Social Complexity and Evolved Moral Principles*

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Introduction

A central theme in F. A. Hayek's work is the contrast between principles and expediency, and the insistence that governments follow abstract general principles rather than pursue apparently expedient social and economic policies that seek to make us better off.[2] This is a radical and striking thesis, especially from an economist: governments should abjure the pursuit of social and economic policies that aim to improve welfare and, instead, adhere to moral principles. In this chapter I defend this radical claim. I begin by explicating and defending Hayek's argument against the pursuit of expediency based on his analysis of economic and social complexity. I then turn to a rather more critical examination of his evolutionary account of moral principles.

The Characteristics of Complex Phenomena

Hayek is famous (in some quarters, infamous) for his idea of a spontaneous order. A spontaneous order is a "grown order":

> Its degree of complexity is not limited to what a human mind can muster. Its existence need not manifest itself to our senses but may be based on purely *abstract* relations which we can only mentally reconstruct. And not having been made it

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> *cannot* legitimately be said to *have a particular purpose*, although our awareness of its existence may be extremely important for the successful pursuit of a great variety of different purposes.[3]

Although spontaneous orders also may be complex, they need not be.[4] Crucial to Hayek's analysis of economic and social orders is that they are not only spontaneous, but also complex. Indeed, although most readings of Hayek stress the idea of a spontaneous order, I believe Hayek's great contribution to social and political theory is the notion of an organized complexity, and it is this idea that poses the biggest challenge for expediency as the aim of social policy. Hayek's analysis of social complexity, especially the complexity of economic systems, points to eight elements, which remain part of current analyses of complexity.[5]

(i) Complex phenomena, according to Hayek, display abstract patterns composed of a large number of variables.[6] Although the sheer number of elements may figure into an analysis of complexity (see emergent properties under the next point), nonlinearity and path dependency are more fundamental, as Hayek's own work suggests.[7]

(ii) Organized complexity occurs "when the character of the structures showing it depends not only on the properties of the individual elements of which they are composed, and the relative frequency with which they occur, but also on the manner in which the individual elements are connected with each other."[8] Hayek thus recognizes the crucial notion of an emergent property:

> The "emergence" of "new" patterns as a result in the number of elements between which simple relations exist means that this larger structure as a whole will possess certain general or abstract features which will recur independently of the particular values of the individual data, so long as the general structure (as described, e.g., by an algebraic equation) is preserved. Such "wholes," defined in terms of certain general

> properties of their structure, will constitute distinctive objects of explanation for a theory, *even though such a theory may be merely a particular way of fitting together statements about the relation between individual elements*.[9]

The basic idea, then, is that a large number of variables may interact in complex ways, such that they give rise to patterns that constitute "wholes" that are distinctive complex phenomena, which have properties that are not reducible to the particular properties of each element.[10] Contemporary complexity theorists thus, for example, see liquidity as an emergent property of a huge number of related water molecules; although liquidity is a property that causally arises out of the interaction of billions of individual molecules, the precise properties of waves and ripples cannot be predicted from what we know about molecular chemistry.[11]

(iii) Complex systems can be tightly coupled.[12] As Hayek notes, in a complex system the state of the system at any one time depends on a number of factors, and if even one is varied, there may be profound changes throughout the system.[13] The behavior of tightly coupled systems is difficult to predict as they are characterized by error inflation: a small error in predicting one variable can lead to drastic errors in predicting the overall system's state.[14] The combination of complexity and tight coupling is especially troublesome to successful manipulation of the system: "Complexity makes it impossible for anyone to understand how the system might act; tight coupling spreads problems once they begin."[15]

(iv) Closely related to this is the sensitivity of the system to the initial conditions; slight differences in the initial conditions of the elements can result in very different system states.[16] Hayek is clear that a decisive factor determining the state of any spontaneous order is crucially dependent on the "initial position" of the elements.[17]

(v) Complex systems often display micro unpredictability with some range of macro predictability (this is closely tied to emergent properties, point [ii]).[18] This is crucial in understanding Hayek's conception of social complexity. It was no part of Hayek's intention to argue that economies or societies are too complex to predict, or that we could not possess a predictive social science. His claim, rather, was that in complex systems the only successful predictions will be "pattern predictions," not predictions of specific states of the system at particular times.[19] That is, we can predict a certain "range of possibilities" for the system or, we might say, parameters within which the system will settle. Thus Hayek insisted that theories of complex phenomena were testable as they predict a range of possible system states.[20] However, because of the nonlinearity of the relations in the system, there is no unique solution; only predictions of ranges of possibilities are feasible.[21]

(vi) In many complex systems we cannot measure how close the system is to equilibrium, though we have good grounds to suppose it is never in equilibrium. The most our theories can do is tell how the system moves toward equilibrium.[22] Thus our theories of equilibrium (say, price theory) will not allow us to reliably predict actual prices.[23]

(vii) Complex systems such as the economy are characterized by constant *novelty*.[24] We need to remember that Hayek, like the Austrian school of economics in general, insisted on the importance of dynamic and unknown factors in economic life. "The solution of the economic problem of society . . . is always a voyage of exploration into the unknown, an attempt to discover new ways of doing things better than they have been done before."[25] Although mainstream economics generally has been critical of this emphasis on the novelty of entrepreneurship in Austrian economics, understanding the differing effects of predictable and unpredictable developments has been the

core of rational expectations theory.[26] One of the main reasons the economic system is characterized by novelty is that economic agents make, and change, their own predictions of the future behavior of others; the economy is a system of mutually adjusting expectations. Hence, it appears that "the equations of economic models will not remain invariant to policy; in other words, economic models will change as different policies are implemented."[27] Because an economic agent adjusts to economic models predicting his behavior, mere knowledge of a model changes behavior.

(viii) Because of the complexity of the system, there is "no global controller that can exploit all opportunities or interactions."[28] This brings us to the very heart of Hayek's economics: global planners cannot secure and employ sufficient information to direct individuals to employ their capital and labor in a way that will tend to a social optimum.[29] This was the crux of Hayek's position in the socialist calculation debate: "The 'data' from which the economic calculus starts are never for the whole society 'given' to a single mind which could work out the implications and can never be so given."[30]

Politico-Economic Complexity and the Perils of Expediency: No Fine-Grained Predictions, No Sound Basis for Expedient Policies

In Hayek's eyes the economy and, more generally, the social order, is a complex system. As we can see from point (iv) above, understanding the economy as a complex system is consistent with a science of economics that generates testable propositions. But these propositions will concern a range of possible states of the system or, rather, "a range of values" of key variables in the model.[31] However, as Hayek himself stressed—and some contemporary proponents of economic complexity have agreed—complexity renders economic models less empirically testable than under a naive understanding

of classical economic models.[32] (However, it is important to stress that it is only in relation to a "naive" view of classical economics that the contrast is striking: there is remarkably little empirical testing of economic models.)[33]

In any event, Hayek's conclusion is that our best economic models will not provide the fine-grained predictions we would need for effective, expedient economic policy. And it is widely agreed that "[e]conomists need to be able to predict . . . because predictions are necessary if they are to fulfill the role of providing policy advice."[34] We need to be careful here: Hayek suggests two types of arguments against detailed economic predictions.

In the first argument, based on the ideas of path-dependency (feature [i]), tight-coupling (feature [iii]), sensitivity to initial conditions (feature [iv]), and novelty (feature [viii]), Hayek presents a general case for inherent and steep barriers to useful predictions in both micro- and macroeconomics. Call this the *General Skeptical Analysis*. Although the General Skeptical Analysis does not preclude the possibility of sound economic predictions, it greatly circumscribes them. For example, given sensitivity to initial conditions, similar systems can go off on very different trajectories; thus we would need extremely fine-grained knowledge of the current system state to predict what path it will take.[35] Given the property of nonlinearity, even given detailed knowledge, sound predictions will not identify a unique future system state (a range of values can satisfy the relevant equations). Although defenders of Hayek wish to stress that he is not simply skeptical about economic knowledge, this is but half true; while he is not totally skeptical, the theory of complex phenomena indicates that predictions are hard to come by.

The second part of Hayek's analysis indicates that the sound predictions we might generate will not concern the specific future states of the micro elements (e.g., economic agents) in an economic system. Call this the *No*

Fine-Grained Predictions Thesis. The analysis of complexity seems to allow for two general types of predictions: (a) the prediction of broad patterns of micro behaviors (people will consume less as price increases), and (b) the prediction of some macro (emergent) properties even though predicting the states of the micro elements on which they rely may be quite beyond us (features [ii] and [v]). (Interestingly, then, Hayek, and any theorist who takes emergent properties seriously, would seem to endorse just what most economists reject: a macro economics without strong micro foundations.)

From the perspective of the theory of complexity, the problem with expediency qua, say, utilitarianism, is that it requires extensive predictions of the future states of the micro elements. Remember, the pursuit of utilitarian expediency is not simply committed to *some* prediction: it must predict the aggregative well-being of the micro agents (individual persons) under any given policy. To see the importance of micro predictions for expediency, assume that we can predict that policy P_1 would produce a growth rate of x percent, but we can only say that this will yield an aggregate welfare w_y, where $w_x < w_y < w_z$, and where $w_x - w_z$ is some large interval, and cannot predict where in that interval w_y will be. But suppose that we are also considering policy P_2, which can be predicted to lead to growth of x-n percent, and all we can say is that the resulting welfare also will be between w_x and w_z (say because P_2 will produce less growth but also less congestion). If so, our ability to make accurate system-level predictions is of no avail when seeking expedient (qua aggregative, individual welfare-enhancing) policies.[36]

From Theory to Empirics

Complexity, Tight-Coupling, and Policy: Some Examples of Complexity and the Perils of Prediction

As it has been developed in the past decades, complexity theory is

mathematical and computational, involving systems of nonlinear equations. Hayek's own account was neither, but it too was often abstract. It might help to bring our discussion down to more specific policy problems. Edward Tanner, in his popular book *Why Things Bite Back*, points out several complicating effects of complexity and tight-coupling for predicting the consequences of changes. *Revenge effects* are the unintended and unexpected consequences of our actions and policies that tend to nullify them. For example, in the early 1970s, utility companies constructed giant smokestacks (some 1,000 feet high) to meet new local clean air standards; the effect was to push pollution into the upper atmosphere, contributing to acid rain.[37] Similarly, a policy that increases the "efficiency" of hospitals by ensuring that all beds are occupied may increase cross-infections among patients.[38] *Rearranging effects* occur when actions unexpectedly transfer the target problem to a new area (erosion control on beaches often erodes beaches further along the coast).[39] *Repeating effects* take place when a successful innovation may encourage people to increase an activity, ultimately producing unexpected harm. Improvements in medical care and coverage, for example, encourage people to undergo more procedures, but all hospital stays have a nonnegligible risk of harm through error. One study concludes that one patient in a hundred is negligently injured; as people enter hospitals for increasingly minor procedures, the number of those "unnecessarily" injured will increase. According to another estimate, avoidable injuries in hospitals cause twice as many deaths each year as highway accidents.[40] *Recomplicating effects* occur as innovative policies and procedures begin to interact, creating new problems. The growth of government and its policy aims have led to huge recomplicating effects as, for example, policies aiming at growth, environmental protection, and urban renewal, all affect each other, and make

it increasingly likely that the intended benefits in one area will be offset by policies in another. And, of course, often our actions have side effects that we could never have foreseen, which render them inexpedient. The agreement of the northern states at the constitutional convention to accept, as the price of union (and the regulation of navigation), the importation of slaves for 20 years, though seen as an expedient compromise at the time, was most unwise in retrospect. Tanner concludes his account of predicting progress and policies by observing "[w]hat is almost a constant, though, is that the real benefits usually are not the ones we expected, and the real perils are not the ones we feared."[41]

Does Economics Accurately Predict?

It is not my ambition to demonstrate that Hayek is correct on these matters; rather, I aim to stress that his theory of complex phenomena is sophisticated, and provides a strong theoretical reason to reject expediency as a basis for policy. Still, many readers tend to think Hayek's account of complexity *must* be wrong since it is obvious that economics does yield useful policy predictions all the time.

Does it? This is a matter of dispute within economics and the philosophy of economics. Philosophers such as Alex Rosenberg and economists such as Diedre McCloskey insist that economics has been a failure as a predictive science.[42] The empirical evidence as to whether economics accurately predicts is mixed, though even supporters of the progress of economics as an empirical science admit that it has not lived up to earlier expectations.[43] Research does indicate that economists tend to converge on many microeconomic prescriptions, as well as on some important ones in macroeconomics. Richard M. Alston, J. R. Kearl, and Michael B. Vaughan found some consensus on 40

propositions, many of which were concerned with microeconomic policy, with high consensus on some claims such as "tariffs and import quotas usually reduce general economic welfare."[44] Of course consensus among economists does not demonstrate correctness. Alston, Kearl, and Vaughan discovered that the decade in which an economist was trained affects his or her views, suggesting that socialization during graduate school may have an important influence on economists' views throughout their career.[45] At the same time, they found that on half the propositions studied in a 1976 study, the economic consensus had changed in 1992. More disturbing for those who claim that, as a matter of fact, the economics profession displays great consensus on basic lawlike propositions is the phenomena of emerging contrary results. Robert S. Goldfarb's study of the empirical literature in economics reveals a pattern according to which "first, evidence accumulates to support an empirical result. As time passes, however, contrary results emerge that challenge that result," leading to a regular overturning of apparently established empirical findings.[46] Although better data and more advanced mathematical techniques are a factor in over half the changes, Goldfarb concludes that the instability of empirical economic findings represents "a serious problem for the conscientious economist trying to make warranted inferences from empirical literature in economics. If seemingly established results often provoke the emergence of contradictory findings, the dependability of inferences based on existing literature is weakened."[47]

Most striking of all is the recent work of Philip E. Tetlock, who has studied the predictions of experts across a range of political and economic issues. For over a decade Tetlock studied the ability of political and economic experts to predict, among other things, economic performance (growth rates in GDP, inflation, unemployment rates) as well as political developments.[48] Tetlock

asked experts in history, political science, and economics to predict future events and the movement of key variables. Would key variables go up (in both the short term and the long term), go down, or stay the same? The good news is political and economic experts do better than undergraduates at predicting future events in their field of expertise. Unfortunately, that is about all the good news. Experts do not do significantly better that what Tetlock calls "dilettantes"—people who regularly read the *Economist* or the *New York Times*. Tetlock distinguished two criteria of a good prediction: discrimination (how precise the prediction is) and calibration (how accurate the prediction is). Someone who always makes very general predictions (for example, "a 33% chance of a downward movement in an index") would make a number of accurate predictions (by chance they would be correct one-third of the time), but she would score low on discrimination; someone who predicts "a 80% chance the variable will fall" aims at a precise prediction, but of course she may sacrifice accuracy: she is more apt to go wrong since she istrying to give a precise prediction. On the discrimination measure—how precise the predictions are—the experts and dilettantes would beat a chimpanzee that made predictions by throwing a dart at a board on which the dart can land on "variable will go up," "variable will go down," or "variable will stay the same." Unfortunately the chimpanzee beats the dilettantes and experts on the accuracy score.

All this is about comparative performance. What about absolute performance? Experts are better, I have said, on the discrimination dimension—they make more precise, if less accurate, predictions than does the chimpanzee. How good are they? The better half of the expert group predicts a meager 18 percent of the variance, the less good group about 14 percent. An average of about 16 percent of the variance is accounted for by

expert prediction.[49] On the basis of these findings, Tetlock is forced to concede the crux of the skeptical hypothesis (which he relates to complexity theory): expert prediction and guesswork are essentially the same.[50]

The Complex Complexity of Politico-Economic Systems

We now come to an obvious, major, objection: although economics is complex, so are many natural sciences, including biology. But, it is said, natural science has dealt well with complexity, and its increasingly complex models have not detracted from our ability to predict—quite the opposite, they have enhanced it.[51] Look (the objection continues) at medicine: we have mastered interventions in a complex system, the human body, to obtain our predicted results. Even if we accept that economics is to be understood in terms of complexity, we should not accept that complexity blocks a predictive economic science that can be employed to guide policy.

Donald Saari, a mathematician, argues, though, that it is simply false to suppose that the complexity in the natural sciences approaches that of economics:

> [W]hat we do know indicates that even the simple models from introductory courses in economics can exhibit dynamical behavior far more complex than anything found in classical physics or biology. In fact, all kinds of complicated dynamics (e.g., involving topological entropy, strange attractors, and even conditions yet to be found) already arise in elementary models that only describe how people exchange goods (a pure exchange model).
>
> Instead of being an anomaly, the mathematical source of this complexity is so common to the social sciences that I suspect it highlights a general problem plaguing these areas. If true, this assertion explains why it is so difficult to achieve progress in the social sciences while underscoring the need for new mathematical tools.[52]

To cut to the chase (i.e., to omit the mathematics), Sarri shows that the hidden complexity of social science derives from aggregation out of the unlimited variety of preferences, "preferences that define a sufficiently large dimensional domain that, when aggregated, can generate all imaginable forms of pathological behavior."[53] It should be noted that Sarri shows that this should lead to some doubts about the efficacy of Smith's invisible hand (not that it is especially clear just what Smith meant by the idea).[54]

Insofar as our concern is *expedient public policy*, the economist's policy advice is given to politicians. However, the political system itself, especially one chosen through elections, is itself chaotic, characterized by similar sources of complexity. As Sarri says of electoral politics: "*Beware*! Beware of aggregation procedures because, in an unexpected manner, they allow unanticipated outcomes." [55] We thus have a recipe for tremendous unpredictability: a coupling of two highly complex systems, the economic and political. The coupling of complex systems induces recomplicating effects, leading us further into complexity.[56]

In Hayekian-level complex systems, novelty and unpredictable innovations are the norm. The level of complexity is thus akin to evolutionary theory, not, say, to physiology. This was a point upon which Hayek himself insisted: "Probably the best illustration of a theory of complex phenomena which is of great value, although it describes merely a general pattern whose detail we can never fill in, is the Darwinian theory of evolution by natural selection."[57] Evolutionary biologists cannot predict the course of evolution, though they can predict that some developments will not occur, "e.g., that horses suddenly should begin to give birth to young with wings."[58] What evolutionary and economic science can do is uncover the general principles regulating the system, not predict anything that approximates future

developments of the systems.

Why Devaluing the Pursuit of Expediency Is Not Sufficient

The Principle of Insufficient Reason

Hayek insists that we should *never* give in to expediency: "A successful defense of freedom . . . must be dogmatic and make no concessions to expediency, even where it is not possible to show that, besides the known beneficial effects, some particular harmful result would also follow from its infringement."[59] The crux of complexity theory is that our predictions about what will occur are likely to be wrong. There is, then, a very strong case that our interventions are not apt to be expedient because we have radically incomplete knowledge. It is not obvious, though, that a blanket prohibition on the pursuit of expediency is warranted. Is it irrational to act on radically partial knowledge?

To appreciate the problem, suppose we are evaluating two proposed policies that aim at expedient outcomes, P_1 and P_2. Suppose that we have good reason to assume that the predictable consequences of P_1 will be more expedient than the predictable consequences of P_2. Hayek argues that in such situations we will ignore all the unpredictable effects and focus on the known benefits, and so will act in ignorance of most of the costs of our choice.[60] But it is not at all clear that this is irrational. If we suppose that in some instance great values are at stake and the power of our predictive theories is such that we have a good grasp of how to achieve those values within some specified range, and we are confident that these values are so great that unforeseen

consequences are to be put aside, then perhaps expedient policy can be advocated. After all, in *The Constitution of Liberty* Hayek himself made concessions to expediency, allowing for, among other policies, state funding of education (including some higher education), public assistance to the very poor, compulsory provision for one's old age, and so on.[61]

Even when great values are not at stake, it is uncertain that acting on only the known costs and benefits is irrational. In such cases are we to say that our expected utility calculations are really indeterminate, and so we should ignore utility considerations? Or are we to say that our calculations, uncertain as they are, still yield guidance? Just what it means to say that expected utility calculations are indeterminate, and what is the best response to such indeterminacy, are difficult matters.[62] But consider a simple case. Suppose as far as we can tell that the expected net utility of P_1 is 1,000 while our best estimate of the expected net value of P_2 is 500; suppose further we know that this is a small fraction of the total costs and benefits of our choice, but these other utilities are entirely unpredictable. Call the latter the *unknown, large residue*. So our calculations include some small, known costs and benefits and the unknown, large residue. There are two interesting possibilities: the unknown, large residue of P_1 is either (i) greater than P_2 or (ii) less than P_2. Now at this point some might appeal to the (controversial) principle of insufficient reason that explicitly directs us to treat (i) and (ii) as equally probable; they are mutually exclusive events, and we have no reason to assign different probabilities to them.[63] But if we treat (i) and (ii) as equally probable, then the expected utility of the unknown, large residue of P_1 and P_2 is a wash: it provides no grounds for deciding between them. So then it appears as if the only grounds for deciding between them are the known, even if fairly insignificant, local effects: P_1 beats P_2 on this score (1,000 to 500), so

we finally have a ground for choice. However, it now looks as if the Hayekian analyses of complexity and the barriers to prediction make no real difference regarding what we should do: we should do our best with what we know, and what is beyond our knowledge should be ignored.

The Relevance of Rules

So long as our only reasons to choose are reasons of expediency—aiming to bring about good results—there is a plausible case for choosing P_1 even though we are well aware it is only a small improvement on a random choice. This is important: if our only reasons to choose are reasons that aim at producing good results, then even if P_1 has only a miniscule advantage in expediency, we have reason to choose it, though we have firm grounds to doubt that choosing it is likely to turn out better than opting for P_2. The key to avoiding this is to allow another sort of reasoning: rule- or principle-based reasoning of the sort that is not outcome oriented.[64] We might say that the total set of number of reasons (R_t) to opt for P_1 depend on both the strength of one's reasons of expediency (R_e) and the strength one's rule- or principle-based reasons (R_r).[65] So, we can say $R_t = (w_i)R_e + (w_{1-i})R_r$, where w_i is a weight between 0 and 1 attached to reasons of expediency.[66]

Now we can see that if rule-based reasons do not enter into the choice, (the weight for $R_e = 1$), then it is plausible that even the weakest reasons of expediency still determine R_t. However, if, as Hayek argues, our reasons of expediency are mightily weak (they will approach, but not equal, zero), and if there are relevant principle- or rule-based reasons, then even rules that are weighted modestly will almost certainly determine R_t. This is interesting: Hayek need not really show that rule-based reasons are terribly strong (i.e.,

that they always have a high weight attached to them), since his analysis of complexity implies that, at least when it comes to government policy, the value of R_e will be so low that even a high weight (say, where R_e =9) will not greatly affect R_t.

However, Hayek has to show that we have sufficient reasons to abide by rules or principles, so that we can rationally give them some positive weighting in decisions. Consequently, he devotes a good deal of his work to providing the case that we have excellent grounds for following the moral rules and, in general, the traditional norms of our society.[67] The key here is his account of social evolution, to which I now turn.

The Strong Appeal to Cultural Evolution

A Sketch of Hayek's Account

Hayek famously employs an evolutionary account of rules. His theory of social evolution is complex and, as I have argued elsewhere, widely misunderstood; I cannot do justice to it here.[68] A rough sketch will have to suffice.

Hayek's is an account of social, not biological, evolution. That which he sets out to explain is the rise of what he calls "the social order of actions"—the orderly cooperation of different individuals—which he sees as an emergent property of a system of rules.

> 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.[69]

Hayek's fundamental insight is that the success of a society in terms of growth, prosperity, immigration, and the copying of its institutions by others depends on the emergent property of orderly cooperation of different individuals that

has a complex relation to the rules of conduct individuals follow. As Hayek says, "The selection process will operate on the order as a whole."[70] This is the "Great Society": an overall spontaneous order of adaptations that allows for coordinated action. Hayek, then, sets out to provide an evolutionary account whereby the rules and institutions that give rise to this order (i.e., this emergent property) are selected via a competition ("in the widest sense")[71] among social orders. The emergent property arises out of a system of rules; therefore the competition among these social orders is determined by their constituent rules and institutions as they operate in specific environments. "Society can thus exist only if by a process of selection rules have evolved which lead individuals to behave in a manner which makes social life possible."[72]

Evolutionary accounts are enormously attractive to complexity theorists. We have seen that complex systems—such as the order of actions—are too unpredictable for us to design rules that are expedient. Rules arise in an undersigned, spontaneous manner. But what gives us any confidence that these spontaneous rules are worthy of being followed?Hayek's answer is that they have arisen in a competitive environment and the success of our current order depends on them.

> To understand our civilisation one must appreciate that the extended order resulted not from human design or intention but spontaneously: it arose from the unintentional conforming to certain traditional and largely *moral* practices, many of which men tend to dislike, whose significance they usually fail to understand, whose validity they cannot prove, and which have nonetheless fairly rapidly spread by means of an evolutionary selection—the comparative increase of population and wealth—of those groups that happened to follow them.[73]

An evolutionary account can claim that, without planning or design, the rules we have are superior (in a sense that we have yet to consider) to at least a

certain class of past rules, so it would seem that in some sense the rules we have are *good rules*, having survived a competition with other candidates.[74] And that would show we should take account of the rules in our decisions: they are good moral rules.[75] Moreover, just as the future of complex systems is, except concerning broad patterns, unpredictable, so too is the course of evolution; thus, we seem to have a method of explanation that perfectly suits the development of spontaneous orders.[76]

The Rejection of the Sufficiency Claim

Can some such evolutionary account provide a justification for following the moral rules and principles constituent of our complex order of actions? The most radical view, which I think is ultimately unacceptable, is that if a moral rule has evolved as part of our complex order of actions, then we have good reason to follow it. Having evolved as part of the complex order would be sufficient to give us good reason to follow the rule or principle. Indeed, it looks as if sometimes Hayek almost wants to claim that being the product of social evolution is a sufficient *and* necessary condition for having good reasons to follow a principle. This, though, would be far too strong, since Hayek does allow for incremental moral reform. Let us focus on the evolutionist's Sufficiency Claim.

To see our way to an evaluation of this claim, let us begin by granting the following:

(a) Given some selection mechanism *M*, our current system of moral principles has been selected (in a competition with other orders of actions over the course of history).

A selection mechanism is supposed by an evolutionary account that, like Hayek's, conceives of evolution as the outcome of a competition between

some units (e.g., genes, individuals, rules, cultures) in an environment. There must be some selection mechanism that determines the outcome of the competition, and so the evolutionary winner at any given time. For present purposes we can leave *M* unspecified, though we must not forget that Hayek insisted that the selection mechanism for cultural evolution is not the same as in Darwin's account of biological evolution.[77]

Claim (a) itself does not provide us with reason to follow a moral principle. Suppose we accept that *M* has selected an order of actions that includes some rule *r*. It certainly seems that we can now step back and reflect whether *r* is mere superstition, or whatever.[78] That a whole set of evolved norms might be very bad is the moral of H. G. Wells's *Time Machine*. In Wells's novel, postapocalyptic humanity has split into two groups: the Morlock and Eoli. The Morlocks feed, clothe, and then eat the Eoli. These norms—certainly accepted by the Morlocks and to some extent by the Eoli too—had indeed developed during a long process of cultural evolution lasting many centuries, but we (and Wells's time traveler) can see that their entire moral code is deeply objectionable. But perhaps this is too quick a conclusion. Someone may object that, though of course the Morlock and Eloi norms are immoral *to us (and the time traveler), given our evolved norms*, we cannot say that they are objectionable, full stop, or from some neutral, objective, point of view. *We* reject the norms of the Morlock and Eloi in light of *our own* morality, but (says the objector) this is to simply draw on our own evolution. What we cannot do is to reject *our own* evolved morality in toto, though we can reject some of our moral rules because, say, they conflict with parts of our evolved morality.

Hayek seems attracted to what I have called the "objector's" position: we can only consider the adequacy of some moral principles in the light of the

"giveness" of the others, and that only an ill-advised rationalism would radically question the overall outcome of social evolution.[79] He writes:

> It is the submission to undesigned rules and conventions whose significance and importance we largely do not understand, this reverence for the traditional, that the rationalistic type of mind finds so uncongenial, though it is indispensable for the working of a free society. It has its foundation in the insight which David Hume stressed and which is of decisive importance for the antirationalist, evolutionary, tradition—namely, that the "rules of morality are not the conclusions of our reason." Like all other values, *our morals are not a product but a presupposition of reason, part of the ends which the instrument of our intellect has been developed to serve*. At any one stage of our evolution the system of values into which we are born supplies the ends which our reason must serve.[80]

Hayek advances a radical proposal: morality did not arise out of reason and, indeed, since our reason is itself the product of social evolution, it does not give us an Archimedean point to stand outside of cultural evolution and evaluate its norms.[81] However, even if morality and reason are the product of some process *M*, it does not follow that reason, having developed, cannot evaluate *M*. As Anthony O'Hear rightly points out, once our capacities have evolved via *M*, they may develop and be exercised in ways for which *M* would never select.[82] Even if, say, our intelligence was selected as a way to obtain better food in competition with other primates, our intelligence could now lead us to go on a hunger strike against the mistreatment of other primates at the local zoo.

What would have to be true for us to accept our evolved moral rules as necessarily worthy of our allegiance? Consider:

(b) *M* selects what we reflectively think to be the best principles/rules.

Claim (b), however, undermines any justificatory force of the evolutionist

account, since it is our reflective capacity that allows us to identify the best principles. That they are produced by *M* would certainly be of interest, but *M* would not seem to be doing the justificatory work: our reflective reason would tell us what the best rules are. A robust evolutionary justification of morality could, in contrast, be grounded on:

> (c) *M*-selected rules are the most worthy principles/rules, though we cannot know this by inspecting each principle/rule.

This would certainly show that rules selected by *M* warrant our acceptance. But (c) articulates precisely the Panglossian view that advocates of cultural evolution, including Hayek, have been careful to avoid: cultural evolution does not imply that we possess the best of all possible moral rules. For (c) to be justified, an evolutionist would have to show:

> (d) Cultural evolution has proceeded for an infinite amount of time, such that every possible set of cultural rules (or cultures) has competed with every other one, with *M* finally selecting our rules;
>
> (e) The endogenous and exogenous states of the complex system are stable. The environment is unchanging.[83]

Unless (d) is true, we cannot say that our rules are the best, as *M* is still in the process of selecting rules; and unless (e) is true, there is no reason to suppose what *M* has selected in past will be selected in the future, as selection occurs in the context of a given environment. What *M* selects in a preindustrial economy need not be selected by *M* in a postindustrial one.

These assumptions are, of course, so strong that (c), the claim that our rules are the best possible set of rules (though we have no direct reflective access to this), must be set aside. In its place, it would seem that the best we can do is:

(f) At each point in the past *t*, *M* selected principles at *t* that were more worthy than the available competing principles, though we cannot know this by inspecting each principle.

It is important that we cannot say either that our present principles are better than all the other principles that have been eliminated or even that our present principles are better than our own past ones. Evolution, as Hayek realized, is path dependent.[84] Suppose that at time t_1 (in environment E_1) *M* selects *A* over *B*; at time t_2 (in environment E_2), *M* selects *C* over *A*. When we get to t_3 (in environment E_3), where *M* selects *D* over *C*, we cannot say that our now-evolved *D* rule is better than either *A* or *B*. Even if we suppose that the environment is stable, if evolution is path dependent in the sense that once a rule is defeated by another it is deleted from the option set, the evolutionary outcome may be inferior to some previously defeated option.[85]

Of course, just because path dependence is possible, and so may lead to outcomes inferior to eliminated options, it does not follow that it is common.[86] It is, though, certainly a bar to inferring that later is better than earlier. Moreover, if we suppose that the rate of social change is rapid, we have good grounds for doubting that our current rules are especially good in the current environment. *Ex hypothesi*, they were selected by *M* as more worthy than some competitors at *t*, but if $t + n$ is very different, there is not much of a presumption that the rules are more worthy now, unless we suppose that *M* operates very quickly. The upshot is this: *even if we make the strong assumption that the selection mechanism inherently selects rules we consider worthy, if social change is rapid we cannot conclude our current rules are worthy unless social evolution occurs rapidly*. All we can say is that at some point in the past the rules were more worthy than a set of competitors.

Even (f) is too strong. Although we might accept that, as a whole, the set of current rules tend to track our reflective conceptions of right and value, it is dubious that this is true of every rule. Even biological evolution produces traits that have no current survival value, and are actually maladaptive (e.g., our appendix), and no doubt cultural evolution does too.[87] If so, then some of our rules may not tend in any way to track our notion of worthy rules. *Pace* Hayek, even on an evolutionary account some rules might correctly be described as "superstitious" and without any merit whatsoever.

A Modest Defense of Evolutionary Morality

Qualified Rational Deferral to the Outcome of Evolution

We must, I think, reject any claim that just because a rule or principle is the product of social evolution we have good grounds to follow it. What Hayek needs is a justification for an attitude of *qualified rational deferral to current moral rules*. Overall, a successful Hayekian evolutionary defense of principled moral action must show the following:

(a) A system of rules is necessary.

(b) We cannot rationally construct such a system.

(c) Social evolution can explain the rise of such a system.

(d) Rational reflection indicates that we often ought to follow these evolved rules (partly) because they are the evolved rules of our society.

Let us see how these four claims might be endorsed within a broadly Hayekian framework. Note at this point our discussion is "Hayekean," rather than Hayek's. I will try to show that important themes in Hayek's philosophy support these claims, even though it leads to a more modest evolutionary account of ethics than he proposed.

Claim (a): Complex Systems as Rule Governed

One of Hayek's core claims is that spontaneous complex orders—unplanned complex systems—depend on their elements following certain rules. A spontaneous order is partially characterized by the rules that govern the behavior of its elements, and any such system must be rule-governed.[88] Spontaneous orders, then, arise among humans because we are rule-followers, and so can develop create systems of cooperation in which we can form reasonable micro expectations about the behavior of others. Such rules need not be conscious; indeed, many are not.[89] Hayek also insists that the system of rules must be abstract, and not aim at "known particular results . . . but is preserved as a means for assisting in the pursuit of a great variety of individual purposes."[90] Given the analysis of complex systems it is clear why the rules cannot aim at "known particular results"—the particular results of the system cannot be known. And given the unpredictability of the system, the rules will have to be applicable to new situations; thus it is plausible that the fundamental ones defining the system will be abstract. So "principle" may be a better term than "rule," as many of these rules are abstract and only implicitly understood.[91]

The point here is that complex systems are inherently principle-following; the social order of actions is structured by the principle-guided action of its members. The order of actions cannot persist if each acts solely to maximize his own utility: uncertainty about what is the best course of action, transaction costs, lack of predictability, all conspire to make human societies necessarily rule-governed. The distance between Hayek and neo-Humean game theorists such as Ken Binmore is not nearly as great as we might think: both believe that inherent to the structure of complex human action is settling on shared rules or norms to guide behavior.[92]

Claim (b): Hayek's Anti-Constructivism

Principes are necessary to the functioning of complex systems, but such a system of rules cannot be rationally constructed. We cannot rationally construct the best system of principles because we do not have a good grasp of the consequences and interaction effects of the principles that compose the system. Remember that Hayek insists that the order of actions is an emergent property of the system of principles: if so, the basis for social cooperation emerges in a complex way from the entire order of rules and principles. Consequently, the project of designing a new system would require a depth of knowledge that far exceeds what is available to us. This is the real crux of Hayek's anticonstructivism, and it is solidly grounded in his theory of complexity.

So far, so good. But while Hayek has an overwhelming case against total social reconstruction of the sort envisaged by revolutionary regimes of the twentieth century, it is not at all clear that this account gives us reason to defer to any specific rule or principle because it is the product of social evolution. True, we cannot redesign the entire system ofprinciples, but there seems no reason why we must pay heed to any specific one. One justification for strict rule conformity to every principle can be derived from what we might call the *Burkean Fragility Thesis*. Implicit in much of Hayek's evolutionary argument is a Burkean "reverence for tradition." Since we cannot know the purposes of our principles, a reformist attitude is apt to alter so many of them that the system will not be able to adapt. If the complex system has limited capacities for adaptation and self-maintenance then, prima facie, it would seem wise not to tinker with it, since almost any significant change might upset its fragile equilibrium, and we have no confidence that it will adapt and move to a new equilibrium. This would indeed instill what Hayek

describes as a "reverence for the traditional," for the traditional embodies a difficult-to-achieve social stability.[93]

The worry, though, is that if Hayek really embraces the idea that somehow complex systems are fragile, he will, despite his disclaimers, be led from classical liberalism to conservatism. A commitment to fragility leads to precisely what Hayek finds so objectionable about conservatism—a suspicion of, and resistance to, change as such, for all change is a threat to a fragile social order. In contrast, says Hayek, "the liberal position is based on courage and confidence, on a preparedness to let change run its course, even if we cannot predict where it will lead."[94] Indeed, Hayek stresses that complex systems are usually self-maintaining.[95] By this Hayek means that complex systems have a tendency to persist and to respond to a range of exogenous and endogenous changes.[96] Alternatively, we can say that complex systems are adaptive: "the agents in these systems in some sense learn to better deal with their environments. They are continually organizing and reorganizing their building blocks according to the payoffs they receive from the activities."[97] If, though, *this* is the nature of complex systems, then it is hard to see why it does not apply to moral innovation as well: the self-adaptive characteristic of the social and economic order will respond, in unpredictable ways to be sure, to moral change as it does do to the host of other disturbances to which it is subjected.

Hayek's use of the Burkean case for current moral rules, then, drives him into a dilemma. If the social order really is fragile, so that change and innovation raises the specter of social disintegration, there is a reasonable argument for reverence for current moral rules. But then Hayek's liberalism is itself called into question, for it is premised on the insistence that society can adjust to widespread innovative behavior.[98] We still are searching for the

grounds of *qualified* rational deferral to current moral principles.

Claims (c) and (d): Why We Should Pay Attention to the Results of Social Evolution

If morality is to perform the function of providing rule-based expectations for social interactions, allowing coordination, and so on, it must be publicly known and shared. Philosophers are apt to conceive morality *simply* as something that is justified, or correct, or true, as if one person could have the only correct view of morality, just as one person might have the only correct view of the type of life on some distant planet. Morality, though, is first and foremost, a practical matter of shared principles that structure complex interactions: principles that are true or the best, but are not shared, simply cannot perform the task of morality in a complex system.

For morality to serve its purposes, then, we must coordinate on the same morality. The relevant moral principles on which we act must be a matter of common knowledge: I must know that you are following the common principles and you know that I am, and know that I know that you are. In this sense morality must be public: if moral principles are to perform their task in a complex order, they must be publicly acknowledged. Moral duty is not, in the first instance, a matter of getting things epistemically correct; it is, first and foremost, a practical guarantee about legitimate expectations.

The problem, however, is that it is largely indeterminate which of the many different systems of rules and principles we shall coordinate. Traditional social contract theory is objectionably constructivist because it seeks to identify a unique set of political principles, or principles of justice, on which rational people must agree. But there are many different possible sets of principles or rules on which we might coordinate. We can think of the

problem in terms of an impure coordination game along the lines of Display 1. Suppose that *X* and *Y* are alternative moral principles regulating some practice. The numbers in the matrix refer to ordinal utility, with high numbers indicating highly ranked options; in each cell, Alf's utility is in the lower left, Betty's in the upper right. The uncoordinated outcomes indicate no moral principles at all on this matter (each acts as he or she wishes). Looked at ex ante, Betty has reason to endorse practice *X*; Alf to endorse *Y*. Ex ante, Betty does not have reason to endorse *Y* as legitimate over *X*, nor does Alf have a reason to endorse *X* rather than *Y*. They do, however, have reason to coordinate on either the *X* or the *Y* principle.

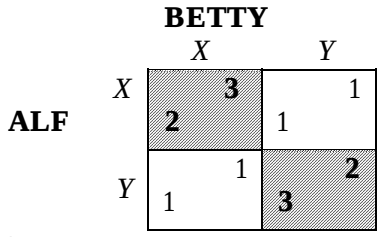

Figure 1: A Simple Coordination Game

Should Alf and Betty find themselves at *X*,*X*, neither would have reason to change his or her action. Given each of their preferences, they have the most reason to act on practice *X*. Should they instead find themselves at *Y*,*Y*, each will then have most reason to act on practice *Y*.

A one-shot two-person game can give us an insight, but it is clearly an inadequate way to model the evolution of a morality. The social coordination problem is not a single- play game, but an iterated game with numerous players. We have a number of encounters with others, and each can be understood as a play in a series of impure coordination games. In large, *N*-person coordination games with multiple equilibria, a bandwagon effect easily

takes over. As Hume observed, the convention grows through "a slow progression, and by our repeated experience of the inconveniences of transgressing it."[99] The key here is the increasing returns to playing the same rule (say, *Y*): the more people play *Y*, the more it makes sense for others to play *Y*, even those who strongly prefer *X*. The same reasoning that shows why I am now using the qwerty keyboard and Microsoft Windows (the increasing returns of shared keyboards and operating systems) shows how we can all come to accept the same moral principles despite beginning with diverse evaluations. What is fascinating is that increasing returns are often a feature of complex systems—and so the system can go off in very different directions depending on small chance events.[100] For example, if *X* players tend to be more visible, people may come to think that *X* is a popular principle, and the more popular people think it is, the more people will be attracted to it, and so *X* may gain currency and dominate; in slightly different circumstances *Y* could have dominated. Thus we see how the evolution of coordination itself exhibits complex features.

This does not mean that we must embrace the whole of our morality: we certainly can stand back and evaluate moral principles and refuse to abide by those parts of our social morality that are unjust, inhumane, or unfair. In terms of the coordination game modeling, only if the current coordination is better than no coordination at all should rational individuals continue to embrace it. Thus we can see how it is both rational to embrace the outcome of social evolution (we accept principle *Y* because it is the evolved rule, even though in our hearts we might think *X* is better), but we still can have a critical attitude toward current morality.[101]

If coordinating on a moral rule is worse than going it alone (coordination is not a Nash equilibrium), individuals will defect and the rule will be

weakened, and perhaps, eventually abandoned. We thus have arrived at a justification for what Hayek needs: a qualified rational deference to current moral rules.

Conclusion

I have tried to show here how Hayek's original and insightful analyses of complexity and the evolution of moral principles provide compelling grounds for his striking claim that we ought to follow abstract general principles or rules rather than pursue apparently expedient social and economic policies that aim to make us better off. It is not that the aim of making us better off is not admirable, but in large-scale decisions such as those undertaken by government, we do not have the information to do it. Given how little guidance expediency gives us, we are driven to rely on evolved moral principles. I have argued that, at least at times, Hayek seems to suggest too great a deference to evolved norms. These aspects of Hayek's thought, I have suggested, are both objectionable in themselves and do not fit well with his liberalism and his faith in the dynamic and self-regulating character of the Great Society. However, I have argued that some basic Hayekean themes allow us to construct an account of evolved morality that grounds an attitude of qualified rational deferral to our current evolved moral rules. Thus we can see how rational and reflective individuals who recognize the complex character of their social order ought to embrace Hayek's dictum that they should forgo expediency and generally rely on the evolved principles of their society.

Notes

[1] I am especially grateful to Chandran Kukathas, Julian Lamont, Guido Pincione, and Leif Wenar for their helpful comments and suggestions on earlier versions of this chapter.

[2] Friedrich A. Hayek, *Law, Legislation and Liberty*, vol. 1, *Rules and Order* (Chicago: University of Chicago Press, 1973), p. 55.

[3] Ibid., p. 38. See also Friedrich A. Hayek, *The Constitution of Liberty* (Chicago: University of Chicago Press 1960), p. 160. Bruce Caldwell reports that the latter is Hayek's first mention of this term. See his *Hayek's Challenge: An Intellectual Biography of F. A. Hayek* (Chicago: University of Chicago Press, 2004), p. 294.

[4] Hayek, *Rules and Order*, p. 38.

[5] Caldwell correctly argues that Hayek never developed a full-fledged theory of complexity (*Hayek's Challenge*, p. 363). Hayek's writings did, however, display many of the ideas that later crystallized into the complexity theory. J. Barkley Rosser, Jr.'s observation seems more accurate: "Hayek . . . was an early and independent developer of complexity theory in something resembling its current form, albeit without computers" ("On the Complexities of Complex Economic Dynamics," *The Journal of Economic Perspectives*, 13 (Autumn 1999): 169–192 at p. 185n. See also Karen Vaughn's excellent essay, "Hayek's Theory of the Market Order as an Instance of the Theory of Complex, Adaptive Systems," *Journal de Economistes et des Etudes Humaines*, 9 (Juin–Septembre 1999): 241–256. Although Caldwell cites Vaughn in support of his view, her study's conclusions are closer to Rosser's.

[6] Friedrich A. Hayek, "The Theory of Complex Phenomena," in *Readings in the Philosophy of Social Science*, eds. Michael Martin and Lee C. McIntyre, (Cambridge, MA: MIT Press, 1994), pp. 55–70 at p. 56. See also Hayek's Nobel Memorial Lecture, "The Pretence of Knowledge," in his *New Studies in Politics, Economics and the History of Ideas* (London: Routledge, 1978), pp. 25–34 at p. 26.

[7] See Vaughn, "Hayek's Theory of the Market Order," p. 249.

[8] Hayek, "The Pretence of Knowledge," pp. 26–27.

[9] Hayek, "The Theory of Complex Phenomena," p. 57. Emphasis added, citation omitted. See Vaughn, "Hayek's Theory of the Market Order," p. 248.

[10] This is an example of Hayek's complicated version of methodological individualism; the properties of wholes cannot be reduced to the properties of individuals, though those properties result from individuals in relations. Cf Caldwell, *Hayek's Challenge*, pp. 281ff.

[11] See Mitchell Waldrop, *Complexity: The Emerging Science at the Edge of Order and Chaos* (New York: Simon and Schuster, 1992), pp. 81–83.

[12] See Edward Tanner, *Why Things Bite Back* (London: Fourth Estate, 1996), p. 16.

[13] Hayek, "The Theory of Complex Phenomena," pp. 61–62.

[14] This is the so-called "butterfly" effect. See Peter Smith, *Explaining Chaos* (Cambridge: Cambridge University Press, 1998), p. 16.

[15] Tanner, *Why Things Bite Back*, p. 16.

[16] Smith, *Explaining Chaos*, p. 20.

[17] Hayek, *Rules and Order*, p. 40.

[18] This is crucial to chaos theory. See Smith, *Explaining Chaos*, p. 13.

[19] Hayek, "The Theory of Complex Phenomena," pp. 60ff. See Caldwell, *Hayek's Challenge*, pp. 382ff.

[20] Compare Hayek, "The Theory of Complex Phenomena," p. 61, to Smith, *Explaining Chaos*, p. 18.

[21] Vaughn, "Hayek's Theory of the Market Order," p. 245.

[22] See Hayek, "The Use of Knowledge in Society," *American Economic Review* 35 (September 1945): 519–530.

[23] See Hayek, "The Pretence of Knowledge," p. 27. This is identified as an element of

contemporary economic analyses of complexity by Rosser, "On the Complexities of Complex Economic Dynamics," p. 176.

[24] Rosser, "On the Complexities of Complex Economic Dynamics," p. 176.

[25] Friedrich A. Hayek, "The Meaning of Competition," in *Austrian Economics*, ed. Richard M. Ebeling (Hillsdale, MI: Hillsdale College Press, 1991), pp. 264–280 at p. 274. See also Israel M. Kirzner, "Discovery, Private Property and the Theory of Justice in Capitalist Society," in *The Meaning of Market Process* (London: Routledge, 1992), pp.209–227.

[26] For a survey see Steven M. Sheffrin, *Rational Expectations*, 2nd ed. (Cambridge: Cambridge University Press, 1996).

[27] Ibid., p. 22.

[28] Rosser, "On the Complexities of Complex Economic Dynamics," p. 176.

[29] Hayek, "The Use of Knowledge in Society." As Israel M. Kirzner observed, "Hayek had no difficulty with the notion, in principle, of a social optimum mapped out by the underlying data of preferences and scarcities. He merely declared that this optimum not to be the relevant criterion for social policy, since the knowledge needed for the formulation of such an optimum is never given or available to a single mind." ("Market Process Theory," in *The Meaning of Market Process*, pp. 3–37 at p. 15).

[30] Hayek, "The Use of Knowledge in Society," pp. 247–248. As Chandran Kukathas points out, in comparison to von Mises, Hayek's critique of socialism is not so much that, in the absence of a market, prices could not be calculated but that, in the absence of a market, the necessary information to determine prices could not be collected (*Hayek and Modern Liberalism* [Oxford: Clarendon Press, 1989], p. 57.

[31] Hayek, "The Theory of Complex Phenomena," p. 58.

[32] Ibid. See also Rosser, "On the Complexities of Complex Economic Dynamics," pp. 184–185.

[33] On the lack on empirical testing of standard economic models, see Roger E. Backhouse,

Truth and Progress in Economics (Cheltenham, UK: Edward Elgar, 1997), ch. 14. Robert S. Goldfarb concludes that some theoretical propositions are "done in" by the data while, for a significant group of economists, "if the data do not fit the theory, too bad for the data" ("Now You See it, Now You Don't: Emerging Contrary Results in Economics," *Journal of Economic Methodology*, 4 (1997): 221–244 at p. 238).

[34] Backhouse, *Truth and Progress in Economics*, p. 113.

[35] This is important to chaos theory. See Smith, *Explaining Chaos*.

[36] In defending utilitarianism as the basis for public policy Robert E. Goodin (*Utilitarianism as a Public Philosophy* [Cambridge: Cambridge University Press, 1995], p. 63) argues that all this is precisely backwards. He claims that while it is certainly true that policy makers do not have access to micro-level predictive knowledge, they do not need it, and that is why expedient public policy is possible. All that policymakers require is aggregate statistical predictions of the overall consequences of the policies; the individual variations will cancel out. This argument for social scientific knowledge goes back to Durkheim. If we can predict how many suicides will occur in a year, we have the basis for an expedient social policy, even if we cannot predict who will commit suicide. Hayek anticipates this reply, and correctly notes that statistics is "impotent to deal with pattern complexity," because it supposes independence rather than systematic connection:

Statistics . . . deals with the problem of large numbers essentially by eliminating complexity and deliberately treating the individual elements as if they were not systematically connected. It avoids the problem of complexity by substituting for the information on the individual elements information on the frequency with which their different properties occur in classes of such elements, and it deliberately disregards the fact that the relative position of the different elements in a structure matter. (Hayek, "The Theory of Complex Phenomena," p. 59)

[37] See Tanner, *Why Things Bite Back*, p. 86.

[38] I owe this example to Julian Lamont.

[39] Tanner, *Why Things Bite Back*, pp. 82–84.

[40] Ibid., p. 42.

[41] Ibid., p. 272.

[42] See Alexander Rosenberg, *Philosophy of Social Science*, 2nd ed. (Boulder, CO: Westview, 1995) and Diedre McCloskey, "The Rhetoric of Economics," in *The Philosophy of Economics*, ed. Daniel M. Hausman (Cambridge: Cambridge University Press, 1994), pp. 395–446.

[43] Backhouse, *Truth and Progress in Economic Knowledge*, p. 206.

[44] Richard M. Alston, J. R. Kearl, and Michael B. Vaughan, "Is There a Consensus among Economists in the 1990s?" *The American Economic Review*, vol. 82 (May 1992): 203–209.

[45] Ibid., pp. 207ff. This effect was not observed in economists working at the top ten research universities.

[46] Goldfarb, "Now You See it, Now You Don't," p. 220.

[47] Ibid., p. 237.

[48] Philip E. Tetlock, *Expert Political Judgment: How Good Is It? How Can We Know?* (Princeton: University of Princeton Press, 2005), esp. ch. 2.

[49] Ibid., pp. 76ff

[50] Tetlock is not himself a skeptic. He is hopeful that we can improve public policymaking, so he focuses on the difference within the expert group, looking at which sorts of experts tend to do better and which do worse.

[51] See Rosenberg, *Philosophy of Social Science*, p. 14.

[52] Donald Sarri, "Mathematical Complexity of Simple Economics," *Notices of the AMA* 42, no. 2 (1995): 222–231, at p. 222. Strange attractors are related to chaos theory; see Smith, *Explaining Chaos*, pp. 142–146.

[53] Sarri, "Mathematical Complexity of Simple Economics," p. 229.

[54] While we can still identify equilibrium, prices do not always move to equilibrium. Ibid., p. 224. On the problems interpreting just what Smith's invisible hand is supposed to be, see William D. Grampp, "What Did Smith Mean by the Invisible Hand?" *Journal of Political Economy*, 108 (January 2000): 441–465.

[55] Donald Sarri, *Chaotic Elections! A Mathematician Looks at Voting* (Providence, RI: American Mathematical Association, 2000), p. 152.

[56] This constitutes a reply to those who argue that "models of complex systems can incorporate positive feedback and path-dependency that appear to demonstrate inefficient market results that seem to cry out for government remedy." (See Vaughn, "Hayek's Theory of the Market," p. 253.) One of the lessons of public choice theory is that policy recommendations cannot be premised simply on a theory of market failure; a theory of government failure is necessary as well.

[57] Hayek, "The Theory of Complex Phenomena," p. 60. See also Douglas Glen Whitman, "Hayek contra Pangloss on Evolutionary Systems," *Constitutional Political Economy*, 9 (1988): 450–466.

[58] Hayek, "The Theory of Complex Phenomena," p. 61.

[59] Hayek, *Rules and Order*, p. 61.

[60] Which will lead to more demands for government action when these costs manifest themselves. See Hayek, *Rules and Order*, pp. 59–60. See also Hayek's *The Road to Serfdom* (1944; Chicago: University of Chicago Press, 1976).

[61] Hayek, *The Constitution of Liberty*, Part III.

[62] See here Isaac Levi, *The Enterprise of Knowledge* (Cambridge, MA: MIT Press, 1980).

[63] The principle of insufficient reason is disputed; in some cases in can lead to counterintuitive results. For a useful defense, see Hans-Werner Sinn, "A Rehabilitation of the Principle of Insufficient Reason," *Quarterly Journal of Economics*, 94 (May 1980): 493–506.

[64] See Alan H. Goldman's discussion of "strong rules" in *Practical Rules: When We Need Them and When We Don't* (Cambridge: Cambridge University Press, 2002), p. 15.

[65] I shall not distinguish rules and principles here. I am assuming here for sake of simplicity that we have a cardinal scale of strength of reasons. This actually is equivalent to many conceptions of decision value or utility, for example, as used by Nozick (see next note).

[66] For the idea of such complex decision value schemes (though not focused on principled reasoning), see Robert Nozick, *The Nature of Rationality* (Princeton: Princeton University Press, 1993). For an application of this idea to principled reasoning, see my "Principles, Goals and Symbols: Nozick on Practical Rationality," in *Robert Nozick*, ed. David Schmidtz (Cambridge: Cambridge University Press, 2002), pp. 105–130.

[67] At times Hayek clearly distinguishes the legal rules of common law from moral rules; and at other times his analysis is broader, encompassing the traditions of a society, including its morality. I shall focus here on moral rules and principles. See the quote from Hayek at note 70 below.

[68] See my essay "Hayek on the Evolution of Society and Mind," in *The Cambridge Companion to Hayek* , ed. Edward Feser (Cambridge: Cambridge University Press, 2006), pp. 259–286.

[69] Friedrich A. Hayek, "Notes on the Evolution of Systems of Rules of Conduct," in *Studies in Philosophy, Politics, and Economics* (Chicago: University of Chicago Press, 1967), p. 68.

[70] Ibid., p. 71.

[71] Hayek, *The Constitution of Liberty*, p. 37.

[72] Hayek, *Rules and Order*, p. 44.

[73] Hayek, *The Fatal Conceit: The Errors of Socialism* W. W. Bartley III, ed (Chicago: University of Chicago Press, 1988), p. 6 (emphasis in original). As Caldwell notes, caution must be exercised when employing this work in interpreting Hayek, as some of the final

text seems to reflect the views of Bartley, who finished the manuscript because of Hayek's failing health. See *Hayek's Challenge*, pp. 316ff. One of the limitations of Anthony O'Hear's otherwise interesting analysis of Hayek's account of social evolution is that *Fatal Conceit* is his sole primary source for Hayek. Anthony O'Hear, *Beyond Evolution: Human Nature and the Limits of Evolutionary Explanation* (Oxford: Oxford University Press, 1997), pp. 146ff.

[74] And remember that according to Hayek competition is itself a discovery procedure. Hayek, "The Meaning of Competition."

[75] Two suppositions are implicit here. First, that an evolutionary account of moral rules provides a *justification* of those rules—it shows that they are sound moral rules. *The Fatal Conceit* (p. 58), however, argues that the rational justification of morality is impossible. The question is whether this is really Hayek's view. Caldwell argues that this position "clearly derives from Bartley" (*Hayek's Challenge*, p. 317; see also note 73 above). Even O'Hear, who takes the *Fatal Conceit* as his sole source for Hayek's views on cultural evolution, ultimately sees Hayek's account as justificatory (*Beyond Evolution*, p. 148). Second, I am supposing in the text that we can provide an answer to the question "why act on justified morality?"—an issue that I consider in the section "Claims (c) and (d): Why We Should Pay Attention to the Results of Social Evolution"

[76] Hayek, *The Fatal Conceit*, p. 25.

[77] The error of Social Darwinism, he argued, was in thinking that the selection mechanism for social evolution was the same as in Darwin's account of biological evolution (*The Fatal Conceit*, pp. 23–28). Social Darwinists such as Herbert Spencer had a more complicated understanding of evolution than this implies. See Herbert Spencer, *First Principles* (London: Murray, 1862).

[78] Hayek is scathing about this "rationalistic" attitude toward our moral principles (*The Constitution of Liberty*, pp. 63ff).

[79] Ibid., p. 63.

[80] Hayek, *The Constitution of Liberty*, p. 63. Emphasis added.

[81] I have examined Hayek's evolutionary account of the development of reason in my "Hayek on the Evolution of Society and Mind."

[82] O'Hear, *Beyond Evolution*, p. 214.

[83] See Whitman, "Hayek Contra Pangloss on Evolutionary Systems," pp. 49ff.

[84] For a nice discussion in the context of cultural evolution, see Whitman, "Hayek Contra Pangloss on Evolutionary Systems," esp. p. 55.

[85] See Dennis C. Mueller, *Public Choice III* (Cambridge: Cambridge University Press, 2003), pp. 586–588.

[86] See Whitman, "Hayek contra Pangloss on Evolutionary Systems," p. 64.

[87] Ibid., p. 51. See also O'Hear, *Beyond Evolution*, pp. 103, 142, 149.

[88] See Hayek, *Rules and Order*, pp. 38ff. See also Vaughn, "Hayek's Theory of the Market Order," pp. 250ff.

[89] Hayek, *Rules and Order*, p. 43.

[90] Hayek, *Law, Legislation and Liberty*, vol. 2, *The Mirage of Social Justice* (Chicago: University of Chicago Press, 1976), p. 5.

[91] Hayek, *Rules and Order*, p. 60.

[92] Ken Binmore, "Reciprocity and the Social Contract," *Politics, Philosophy and Economics*, 3 (February 2004): 5–35.

[93] Note here the similarity to the "precautionary principle" that is popular in environmentalist writing.

[94] Hayek, *The Constitution of Liberty*, p. 400. As Virginia Postrel writes, "This faith in spontaneous adjustment, in adaptation and evolution, does indeed separate dynamists from their fellow conservatives" (*The Future and its Enemies* [New York: Touchstone,

1999], p. 41).

[95] Hayek, "The Theory of Complex Phenomena," p. 57.

[96] Hayek, *Rules and Order*, p. 63.

[97] Vaughn, "Hayek's Theory of the Market Order," p. 244.

[98] Hayek's attraction to the Burkean case for traditional morality tempts him to distinguish economic from moral innovation, telling us that the liberal, "especially in the economic field," believes that self-regulation will bring about necessary adaptations, suggesting that the economic order is dynamic while the moral order is fragile. Hayek, *The Constitution of Liberty*, p. 400.

[99] Hume, *A Treatise of Human Nature*, 2nd ed., eds. L. A. Selby-Bigge and L. P. H. Nidditch (Oxford: Clarendon, 1976<, p. 490.

[100] See Waldrop, *Complexity*, ch. 1, esp. pp. 44–45.

[101] Hayek, *The Constitution of Liberty*, p. 70.