaggregated models and the question of what generates coherent "cultures" and maintains cultural boundaries between them. Game theorists have placed much more emphasis deriving normative conclusions from their analysis.

There is also a real, important difference between the two views: the Darwinian view holds that forces other than biased transmission are important, and that the action of these forces sometimes lead to outcomes that could not be predicted based on the actions of selfish individuals. For this to occur there must be important classes of memes that are not strongly influenced by biased transmission which can occur only if it is difficult for individuals to evaluate the costs and benefits of alternative memes. When bias is weak, evolutionary modeling suggests that people might simply imitate other people, and as a result processes like natural selection may determine which memes predominate in the long run and possibly lead to bizarre behavior like that of contemporary academics.

In this way, the Darwinian view provides a partial license for the anthropological view of norms. It provides a way of deriving an independent, causal role for tradition that is consistent with the actions of individuals who have psychologies consistent with an evolutionary origin. This license is limited to memes whose effects are hard to detect. We think that this limitation is not too severe because there are many, many such memes. Is there an afterlife in which the wicked are punished? Will children turn out better if they are sternly disciplined or lovingly indulged? Is eating lots of salt harmful to one's health? Is academic life a promising career in 1993? These are difficult questions to answer, even with all of the information gathering and processing resources of a late twentieth century industrial state. For most people at most times and most places even questions like "Does drinking dirty water cause disease?" and, "Can people affect the weather by appeals to the supernatural?" are very difficult to answer. While it may be very difficult to determine which meme is

best, the choice may nonetheless have profound effect on people's behavior, including behavior driven by rational choice. A person who believes that immoral acts are punished by an omnipotent deity may make very different choices than someone who does not share this belief.

The license offered by Darwinian theory of cultural evolution does not extend to business as usual in anthropology. The theory we have outlined allows cultural evolution to diverge from the predictions of biological self-interest, but it does not divorce cultural change from human biology. Instead, it is more natural to see culture as part of human biology, an evolved human characteristic like bipedal locomotion and large cheek teeth. Because culture is an inheritance system, the human evolutionary process is different from that of other, non-cultural animals, and, under certain conditions, evolutionary equilibria can be different from what you would predict from simple fitness maximization (or its corollary, rational self-interest). Nonetheless, cultural change is pervasively affected by our evolved psychology, and much of cultural evolution must be understood in that light.

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The Evolution of Norms: An Anthropological View

Comment

by

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“The historical development and current form of jurisprudence show it to be, like medicine, a normative and practical science. The final goal is not satisfying the drive for knowledge. Rather, we want to find ways through which we both satisfy those biological legal needs and achieve those laws which life demands.”

With these words in 1912, the celebrated jurist and rector of the University of Tübingen, Philipp HECK [1912, 7], entered into a largely uncharted terrain of legal philosophy. The recognition that legal norms address conflicts of interest, a strenuously debated issue at the time, must be obvious to BOYD and RICHERSON [1994, 72]. Without limiting themselves to the field of law, they describe the development of norms according to their existing value on the one hand, and their inherent perseverance on the other. How are these norms maintained within the tension between imitation and innovation? Upon what criteria are they accepted or rejected?

I.

The conclusions of BOYD and RICHERSON [1994], derived from studies of different basic attitudes towards the alienation of real property, are also interesting for the narrower field of jurisprudence. Under similar objective conditions, groups of varying descent and socialization develop clearly differentiated patterns of behavior. Whereas one group may be prepared to take advantage of short-term economic bargains, the other, to its considerable detriment, persists upon maintaining its “traditions.” Clearly, this second group is motivated by a set of principles, only a part of which are economically “rational.”

At this point, the relationship to the genesis of legal and behavioral norms should be addressed. What, for example, could motivate a restaurant guest to correct a bill that was set too low? Economic goals clearly do not apply if the

guest never expects to frequent the restaurant again. Thus, maximizing one’s subjective advantage is only one – perhaps in everyday life the more important – side of the coin. Nonetheless, jurisprudence has also striven to address the other side of the coin. We concur with the conclusion of BOYD and RICHERSON [1994, 86] that “evolutionary equilibria can be different from what you would predict from simple fitness maximization.” Game Theory, often criticized in this respect, lacks the parameters to explain altruism.

II.

Much time was spent before it was realized that legal norms are relative; that they are a product of place, time and culture. Where legal norms are religiously or ideologically founded, there is little room for choice among normative paradigms. Where the hope for redemption is tied to the organization of human behavior, there is often only one path to follow. On the other hand, experience would not support the idea – criticized also by BOYD and RICHERSON [1994, 72] – that humans are no more than “an empty vessel into which culture is poured.” Comparative law reveals that certain questions of conflicting interests within human interaction are solved quite similarly, regardless of cultural differences. The protection of minors and the legally insane should serve as an example. Is there a “just law”? (STAMMLER [1926] particularly pp. 52, 61, 68 ff.)

The doctrines of legal authority begin with deductive systems that are grounded in the conception of a transcendental world order.

Natural law has developed an individualization of such general concepts. The approach – what is it to be human? What may, should or must humans do? What freedoms does he enjoy? – changes. Whereas anthropological natural law infers characteristic behavioral principles from human nature, religious natural law replaces the anthropological principles with a theological component, and rational natural law searches for axioms of justice grounded in reason. The starting point is the idea that through the premises of human freedom and equality, a consensus in the long-range advantage of all can be constructed. Laws developed this way are “rational” (see KOLLER [1992, 119]). These various doctrines of natural law have in common a conception of world order that is basically immune to human interference. Norms based on such convictions count towards the cultural inheritance that is passed on in relatively homogeneous systems. Behavioral paradigms that retain a workable core of the ancestral experience during periods of change may achieve a comparable quality. BOYD and RICHERSON’s [1994] inquiry illustrates that short-term economic goals lose their relevance in such situations. Where the alienation of real property is more than the “mere” realization of profit, land ownership achieves an axiomatic value. This value is strengthened by a circular thought pattern in which future generations are incorporated into current decisions of fundamen-

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tal importance. The honest restaurant guest's "decorum," which motivates him to correct the bill to his apparent disadvantage, belongs in this category. Rawls' theory of "Justice as Fairness" fits here as well (RAWLS [1972], pp. 11, 27, 513 ff., Summary: 577).

Legal positivism lies at the polar opposite of the doctrines of natural law. It places the simple existence of law at its center, regardless of the justness of its contents. Law and morality are separated; law and justice do not necessarily correspond. The extreme version of this position is described in Kelsen's [1960] "Pure Legal Doctrine." In this respect, a connection with game theory which was similarly criticized by BOYD and RICHERSON [1994] can be made: the development of legal norms is structurally arbitrary. As a result, any arbitrary goals can be pursued, such as the maximization of profit for a distinct set of persons or groups. Supra-personal justifications of a law do not necessarily speak for or against the decision to adopt it.

Sociological jurisprudence and legal realism are essentially based on legal positivism. Although purpose-oriented, since they strive to maximize the satisfaction of prevailing wants and interests (see SUMMERS [1982, 43 ff.]), they subordinate value issues to the technically optimal satisfaction of the interests of the many. "Values," therefore, do not necessarily need to be satisfied. This is also true for the variant presented by the "Predictive Legal Doctrine" (SUMMERS [1982, 116 ff.]), which searches for the concept of legal rights (as well as duties) in the prediction of legal decisions.

This is not the forum to lay out the arguments for and against the concepts of natural law and legal positivism. Both theories meaningfully explain the existence of certain legal phenomena. Dworkin's introduction of "principles" inherent to law reconciles the two views by placing the law within a broader context of societal conceptions of values (KOLLER [1992, 165]; COING [1993, 127 ff.]). TEUBNER's [1989, 16, 32, 36] theory, wherein law is depicted as an "autopoietic system," must also be evaluated within this context. He explains the law's tenacity in perpetuating itself through its system of self-referral and self-production. A value ideal, once placed in the legal system, will penetrate and eventually dominate it. Deliberate modification faces widespread resistance. TEUBNER [1989, 18, 71 ff.] refers to this as a "stability of self-values."

SUMMERS [1982, 239, 268 ff.] similarly illustrates the limits of pragmatic instrumentalism. Complex social structures and interrelationships do not allow for a reliable quantitative prognosis of desired results, much less of undesired side-effects. Additionally, the efficacy test works poorly for norms that do not have a direct, behavior-modifying effect (i.e., guarantees of freedom or provisions intended to promote social attitudes, see SUMMERS [1982, 66]). In any case, the predictive variant of legal realism fails when applied to the necessary flexibility of law. Legal certainty is indeed to be valued, but may not be allowed to demand the higher price of a rigidity too remote from reality. Various, often contradictory, value assessments find their way into the norm-creating and norm-maintaining processes. The creator of the norm will keep in sight the

interests of the general public, perhaps also that of future generations. The judiciary is interested in the certainty and simplicity in the application of the law. Individuals and groups as objects of the norms seek the optimal satisfaction of their needs as well as legal security as a reliable basis for their decisions. Fundamental religious or ethical convictions may also play a role. Philipp HECK's [1914, 17] conception of interests includes these dimensions. Thus, in determining the validity of a norm, a "technological" efficacy standard can be only one criterion among many. Nonetheless, in its application, jurisprudence must be prepared to maintain enough room for innovation. The failure to innovate would promote a significant amount of circumvention of the law and thus threaten its long-term validity. As a result, civil law demands that legal norms largely be fashioned dispositively. Those who can draw upon imitation may utilize it; otherwise innovation is available. Conversely, ideologically grounded innovation without real possibilities of implementation can call the reliability of a legal system into question. The attempts to establish a "right to employment" in the German constitution provide an example.

III.

What is the jurisprudential meaning of BOYD and RICHERSON's [1994] conclusions? Even in the narrower field of law, existing legal conceptions and circumstances cannot be interpreted by pure instrumentalism. Clearly, there exists an almost irretractable base of convictions that cannot be explained through the mere implementation of biological or economic interests. The sequence of events leading to their formation often cannot be reconstructed (see BYDLINSKI [1988, 3]). At the same time, certain parameters of norm-formation under similar living conditions become apparent. TEUBNER [1989, 67] speaks of an "evolutionary selection within the given coexistence of different sociocultural phenomena as the typical situation." Today, in the waning twentieth century, one "knows" that the simple possibility of enforcing an enacted norm as such cannot be equated with "law" that is generally accepted by society. Rather, one must also appeal to the common set of societal convictions – a process that can be confounding in a pluralistic society. A variety of values must be reconciled within a minimal consensus that retains the largest possibility for the development of individual freedom. This also takes the efficacy criterion into account. Nonetheless, this process requires a form of prestabilized consensus that releases society from the unsolvable problem of continually reaffirming the consensus. Modern societies, therefore, have chosen the form of a (written or unwritten) constitution that establishes certain fundamental principles, and attempts to reconcile interests in cases of conflict. In Germany, the principle of "practical concordance" (HESSE [1991, 317 ff.]) where constitutional rights conflict may serve as an example. To allow such reconciliation, the prestabilized consensus

contained in constitutional rights must permit room for innovation; the consensus therefore requires a certain abstraction.

In this way, perpetually valid constitutional values can be construed as “cultural heritage” that sets the parameters for the legal order. New problems necessitate new solutions within these parameters: choice is possible, innovation is desired. In a constantly shrinking world, problem situations tend to resemble each other more and more and their solutions should become more uniform (see ESSER [1964, 336, 378 ff.]). Common fundamental principles – a common cultural heritage of mankind? – can then help to maintain and improve existing living conditions. It is a long way from the common conviction that, despite possible opposing interests, one does not burn down the house of one’s – (possibly foreign, possibly religiously, politically or culturally thoroughly different) – neighbor to the decorum that calls for proper payment of a restaurant bill. They lie, however, on one and the same path.

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The Evolution of Norms: An Anthropological View

Comment

by

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1. What Are the Phenomena to be Explained?

The title of the paper by BOYD and RICHEYSON [1994] is “The Evolution of Norms...” Does this title really capture what the paper is about? Indeed, the paper begins by suggesting some general propositions about *norms*. But then the authors switch to *culture* which refers to a much broader class of phenomena than norms. The concept of culture includes norms, but “skills, beliefs, attitudes, and values” as well. The concept of “values” sometimes has the same meaning as norms, but sometimes refers to preferences. “Culture” also includes behaviors. In fact, then, the phenomena the paper focuses on are cultural items or, using the terms of the authors, “memes.”

There is no objection in principle to subsuming a broad class of phenomena under one concept. Definitions cannot be true or false, but only more or less useful. Because the authors pursue theoretical objectives, the criterion for judging the usefulness of the definition is theoretical fruitfulness. The definition is theoretically fruitful if the evolution of each single cultural item is governed by the same “forces” (to use a term of the authors) or, put differently: if the same hypotheses can explain the evolution of each of the items included in the term “culture.”

The paper does not explicitly deal with the question of the theoretical import of taking culture as the explanandum. The examples and the theoretical argument sometimes refer to beliefs, sometimes to behaviors and sometimes to norms. It is not clear whether the hypotheses stated for one type of cultural items hold for the other types as well. For example, do hypotheses about the transmission of technologies hold for norms, attitudes etc. as well?

It seems to me that the general mechanisms for transmission on which the paper focuses – imitation and enculturation (i.e., social learning) – are the same for each cultural item. However, for different items the conditions for transmission vary to a great extent. This is alluded to in the paper, but not systematically explored. For example, the advantages of a new technology such as a telephone can easily be observed. But what about attitudes, e.g., toward using violence? First of all, it is very difficult to observe an attitude: an attitude can only be

inferred by observing action or by verbal communication of the person whose attitude is to be ascertained. Secondly, it is very difficult to judge the success of an attitude. Thirdly, the process of acquiring an attitude differs from the process of adopting a new technology. The success of transmitting an attitude from parents to offspring needs an efficient learning technology. I cannot decide to acquire an attitude such as saying, now I want to hate violence. In contrast, adopting a new communication technology is simply a decision to buy an equipment.

The conclusion I draw is that the broad concept of cultural item is useful insofar as the mechanisms for transmission hold for cultural items of each type. But for different types of cultural items, different models of transmission must be formulated.

2. What are the Questions to be Answered?

The paper is concerned with the "evolution" of norms. To what extent does this question include those issues that social scientists involved in the explanation of norms are interested in? The paper is concerned with the *transmission* of given cultural items in a population. This is illustrated by the example of the spread of yeoman and entrepreneurial values. The evolutionary processes outlined in the paper leave the following questions unanswered.

(1) How do cultural items originate in the first place? This question is a central research problem in the economics of property rights. The explanation of the emergence of property rights on the Labrador peninsula described by H. DEMSETZ [1967] is an example for this issue. Models focusing on the transmittance of given cultural items do not address this issue.

(2) The paper focuses on two mechanisms for the transmission of cultural items: imitation and enculturation. Are there other processes? What norms do *not* originate or spread by those processes? Take the norm of not smoking. The perceived risk of active and passive smoking has increased over the last twenty years. That is, smoking has become an externality.¹ Those individuals concerned about their health develop a kind of regulatory interest, and they express demands for non-smoking in various situations. Students demand prohibition of smoking during lectures, smoking is forbidden in airplanes, public buildings and offices. It seems that there is a class of situations where the first step in the evolution of norms is the emergence of an externality.² This leads to an increase

¹ For the hypothesis that norms originate due to externalities see DEMSETZ [1974]. See also COLEMAN [1990], OPP [1982], [1990].

² Such a process is outlined in more detail in OPP [1982].

of demand for a certain behavior, which in turn raises sanctioning of "aberrant" action. After some time there will emerge an attitude against smoking or even a norm of non-smoking under certain conditions. People suddenly have a bad conscience when they smoke. What role does social learning and imitation play in this process? Social learning will have a long term effect in the sense that parents try to reward non-smoking of children or teach them how bad smoking is for their health. What is the role of imitation? Is non-smoking imitated? It seems that sanctioning behavior is imitated. Maybe the decreasing number of smokers increases the costs of smoking. In this example, the major mechanism for the emergence of norms is the existence of an externality that leads to norms of non-smoking. People being exposed to this externality react in a similar way without being influenced by each other. Only after some time may imitation speed up the dispersion of certain behavior patterns, and enculturation may ensure the long-term existence of the behavior.

My conclusion is that the processes outlined in the paper capture only certain types of mechanisms that transmit cultural items.

(3) Is it possible to explain the *attenuation* of cultural items (OPP [1990])? For example, it seems that the norm of sending Christmas cards has become weaker over the last ten years or so. How can this kind of process be explained?

3. Theoretical Alternatives

In the final section of the paper the Darwinian approach is compared with game theoretic reasoning. It is pointed out that there are differences, but the extent to which a Darwinian theory is superior to a game theoretic approach is not discussed.

I take it that the major concern of the paper is the presentation of the authors' theory. But if they discuss theoretical alternatives, mention should be made of some recent sociological work focusing on the production of public goods. This literature shares the major assumptions of methodological individualism. Norms are a kind of public good: a norm that is provided holds for every norm recipient regardless of her or his contribution to the provision of the norm. This work is pertinent here. The distinctive feature of some of this work is that it uses computer simulation. In the most recent work, Michael MACY [1989], [1990], [1991] applies "a stochastic learning model in which cooperative responses are shaped by the social sanctions and cues generated by the responses of others" (MACY [1990, 809]). This model explains the emergence of cooperation in the first place, and its dispersion among group members. The role of "normative solidarity" is also addressed. It would be interesting to see the extent to which this work supplements a Darwinian approach or addresses some of its problems that I have mentioned.

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