

Evolutionary Rationality, "Homo Economicus," and the Foundations of Social Order

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ABSTRACT

This article elaborates an alternate general approach to rationality, starting with the Hayekian concept of mind as a complex system of genetically, culturally, and individually created and transmitted rules. "Evolutionary rationality" is an individualistic alternative to "Homo economicus" and the conventional concept of utility maximization under constraints. Its main elements are examined by means of an analysis of paradoxes in the theory of games, as well as anomalies in the conventional approach that have been uncovered by experimental economics. This yields an approach to rationality in which individuals are "power-maximizers," able to synthesize both rational and irrational behaviors in their standard meanings. "Evolutionary rationality" is thus a unity of reason and emotion—a unity that can be restated in evolutionary terms as recognizing the negative adaptive consequences of "Homo economicus" in our species' social context. Such unity of reason and emotion also prevails in cultural evolution. "Social affectivity" is linked to particular patterns of competition for power and the production of public goods within specific societies. Different consequences for the general analysis of social order are sketched, with special attention to the role of groups in the making of society.

Hayek's Idea of the Mind: A Major Challenge to the Traditional Economic Concept of Rationality

What follows is naive by design because I try to be as clear and straightforward as possible. This naivité is the same as the naivité of the traditional idea of "Homo economicus"—a research tool that has enjoyed a growing respect not only in economics proper but in the social sciences in general. Its main features are simple and understandable for every new student in any basic university course, even if enriched versions like Brunner's RREEMM are considered (Lindenberg, 1990). Its intellectual history begins with the classical economist's distinction between the rational and irrational aspects of human nature, and the development of economics as a social science based on a focus on rational choice in economic behavior (see Kirchgassner, 1991, for a survey). Its modern version is specifically linked to the neoclassical revolution in economics, in which Homo economicus is supposed to be a representative individual (sometimes with a preference

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structure taken to be identical for all human beings) who maximizes his/her subjective utility rationally, given certain constraints and a set of information about the set of alternatives. If the concept appears to be more complex on second sight, this results from the application of calculus and all of its methodological derivations in formal representations of the idea. (The Nobel laureate Gary Becker—e.g., 1978—is one of the most famous proponents of the sophisticated approach.) However, *Homo economicus* him/herself is not supposed to work in that way—*Homo economicus* is rather supposed to be taken primarily as a powerful analytic device, with questions of ontology considered as a second step. Hence, for the sake of working out a methodological alternative, one should make its basic features as simple as those of *Homo economicus*. This is why I need to be “naive” in my approach.

We can begin by pointing out that the general idea of rationality underlying *Homo economicus* was formulated classically by Max Weber (1922/1985, pp. 1 ff.), who argued that rationality is an analytical device for understanding (“*Verstehen*”) human action in such a way that its rational causes can be clearly demarcated from the irrational. This lays the foundation for explanation (“*Erklären*”) of human action: only rational causes can be understood theoretically; irrational aspects might be grasped by intuition but not via scientific explanation. (I will later argue that rationality can be reconstructed to encompass irrational as well as rational in the Weberian sense.)

Homo economicus has emerged to now become the most influential idea in the social sciences, in particular regarding a possible unification and synthesis of the different branches of the social sciences (Frey, 1990). The main reason for this development is the immense adaptability of the idea. For instance, if “social norms” are conceived as “informal constraints,” a close link between economic and cultural studies can be established without provoking any basic methodological rupture in the economic approach (North, 1990).

Meanwhile, almost simultaneously with this propagation of *Homo economicus*, F. A. von Hayek’s thought gained widespread acknowledgement as one of the basic ingredients of any theory of social order, if not a full-fledged theory already. The demise of socialism has strengthened this development, and in the post-socialist countries a growing number of what might even be called “believers” in the Hayekian approach are on the scene. Given this simultaneous spread of certain methodologies, theories, and normative judgements, one wonders why so little attention has been paid to the fact that Hayek’s approach to rationality is radically different from the premises of *homo economicus*.

Hayek’s evolutionary view of the human mind (Hayek, 1979, pp. 155ff.) is very rich indeed when compared to the parsimonious assumptions of utility maximization under constraints. Mind is regarded as a complex system of rules that emerged out of a long-term evolutionary process in which supra-individual patterns of interaction exert selective force on the change of those rules. Of course, mind remains an individual phenomenon in the basic ontological sense. But even if Hayek’s concept of rules were equated with the concept of constraints, his theory would simply turn out to be an attempt to explain the evolution of the constraints. But this would immediately entail the conclusion that constraints cannot be explained by the choices of *Homo economicus*: within Hayek’s individualistic approach, choices are the cause of the change of rules qua constraints, but a complete across-the-board intentional reduction of individual choices as per *Homo economicus* is impossible. Why?—because many unintended consequences of individual

choice determine the evolution of rules, and this means that evolution proper cannot be the object of choice.

Hayek's idea of the mind as a complex system of rules thus appears to be a major alternative to Homo economicus. What are the main constituents of Hayek's approach? Mind is a complex structure of at least three layers of rules in which actual choice is embedded (Hayek, 1963). These three different types of rules are the respective result of three different types of selective processes—namely, *Darwinian selection*, which shapes the basic neuronal structures of the mind; *cultural selection*, which shapes the malleable sets of social norms and behavioral patterns within a certain society; and *individual selection*, which means that individuals also set up their idiosyncratic rule systems by means of constructivistic (“rational”) choice. Although in the discussion of Hayek's approach that followed, most emphasis was laid on the second kind of selective processes (e.g., Radnitzky, 1987), I should stress that Hayek's concept of mind goes back to his neuropsychological investigations into the “sensory order” (Jonker, 1991; see also Herrmann-Pillath, 1992a for a valuable summary). There we find a full-fledged exposition of how the different mechanisms and the different layers of rules interact. One important implication of this approach is that, basically, every human behavioral pattern could be referred to the three different layers without being reducible to one layer exclusively. Thus, Hayek's approach is materialistic in the sense of arguing in favor of neuronal monism (i.e., assuming a basic ontological unity of the brain and the mind) but not sociobiological in the narrow sense, because cultural evolution is supposed to proceed at least partly autonomously from biological evolution (cf. Boyd & Richerson, 1985).

The driving force of cultural evolution is group selection, given that Hayek assumes rules to be a supra-individual phenomenon in that the “reason of rules” does not arise from individuals: it derives from the selective forces working on the functional unit that the rules need to be referred to, i.e., the group. Of course, precisely this part of the argument has become the target of individualistic critiques of Hayek (e.g., Witt, 1991), which point out that the group is no actor in evolution, and “rules” and “groups” seem to attain an ontological status of their own in Hayek's schema. However, since Hayek envisions the propagation of rules to be directed, for instance, by individual imitation or migration into a group obeying a seemingly successful system of rules, a more explicit individualistic restatement of his approach does not seem to be out of reach. Nonetheless, this does not mean that the evolution of rules will be completely reducible to individual choice. This point becomes fairly obvious when we look at the normative conclusion that Hayek draws out of this analysis: Hayek is suspicious of constructivistic design of rules precisely because he believes the supra-individual process of evolution to be more powerful than mere individual information processing in accumulating information (cf. Voigt, 1990).

In principle, individual choice plays here precisely the same role as chance in the Darwinian model of selection. Indeed, formally, individual choice works somewhat blindly within the whole pattern of selection because humans are not able to know all the forces that ultimately determine the outcome of their decisions; thus, from the perspective of the outside observer, any outcome is co-determined by necessarily unforeseen, hence usually erroneous, individual choices and the deterministic selective forces of the environment (cf. Levinson, 1988, pp. 50ff.). This is the main reason that Hayek's approach is an evolutionary one in formal terms, too.

Hayek's idea of the mind is still an overly abstract one, and thus an easy object of criticism. A more creative reception of his ideas would instead take all the lacunae as a challenge to develop his approach into a full-fledged paradigmatic alternative to "Homo economicus." Before taking up that challenge, I would like to argue more clearly why his approach is indeed a paradigmatic alternative. As is well known, most proponents of "Homo economicus" do not assign any ontological status to that concept—quite the other way around, because its status as an analytical category is precisely what allows expansion of its application even into areas where to argue ontologically would be meaningless (as, for instance, in the case of the "analytical continuity" in the application of the economic approach to the behavior of animals and humans, see Becker, 1981, p. 216). However, neither is Hayek's idea of mind in any way tantamount to the well-known critique of "homo economicus" by behavioral economics. The latter tries to refute neoclassical premises by referring to a loose systematization of empirical knowledge about actual decision procedures of humans. In other words, in a fundamental sense behavioral economists argue on the conceptual level in the protective belt of "homo economicus" without being able to offer a new core idea (cf. Schlicht's, 1990, point on the resulting "balkanization" of social theory).

Hayek's approach is different because he puts the evolutionary argument in the formal core of his paradigm. This means that against the neoclassical reference to mere analytical categories his methodological premises might be condensed, first, into the assumption that any idea of the mind needs to be rooted in the above-mentioned, three-layered ontological structure; that is, the idea of the mind is no mere analytical but an ontological category. Second, if one refers to this category, this has immediate analytical consequences because now no analytical hypothesis about the mind should be allowed to contradict the general theoretical framework of evolutionary analysis; that is, the formal structure of rationality should be deduced from the general evolutionary ontology. Hence, Hayek argues in part on precisely the same analytical level as the standard view on Homo economicus. In both theories, the empirical systematizations of behavioral economics might serve as falsifiers, even though Hayek's position is by no means the behavioral economist's one. By implication, Hayek's idea of the mind can stay in the core of a research program, and can aptly substitute for the traditional concept of Homo economicus. The main formal features of that new program can be designed according to evolutionary theory.

But Hayek does not argue in favor of an Darwinian reductionism. The concept of a three-layered structure of the rules governing the mind means that although the human mind has many universal features embedded into the genetically fixed mechanisms of the brain, it is historically contingent in a substantial way as far as the second layer is referred to, i.e., it is the result of cultural evolution. This, again, is no empirical hypothesis in the sense of behavioral economics but a necessary conclusion to be drawn out of Hayek's concept of a rule. If the cultural framework of the mind is indeed the result of group selection, the mind should show certain features peculiar to the selective processes operating at certain places and within certain time periods. Only if a universal convergence of all these processes takes place, will the mind be completely identical for all human beings. But there is no guarantee even then that such a state will be the ultimate one because probably a new divergence between different groups will occur after a certain lapse of time.

Hence, the second challenge to the neoclassical idea of rationality turns out to be the assumption of a culturally specific rationality. No difference or contradiction between

“culture” and “rationality” is conceived other than a cultural diversity of rationality proper. In addition to universal genetic features of rationality, this also means that the laws governing the process of cultural selection will imprint some universal characteristics on aspects of rationality otherwise culturally specific. However, this is a universal feature on a second, more abstract level of analysis. Quite interestingly, we can again deduce an analytical hypothesis concerning this second level of analysis if we look at the process of group selection. In order to analyze that process, we will need to look at the organization of the group as a determinant of success in group selection for activities that can take place only on the level of the group and not on the level of the individual. In economic terms, these activities will be the production of public goods in the general sense; this means including not only material goods but also rules and laws, for instance. This observation entails the hypothesis that the cultural specificity of rationality will be linked to the historically contingent selective forces working on the need for certain public goods if a group is to be successful in group competition. On the one hand, rationality will be specific to certain challenges for the production of certain public goods; on the other hand, the laws governing the effects of those public goods for the outcome of group competition will shape some universal features of cultural rationality.

I believe that the above short sketch of the possible implications of Hayek's idea of the mind can be the foundation for an alternative research program in the study of rationality. Obviously such a far-reaching shift in focus will entail many important consequences for the theory of social order. I do not want to argue that all of these implications have been foreseen or would have been agreed to by Hayek. In a sense, what will be elaborated in the following pages are some of the unintended consequences of his approach. But what else could have been expected, given his own view on the importance of these effects for the evolution of mind and society?

Anomalies of Rationality and a Possible Evolutionary Solution

That many implications and empirical results of evolutionary theory fit into the framework of neoclassical analysis is well known (Tullock, 1987). Economic models are used in behavioral ecology in order to analyze the results of selection “as if” the individuals optimize as utility maximizers (Stephens & Krebs, 1986). Many economists, even some biologists, therefore believe that evolutionary theory is simply a special case of a “general” or “universal economy” (e.g., Ghiselin, 1987). The methodological premise of that attitude is, of course, the assumption of a mere analytical use of the idea of *homo economicus*. However, evolutionary theory proper is by no means only a set of analytical hypotheses: it contains many ontological assumptions. This becomes obvious immediately if one considers the biological argument that tries to explain the fact that many results of evolution can be described “as if” they had been shaped by economic optimization. Such an explanation is deemed possible only via reference to the actual workings of natural selection—which is to say, the analytical meaning of *Homo economicus* is founded in evolutionary ontology, rather than vice versa (Smith, 1983; see also Tietzel, 1993).

If the Hayekian concept of evolutionary rationality is supposed to substitute for the neoclassical concept of rationality, those considerations seem to be a good starting point because a new research program should be able to include the results of the former. The

fit between evolutionary theory and neoclassical rationality is therefore conceived as an indicator of the reductive power of the evolutionary model. However, the real challenge of a new research program is coming to terms with the anomalies of the old. Our attempt to elaborate on the foundations of evolutionary rationality should therefore be focused on the anomalies of neoclassical rationality in the broad sense. If these anomalies can be changed into “normal” and general features in the the new program, it will have proven its explanatory power. This can be achieved by looking at the possible implications of anomalies for our idea of rationality. Can anomalies be used creatively to fix the formal features of evolutionary rationality?

Two different fields of research seem to be fruitful. First, we deal in a straightforward way with some of the dilemmas of game theory resulting from the traditional concept of rationality; and second, we offer a brief glance at the empirical anomalies discovered by experimental economics.

Strategic Interaction: On the Rationality of Irrationality

In an almost paradoxical way, game theory has developed with great intensity and speed during recent decades because one of its main preoccupations has been attempting to provide solutions to problems of strategical interaction by means of the traditional concept of rationality—problems which are precisely the result of the application of traditional rationality (Kliemt, 1991). Problems of strategical interaction emerge because the different parties are assumed to be rational utility maximizers; a solution to the problems is then sought which still fits into that framework. But must this be the only way of dealing with these problems? How about changing the idea of rationality proper by referring to the emerging problems as indicators of the application of a wrong concept of rationality?

I would like to make my point as simple and clear as possible. Figure 1 shows the extensive form of the market entry problem in which the incumbent chooses between “fighting” and “dividing the market.” In the original form of the matrix of payoffs we have two possibilities of Nash-equilibria with payoffs: the incumbent gets the whole profit of 100 (0,100) (the competitor withdraws because of a credible threat of a fight [-10,-10]); or the market is divided between incumbent and competitor (40,40). In contrast, the extensive form shows that after the actual entry of the competitor only one subgame-perfect decision is available—the divided market (40,40). Thus, the actual entry of the competitor renders the maximal (0,100) and hence rational option for the incumbent irrational—because if the incumbent refuses to divide the market both the incumbent and competitor will wind up with -10. Further, since both players can anticipate this whole sequence from the beginning, the initial option of 0,100 was presumably not a viable option for the incumbent in the first place. Fighting will always lead to -10,-10—though, of course, if the competitor believes the incumbent will act “irrationally” and fight, then the competitor may withdraw without fighting. This in turn would leave the incumbent with the full 100, which would mean the incumbent actually was acting rationally... Hence the paradox.

This simple structure is the core of the famous “chain store paradox” formulated by Selten (see, e.g., Harsanyi & Selten, 1988), or the analysis of games of reputation by Kreps

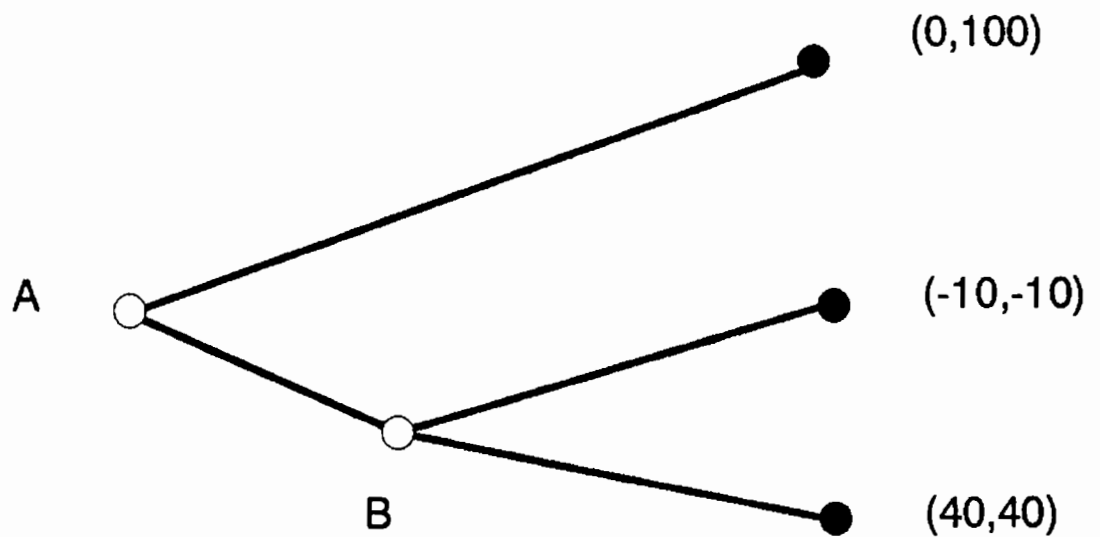


Figure 1. The Market Entry Game

and others (Holler & Illing, 1991, pp. 114 ff., 173 ff.). (The factor of reputation is important in this structure, because the incumbent's reputation can lead to the competitor withdrawing without a fight.) The structure can be applied in different ways. One is the common perspective on monopolistic competition. Let's project that structure into another real world situation: the incumbent is the dominant male in a group of primates, exerting exclusive control over a harem of females. Other males try to gain access to these females, and the incumbent has to choose between "fighting" and "dividing the harem." If a sequence of attempts of other individuals is imagined, an analogy to the chain store paradox can be drawn if the single females who are the object of the male attacks are equated with market segments. Then the dominant male needs to consider whether fighting in one market segment builds up a reputation which deters other males from attacking another female. Of course, none of these analogies pay respect to the possible reactions of the females, but this assumption also underlies the interpretation of the structure as a market in which buyers do not intervene actively in the conflict between the incumbent and the competitor.

Apart from such concrete problems, similar paradoxes arise in most extensive-form games in which the iteration of individual decisions leads rational individuals to a solution by means of backward induction—that is, individuals attempt to apply optimal solutions discovered in the final step of the game back to the initial state (see Reny, 1992). For example, in the "Take-It-Or-Leave-It" game, two players are offered increasing amounts of money in turn, and the decision of one player to take the money leaves the other player with no money. The rational player will solve the problem by means of backward induction: take the first, albeit smallest, amount of money offered, because no rational means exists of getting a larger pot. But this approach depends upon the assumption that the structure of the game, as well as the fact that both players are rational optimizers, is common knowledge to both players. And if the first player leaves the pot to the second player, this very assumption that both players are "rational" breaks down—meaning neither player

can successfully use backward induction. But this second situation could lead to a much larger pot for the first player—meaning that the most “rational” option for the first player might be to proceed “irrationally” (leave the pot for x number of offers).

Of course, more sophisticated developments—in particular regarding the analysis of games of reputation and signaling—have reduced the degree of paradox in such simple examples. Nonetheless, a second, very different interpretation of the above will show that an alternate way of dealing with the paradox can be imagined. First of all, the anomaly of rationality in our simple structure results from the fact that if the incumbent is rational in the common meaning, he/she will not realize the maximal pay-off. Quite the other way round, if the incumbent acts irrationally in the second step (chooses to fight) and if the knowledge about this irrationality is common to both players, then the incumbent will realize the maximum by choosing not to fight (to divide), i.e., the incumbent will not be compelled to realize the irrational option at all. This means that irrationality is not only the precondition for credible commitment but also prevents individuals from taking irrational action (see Frank, 1988, pp. 43-114).

This is, indeed, a paradox within the standard approach to rationality. However, the perspective changes completely regarding the “harem-game” of primates. If we consider the pay-off to be successful copulations with females of the harem, and if for sake of simplicity we assume that the more frequent the number of copulations the higher the differential reproductive success of a male, we immediately realize that, given the structure of pay-offs in the long run, irrational behavior will be at least partly an important feature of the genetically fixed patterns of decision-making and behavior in the population. The reason for this lies in the fact that selection does not proceed in the same direction as the sequence of decision-making presumed in the “market game” interpretation, but just the opposite: the relative magnitudes of the pay-offs in the last stage of the game determine the behavioral patterns with which the participants will enter new games with the same structure. The basic formal distinction between economic and evolutionary rationality turns out to be that the former explains patterns of behavior as consequences of ex-ante optimization of the agents, whereas the latter explains patterns of behavior as ex-post-facto consequences of realized behavior, which in turn predetermine subsequent behavior within games of the same structure. (See the analysis of the hawk/dove game below for more on the harem game.)

Of course, no population of “irrationalists” will be a stable one. But the argument demonstrates that within the simple framework sketched, rationality (in the narrow sense) is an endogenous variable—populations are a mix of individuals with different degrees of “irrationality” and of individuals with mixed strategic capabilities for acting rationally or irrationally. Such a process might be dealt with via the theory of reputation games in which a sequence of game structures as above is conceived as being governed by Bayesian optimization on the part of the individuals. The individuals enter the scene endowed with a certain set of subjective probabilities regarding the distribution of types of players in the population. During a sequence of games these probabilities are adapted according to experience. Quite obviously, if this approach is projected onto the harem-game, we will get in touch with the Hayekian idea of different layers of the mind: on the one hand, actual choice proceeds along the sequence of games and according to the experiences made individually; on the other hand, the results of the choices determine the distribution of types of players in the whole sequence, or, more concretely, the distribution of subjective

probability estimates in the population. Thus, the Bayesian process is modified considerably because not only are the subjective probabilities adjusted, but also the a priori distribution of types through the workings of the pay-off structures (for a related criticism of the Bayesian approach, see Elster, 1989b, p. 34f.). We should stress that the change of the distribution of types in the population can be realized not only via inheritance, but through imitation and cultural transmission (Boyd & Richerson, 1985, pp. 81-131).

Interpreting the above-described "Take-It-Or-Leave-It" game in an evolutionary perspective, we can see that the outcome of single games will determine the frequency of types of players in any group. Thus, the percentage of "purely rational" players (those who operate according to backwards induction and take the initial pot) will be reduced, because the types of players who deviate from that procedure (the "irrational" ones, who leave the pot) will realize larger gains in a sequence of games.

Evolutionary rationality, hence, is a higher-order rationality that encompasses rational and irrational behavior, as these have been traditionally defined. If the objective probability distribution of players between the poles of "rational" and "irrational" types is determined by the sequence of pay-offs in the game, quite obviously "rationality" obtains a distinctively new form. Let us assume only that the endogeneity of "rationality" in a population is part of the common knowledge of all players, that they do not know the specific function that links pay-offs to that distribution. In this quite plausible case, the players will not be able to adapt their subjective probabilities to the objective distribution. This means that the subjective probabilities have paramount importance for the outcomes of the single games (this notion is related to recent attempts in game theory to reconstruct the conventional equilibrium concept as an "equilibrium in individual conjectures about the choices/strategies of other individuals"—see Brandenburger, 1992, pp 90 ff.). Each player will know that he/she will be able to stay in a dominant position if he/she can influence the beliefs of the other players in the appropriate direction, quite independent of the actual distribution of types, namely, the objective probabilities.

Thus, such type of behavior is directed at the strategic management of common knowledge. On the one hand, higher-order or evolutionary rationality as herein defined includes the standard optimization of pay-offs according to subjective probabilities; on the other hand it tries to manipulate the subjective probabilities of other players by means of choices that refer to the former. This is by no means a new idea. For instance, John Gray (1987) argued that "rationality" should be conceived as being two-fold—namely "calculatory" (as in *Homo economicus*), and "expressive," the latter including all behavioral strategies aimed at influencing the behavior of the other and communicating one's own objectives and capabilities, albeit sometimes deceitfully. However, this and other attempts to compartmentalize rationality seem to suffer from a lack of capacity to clarify the relation between both "rationalities" if a single action is to be explained via these multiple concepts. When is someone expressively-rational, when calculatory-rational? What determines the relative weights in choosing one's behavioral strategies?

Therefore, I recommend staying with a unitary idea of rationality, so that from the outset these types of questions need not be posed. This means that evolutionary rationality is a feature of behavior which both contributes to optimization and tries to manipulate the perception of the others, i.e., the common knowledge of all players (this is related to the so-called "personal construct theory" in psychology, see Earl, 1990, pp. 732ff.). I should stress that ex-post-facto, of course, evolutionary rationality will lead to

“calculatory” optimization in the majority of cases, so that no basic contradiction with the objectives of “economic man” will be discernible. However, as our simple example of the market entry/harem game demonstrated, precisely that result will be reached only by not acting according to calculatory, i.e., homo economicus, standards.

Let us list some basic characteristics of an evolutionary rationality which is focused on the endogeneity of common knowledge (for more on the specific game-theoretic analysis of “common knowledge,” see the survey by Geanakoplos, 1992). Players will never optimize exclusively within the frame of a single game or a clearly defined sequence of games, but will always evaluate the relative pay-offs according to their possible consequences on the perception of other players in other games which can be completely independent from the actual situation of choice. For instance, during a certain game the choices might be determined by the wish to influence the perception of mere observers who do not participate. Players act as entrepreneurs in the strict sense because they operate in an environment of open, complex networks of recurrent strategical interactions and within a constantly changing medium of common knowledge of all players. They will never be able to assess all the possible consequences of certain actions on the sum of all pay-offs to be attained during the continuous flow of strategical interaction. However, they know that if they were only to choose according to the clearly discernible pay-offs of single games, they most probably will not optimize within the whole context of strategical interaction. Quite similar to a related Hayekian point, a more specific argument might be offered that humans are particularly able to deal with these complex networks when staying in small groups, which were an important feature of the phylogenetic history of humankind.

The only economic concept apt to deal with these matters, and which simultaneously establishes a link with more traditional economic approaches, is that of “social capital” (Coleman, 1990, pp. 300-324). In a first step, we might envisage strategical entrepreneurs as investing in the formation of a stock of social capital which will enable them to attain a better position in future sequences and networks of strategical interaction. Moreover, the concept of social capital can be connected with the idea of controlling strategical interaction according to one’s own aims by means of providing perceptual cues for others in the group. Therefore, strategical entrepreneurs do not maximize pay-offs, but try to evaluate the effect of single pay-off patterns on the stock of social capital. We will distinguish between two different types of these effects. Social capital consists of two parts, namely tangible and intangible stocks. Tangible stocks are defined as stocks which can be evaluated according to the measure of the current pay-offs in strategical interaction. If the analysis assumes that those pay-offs are to be measured in terms of money, we could simply equate the tangible stocks with the idea of “wealth.” Regarding optimization, this assumption implies that players will never try to maximize the pay-offs of a single game or sequence of games, but will try to maximize the future differences in wealth in terms of their present, discounted value. Notice that these differences are assessed by reference not only to the other players of a certain game, but to all other possible players. The second part of social capital might be defined as intangible and refers to, e.g., the “fame” of a player, his/her ability to mobilize social support and so on (this is the more common use of the term “social capital” in sociology, following Bourdieu and others).

These fairly evident properties of the idea of evolutionary rationality provide the starting point for a complete revision of the common picture of Homo economicus. People are now assumed to maximize their stock of social capital and, in particular, the differences

in their endowment with social capital as compared with others. This hypothesis entails a rejection of the idea of subjective utility maximization because social capital is by definition an observable category. Social capital as wealth is measured by the existing standard for measurement in a society (“money”), and intangible social capital is completely independent from one’s own assessment of a strategical option—it depends on the perception of the others, exclusively. Although that perception is a subjective phenomenon, too, it needs to be treated as an objective one by the selecting individual.

We are now able to clarify another aspect of our simple example of the market entry game. Quite obviously, the incumbent will maximize according to the long-term effects of his/her behavior on his/her social capital. This assumption is well preconceived in the Bayesian analyses of that game structure. However, Bayesian analysis only pays attention to future income streams within the given group of players, and it assumes that common knowledge does not change, in particular regarding the subjective probabilities with which the games commence. The evolutionary rationality approach instead argues that, first, the incumbent will choose according to a complex structure of trade-offs, as for example, the possible trade-off between the formation of intangible social capital and short-term negative effects on wealth, if the incumbent decides to fight; and even more important, second, that maximization will be focused on the differential effects on the stock of social capital. If, for sake of simplicity, we assume that the incumbent concentrates on wealth, we can see that, first, for the strategical choices of all players, the given relative position in terms of social capital will be the defining feature for the assessment of the original subjective probabilities; and second, that the respective effects of pay-offs on that relative position will determine their choices. This should be compared to the standard assumption of the Bayesian approach, in which the players optimize according to the discounted future streams of pay-offs weighted according to their assessment of probabilities of fighting and loosing which in turn are determined by the actually observed behavior of the others. That players will be assessed as “strong” incumbents if they enter the game with a great stock of wealth—in particular if a possible loss will not affect their relative positions after the game but only their absolute positions—seems to fit everyday experience. In a similar vein, in the “Take-It-Or-Leave-It” game a first player will be quite indifferent towards possible loss if he/she enters the game with a great stock of wealth, whereas a poor player will not dare waiting, and will instead take the small pot immediately. Hence, the existing amount of wealth determines the result of the game, not only perceived future outcomes.

Thus we reach the important conclusion that the concept of social capital might be connected to the concept of common knowledge because perceived, relative stocks of social capital determine the subjective probabilities of the players. Common knowledge is now directly related to social structure. Furthermore, because, as a result of strategical interaction, the distribution of social capital changes, common knowledge will be endogenous to the sequences and networks of strategical interaction. This is a remarkable result because we have now identified two ways of endogenizing common knowledge, two ways directly related to Hayek’s layers of the mind. If we refer again to the harem game, this becomes obvious immediately. Strategical choices determine two different mechanisms by which common knowledge is established. First, the pay-off sequences determine the differential reproductive success of certain types of players, just as has been argued above. Second, players focus on the formation of social capital which might serve to stabilize, for example, their relative long-term position as a dominant individual. This fits well into

recent developments in sociobiology that emphasize “life history strategies” as opposed to one-shot behavioral choices (Schmid-Hempel, 1992). Moreover, we can establish a relation between differential reproductive success and social capital which also harmonizes with the “enlightened” sociobiological approaches that no longer try to explain particular choices as being directed at maximization of reproductive success, but which instead try to link “status” and “reproductive success” (e.g., Betzig, 1986).

What are the formal consequences of such an idea of evolutionary rationality? Fortunately, we are not compelled to invent the wheel anew. Out of the many achievements of economic theory, two seem to fit into our approach particularly well. First, regarding strategical interaction, the minimum revision needed for an integration of evolutionary rationality into game theory is to use games of difference exclusively (Taylor, 1987, pp. 109-124). This is very radical because it means that no game theoretic approach can be accepted which assumes that the players maximize pay-offs without paying attention to the difference in pay-offs to other players. And those are the large majority of game theoretic analyses. A more sophisticated treatment would need to distinguish between stocks and flows as well as trade-offs between the effects on tangible and intangible parts of social capital. The second far-reaching consequence is that even if individuals do not perceive strategical situations they will not maximize absolute utilities without referring to the effects of choices on their relative position to others. Hence, the theory of choice needs to be built upon the theory of status preferences and not on standard utility theory (Frank, 1985; Konrad, 1990).

As we see, the idea of evolutionary rationality does indeed establish a new research program which changes virtually all standard assumptions in economic theory. Let us now ask whether the new approach will be strong enough to explain some of the anomalies of rationality discovered by experimental economics.

Anomalies as Evolutionarily Rational Behavior

We have now realized how the alleged paradox that irrationality might be a rational strategy can be resolved. From now on, we will draw the threads of the argument together into one central idea that has the same status in relation to evolutionary rationality as utility in relation to the rationality of *Homo economicus*. We will speak of evolutionary rationality as focused on the maximization of “power” (Herrmann-Pillath, 1993). Although there are some important differences, we will simply treat “power” as an equivalent to “social capital” in the broad sense used above (see Popitz, 1992). Those who maximize power and who start out with a certain stock of social capital will be the strong incumbents in the market entry game who will be able to commit themselves to an “irrational” strategy which, however, ultimately contributes to the further increase of their power.

We should ask whether the anomalies of the traditional approach will be regular behavioral patterns within evolutionary rationality. Figure 2 provides a sketchy survey of the argument, given that the number and different types of anomalies have become very large indeed (Roth, 1988; Frey & Eichenberger, 1989). The basic idea put forward by the theory of evolutionary rationality is as follows. Anomalies of rationality demonstrate that the inherited structure of rational decision-making differs considerably from the assumptions of *Homo economicus*. Therefore we have to ask whether we can imagine phylogenetic standard situations in which such anomalous behavior in fact contributed

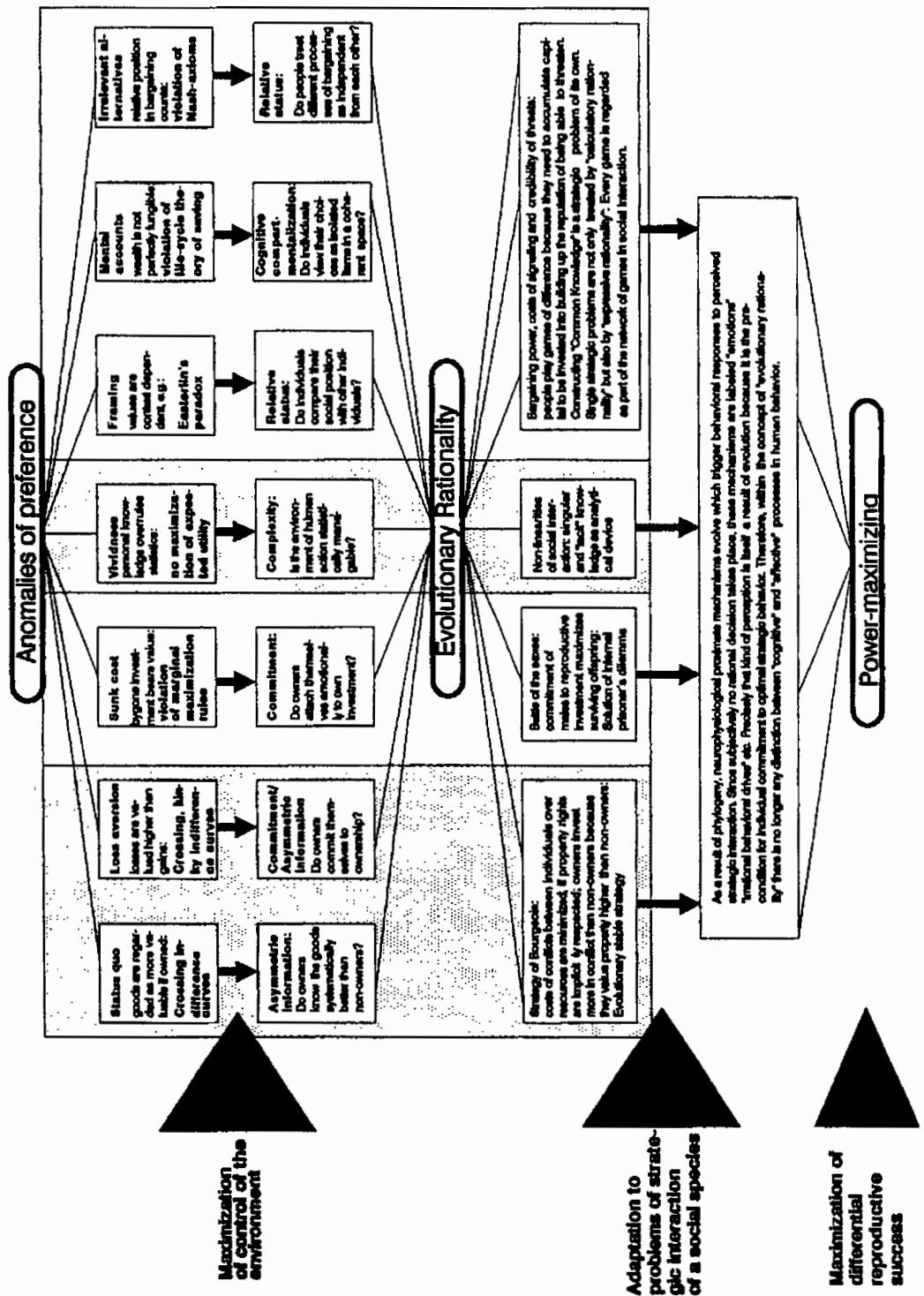


Figure 2. The Evolutionary Approach towards Anomalies of Standard Preference Theory

to differential reproductive success, fostering the inclusion of that behavior in the genetic stock. This is tantamount to an evolutionary optimization so that *Homo economicus* and its standard rationality turn out to be an evolutionary suboptimal pattern of choice behavior. Hence, the anomalies turn out to be normal patterns of evolutionary rationality.

Basically, the different anomalies might be put into two different clusters. One type of anomaly can be explained as a necessary result of maximization of power in contrast to maximization of utility. The other can be related to the effects of certain general properties of the environment which exerted selective pressure during human phylogeny.

One of the most important types of anomalies has been called "status-quo preferences" (Kahnemann et al., 1990, 1991). In brief, status-quo preferences show up in the fact that individuals seem to evaluate the utility of goods very differently if they are or are not owners. More generally, the status quo is valued as having utility on its own, so that a certain good is valued differently if it is part of a status quo rather than to be newly added to the existing endowment. Both attitudes are discernible in a very pronounced way in many experimental tests. For instance, in simple market games, individuals showed large gaps in reservation prices depending on whether they were owners or not. As a result, in a series of simple exchanges of goods the volume of transactions realized was considerably lower than what could be expected in theory because many owners of goods refrained from offering the goods at reasonable prices. In other terms, such behavior entails crossing preference curves because the evaluation of losses and gains differs sharply in the case of the same good and the same person. In order to get access to a good, people will never pay the same price as they claim when requested to sell it. Status-quo preferences also become behaviorally relevant in the fact that individuals tend to violate marginalistic criteria of choice by taking "sunk" cost and "foregone" investment into consideration. All of these phenomena are clear anomalies within the context of traditional utility theory.

The standard reaction of behavioral economics is to introduce some generalized descriptions of these phenomena and to regard these as natural properties of human decision-making. The power of the evolutionary rationality approach lies in its being able to explain the observed facts as consistent with quite universal strategic situations not only during human but also animal phylogeny. Thus, status-quo preferences are demonstrated to be universal features of any evolutionary optimal pattern of choice; they were selected through evolutionary optimization. One of the straightforward ways of making this point is to reference the famous "hawk and dove" game analyzed by Maynard-Smith (see Figure Three, derived from Krebs & Davies, 1987, pp. 138-142). If that game is enlarged by the "Strategy of Bourgeois," this strategy turns out to be the only evolutionarily stable strategy. This means that, in a very abstract and simple analysis of the typical situation of conflict about resources, a strategy will be optimal which follows the simple rule: if owner, then fight, if not owner, then be careful and timid. As a result, any population will be characterized in the long run by a mix of types and by individuals able to adopt mixed strategies, where the genetic endowment of these individuals provides them with the incentives needed to put a higher value on resources if they are the owner. From the economic perspective, the strategy of the bourgeois can be explained only when the respective reservation price depends on the status of owner and non-owner. Quite remarkably, such an attitude can be seen in children of the kindergarten age who are in general particularly prone to escalate conflicts (acting "expressively") over goods when they are the owners (Grammer, 1989, p. 104). Non-owners are careful and act much more

<i>Attackor</i>	<i>Opponent</i>		
	Hawk	Dove	Bourgeois
Hawk	-25,0	+50,0	+12,5
Dove	0	+15,0	+ 7,5
Bourgeois	-12,5	+32,5	+25,0

Note: The payoff matrix shows the average payoffs for the aggressor. It is assumed that winners get +50, losers 0, injured -100, and that mere displays of power cost -10. Hawks against hawks win with a 50% probability, hawks against doves are always winners since doves immediately adopt the position of the loser when meeting a hawk. Doves against doves display their force and are winners with a 50% probability. The bourgeois is assumed to be owner in 50% of the conflicts and therefore to behave as a hawk. The payoffs are the average of the respective payoffs for hawks and doves when meeting each other. When bourgeois meets bourgeois the owner wins and there are no costs of display or injuries.

Figure 3. Hawks, Doves, and the Strategy of the Bourgeois

“calculatorily.” The other side of the coin is that even physically stronger non-owners respect the property of others, presumably because they know the great propensity of owners to fight (Eibl-Eibesfeld, 1984, p. 454).

Status-quo preferences are exactly that pattern of preferences which will produce the observed behavior. But these need not be set a priori, as is in fact done by neoclassical economics for Homo economicus. Instead, the pattern of preferences can be deduced from the analysis of very common selective forces. (A similar argument can be made regarding the “sunk” cost anomaly.) As example, a very basic constellation in sexual reproduction is sexual conflict. In many mammals there are strong incentives for males to change their mates in order to maximize reproductive success. However, that behavior might lead to under-investment in one’s own children, in particular if the time needed to rear offspring is very long, as is the case in humans. Each force works in a different direction—which means that an evolutionarily optimal solution must entail a trade-off. One of the mechanisms leading to a minimization of the incentives for early change of mates could be simply the general inclination to take sunk cost into account, as, for example, in the effort invested in getting a mate. Although such behavior is not economically rational, it will be positively selected at least in part, because the investment in the offspring is higher than in the alternative case. Hence, we have discovered another basic strategic constellation in which status-quo preferences play a decisive role in reaping reproductive advantages. (This point also bears on the Trivers/Dawkins controversy over the role of investment in sexual conflict, in which Trivers finally abandoned his position; see Trivers, 1985, p. 268 and Dawkins, 1989, p. 150).

There are many other examples of how evolutionary rationality can be related to phylogeny. But I should stress that many of these examples can also be applied to strategic interaction in a much shorter time scale, in particular if certain outcomes of the evolutionary process are regarded as the framework for choices realized in an historical time scale. In other words, the arguments are valid for both the first two layers determining behavior in the Hayekian view. For instance, if we can rightly assume that long-term success in human societies (reproductive, social, military, or whatever) is strongly

determined by the accumulation of wealth and status, we can see immediately why the Nash-axioms will be constantly violated in reasonable scenarios of bargaining (Elster, 1989a, pp. 74 ff.). In this case the bargaining parties will constantly try to realize solutions which at least will leave their relative position unchanged, and no party will accept any deal where it will lose considerably in relative terms even if it realizes an improvement over its status quo. Hence, marginalist and other criteria of “rationality” will not be respected, and individuals will behave “irrationally.” The concept of evolutionary rationality thus provides a fresh view on the fact that ideas on the just price are so deeply entrenched in human societies, and why economic price theory is an artificial construct.

I want to stop here. One hopes my sketchy remarks were sufficient to demonstrate that the idea of evolutionary rationality can be the core of an alternative research program in the social sciences. On the one hand, given certain narrow conditions regarding the situation of choice, *Homo economicus* still belongs to the tool kit of the social scientist; but on the other hand, the anomalies of *Homo economicus* can be resolved within the new core. In this way we were able to achieve substantial progress in applying the first ingredient of Hayek’s idea of the mind—that is to say, how some fundamental features of rationality might have been shaped by natural selection. This of course simultaneously means that these aspects of rationality should be rooted in certain genetically determined, neurophysiological mechanisms. For instance, status-quo preferences should be regarded as a neurophysiological fact and not simply as an analytical device. However, the Hayekian view on the mind is much richer because Hayek assumes that mind is a cultural phenomenon as well. Let us now consider that question.

Social Affectivity and Cultural Evolution

What has been argued above is, basically, that “irrationality” as evolutionary, rational behavior—or, expressively rational behavior—is encoded in the human genes. The strategy of the bourgeois can be adopted only if it is not an object of rational choice, but fixed within a neurophysiological mechanism that specifies values to certain behavioral alternatives and cues of the environment (see Bunge & Ardila, 1990, p. 259). “Loss aversion” is an emotion. This means that within the idea of evolutionary rationality there is no longer any contrast between “rationality” and “affectivity,” because emotions can no longer be regarded to be “irrational” in the larger sense. Up to now, similar considerations have led only to the above-mentioned compartmentalization between “expressive” and “calculatory rationality,” so that human behavior was still divided between “reason” and “emotion” (Frank, 1988). However, basic neurophysiological research demonstrates that such a compartmentalization does not exist in the human brain (Bunge & Ardila, 1990, pp. 218 ff., 242 ff.). Quite to the contrary, cognitive and affective functions must be closely intertwined, because only affective functions provide the deeper standards for cognitive evaluation and decision-making. The brain feels and thinks simultaneously.

In order to step into the second realm of Hayek’s idea of the mind, we ought to realize that the compartmentalization between “rationality” and “emotions” is a phenomenon culturally specific to recent Western civilization. It belongs neither to the earlier European traditions of experiencing social interaction nor to the traditions of other cultures—such cultures know no contradiction between “self-interest” in terms of calculatory attitudes

towards social relations on the one hand and “emotional attachment” to certain persons on the other hand (Medick & Sabeau, 1984). The presumed contradiction between the two behavioral patterns plagues not only present social theory (underlying, for instance, the Hayekian distinction between “groups” and “Great Society,” see below), but also actual Western practice in personal behavior, in which self-interest is regarded as proof of a lack of emotional attachment.

That observation entails an important question: perhaps the compartmentalization between rationality and affectivity is itself an evolutionarily rational phenomenon, or, a special form of expressive rationality? Should we consider the possibility that the rationality of emotions is linked not only to phylogenetically universal aspects of human behavior but also to culturally specific developmental trajectories? The hypothesis emerges out of these questions that many problems of social theory in the West (both collectivistic and individualistic) stem from the unconscious adoption of a certain pattern of evolutionary rationality that is culturally specific (Elias, 1969)—and which, of course, by necessity would not be discernible for the individuals themselves because such knowledge might lead immediately to the destruction of the positive effects of that particular pattern. Indeed, Hayek himself has produced the hypothesis of a cultural specificity of mind, since he conceives the mind as a set of historically contingent rules.

We have already put forward the idea that the production of public goods within groups might provide the key for understanding these aspects of evolutionary rationality, because Hayek establishes a close linkage between the evolution of rules and group selection. For instance, we can meaningfully conceive the strategy of the bourgeois as a public good that minimizes the losses for the group (however, qua the sum of individual losses). Strong individuals who pay respect to the property of weaker ones contribute to the production of that public good. This becomes possible precisely because they do not evaluate the differences in physical strength according to calculatory rationality, but instead react along the lines of certain neurophysiologically induced emotions. Let us try to make this point in a more general way.

The idea of evolutionary rationality establishes a picture of people who are not utility-maximizing but power-maximizing agents. If this basic statement is applied to the concept of group-selection, we can elaborate on a reinterpretation of that concept which does not fall into the trap of presuming genetically altruistic behavior of single individuals (for a related but alternate approach, see Tullock, 1990). (The standard sociobiological critique of the concept of group-selection has been directed at Hayek, too.) However, the more general view can now be made formally concise that the competition between self-organized human groups is a driving force of social change conceived as resulting in new patterns of social interaction between individuals (cf. Alexander, 1979, 1987). In that sense, these patterns can be conceived as being the object of selection. The question now needs to be posed of how this level of selection can be applied to individual action without assuming supraindividual processes in terms of an enlarged social ontology (such processes still seem to exist in Samuelson's, 1993, most recent rescue of the idea of group selection).

Let us consider the following example. Imagine two human groups competing for resources. Neither group is a supraindividual agent because the individuals who form the groups do not act altruistically but compete against each other for positions of power within each group. This means that we observe a two-level competitive process: within the groups and between the groups. Evidently, one of the determinants of relative success

on the second level comes from the first: do the actions of the more powerful individuals in one group contribute to the increase of the power differential between this group and another? Are internal power differentials correlated positively with external power differentials? If the enlarged power of one individual in one group leads to a decline of the power of the group (imagine a dictator whose actions lead to a reduction of wealth for the whole society over which he/she reigns), this group will suffer from disadvantages when competing with a group where the dominant individual contributes to the production of public goods that enhance the power of the group, both by design or unintendedly.

Therefore, we reach the simple conclusion that the outcome of group selection will be determined at least in part by the respective amounts of public goods that are produced by powerful individuals in the competing groups and which are an intended or unintended side-effect of their self-interested actions in pursuit of power (Herrmann-Pillath, 1991). If this idea is added to Hayek's concept of group selection, one of its lacunae can be filled straightforwardly, namely the absence of individual agents of cultural evolution. Although Hayek's view on group selection needs to presume that power differentials between the groups exist, Hayek tends to conceive the inner structure of groups to be free of power relationships since the members of the groups act according to an altruistic group morale. In my view, however, precisely the internal conflicts over power within the groups are the driving forces of group selection and, hence, cultural evolution. (But I must point out that recent advances in the economic analysis of genetic altruism have indeed shown that even the Hayekian approach in its original, narrow sense is by no means entirely flawed—especially when altruism is traced in a sequence of genetically and culturally linked generations; see Bergstrom & Stark, 1993).

Such an approach offers many valuable opportunities for theoretical and empirical elaboration. Regarding the problem of rationality, we can now ask whether there is a relationship between a certain pattern of evolutionary rationality as established by group selection on the one hand, and the prevailing structure of power in the respective group on the other hand. Is there any linkage between affectivity as an individual phenomenon and power as a social phenomenon? When one asserts that group competition will positively select those patterns of behavior in pursuit of power which lead to the production of public goods, this by no means implies any general statement on the specific type of public goods that will emerge. The latter needs to refer to historically and geographically contingent determinants of the trajectory of group selection. For instance, the available military technologies or the given natural environment prescribe the possible alternatives for social organization which might lead to the maximization of the power of a group relative to other groups. This observation immediately leads to the conclusion that the Hayekian theory of group selection does not subscribe to an environmental determinism, because only the particular dynamics of the group-internal competition for power lead to the emergence of particular patterns of social interaction, which then are selected by a manifold of environmental forces. The latter cannot determine any particular patterns without the input produced by autonomous phenomena of power.

We are now able to produce an hypothesis which will turn our argument into a form which lends itself more easily to empirical tests. The above considerations imply that a correlation should exist between certain patterns of social interaction, affective aspects of rationality, and material conditions of group selection in the broad sense, given a particular place and a particular point of time during the trajectory of group selection. More

specifically, certain affective aspects of rationality in concrete human groups and societies could possibly contribute to the stabilization of certain patterns of power within those groups which proved successful in the process of group selection, so that an historical analysis of such groups should be able to establish systematic linkages between the findings of different disciplines of the social sciences that analyze these phenomena (cf. Simon, 1993). For instance, results of the economic analysis of group selection at a certain place and in a certain time period (such as research into the "European miracle") would be matched with the respective results of an historical psychology investigating the individual behavioral attitudes, as well as with sociological research into the then prevailing structures of power (cf. Elias, 1969). Obviously, such a research strategy is very close to a Weberian one.

We can see immediately that such a research strategy for the evaluation of hypotheses regarding evolutionary rationality cannot rely on "stylized facts" which are mostly used in the standard economic approach to history. Instead, a "thick description" of certain historical processes will be needed. However, the possible validations of our approach are many indeed, and can be connected to crossways of world history which mark some decisive changes in the trajectory of group selection. Take the Greek Hoplite phalanx as an example (Mann, 1986, pp. 195 ff.). That remarkable invention in military organization and technology presupposed a very particular social and emotional competence of the members of the phalanx. In fact, there were only marginal technological inventions involved in the design of the phalanx—social ones were by far the crucial innovations. The single member of the phalanx was expected to stay in the phalanx in spite of being faced with the immediate threat of death, because he was obliged to protect his neighbor in the phalanx with his shield. If only a few members of the phalanx had lost their spirit of commitment and had fled, the whole phalanx would have unravelled in a couple of minutes. Of course, technological changes like an increased weight of the armor served as an indirect device for fostering commitment because the costs of leaving the phalanx were increased. However, the whole phalanx was built on the individual commitment to the production of the public good of providing non-reciprocal shelter among single members. That kind of commitment presupposed a particular affective state of the members which could not be transferred into other societies by means of a simple imitation of the technology and the organizational structures of the phalanx. Given a comparable level of technological development and similar environmental conditions, the Persian opponents of Greek armies were not able to adopt that particular pattern of military organization. On the level of the individual, they could not overcome the obstacles that calculatory rationality builds up against the individual commitment to death. However, this important difference on the level of individuals needs to be related to differences in the social structure of the societies in question. The internal patterns of power in the polis established a closed community with a common destiny; every member of the phalanx was an owner of land belonging to the jurisdiction of the polis and was therefore very conscious of the strong linkage between the success of the group and their own position as an owner. (A similar mechanism worked in the revolution of the feudal military organization by the Swiss pike phalanx.) An autocratic society which was built on large power differentials between the individuals therefore could not adopt the same military technologies because it lacked the underlying mechanism of identification between individual and group.

I should stress that reference to military aspects of group selection is by no means the required way of establishing certain relationships between affective aspects of

rationality and social patterns of power. In another text (Herrmann-Pillath, 1992b), I have tried to demonstrate that Weber's old question of why China did not develop into an industrial society on its own should be answered by using an integrated approach to economic history, historical psychology, and sociological analysis focused on the concept of a culturally specific "social affectivity." Chinese social affectivity is still prevalent today, and turns out to be the driving force of economic development in the environment of the industrialized world economy as well as an obstacle to the emergence of rational-bureaucratic organizational structures in internal enterprises and government institutions (Redding, 1990). This means that on the one hand social affectivity shapes the space of alternatives for the realization of power within Chinese societies (rational bureaucracies being one of the most important modern devices of power), and on the other hand itself is the result of an historical interaction between power and affectivity within the context of group selection. Without being able to go into the details, suffice for me to mention here that Chinese social affectivity fosters strong self-commitment to context-dependent authority (as opposed to rule-governed authority) within the framework of the perception of reciprocal exchange of private and public goods. That particular psychological attitude laid the foundation of a remarkable "fit" between patterns of power in the economy and the polity, because it led the historical change of formal institutions along the gradient of their respective transaction costs. In the economy, precisely that institution which governs the formation of social affectivity, namely the family, turned out to be the most efficient organization of labor input in Chinese horticulture as well as handicraft production, and outcompeted all other organizational alternatives. Context-dependent authority relations within the family provided the solution for the intricate problems of measuring labor effort in horticulture by means of enhanced self-commitment. Precisely in the same vein, on the level of government, indirect rule by means of context-dependent authority relations in local communities proved to be the most efficient way of achieving a political integration of the Chinese empire. Both phenomena of power were recognized in the Chinese political ideology from very early on, and then were supported actively by the government. This means that one particular pattern of social affectivity laid the foundation for the efficient production of private goods in the family and of public goods by the government as well. That system proved to be very successful in terms of the results of group selection—until China met the West.

In this article, I cannot discuss these and other examples in more empirical detail. Perhaps the core of the idea of evolutionary rationality is now established in an albeit preliminary way: evolutionary rationality means the unity of affectivity and rationality on the one hand, and the cultural specificity of rationality on the other hand. Take the example of the Greek phalanx. The phalanx is a completely "rational" phenomenon in terms of military and organizational efficiency. But that rationality is the outside observer's, who might be able to design optimal organizational patterns without being impeded by being an individually rational member of the phalanx. Individually (calculatory) rational members of the phalanx will not be able to adopt this "rational" organizational pattern unless they are equipped with a certain emotional endowment. The possibility of such an emotional way to rational solutions rests upon the neurophysiological unity of rationality and affectivity in the human brain. But the particular way adopted depends on culturally specific conditions and the historically contingent forces of group selection.

Possible Implications for the Theory of Social Order, and Disagreements with Hayek

A full-fledged exposition of the idea of evolutionary rationality will need to be much more explicit about the internal structure of rationality. For instance, we may be able to provide an evolutionary argument in favor of the hypothesis that the human individual should be conceived as consisting at least of three different types of "individuals," as has been proposed by James Coleman (1990), among others. All of these changes in our theoretical image of humans will have serious and far-reaching implications for the theory of social order. The most basic implication is that evolutionary rationality provides a systematic foundation for the idea of social order within a truly individualistic framework. This is highly significant because one of the crucial flaws of *Homo economicus* is the impossibility in its precincts of a coherent and conclusive individualistic foundation of social order (see Kliemt, 1991, and Kliemt & Zimmerling, 1993). The ultimate reason for this limitation is that *Homo economicus* can behave opportunistically only in the sense of weighing costs and benefits during the current stream of individual choices—no commitment to general rules is possible independent of the actual situation of choice (rules are chosen at specific points in time, via weighing of future costs and benefits). Yet the immense literature and ongoing discussions about social order say that a profoundly rule-abiding, albeit egotistic and rational, animal is essential for the production of social order. Evolutionary rationality provides a way out this "homo economical" quandary.

We need not wait for a complete elaboration of the new approach to get further insights into the above implications. We can start by rearranging many already existent results of research and theoretical pieces into a general, overarching pattern. For instance, we already know that macroeconomic models will take a different shape if we assume that individuals maximize differences in status, and that such a change in the framework of modelling will change policy recommendations in a substantial way (e.g., Blinder, 1988). These approaches have already been treated in a systematic way by theories on status preferences (Frank, 1985). There was even a proposal to introduce a new concept of "status rationality" (Krüsselberg, 1989). The pieces thus are at hand for a reconfiguration into a theory of economic policy in terms of evolutionary rationality.

Not all aspects of Hayek's own work accord fully, on issues of social order, with a theory of evolutionary rationality that takes its point of departure from his idea of the mind. Let's look at two aspects related to his concept of the "Great Society," which is supposed to be governed by a set of abstract rules and which is the main precondition for the establishment of individual liberty. As is well known, Hayek argues that the establishment of systems of abstract rules suffers from the constant danger of being undermined by the genetically fixed inclination of humans to act under the shadow of small groups (Hayek, 1989). People are supposed to project the morale of the group onto the politics of the Great Society. Hence they tend to leave abstract principles of justice aside, and adopt the morale of redistribution, which goes back to the possibility of altruism within small groups. Presumably, this view of the possible negative effects of human nature for human liberty in modern societies is one of the implicit reasons that Hayek rejects any kind of biological reductionism. He needs to favor a theory of the autonomy of cultural evolution because only in that case can the Great Society be established as a system which is independent from the phylogenetic history of humankind. We thus have to pose the question of whether this absolute distinction between "society" and "groups" indeed will

be a part of the premises of our theory of evolutionary rationality. I hasten to add that this point is of immense practical importance: for example, many liberal Chinese intellectuals today argue that the attitude of the Chinese towards groups and their psychological set-up needs to be changed before a true market society can be established. Otherwise, reform is expected to fail completely.

Hayek's distinction obviously reiterates the above-mentioned European compartmentalization between "reason" and "emotion"—given that, basically, he links the "emotions" with the "group," and "reason" with the "society," and that, hence, he fears that "redistributive emotions" will disturb the workings of a "reasonable society." But his view of the Great Society seems to contradict his own perspective on the continuity of human evolution, in which a unified principle of group selection works on all levels of the human mind simultaneously. On first sight, this would lead to the reasonable guess that there should be no complete rupture between the evolution of groups and the evolution of society. However, thus far social theory provides but a few steps towards a possible integration of the concept of groups into the theory of the Great Society—the latter meaning, in less idiosyncratic terms, the theory of modern industrial societies organized along the principle of individual liberty. From the perspective of the theory of evolutionary rationality, this problem of the interaction between groups and society mirrors precisely the problem of the culturally specific interaction between affectivity and rationality. In principle, in the terms of a particular human society, both problems should be related to the solutions of the trade-offs between the positive and the negative effects of the human inclination to search for the primordial social organization within groups.

Against Hayek's exclusive stress on the negative effects of human group orientation, we should note the conventional wisdom that spontaneous sanctions against free-rider behavior and other destructive attitudes for social order work more efficiently within small, closely knit groups. An optimal solution of the trade-off between both effects of the human group orientation should therefore result in a Great Society being a rule-governed network of individuals spontaneously organized in primordial and secondary groups (Kliemt, 1985, pp. 103 ff.). In fact, Hayek's own proposals regarding constitutional reform assign a crucial role to small elites of a society which, of course, have to be regarded as a subgroup of the Great Society. Such a delegation of crucial mechanisms of constitutional control onto the level of small groups takes place in many segments of modern societies. For instance, the processes controlling the honesty of research and teaching in universities take place on the level of informal groups; or, to a large extent, business codes of honesty are anchored in group networks, without any substantial interference of the law.

Another aspect of the human group orientation lies in the mitigating effects on the competition for power. If societal-power hierarchies were ordered along only one scale of reference, the overwhelming majority of the members of a society would always consist of the relatively powerless individuals striving to topple the few staying at the apex. This means that were human perception of power indeed focused on the Great Society exclusively, the result would be an extremely unstable state. However, since humans perceive their power differentials within networks of groups, the great variety of individual reference scales act to diminish sources of conflicts within society. There are many positions of power available, because an individual can be powerful in his/her own reference group while powerless in another group—one which is not this individual's reference group.

But this possibly positive role of the human group for social order might be balanced with the pronounced negative effects of status maximization in general which have been scrutinized by the theory of games of difference. Common dilemma of coordination and cooperation become more difficult to resolve when the players of a game want to maximize the differences between their own and the other players' pay-offs. This means that precisely the positive effects of the darker shadow of the future might be outweighed. Furthermore, status-maximization directly interferes with allocative efficiency—for instance, when both parties of a bargaining game reject a bargain on grounds of the failure to agree on a “just price,” namely, a partition of the benefits of the bargain that leaves relative status the same as before. Since efficient solutions include a wide range of points on the contract curve which lead to relative losses (albeit absolute gains) for one party, very often efficiency can be attained only by powerful enforcement of “unjust” contracts.

The fundamental problem of social order, therefore, seems to be how to resolve the trade-off between these countervailing forces inhering in the human group orientation. This is quite different from Hayek's straightforward view of the Great Society, which is seen as simply governed by a set of abstract rules. For instance, social theory raises the problem recurrently of how the public good of enforcing those rules might be provided by political entrepreneurs (Witt, 1989). Within our framework, one could imagine this public good emerging out of the competition for power within a certain group of the society, which, on the other hand, competes with other groups for dominance. This complex, competitive regime interacts with a set of general rules possibly emerging simultaneously, but whether indeed something similar to the Great Society is established will be decided by many contingent forces interacting with each other. A short glance at the emergence of law in European history suffice to give the full illustration of this perspective.

Within the evolutionary approach, one should ask whether the long-term selective process did not lead to another modification of evolutionary rationality that worked in the direction of resolving the trade-offs of human group-orientation. This has to be expected from the application of evolutionary principles, since societies which will be dominated by the negative effects will not survive the competition with other societies which happen to resolve the trade-off in a more positive way. Two proposals can be made, first regarding the internal structure of evolutionary rationality and, in particular, its emotional endowment, and second, about the possible role of social norms.

Given that the negative effects of group-orientation are in part the result of status-maximizing behavior, we should ask whether a certain structure of human emotions might mitigate these effects and, hence, might pave the way for the more positive effects to predominate. The necessary condition is that pay-off differences are not valued highly or that they are evaluated in a more complex way. I want to propose that two human emotions play a crucial role in that regard—namely, envy and the feeling of justice. Within human societies, both emotions are culturally specific in a very pronounced manner, which means that they are related to particular patterns of social interaction and that there are prescribed patterns of expressing those emotions unless social order itself is regarded as disturbed.

Now, envy can be analyzed as a complex way of taking a position towards perceived differences in pay-offs and positions on the social ladder. On the one hand, envy simply mirrors the fact that for human beings differences matter—beyond the state of well-being that one attains from the pay-offs and subjective utility. Envy is thus the emotional counterpart of the formal weighing factor in games of difference. However, envy is also

more complex, in that it contains important ingredients of admiration, submission, even obsequiousness—and, therefore, open acknowledgement of the difference. Sometimes precisely the feeling of the inner urge to behave obsequiously gives rise to envy. However, as long as the social order imbues the envious individual with a certain fear of possibly negative effects of openly destructive action, this mix of emotions actually stabilizes the given differentials in power. In contrast, the feeling of justice is more cognitively founded. In the same way as the perception of power and maximizing behavior is not focused on specific pay-offs but on the whole network of games and interactions in time, we might suppose that humans have the capacity to realize the causal linkage between pay-off differences and the production of public goods, either intended or unintended. In a very general way, humans acknowledge power to be legitimate because they know that power is needed for the establishment of social order. Hence we presume that there is first a tendency to view pay-off differences as “just”; only after there is proof that there is no simultaneous production of public goods do we regard the differences as “unjust.” This is precisely the story in myriads of ancient myths and tales.

The emotional deep-structure of human beings seems to have been selected in a direction in which the trade-off of the group-orientation is resolved positively. This has important implications for the Hayekian approach. For instance, Hayek’s treatment of the “social” seems to be overly superficial. Within the formal and abstract idea of a Great Society, the social might be conceived as a force that ultimately destroys just the foundation of that ideal order. But probably the social has its roots in the requirements of a complex order of human groups in the society. At least the social constitutes the symbolic repertoire needed to provide the emotions of envy and justice with expressive tools, the application of which ultimately stabilizes the networks of competitive groups. Such a view, of course, amounts to reinterpreting the social. For instance, the absolute dimensions or the economic effects of redistribution do not matter; sometimes “only” symbolic effects of that redistribution for the perceived differentials of power within and between different groups of society are significant. This also means that these effects might be attained through very different absolute amounts of direct redistribution, depending on the way that the related formal institutions are worked into the network of groups. Hence, the social will be highly specific to cultures and societies.

In that regard, the second topic mentioned above comes to the fore, namely the question of social norms. There is still an ongoing discussion on why and how norms arise, and social theory apparently still does not provide a convincing explanation aside from taking the norm for granted or even as an explanatory concept on its own, as in traditional sociological approaches (Elster, 1989c). The evolutionary approach offers an almost naive solution: during human phylogeny, a genetic drive to bind oneself to norms will emerge that contributes to the positive solution to the trade-offs of human group orientation. One proof of that presumption is the existence of so-called “norm-preserving aggression” present in all human beings (Eibl-Eibesfeld, 1984, pp. 409 ff.). As mentioned above, current individualistic social theories discover another free-rider-dilemma in the provision of the public good of norm-control and sanctioning (e.g., Coleman, 1990, pp. 270 ff.). This so-called “second-order” dilemma of social order is, again, no problem at all because from the evolutionary perspective groups which were less able to solve this dilemma would have suffered from an underproduction of public goods and, therefore, would have lost the competitive race to other groups. We therefore expect a genetically

encoded drive to norm-preserving and norm-sanctioning behavior to have emerged during human phylogeny. This is just the emotion of "norm-preserving aggression." Thus there is no need to explain social norms as such but only their concrete content. The question of why norms emerge at all is simply an artificial problem resulting from a flawed concept of rationality. Norms will emerge spontaneously by endogenous creation of human action, without any necessary exogenous cause.

Conclusion

I want to stress that the Great Society as an abstract system of norms will be no good beacon to guide political action directed at the establishment of a social order. All of the human aspects of order seem to be disturbances in the mechanism of that great scheme. From the viewpoint of evolutionary rationality, which adopts a basically Hayekian perspective, social order just goes back to these human roots. This means that social order needs to establish a meaningful link with existing social norms and cultural traditions of human groups and networks of groups. That link is a mirror of the cultural specificity of rationality proper. After the breakdown of socialism, this insight is of paramount importance. Socialism was an attempt to establish a social order constructivistically. Now many approaches to the market economy in post-socialist countries suffer from the same flaw, namely a constructivistic approach towards the market (Murrell, 1993). This is by no means a rational approach, since in evolutionary terms any kind of political action needs to refer to the social norms, the cultural heritage, and the historical traditions of the different countries in order to establish a rational social order. That rational social order will not only be different for different societies, but will also change during the political process of establishing social order.

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