The ubiquity of habits and rules

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Under what circumstances is it necessary or convenient for an agent to rely on habits or rules? This paper focuses on the types of decision situation giving rise to their use. Even optimisation requires the deployment of rules, and for this reason mainstream economics cannot legitimately ignore these questions. The argument is that habits and rules are ubiquitous in human activity. In a new taxonomy, seven types of decision situations are considered, classified according to the type of information problem involved. Neither neoclassical nor behavioural economics can provide a complete account of the bases of habits or rules in these cases.

Economists have typically ignored the procedures and rules that are knowingly or unwittingly employed by agents when deciding and acting in the real world. In a highly influential essay Milton Friedman (1953, p. 22) conveniently side-stepped pleas for more realistic analyses of the way in which business people decide and act. He disregarded empirical evidence of the routine-driven nature of business activity with the famous argument:

Let the apparent immediate determinant of business behaviour be anything at all—habitual reaction, random chance, or whatnot. Whenever this determinant happens to lead to behaviour consistent with rational and informed maximization of returns, the business will prosper and acquire resources with which to expand; whenever it does not, the business will tend to lose resources and can be kept in existence only by the addition of resources from outside.

Thus for decades economists have largely ignored the actual processes governing decision and action, presuming that the mysterious forces of 'natural selection' ensure that 'correct predictions' about human behaviour are likely to come from a much more 'economical' account of human behaviour—that of the agent with fixed preference functions, mechanically programmed to maximise some objective function.

The argument that 'natural selection' necessarily leads to the predominance of profit or utility maximisers has been criticised elsewhere and need not be discussed further here (Winter, 1964; Hodgson, 1994). Remarkably, it has been recently demonstrated using computer simulations—using the technique of genetic programming—that in a complex decision environment artificially intelligent agents are likely to generate and apply simple decision-making rules, because of the insurmountable informational difficulties involved.

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in global, optimising behaviour (Dosi et al., 1993). The conclusion of this analysis is that economists cannot reasonably avoid study and analysis of the processes of formation of representations and behavioural rules, and the problem cannot be avoided on the grounds suggested by Friedman years ago.

The central question here is: in what circumstances are agents required to, or likely to use, habits or rules? It is suggested that the need to rely on habits or rules is quite general, even when facing well-defined optimisation problems. The ubiquity of habits and rules locates optimisation as a special case of a broader class of decision problems. This does not necessarily mean that an alternative 'general theory' of human behaviour is possible or desirable; instead it suggests more clearly that a detailed analysis of the evolution of specific habits and rules—including the pecuniary rationality of a market economy—should be instated at the core of economics and social theory. However, the full discussion of the implications of the argument here must be left to another work.

Section 1 examines in detail the possible circumstances in which habits and rules are advantageous for human decision-making or action. Such habits and rules are advantageous in the sense that they help agents to decide, learn or act. Although much of the argument here is based on previous work by other authors, the proposed taxonomy is novel and seemingly exhaustive of all possibilities. A concise exposition of seven types of decision situation is offered, even at the risk of briefly revisiting some familiar points. Note that the taxonomy does not exclude the possibility that the framework of rational optimisation may be applicable to a significant class of decision situations. Instead, the emphasis is put on the reliance of rational behaviour on habits and rules. Even if the domain of applicability of the rational actor paradigm is significant, it is not universal. It is one of seven types of decision situation which are reliant on habits or rules. Section 2 concludes the essay by extending the argument briefly to institutions and making some observations concerning neoclassical, behavioural and institutional economics and their different treatments of the uses of habits and rules. Some final remarks concern the direction of future research.

1. When are habits or rules conveniently deployed?

Habit is defined by Charles Camic (1986, p. 1044) as 'a more or less self-actuating disposition or tendency to engage in a previously adopted or acquired form of action'. Rules are conditional or unconditional patterns of thought or behaviour which can be adopted either consciously or unconsciously by agents. Generally rules have the form: in circumstances $X$, do $Y$. Habits may have a different quality: rule-following may be conscious and deliberative whereas habitual action is characteristically unexamined (Murphy, 1994). Rules do not essentially have a self-actuating or autonomic quality but clearly, by repeated application, a rule can become a habit. Typically it is easier to break a rule than to change a habit, since our awareness of our own habits is often incomplete and they have a self-actuating character because they have become established in subliminal areas of our nervous system. However, habits still have the same general form: in circumstances $X$, action $Y$ follows. Hence for much of the following discussion it is not necessary to address the important distinction between habits and rules. Both apply to situations that, in essential terms, are actually or potentially repetitive and non-unique. Although the qualitative differences between habits and rules are important, they are not central to the preliminary issues that are addressed in this essay.

Clearly some habits or rules are efficacious and others are not. Some rules—such as
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when tragedy strikes, sacrifice a favoured animal to placate the gods—may have no scientific foundation. However, the association of ritual sacrifice with subsequent well-being is consistent with a system of belief, and recourse to the rule is thus explicable in those terms. Cultures can foster enduring explanations and justifications of even the most ill-founded of rules. There are also bad habits. Repeated behaviours may become ingrained even if they are disadvantageous. Nevertheless, if bad habits are common this does not undermine the proposition that recourse to habit is often necessary. On the contrary, humans and other animals have evolved the ability to form habits to deal with elaborate and changing circumstances. The evolved capacity for habituation may produce maladaptations and errors but this does not undermine the fact that habits of some kind are indispensable. For these reasons the efficacy or otherwise of particular habits or rules need not concern us here. The argument is more general, in terms of a pervasive requirement to use rules or form habits as part and parcel of the human condition.

Some habits and rules may be advantageous for a society or group but not for specific individuals, like obeying the orders of an army officer and thereby risking death in battle, or the adult placing him/herself in danger to protect or rescue a child. Explanations of the origin and reproduction of habits and social rules that confer dubious individual benefit may be problematic for a conventional utilitarian framework, but are not the topic of discussion in this paper. The concern here is simply to examine the circumstances in which agents are likely to turn to habits and rules.

Furthermore, we need not address the origins of particular habits or rules themselves, although their genesis and replication is a vital additional issue. In many cases it could be argued that we have habits and we follow rules because of our biological nature. Again, this proposition is not central to the investigation in this paper. The important question of the extent to which habits or rules are biologically grounded is side-stepped, to place emphasis on the issue of the kind of decision or action situation in which it is advantageous to rely upon habits or rules. Seven instances calling for the employment of habits or rules are considered:

1. **Optimisation**: where the choice set is known and it is possible to employ procedures and decision-rules to find an optimum.
2. **Extensiveness**: where the information may be readily accessible and comprehensible but the search for it requires the application of substantial time and other resources.
3. **Complexity**: where there is a gap between the complexity of the decision environment and the analytical and computational capacity of the agent.
4. **Uncertainty**: where crucial information and probabilities in regard to future events are essentially unobtainable.
5. **Cognition**: the general problem of dealing with and interpreting sense data.
6. **Learning**: the general process of acquiring crucial knowledge about the world.
7. **Communication**: the general need to communicate regularly with others.

Note at the outset that not all the above are mutually exclusive and that situations frequently arise involving aspects of more than one. For example, (5) and (6) are closely related. We shall consider each of the seven elements in turn. Furthermore, it should be noted at the outset that these seven types of decision situation are not merely subjective states of mind experienced by the agent. Each decision situation concerns both the

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1 Notable attempts to explain such 'altruistic' or self-sacrificial behaviour include Frank (1988) and the sociobiology of Dawkins (1976) and Wilson (1975).
subjective knowledge and mental capabilities of the agent, on the one hand, and objective characteristics of the decision problem, on the other. This point should become clear in the discussion of the seven types of decision situation below.

1.1 Optimisation

A familiar question of enduring controversy is the extent to which optimising techniques are applicable to decision situations in the real world. Modern neoclassical economics is founded on the assumption that they are.\(^1\) Even if assumptions of perfect information are dropped, it is typically assumed that uncertain or complex decision problems can still be accommodated using probabilistic methods, by assuming that well-defined probability distributions can be attached to key variables. Against this, a number of critics have argued that a significant proportion of decision problems are not amenable to stochastic or other optimisation techniques (Veblen, 1919; Knight, 1921; Keynes, 1936; Hayek, 1948; Simon, 1957; Shackle, 1972). Arguably, optimisation applies to a limited set of static and closed decision contexts. For the purposes of the following discussion, however, the extent to which optimisation can apply to the real world need not be considered at length.

Against the view that the extensive use of habits and rules is incompatible with the picture of rational, optimising 'economic man', Rutherford (1994, pp. 53—4) writes:

The fact that individuals develop and follow rules does not, in and of itself, indicate that they are not behaving rationally. For example, the usual game theoretic discussion of the emergence of social conventions out of the situation of a repeated game is an attempt to explain a social rule in a way compatible with standard notions of rational maximization. Even more obviously, it is perfectly rational for an individual to comply with an existing social or legal norm if the costs of compliance make adherence to the norm his maximizing choice on each and every occasion.

However, the two examples in this quotation refer to rule-compliance rather than rule-driven behaviour. The ‘usual game theoretic discussion’ of the emergence of rules purports to explain rule-compliance on the basis of rational choice and utility maximisation. This explanation involves continuously optimising agents who happen to favour a particular rule from the menu of options available to them. This is not the same thing as being driven by a habit or rule where other options are either non-existent or not considered at all.

Much of the game theoretic literature is concerned primarily with the emergence of rules or the basis of rule-compliance. In contrast, the question raised here is the extent to which the very act of optimising behaviour must intrinsically involve rules of decision and action. We are concerned here first and foremost with rule-driven or rule-following behaviour, rather than processes of rule-generation or instances of rule-compliance.

Vanberg (1988, 1993) suggests that rational choice and rule-following behaviour are incompatible. He argues that it is inherently inconsistent to speak of a ‘rational choice to follow rules’ or a ‘rational choice among rules’. To Vanberg, the essence of following a rule is not to deliberate or calculate in every single case but to some extent to be unresponsive to the changing particularities of each choice situation. This is contrasted

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\(^1\) Neoclassical economics may be conveniently defined as an approach which (1) assumes rational, maximising behaviour by agents with given and stable preference functions, (2) focuses on attained, or movements towards, equilibrium states, and (3) excludes chronic information problems. Although recent developments in economic theory—such as game theory—may push beyond these boundaries, this optimisation paradigm remains dominant in textbook and applied economics.
with the concept of choice, where an individual is deemed free of such 'pre-programmed behavior'.

However, this argument is not entirely convincing. First, the quality of being unresponsive to changing particularities is not an universal feature of rule-following behaviour. As Vromen (1995, p. 81) argues, a distinction can be made between conditional and unconditional rules. Conditional rules discriminate between different environmental conditions and point to different outcomes in different circumstances. Second, the very idea of rational calculation, as elaborated below, must itself depend on computational rules.

What Vanberg ignores is the fact that strict optimisation must necessarily exclude choice. The optimiser of neoclassical economics is essentially a taste-satisfying machine. The outcome is mechanical, determined by given preference functions, relative prices and endowments, and questions of real will or purpose fade away. As Shackle (1972, p. 122) puts it: 'if the world is determinist, then it seems idle to speak of choice'. The observation that strict optimisation is programmed behaviour that essentially denies choice has been made by a number of authors (Buchanan, 1969; Loasby, 1976). If choice means the possibility of acting otherwise then it cannot be predetermined by either preference functions or rules. Vanberg correctly notes the opposition between rule-following and choice but does not see that optimisation also excludes genuinely 'free' choice. Rule-following and optimising behaviours are not necessarily mutually exclusive.

Having cleared that ground we now consider ways in which optimisation may involve the employment of rules. Consider mathematical optimisation problems and their solutions. The procedures of linear programming and differential calculus, for example, all involve methods of optimisation with strict rules. Optimising procedures always involve rules and are rule-governed. These are not essentially the 'rules of the game', but the rules of computation and optimisation itself.

In practice, the human agent cannot be a 'lightning calculator', quickly, effortlessly and inexplicably finding the optimum just as we can readily locate the lowest point of a U-curve in a simple textbook diagram. Even with given and unambiguous information, complex optimisation problems typically involve difficulties not only of specification but of computability (Cutland, 1980). Artificially intelligent systems even in moderately complex environments require 'inherited' framing procedures to structure the incoming information (Cosmides and Tooby, 1994; Pylyshyn, 1987).

Conventional accounts sometimes neglect the universal need for rules of calculation to reach optima. One reason for this is that optimisation is coupled with equilibrium. Statements of equilibrium conditions are not the same thing as the specification of algorithmic or other procedures required to attain equilibria. Yet, often, outcome is confused with process. Another reason for the neglect is the widespread belief that optimisation involves choice and rule-following denies it. On the contrary, as suggested above, optimisation may exclude genuine choice.

Whatever the extent of its application, optimisation must involve rules. This raises the secondary but important question of their origin. Notably, optimisation itself cannot provide a complete explanation of either the origin of rules or the adoption of rule-driven behaviour. As all optimisation involves intrinsic rules, the idea of explaining all rules on the basis of the optimising behaviours of agents involves circular reasoning and is thus misconceived (Field, 1979, 1981, 1984). Hence the question of 'where do the original rules come from?' remains, and it cannot be answered completely in terms of optimisation itself. It is necessary to consider additional explanations of their genesis, at least to supplement
the optimisation story. In search of this ‘first cause’ we are forced to consider explanations other than optimisation for the reliance of the individual upon habits and rules. This primary reliance on habits or rules limits the scope of rational optimisation. This itself must always depend on prior habits or rules as props (Hodgson, 1988). Hence rational optimisation can never supply the complete explanation of human behaviour and institutions that some theorists seem to be striving for.¹ There is thus a limit to the ‘imperialism’ of neoclassical economics. Given that explanation in social science requires more than this powerful idea at its core, it may be surmised that we must rely on more complex, contingent and multifaceted behavioural specifications.²

1.2 Extensiveness
Extensiveness here refers to the problem of dealing with large amounts of information, even when it is potentially understandable, accessible and its location is known. We typically face this problem when we search through a library for information on a given topic. A large mass of information is accessible but the library is so vast that an exhaustive search is impossible. Note that the problem being addressed here is not one of complexity, or of interpretation of the information when it is accessed, although these additional features are often present. It is a problem of the ‘computational limitations’ of the agent only in the narrow sense of dealing with the amount of information available. Practical limitations of time and attention are being addressed here.

The problem here is often conventionally put down to the perceived net ‘cost’ of obtaining further information. Given the expected benefits of the search it does not seem worth using more time and resources in continuing. The ‘cost of information’ problem is now widely discussed, but recognition of it is not new. One of the earliest accounts is in the writings of the neglected American institutional economist John Maurice Clark (1918, p. 25) who wrote: ‘a good hedonist would stop calculating when it seemed likely to involve more trouble than it was worth’. Hence Simon’s concept of satisficing behaviour finds its origin in the work of an ‘old’ institutional economist.

Importantly, there is more to Clark’s analysis than this. Because the searcher for the optimum ‘could not in the nature of the case tell just when this point has been reached …no claim to exactness’ (ibid.) can be made. Thereby the concept of complete optimisation or global rationality is undermined (Winter, 1964, p. 264; Conlisk, 1980). As Pingle (1992, p. 8) writes: ‘The paradoxical difficulty facing the consumer when optimizing is costly is that it is not possible to make an optimal choice and know that the choice made is optimal.’ Both the costs and the benefits of further search are unknown. Thus, even if we were at the optimum we would not be able to know it and recognise it as such.

It is true that agents may attempt to optimise when faced with a problem of extensiveness. If time is regarded as relatively expensive then, typically, the search for further information will be abandoned. But only the expected, not the actual, benefit of further search enters into this calculation. And even if the expectations of costs and benefits were correct, the would-be optimiser could not in principle be aware of this fact.

¹ For instance, note Schotter’s (1981, p. 5) ‘definition of economics as the study of how individual economic agents pursuing their own selfish ends evolve institutions as a means to satisfy them’ (emphasis in original).
² Accordingly, neoclassical economics could be regarded as a special and (highly) restricted case of the ‘old’ institutional economics, which accepted the ubiquity of habits and rules. In contrast to their image as myopic and anti-theoretical data-gatherers, institutionalists have the potential to achieve a higher level of theoretical generality.
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Admittedly, the costs of search may be so great and the expectations of benefits so small that it seems clear that further search is not worthwhile. It may thus be suggested that such cases of extensiveness may be treated as conventional optimisation problems. Leaving aside the leap of faith required in forming expectations in such a case, in general it should be evident that many day-to-day problems of extensiveness do not have such a clear excess of costs over perceived benefits.

The problem of information extensiveness is often restated in terms of the net 'cost of obtaining information', in the mistaken belief that this type of problem can always be restated and accommodated in conventional, optimising terms. However, as noted above, the problem of information extensiveness in fact undermines one of the core precepts of orthodox economics: even if agents attempt to optimise they cannot recognise the optimum. Accordingly, the 'cost of information' idea does not in general reduce the problem of extensiveness to one of conventional optimisation with a full information set.

In an essay on the key behaviouralist concept of 'satisficing', Simon discusses the problem of extensiveness without distinguishing it from the issue of complexity. He thus (Simon, 1987B, p. 244) writes of 'searching for a needle in a haystack', where there are 'needles of varying degrees of sharpness' and the objective is to find a sharp needle. Do we search through the entire haystack to find the sharpest needle or find one that is good enough to sew? Frequently we face equivalent problems of extensiveness in our everyday lives. We know the location of all the local supermarkets, but we have not got the time to visit every one and check the prices of all the items we are likely to buy. Even within a single, typical supermarket there are at least 10,000 different products, and we cannot be expected to examine each item and make a fully informed and optimal choice within our budget constraint (Earl, 1983, p. 65). The problem is not one of complexity but of 'information overload'.

Faced with this kind of problem we frequently employ habits or rules. We visit a particular supermarket because it is familiar and we are in the habit of provisioning our needs from its shelves. Or we invoke implicit rules: do not search through all the books in the library, just those by recognised authors, in a definite subject area and published after a specific date.

Nevertheless, unlike the other six factors considered here, extensiveness may not itself be a sufficient basis for habits or rules. While we frequently use habits and rules in such a context, there is no reason for us always to do so. We could rely on mere whim, such as stopping at a particular supermarket simply because we encounter it on another journey. Although rules and habits are inevitably going to be involved even in capricious behaviour, extensiveness is in fact their weakest grounding. This is despite its frequent appearance in discussions of rule-governed behaviour and of the limits to rationality.

1.3 Complexity

The problems of complexity and extensiveness are conceptually quite different, although many real-world information problems have both these properties. Complexity refers to the density of structural linkages and interactions between the parts of an interdependent system, and is not necessarily or primarily a problem of extensiveness or scale. As noted above, the problem of extensiveness may apply to information in regard to which there is little complexity or analytical difficulty. In contrast, consider a situation where all the required information to make an optimal decision is in our hands but because of the complexity of the problem we are unable to analyse it fully and reach an optimal decision.

The problem of complexity also differs from that of cognition, discussed below. The
problem here is not one of the cognition of the sense data but of analysing and using the information that we already possess. Even after the act of cognition, when the sense data are categorised and interpreted, we are not necessarily in a position to use the information that we have acquired.

It is again important to emphasise that there is much more involved than the ‘cost’ of information here. Some time ago Boulding (1956, p. 84) saw globally rational choice as involving ‘a feat of mathematical agility which would take centuries of experience and enormous electronic calculators to perfect.’ This recognition of computational limitations has, of course, become a central feature of the behaviouralist research programme of Simon (1957, 1976) and his followers.

Heiner (1983) also addresses the agent’s problem of full use of available data. Using empirical support from psychology and elsewhere, Heiner argues that normally there is a gap between the ‘competence’ of an agent and the ‘difficulty’ in selecting the preferred alternatives. Such a ‘C-D gap’ could result from the burden of complex information placed upon the agent in making a decision. Rationality is here ‘bounded’ because the known information is too complex to compute or assess. As pointed out elsewhere (Heiner, 1983, pp. 563–4; Simon, 1976), some of the best preliminary illustrations of this are the game of chess and puzzles such as Rubik’s cube.

There are a very large number of possible initial positions from which to unscramble Rubik’s cube. However, the data required in any attempt to work out the quickest way of doing this are readily available by observing the scrambled patterns on the six faces. A ‘rational maximiser’ with unbounded computational agility could use all this data and find the best way of solving the puzzle. In practice, however, it is too difficult and time-consuming to proceed in this way. Hence cube analysts have developed simple procedures to unscramble the cube (Heiner, 1983, p. 564). These are largely independent of the initial scrambled position and are sub-optimal in that they do not typically unscramble the cube in the minimum number of moves. But from an operational point of view these rules are much more useful than trying to compute and execute the ‘optimal’ solution.

The chessboard, like Rubik’s cube, readily displays all the data required to compute the optimal solution. Chess is thus a game with ‘perfect information’. According to game theory, there is always a strategy which will assure one of the players of a win or a tie. Owing to finite speed and memory, however, even fast modern computers are generally unable to analyse all the options available and quickly derive the optimal solution. Consequently, computer programmers have followed and extended the decision procedures of the human chess expert. A skilled human player routinely memorises a large collection of possible patterns of the pieces, together with procedures for exploiting the relations that appear in these patterns. A computer program for playing chess relies less on pattern recognition, and more on an extended search of the move possibilities, according to more rigid decision rules. However, in both cases, players do not ‘maximise’ by computing the optimal strategy but ‘satisfice’ by finding one that is ‘good enough’.

Rubik’s cube and the chess algorithm provide excellent examples of available data that are imperfectly used. Hence a prevailing interpretation of Simon’s work can be faulted. Baumol and Quandt (1964), Jensen and Meckling (1976, p. 307n) and others argue that all satisficing behaviour is essentially cost-minimising, once the ‘cost of obtaining information’ is taken into account. Clearly, cost-minimising behaviour is just the dual of the standard assumption of maximisation. If ‘satisficing’ was essentially a matter of minimising costs, then it would amount to maximising behaviour of the orthodox type.

However, contrary to this ‘cost-minimising’ misinterpretation, Simon’s concept of
bounded rationality refers primarily to the matter of computational capacity and not to additional 'costs'. Once it is recognised that 'bounded rationality' is essentially about limited computational capacity relative to a complex or extensive decision environment, rather than primarily the scarcity or cost of information, then its indissoluble link with the twin concept of satisficing is evident. The term 'satisficing' is employed by Simon precisely to distance his conception from global rationality and maximising behaviour. As Simon himself has always made clear, the twin concepts of bounded rationality and satisficing both involve a direct attack on the concept of global rationality. Indeed, as Dosi and Egidi (1991, p. 151) show, with changing and uncertain environments 'the very notion of “optimality” becomes an ambiguous theoretical notion'. In open and evolving systems the canonical idea of optimisation under constraint is inapplicable because the constraints, if not the objective functions, are moving and changing. In a complex, open and evolving world the very idea of agents with global rationality is not simply empirically unfounded—it is theoretically misconceived.

With limited computational capacity in the face of complexity, attempts to do the calculations implicit in the standard rational choice model would cripple the decision-maker, leaving many vital decisions unattended. We thus fall back on habits and rules of thumb. In mainstream economics there is inadequate recognition of the complexity of the real world and the relatively limited analytic and computational competence of the human brain. Some decision problems may be tractable, but often we encounter those that are not. It is only in a textbook world that we deal typically with a few factors of production and a well-defined space of decision alternatives. In reality, there is a huge variety of heterogeneous resources, related together in complex ways. Analysis is thwarted by the many-dimensional decision space, the explosive scale of the decision tree and the non-linearity of functional relations. Accordingly, although managers may be able to make use of the methods of operations research to obtain solutions to some optimisation problems, as Teece and Winter argue (1984), most real-world management problems are dynamic, complex and often difficult to structure analytically. They suggest that in these circumstances the neoclassical assumption of transparently rational decision-making in a world of known outcomes or probabilities is of relatively little use.

By wrongly presupposing that all individuals can make optimal decisions in complex environments it is suggested that every individual has an unlimited ability to process complex information, a boundless computational capacity, and the analytical abilities of an advanced mathematician. In fact this assertion is not only problematic, it is also a denial of the principle that resources are generally scarce. Computational capacity and analytical competence are scarce resources too (Pelikan, 1989). We cannot assume unbounded human rationality and universal resource scarcity at the same time.

1.4 Uncertainty
Complexity should not be confused with uncertainty. The latter term appears in mainstream economics texts but with the assumption that agents can attach numerically definite probabilities to events. This is better described as risk and comes within the compass of the optimisation problems discussed above. True uncertainty, in the sense of Knight (1921) or Keynes (1936), applies to situations where the calculation or attribution of a numeric probability is impossible. Arguably, such ignorance makes the attachment even of subjective probabilities implausible. Accordingly, the idea of uncertainty in this radical sense is inconsistent with optimising behaviour. Without a calculus of probability and risk, agents would not be able to locate an optimum.
Subjective probability theorists attempt to tame uncertainty and subsume it under risk, by considering subjective attachments of probability, whether or not such attachments are warranted by the objective situation in the real world. In this way the Bayesian probability calculus is purportedly extended to cover the types of event that are described as uncertain by Keynes and Knight. This attempt cannot be considered in detail here, sufficient to note that there is a significant amount of evidence that agents do not generally make decisions which are consistent with the axioms of this approach (Arrow, 1982; Ellsberg, 1961; Feldman, 1963; Kahneman et al., 1982). The following discussion is defensible insofar as the existence in the real world of a degree of uncertainty in the Keynesian or Knightian sense is accepted.

Consider an example. We are in the possession of a number of shares in a company and their price begins to plunge. We have no clear or reliable information about the reason for the fall. The slide continues relentlessly, so what do we do? Even if we are profoundly uncertain about what is likely to happen, it is reasonable to assume that there is some underlying reason for the share price to fall and to consider selling the shares. Conveniently, as Keynes (1973, p. 114) put it, we often ‘fall back on the judgement of the rest of the world which is perhaps better informed.’ If others sell it may be reasonable for us to follow, on the assumption that they know something that we do not.

Note that this is not primarily a problem of complexity. We are not in possession of clear information, with the primary difficulty being one of tractability and analysis. Neither is it primarily a problem of extensiveness: a problem of dealing with large amounts of information, even when it is potentially understandable and accessible. Instead there is ‘uncertainty—the fact of ignorance and necessity of acting upon opinion rather than knowledge’ (Knight, 1921, p. 268). The concept of uncertainty refers primarily to our lack of knowledge of the future. In contrast to complexity and extensiveness, it is not wholly a problem of analysing or accessing existing information; it is one of dealing with unpredictable future events.

In such situations it is often reasonable either to follow others or to rely on conventions (Keynes, 1973, pp. 114, 124). The habit of doing what we had done before remains efficacious, despite our uncertainty. Regularities of behaviour and conventions become established, by conforming with the current behaviour of others, or by carrying on with the same routines on the assumption that the world will continue as before.¹

Thus uncertainty does not banish rigidity and routine. Instead it is a situation in which rule-governed behaviour can be appropriate, as the simulations carried out by Dosi et al. (1993) suggest. Of course, uncertainty itself does not give rise to these habits and routines: their origin must come from elsewhere. Yet a situation of uncertainty provides the context in which certain habits and routines may prevail. It is in this manner that Knight (1921, p. 271) argued that the existence of institutional arrangements such as the capitalist firm and the wage system were ‘the direct result of the fact of uncertainty’. Nevertheless, it is still necessary to supplement this account with an historical explanation of the origins of particular institutions.

Heiner (1983) sees the origin of ‘predictable behavior’ in ‘uncertainty’. On close inspection, however, Heiner is saying something slightly different from Knight and Keynes. In his paper the term ‘uncertainty’ is not clearly defined, but related—as in the phrase ‘additional uncertainty from a larger C-D gap’ (p. 562)—to the ‘gap between the

¹ For discussions of Keynes’s idea of the emergence of conventions under uncertainty see Littleboy (1990, especially pp. 28–34, 269–71) and Shackle (1972, pp. 220–8). Shackle also highlights the important article on this theme by Townshend (1937).
agent's competence and the difficulty of the decision problem'. Clearly, this is not the same thing as uncertainty in the sense of Knight and Keynes. What Heiner primarily has in mind is the problem of complexity, as defined here.

Furthermore, Heiner's article is centred misleadingly on 'predictable' rather than habitual or rule-governed behaviour. As argued elsewhere (Hodgson, 1988, pp. 289-90), the complete absence of uncertainty and the lack of any gap between competence and difficulty can also give rise to predictable behaviour. With perfect knowledge the rational maximiser will reach and rest at the attainable and predictable maximum. The fast-calculating genius will find the optimal procedure for unscrambling Rubik's cube on every occasion. Even without complexity and uncertainty, predictable outcomes are possible. Instead of 'the origin of predictable behaviour', the focus in this present paper is the bases of habits and rules.

1.5 Cognition
Modern economics has become more and more concerned with 'information problems'. Typically, however, these problems are specified in an overly narrow fashion, emanating from a deficient conception of information or knowledge, based on an empiricist epistemology. The picture is not rectified simply by assuming that 'information' is scarce, or unequally distributed between individuals, or unattainable without cost. The danger is a misconception of the very nature of knowledge and information.

The idea that unambiguous evidence existing 'out there' is a sufficient basis for direct knowledge and understanding of the world is the central proposition of empiricist epistemology. It assumes that we receive information directly from the outside world without a prior framework of conceptions, rules and theories. Information is treated as atomistic 'facts', knowledge of which is seemingly independent of the conceptual frameworks involved. All sense data are thus directly understood and readily transformed into useful knowledge in the form of certainties or probabilities. Essence is dissolved into appearance: we have direct access to the real world. This view is pervasive but it is untenable.

First it is necessary to distinguish between sense data and information. Sense data consist of the multitude of aural, visual and other signals that reach the brain. We have no other contact with the outside world other than through this sense data. However, they do not come packaged with concepts and meanings. Our knowledge of the world does not spring alive from the sensory data as they reach the brain. To derive information it is necessary that a prior conceptual framework is imposed on the jumble of neurological stimuli, involving implicit or explicit assumptions, categories or theories which cannot themselves be derived from the sense data alone. Often the sense data are open to different interpretations, as some simple and celebrated optical illusions demonstrate. The attribution of meaning is not direct or automatic. Sense data, like the proverbial facts, do not speak for themselves. There has to be a process of cognition, to provide a form that is meaningful and has informational content for the agent.

The attribution of meaning to apparently chaotic mass of data requires the use of acquired concepts, symbols, rules and signs. Perception is an act of categorisation, and in general such categories are learned (Bruner, 1973, p. 12). Through processes of development and education we acquire cognitive habits and perceptual frameworks. These are essential for us to gain knowledge of and act within our environment.

If sense data from experience remain seemingly consistent with the existing cognitive schema they are readily accepted. If they are apparently incongruent, either the
information is ignored or the schema is altered to accommodate the incoming information (Whitehead, 1976). Typically, information is interpreted in ways which are consistent with previous conceptions and theories about the world. But because cognitive schema are additional to the sense data themselves, different cognitive frameworks are possible with the same sensory input (Choi, 1994). This gives rise to a persistent problem of ambiguity (March, 1994, p. 9).

All this becomes understandable and relevant once we have abandoned an empiricist epistemology. Because all perception is concept- or theory-bound, the empiricist conception of knowledge is flawed. Even if sense data are available, they cannot be handled or understood without acts of interpretation and cognition. These require conceptual frameworks which are previously inherited or learned but which do not necessarily provide us with a single, reliable view of the truth.

Cognition does not simply involve the sorting and categorisation of data. Because of the confusing disorder of sense data it is often necessary to ignore some bits and highlight others. Cognitive psychology thus provides examples of available data that are imperfectly used, showing that the full use of available data is a rare exception rather than the rule (Spradley, 1972, pp. 9–10). It is typical of human behaviour, even with sophisticated economic agents with the full use of modern information technology, to ignore some of the received sense data. We are required to be selective and treat much of it as ‘noise’. Case studies in politics and international relations suggest that decisions are not made on the basis of all the accessible information, but in regard to the subset of information which is meaningful or acceptable in relation to existing cognitions and choices (Axelrod, 1976; Wohlstetter, 1962).

Cognitive processes are built primarily on habit and tacit knowledge (Polanyi, 1967) rather than on conscious and codifiable rules. With higher levels of education involving codifiable knowledge and rules, the priority of the tacit and uncodifiable remains. This applies to the trained scientist as well as to the casual observer (Kuhn, 1970, pp. 191–8).

Cognitive habits are essential to the process of interaction with the outside world. At the same time, however, because cognition means placing a restrictive interpretation on the data, typically by ignoring much of it, cognition inevitably constrains opportunities as well as enabling the actor to understand his or her environment. We are both liberated and incarcerated by our necessary habits of cognition.

1.6 Learning

Strictly, learning is not separable from cognition. It is treated here as a separate category for expository convenience. Even the cognition of an object of a known type involves learning of the existence of that object. The acquisition of our cognitive habits and perceptual frameworks is necessarily a developmental and learning process. Learning can mean the cognition of additional information or the acquisition of new conceptual frames. Typically, it involves both.

The phenomenon of learning has now made its way into mainstream economic theory but there it is based on an untenable and empiricist conception of knowledge. Learning is thus treated as the mere acquisition and accumulation of information, as if it were a transferable substance ‘out there’. On the contrary, learning involves the continuous reconstruction and reformation of knowledge, involving a changing relationship between the agent and the external environment. It involves cognitive framing and selection of information. It is a process of problem formulation and problem solving, rather than the acquisition and accumulation of given, objective ‘bits’ of information. This process
involves conjecture and error, in which mistakes become opportunities to learn rather than mere random perturbations (Berkson and Wettersten, 1984; Popper, 1972; Rutherford, 1988).

Consider the rational expectations hypothesis. Here it is assumed that agents 'learn' and become aware through experience of the 'true' underlying model of the economy. It is typically presumed that such learning proceeds through observation and some consequent Bayesian updating process of parametric variables. There are several major flaws here. It is mistakenly assumed that the required information is unambiguous and directly amenable to the Bayesian calculus. Information is simply discovered and accumulated, rather than cognitively generated or reformulated (Wible, 1984–85). It is assumed that incorrect perceptions will always be gradually corrected through learning, whereas there is widespread evidence that misperceptions can be lasting or permanent, even when confronted with contrary evidence (Frey, 1992). Evidence from psychology suggests 'that people have neither an intuitive understanding of standard probability concepts nor any innate psychological ability to learn directly through experience to characterize their environments accurately or arrive at optimal problem solutions' (Rutherford, 1988, p. 51).

The internal contradictions in the empiricism implicit in the rational expectations hypothesis become apparent when it is realised that whatever 'learning' takes place, agents are saddled with a given underlying model of the economy, which is usually one involving the quantity theory of money, assumptions of market clearing, and so on (Buiter, 1980; Tobin, 1980). Accordingly, on the one hand it is assumed that agents have boundless powers of 'learning' when it comes to parametric adjustment, but no powers of further enlightenment when it comes to the structural features of the 'true' underlying model. Because these models treat learning as the mere accumulation of information, and knowledge once acquired is presumed to be certain and stable, the problems, conjectures, rules, procedures and concepts involved in the process of learning are ignored. But, as Bianchi (1992) argues, without these issues the concept of learning is empty.

Generally, mainstream economists treat learning as the progressive discovery of pre-existing 'blueprint' information, or Bayesian updating of subjective probability estimates in the light of incoming data (Bray and Kreps, 1987). There are severe problems, however. For instance, as Hey (1981) demonstrates, a process of Bayesian learning in search of an optimum depends upon the assumption of correct prior knowledge. Accordingly, such search models may break down if such an assumption does not apply. Furthermore, as Dosi (1988), Dosi and Egidi (1991), Nelson (1980) and others have argued, the Bayesian approach is a very limited way of conceiving of the role of learning, which in reality is much more than a process of blueprint discovery or statistical correction.

It is not simply the rational expectations hypothesis that is undermined by these arguments. All economic models that suggest that information is transparent and unambiguous or that agents are likely to react in similar ways to the same information can be challenged. For instance, this applies to much work in game theory, as Kreps (1990, p. 111) has noted. The psychological and cultural frameworks through which information is selected and interpreted cannot legitimately be ignored.

Contrary to the empiricist conception of knowledge, much more than the acquisition of facts is involved in learning. Additionally, learning involves cognitive development and the acquisition of practical and intellectual skills. Learning is often prompted by problem situations involving something novel: contrary to our beliefs or expectations. This leads to conjecture and possible error, as we search for alternative solutions and interpretations.
Once a solution is acquired it is nevertheless fallible, provisional and tentative (Berkson and Wettersten, 1984; Gregg, 1974; Laudan, 1977; Popper, 1972).

Typically, successful learning involves the establishment of habits that fix patterns of cognition and behaviour and remove them from full, conscious deliberation. This formation of habits is indispensable for the acquisition of all sorts of practical and intellectual skills. At first, while learning a technique, we must concentrate on every detail of what we are doing. It takes us a great deal of time and effort to learn a new language, or to play a musical instrument, or to type, or to become familiar with a new academic discipline. Eventually, however, intellectual and practical habits emerge. This is the very point at which we regard ourselves as having acquired the skill. When analytical or practical rules are applied without full, conscious reasoning or deliberation then the technique can be said to have been mastered. Again, the concept of tacit knowledge is relevant. Even if codifiable instructions can be helpful, the formation of durable habits and tacit knowledge is unavoidable in these cases.

However, as Koestler (1967, p. 131) points out: ‘There are two sides to this tendency towards the progressive mechanization of skills.’ On the positive side, mechanical habits help us to deal with complexity and information overload, by removing several aspects of action from conscious deliberation. On the negative side, mechanical habits can remove important actions from the due exercise of deliberation and creative skill. This limitation is likely to be more serious with the more complex activities, and especially in a changing environment. While the very rigidity of habits is necessary to fix learning and fasten skills, such rigidity can often be disabling, particularly when faced with a new and complex problem. Despite this, the adoption of habits and rules is essential to the learning process.

1.7 Communication

Communication need not be verbal. In both the animal and the human worlds there are many cases of communication that do not involve language. Signalling is defined as the non-linguistic communication of intents or outcomes by means of regular and established patterns of behaviour. Frank (1988, p. 97) distinguishes usefully between signalling ‘between parties with common goals from those between parties who are potentially in conflict’. An example of the former is the signalling of information from a bridge player to his or her partner by the pattern of card play, according to previously agreed interpretative rules.

Situations of potential conflict often involve the signalling of a precommitment to a given pattern of behaviour or response. Such precommitment problems are discussed extensively in game-theoretic and other approaches to the analysis of rules and institutions. Accordingly, individuals adopt rules such as ‘never give in to blackmailers’ and governments try to establish rules such as ‘never negotiate with terrorists’, in order to indicate to potential blackmailers or terrorists that there will be little or no advantage to their actions. Key issues raised here include the credibility of a threat or response and the establishment of reputations by actors (Frank, 1988; Kreps, 1990, ch. 14; Schelling, 1984).

Precommitment can thus be treated as a case of individual optimisation, but clearly this is not necessarily so. Boundedly rational individuals could also see advantages in signalling to others. Indeed, precommitment may be even more important in situations of complexity or uncertainty. In such circumstances it would still be reasonable to attempt to signal regularities of behaviour. Whether it is optimal or otherwise, as Frank (1988, pp. 96, 102–3) elaborates, signalling behaviour can evolve in the natural world even without
any design or intention by the organisms involved. With no prior deliberation, humans typically make facial expressions or use ‘body language’ suggesting, for example, welcome or repugnance, happiness or fear. Just as rational calculation can give rise to signalling, so too can evolution produce such behaviour in unintended or instinctive form.

What are often underestimated in game-theoretic and other formal models involving signalling behaviour are the problems of cognition and interpretation involved in attributing meaning to the signal and the consequent possible mistakes or ambiguities. An action intended to signal one thing can be interpreted differently. Behavioural rules themselves require rules of interpretation. Thus signalling cannot itself provide a complete explanation of the origin of habits or rules. Signalling must involve an interpretative language. Clearly, there are other cases where a communicative language is employed and to these we now turn.

Our education and socialisation in early years help us to develop our innate perceptual equipment and to form a conceptual basis to understand and interact in a complex and changing world. At least for the socialised adult, most concepts and perceptual frames are expressed in terms of a social language. For this reason, cognition, development and learning are social, and thus have cultural specificity. The acquired conceptual framework reflects our culture and the social norms and rules that we inherit (Lloyd, 1972). The acquisition of knowledge about the world is not simply an individual but a social act (McLeod and Chaffee, 1972).

The old idea that language is primarily a representation of the world is fatally flawed. Language cannot be merely a symbolic vehicle for information. As Gödel’s theorem suggests (Nagel and Newman, 1959; Hofstadter, 1979), there are limits to all language systems and formal representations of our universe. Language cannot completely and consistently represent the world because language is part of the world and it cannot represent itself. This imposes severe limitations on the representation of the world through any symbolic or linguistic system. A wedge is driven between essence and appearance and again the empiricist conception of knowledge is undermined.

Language involves habits and rules; it is a social institution par excellence. It disciplines our behaviour and provides us with a very limited choice of meaningful utterances from the vast array of sounds that could conceivably be vocalised. Yet these very constraints, once likewise adopted by others, enable us to communicate an immense variety of statements and feelings. In part this problem of communication can be treated as a ‘coordination game’, where an infinite number of possible ‘equilibria’ exist concerning the signs and utterances to be associated with a given statement. However, that is not the whole story, as the repertoires of meanings, utterances statements must themselves be explained. What is clear is that over thousands of years, a specific and durable language gradually evolves through social interaction. A very narrow set of possible utterances become established as the code, and is subsequently reinforced through regular usage. It is only through the evolution of such habits and linguistic rules that extensive social communication becomes possible.

2. In conclusion: neoclassicism, behaviouralism, institutionalism

Although optimisation problems have not been excluded from the above analysis, it has been argued that the assumption of optimising behaviour by agents cannot itself give a complete explanation of rule-driven, rule-observing or rule-generating behaviour.
Accordingly, neoclassical economic theory must invoke additional explanations of the origin of habits and rules.

But the problems do not end there. The possibility of optimisation is hemmed in by alternative types of decision situation that seem to exclude such behaviour. Extensiveness involves problems of the very identification of the optimum, complexity undermines the idea of effective optimisation, and uncertainty excludes quantifiable assessment. Furthermore, cognition, learning and communication each expose the limits of the empiricist conception of information and knowledge that permeates neoclassical theory.

Note that the empiricist epistemology which is so fundamental to mainstream economics is the other side of the coin of the assumption of rational, optimising behaviour. Empiricism suggests that individuals are capable of learning and revealing the essential features of the world simply through observation and experience: mistakenly asserting the possibility of discovering causal relations simply through empirical evidence, and denying the social character of cognition, enquiry and learning. The assumption of global rationality assumes that the information set is given to the agent, and is not itself subject to critical problems of cognition, calculation, communication and necessarily selective vision. Rational choice between alternatives requires a fixed, bounded and unambiguous choice set, expressed in terms of certainties or computable probabilities. Hence the deployment of an empiricist conception of knowledge: it vastly reduces the nature and scale of all information problems, and helps the rational optimiser to evaluate the 'given' facts and find the optimum according to given, individual preferences. But the empiricist conception of knowledge is untenable. In order to gain knowledge of the world we require prior clues and cognitive frames that are provided in part through social interaction with others.

Simon's (1957, 1976, 1987A,B) twin concepts of 'bounded rationality' and 'satisficing' apply principally to the problems of extensiveness, complexity and uncertainty. In such circumstances, we are obliged to fall back on rules of thumb instead of global optimisation. The limitations of human knowledge and decision-making capacity thus provide a reason for human reliance on habits and rules. Their repeated use in turn gives rise to organisations and institutions: 'It is only because individual human beings are limited in knowledge, foresight, skill, and time that organizations are useful investments for the achievement of human purpose' (Simon, 1957, p. 199).

However, Simon sees the problematic nature of decision-making as emanating solely from the limitations of the given agent. In contrast, in this paper information problems are classified in terms of a relationship between a specific type of phenomenon and the actor's epistemic and computational abilities. Especially in the cases of cognition, learning and communication discussed above, it is clear that this simultaneously involves relationships between multiple agents and between agents and the decision environment. It is also recognised here that the cognitive, analytic and computational abilities of agents develop through time. This contrasts with Simon's one-sided emphasis on the limitations of the individual agent.

This point dovetails with an earlier criticism of Langlois (1986, p. 236, 1990) who argues that the work of Simon and his followers puts supreme emphasis on the explanation of the behaviour of the single agent, to the neglect of interactions with other agents. In contrast, the prime goal of social science is not to explain individual behaviour but the intended and unintended outcomes of the interacting behaviours of many agents. Rule following is assumed, but there is no adequate analysis of where rules come from. While it is a major improvement on the neoclassical paradigm, the behaviouralist
The ubiquity of habits and rules

approach neglects the social character of individual decision-making and also lacks a theory of the origin and adoption of rules and habits themselves.

In any explanation of the origin, adoption and transmission of habits and rules it is important to avoid the functionalist trap. The beneficial consequences of the adoption of a habit or rule do not themselves explain why individuals adopt the habit or rule. Such an explanation commits the functionalist error of seeing the beneficial functions of a phenomenon as themselves causes for its existence. A principal alternative to functionalism is an evolutionary explanation, in which the advantageous character of a habit or rule in a given environment confers a selective advantage on those adopting it (Veblen, 1899, 1919; Hayek, 1982, 1988; Hodgson, 1993B).

Table 1 summarises the results of the foregoing discussion, with respect to both neoclassical and behaviouralist approaches. What of the 'old' institutionalist alternative? This is discussed in more detail elsewhere (Hodgson, 1988; Rutherford, 1994) and we are confined here to the briefest of remarks.

The 'old' institutionalists founded their approach on the pragmatist philosophy of Charles Sanders Peirce and others. Peirce rejected the Cartesian notion of the supremely rational, calculating agent, to replace it by a conception of agency propelled in part by a bundle of habits and routinised behaviours. For Peirce (1934, pp. 255–6) habit does not merely reinforce belief, the 'essence of belief is the establishment of habit'. Accordingly, as Commons (1934, p. 150) put it, Peirce dissolved the antimonies of rationalism and empiricism at a stroke, making 'Habit and Custom, instead of intellect and sensations, the foundation of all science'. As a result, 'old' institutional economists such as Veblen, Commons and Mitchell rejected the continuously calculating, marginally adjusting agent of neoclassical theory to emphasise inertia and habit instead.1

This does not necessarily mean that all action is driven by habits and rules. Indeed, as Peirce, Veblen and Commons noted, account has to be taken of novelty and creativity as well. Creativity may itself emerge from the clash or combination of rival languages or rules, or it may be essentially undetermined or 'uncaused'. These questions are not raised because an answer is possible here, but to indicate that the ubiquity of habits and rules should not be taken to mean that such factors are excluded. On the contrary, a theoretical focus on habits and rules should include explanations of their origin, evolution, breakdown and replacement.

When they are shared and reinforced within a society or group, individual habits assume the form of socio-economic institutions. In accord with a wider practice in social science, institutionalists define institutions not in terms of the narrow sense of formal organisations, but in the broad sense of socially habituated behaviour: 'a way of thought or action of some prevalence and permanence, which is embedded in the habits of a group or the customs of a people' (Hamilton, 1932, p. 84). In the work of institutional economists the notion of an institution is linked to cultural values and norms. However, Veblen and other institutionalists rebut the assumption that institutions must necessarily serve human needs. Instead, some institutions are often regarded as 'archaic' or 'ceremonial', alongside those of a more functional character.

This paper has established reasons why habits and rules are efficacious for human decision and action. Institutions are grounded on the common social transmission and replication of such habits and rules. Accordingly, many rules and institutions enable

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1 Hayek (1982, Vol. 1, p. 11) writes that: 'Man is as much a rule-following animal as a purpose-seeking one.' On this question, at least, Hayek's theoretical position is close to that of the 'old' institutionalists (Leathers, 1990).
### Table 1. The deployment of habits and rules in neoclassical and behavioural economics

<table>
<thead>
<tr>
<th>Type of problem giving rise to use of habit or rule</th>
<th>Is the explanatory basis of habits or rules accommodated by:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Optimisation</strong></td>
<td>Completely accommodated, by definition: rules for finding an optimum are readily incorporated, habit, if blind, less so. However, the process of acquisition of these rules is not explained, hence insurmountable difficulties with problems of types 5, 6 and 7 below.</td>
</tr>
<tr>
<td><strong>2. Extensiveness</strong></td>
<td>Procedures or rules for finding an optimum are readily incorporated, but only within the limits prescribed by 'bounded rationality'. However, the process of acquisition of these rules is not explained, hence difficulties with problems of types 5, 6 and 7 below.</td>
</tr>
<tr>
<td><strong>3. Complexity</strong></td>
<td>Accommodated on the basis of 'cost of obtaining information' explanations but generally without recognition that the agent cannot ever know that he or she is at the optimum in such circumstances.</td>
</tr>
<tr>
<td><strong>4. Uncertainty</strong></td>
<td>Completely accommodated. Problems of computation and analysis of given information are generally ignored. The rational agent is a 'lightning calculator'.</td>
</tr>
<tr>
<td><strong>5. Cognition</strong></td>
<td>Not accommodated. Problems of computation and analysis of given information are generally ignored. The rational agent is a 'lightning calculator'.</td>
</tr>
<tr>
<td><strong>6. Learning</strong></td>
<td>Completely accommodated. But the recognition of computational and analytic limits implies a rejection of 'cost of information' explanations in such circumstances.</td>
</tr>
<tr>
<td><strong>7. Communication</strong></td>
<td>Completely accommodated. The process of acquisition of these rules is not explained, hence difficulties with problems of types 5, 6 and 7 below.</td>
</tr>
</tbody>
</table>

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The implicit empiricist conception of knowledge involves an interpretation of language merely as a symbolic means of communication of existing information—but not as a means of actually constructing information and meaning—behavioural economics is concerned primarily with the decisions and actions of a given agent.
The ubiquity of habits and rules rather than merely constrain action. Thus it is a major error to regard rules or institutions wholly or principally as impediments or constraints. This point has major implications for economic and social theory, including institutional economics itself, but its further exploration must be the subject of another work.

Where should the analysis go next? In focusing simply on the efficacy and ubiquity of habits and rules many loose ends have been identified. First, for instance, it is necessary to examine the particular origins of those habits and rules. Second, the ways in which new rules and habits are created and displace others have to be addressed. Third, the criteria of efficacy have to be considered, including cases where habits or rules are more useful in some contexts rather than others, or may be advantageous for groups but not for individuals, or vice versa. Fourth, the mechanisms by which habits and rules build up to social routines and institutions have to be analysed, as well as the feedback loop by which institutions help in turn to reinforce particular habits and rules. Unlike the preliminary discussion in this paper, it is likely in further work that the distinguishing features of habits versus rules will become more important and it will thus be necessary to differentiate between them.

The degree of generality obtainable in such a theory is open to question. Unlike neoclassical economics, no single and formal theoretical framework may be possible. However, given the ubiquity of habits and rules and the greater number of decision and action contexts that they cover, it may be possible to develop a set of concepts and theoretical approaches that apply to a richer set of contexts and information problems. Nevertheless, such generalities can only take us so far: detailed historical enquiry and particular analysis of specific institutions is likely to prove irreplaceable.

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