Chapter 3 (final)

BELIEF SYSTEMS, CULTURE, AND COGNITIVE SCIENCE

As soon as we realize that we always have an imperfect grasp of "reality" and frequently have contrasting and conflicting views of the human landscape,we can then begin to get a handle on the process of human change: the beliefs that humans hold determine the choices they make that, in turn, structures the changes in the human landscape. How humans perceive the human landscape, how they learn, and what they learn is the subject of this chapter. I begin with exploring the the mind of the individual as a necessary condition to aggregating beliefs of a whole society.

We begin with the rationality assumption underlying economic (and increasingly other social science) theory. By now there is an immense literature on both the usefulness and the limitations of this behavioral assumption.[1] The substantive rationality assumption of the economist works well in competitive posted-price markets. The chooser need only choose the quantity to buy or sell as the competitive environment so structures the situation that price can effectively be viewed as a parameter and only the quantity need be chosen. If all choices were simple, were made frequently, with substantial and rapid feedback, and involved substantial motivation, then substantive rationality would suffice for all purposes. It would be both a predictive and a descriptive model of equilibrium settings, and learning models based upon it could be used to describe the dynamics out of equilibrium. But as soon as we

[1] See Hogarth, Robin and Reder, Melvin, (eds.) (1987): Rational Choice, Chicago, University of Chicago Press for the proceedings of an interdisciplinary conference held on the subject.

move away from this simple competitive model and the price depends on the behavior of other buyers and sellers the complexity of the decision increases and we need to delve much more deeply into the cognitive process. In particular we must take account of the ubiquitous existence of uncertainty as discussed in the previous chapter. The tendency of economists to carry over the rationality assumption in undiluted form to more complex issues involving uncertainty has been a roadblock to improving our understanding of the human landscape.

The interesting issues that require resolution come from the interaction of human beings in economic, social, and political settings where the players are imperfectly informed and the feedback on their actions is likewise imperfect. It is not that the rationality assumption is "wrong". Rather it is that it does not provide us with a guide to understanding the choices humans make in a variety of crucial contexts that are fundamental to the process of change. In addition to imperfect information and feedback that underlie the ubiquitous character of uncertainty, it fails to deal adequately with the relationship of the mind to the environment. The former point is the subject of chapter 2, but the latter requires amplification. I

. "Every thought is had by a brain. But the flow of thoughts and the adaptive success of reason are now seen to depend on repeated and crucial interactions with external sources. The role of such interactions...is clearly computational and informational: it is to transform inputs, to simplify search, to aid recognition, to prompt associative recall, to offload memory, and so on. ... Brain and world collaborate in ways richer and more clearly driven by computational and informational needs than was previously suspected." (Clark, 1997, pp68-69) The implication for social science theorizing is that much of what passes for rational choice is not so much individual cogitation as the embededness of the thought process in the larger social and institutional context. This leads Satz and Ferejohn (1994) to the

conclusion that "the [traditional] theory of rational choice is most powerful in contexts where choice is limited ."(p.72). The reason is straightforward. "When the external scaffolding of policies, infrastructure and customs is strong and (importantly) is a result of competitive selection, the individual members are, in effect, interchangeable cogs in a larger machine. The larger machine extends way outside the individual, incorporating large-scale social, physical, and even geopolitical structures. And it is the diffused reasoning and behavior of this larger machine that traditional economic theory often succeeds in modeling." (Clark, 1997, p182) In this study we seek to get a better, if imperfect, grasp of the complex interaction between cognitive processes, belief formation and institutions.

II

It would be nice to be able to say that cognitive science has developed far enough to give us an unambiguous guide to the issues posed at the beginning of this chapter. It has not but it has come a long way in a short period of time and provides the promise of dealing ever more authoritatively with the issues in the future.[2]

Let me begin by sketching out with a broad brush the process of human learning as a cognitive process, which in an earlier essay I described as follows: "Learning entails developing a structure by which to interpret the various signals received by the senses. The initial architecture of the structure is genetic, but the subsequent scaffolding is a result of the experiences of the individual--experiences coming from the physical environment and from the socio-cultural linguistic environment. The structure consists of categories---classifications that gradually evolve from earliest childhood to organize our

perceptions and keep track of our memory of analytic results and experiences. Building on these classifications, we form mental models to explain and interpret the environment---typically in ways relevant to some goal. Both the categories and mental models will evolve reflecting the feedback derived from new experiences: feedback that sometimes strengthens our initial categories and models or may lead to modifications---in short learning. Thus the mental models may be continually redefined with new experiences, including contacts with others' ideas."[3]

An evolutionary theory of learning would have the following building blocks according to a perceptive essay on Learning in Evolutionary Environments:[4]

"Cognitive foundations focused on the dynamics of categories and mental models;

Heuristics as quite general processes for decision and learning;

Context-dependence, and, relatedly, social embededness of both interpretative models and decision rules;

Endogeneity of (possibly inconsistent) goals and preferences;

Organizations as behavioral entities in their own right....

Processes of learning, adaptation and discovery apt to (imperfectly) guide representations and behaviors also (or primarily?) in ever changing environments...."

While issues about the cognitive process are far from resolved some variant of a connectionist model is consistent with much of what we have been learning about human reasoning, belief systems, and the structure that humans impose on the human landscape (the subject of chapter 5). Pattern

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[2] See Speaking Minds: Interviews with Twenty Eminent Cognitive Scientists , Baumgartner, Peter and Payre, Sabine, (eds.), (1995) for an excellent summary of the state of the field which highlights disagreements as well as accomplishments.

[3] North (1994), p.362-3. Still the best overall approach to the field is Holland et al (1986).

recognition rather than abstract logical reasoning is at base the way human neural networks appear to operate. "Thinking occurs in terms of synthesized patterns, not logic, and for this reason it may always exceed in its reach syntactical or mechanical relations" (Edelman, p.152). Such an approach is consistent with research on the nature of human learning. Much of learning comes from absorbing and adjusting to subtle events that have an impact on our lives, incrementally modifying our behavior ever so slightly. Implicit knowledge evolves without ever being reasoned out. In fact we are relatively poor at reasoning compared to our ability to understand problems and see solutions. We are good at understanding and comprehending if the issue is sufficiently similar to other events that have happened in our experience. Ideas too far from the norms embodied in our culture cannot easily be incorporated into our culture. Ideas are adopted if and when they share a kind of cohesion that does not take them too far from the norms we possess. Pattern matching is the way we perceive, remember and comprehend. This is the key to our ability to generalize and use analogy. This ability not only makes us good at modeling "reality", but also at constructing theories in the face of real uncertainty.

An experiment undertaken by the psychologist Julian Feldman draws out some of the implications of pattern recognition for theorizing in the face of uncertainty. "Feldman had subjects predict which of two events, the appearance of a '1' symbol or the appearance of a '0' symbol would occur next in a sequence of two hundred trials where the experimenter could control whether 1 or 0 appeared next. ...Feldman found that each subject was quick to spot patterns in the sequence of 1's and 0's and to form hypotheses on the process generating the sequence.... The interesting point is that the sequence of 1's and 0's used was perfectly random. Yet each subject could 'see' patterns to act

[4] Dosi, G., Marengo,L. and Fagiolo, G., (1996) Working Paper Experimental Economics Laboratory, University of Trento GET FINAL CITE

upon, albeit different ones as the experiment progressed."[5] Finding patterns where none exist is consistent with the ubiquitous effort of human beings to have explanations, theories, dogmas to explain the world around them even in the absence of a "scientific " explanation. Indeed it may be a superior survival trait to have any explanation rather than no explanation for the problems we confront.

The process of learning is unique to each individual but a common institutional/educational structure (the subject of chapter 5) will result in shared beliefs and perceptions. A common cultural heritage, therefore, provides a means of reducing the divergent mental models that people in a society possess and constitutes the means for the intergenerational transfer of unifying perceptions.[6]

Before going further I must deal with two still unresolved controversies that bear on the issues in this study. They are 1) the degree to which the genetic architecture of the mind shapes special features of human cognition and 2) the fundamental characteristics of the cognitive process.

III

The first controversy squarely addresses the issue of the degree to which the genetic architecture of the mind, in contrast to environmental conditioning, shapes cultures. Evolutionary psychologists have asserted that the millions of years of hunter/gatherer conditions have resulted in the genetic development of special purpose adaptations of the mind that are responsible for much of our cultural characteristics. "The claim that our only evolved psychological mechanisms are general-purpose and content-free, and that "culture" must therefore supply all the specific content of our minds, is exactly the issue on which evolutionary psychological approaches diverge most sharply from more traditional ones. In our view instead of culture manufacturing the psychology of social exchange de novo, content-

[5] Reported by Brian Arthur in "On Learning and Adaptation in the Economy" (1992).

specific evolved psychologies constitute the building blocks out of which cultures themselves are manufactured"(Tooby and Cosmides in Barkow,Cosmides and Tooby, 1992, p207-8).

On the other hand evolutionary biologists like Stephen J. Gould have maintained that there is a lot of slack in the genetic architecture that provided much more latitude for environmental conditioning. Gould has maintained not only that the selection environment changes but that in many cases it is relatively "loose" resulting in survivals in which chance and breeding capabilities rather than competitive pressures may play a major role.

At issue is the adaptability of the human mind. The evolutionary psychologist would have much of cooperative human behavior genetically determined and some recent empirical research by experimental economists lends some support to this argument. In a recent paper Elizabeth Hoffman, Kevin McCabe, and Vernon Smith summarize a large number of experimental game results as follows:

> "...people invoke reward/punishment strategies in a wide variety of small group interactive contexts. These strategies are generally inconsistent with, but more profitable than, the noncooperative strategies predicted by game theory. There is, however, consistency with the game theoretic folk theorem which asserts that repetition favors cooperation, although we observe a substantial use of reward/punishment strategies and some achievement of cooperative outcomes in single play games.
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> Non-cooperative outcomes are favored, however, where it is very costly to coordinate a cooperative outcome, in large groups, and even in smaller groups under private information. In large groups interacting through markets using property rights and a medium of exchange, and

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[6] For a further discussion of the unifying role of a common cultural heritage see Arthur Denzau and Douglass North, "Shared Mental Models: Ideologies and Institutions", Kyklos, Vol. 47, Pages 3-31, (1994)

with dispersed private information, non-cooperative interaction supports the achievement of socially desirable outcomes. Experimental studies have long supported this fundamental theorem of markets. This theorem does not generally fail, however, in small group interactions because people modify their strict self-interest behavior, using reward/punishment strategies that enable some approximation of surplus maximizing outcomes. Seen in the light of evolutionary psychology, such behavior is not a puzzle, but a natural product of our mental evolution and social adaptation." [7]

The evolutionary psychologist's argument is not new. It is a continuation (if with some additional interesting empirical research) of the arguments of sociobiologists such as Edward Wilson who has restated his position with elegance in a recent study arguing for a unified approach to knowledge built on the physical sciences.[8] Certainly no one would quarrel with his central thesis that "Behavior is guided by epigenetic rules" (Wilson, 1998, p. 193) where "Epigenesis, originally a biological concept, means the development of an organism under the joint influence of heredity and environment" (Wilson, 1998, p.193). But for the social scientist attempting to account for the enormous diversity in the human condition both historically and in the contemporary world, such features as the universal taboo against incest, the innate language capability of humans, and even the propensity for cooperative behavior--all viewed as genetic features by Wilson, Chomsky and Pinker[9], and by Tooby and Cosmides--while important building blocks in epignenesis take us only a short, if significant, distance in understanding the human condition and the process of change. I believe the most important contribution of the evolutionary

[7] "Behavioral Foundations of Reciprocity: Experimental Economics and Evolutionary Psychology" Economic Inquiry, v. 36, # 3, July 1998 GET PAGE #
[8] Consilience, New York: Alfred Knopf, 1998
[9] Chomsky, N., 1975, Reflections on Language, New York: Parthenon Press, and Pinker, S., 1994, The Language Instinct: How the Mind Creates Language, New York: William Morrow.

psychologist is in explicating the underlying inference structure of the mind that appears to account for the predisposition of the mind to entertain and construct "non-rational" beliefs such as supernatural explanations and religions that underlie so much of the decision framework of individuals in societies.[10] The immense variation, however, in the performance characteristics of political/economic units over time makes clear that the Lamarkian characteristics of culture must also be central to understanding of the process. The exact mixture between the genetic predispositions and the cultural imperatives is far from resolved, however, and represents an important frontier for further research

IV

How does the mind work? Does it work like a computer? What are the basic "operating mechanisms" of the mind and how are they accomplished by the brain? The early work in artificial intelligence built on the computer analogy; more recent work built around a parallel distributed processing model, while still influenced by the computer analogy, has gone off in a different direction. I have stated above that some variant on a connectionist model appears to be most consistent with our understanding of the way the mind works. At issue is how knowledge is stored and retrieved. The artificial intelligence approach operates under the assumption that knowledge is stored and retrieved in memory like data in computer storage. Connectionist theory, in contrast, would not simulate cognitive processes by means of symbols and symbolic manipulation as in the artificial intelligence model but rather would simulate the process taking place in neural systems in the brain. The resultant artificial neural networks are, at best, crude models of the very complex structure of the brain but suggest a very

[10] See Boyer, Pascal, Religion Explained for an invaluable discussion

different way of storing and retrieving knowledge although Paul Smolensky suggests that the two approaches are compatible.[11]

The contrast between the classic and the connectionist approach leads us to the mechanisms by which the mind and intelligence systems operate. Do the cognitive processes entail the use, manipulation, and storage of internal representations? " Since cognitive processes are assumed to be computational processes, explaining how an intelligent system works requires some computational framework. The link between computationalism and representationalism appears to be direct, for without a medium of internal representations, computational systems could not compute."[12] But in a connectionist framework the networks could learn the value of the weights to be assigned by an inductive process. This process would, by trial and error, arrive at weights which connectionist theorists have simulated by a number of learning algorithms." In effect a neurally-inspired computer "network" learns to recognize patterns by adjusting local thresholds of activation on a wide range of individual computational units each of them quite stupid. The idea is that although individual units are stupid, the overall network can be quite smart."[13] Merlin Donald summarizes our state of understanding of connectionist models very well as follows: "The reason connectionist models are attractive is that they try to model the brain and mind with a non-symbolic (sometimes called a non-representational) strategy. Like a primitive nervous system, a connectionist network constructs its own perceptual version of the world, without relying on a symbolic system given to it by a human operator. Such models are very rudimentary at present, but in principle they could be made much more powerful." (1991, p. 366).

[11] The issues are far from resolved. Excellent discussions are contained in Bechtel and Graham, eds. 1998. In particular see the essay by Robert Mccauley, "Levels of Explanation and Cognitive Architecture".
[12] Robert S. Stufflebeam, "Representation and Computation", p. 640, in Bechtel and Graham, eds. 1998.
[13] Mark Turner, from Cognitive Dimensions of Social Science. , Oxford, The University Press, 2001, p.138

If the latter is a correct understanding of the mechanism it has important implications for the process of learning. Connectionist models learn by example and "use the statistics of those examples to drive learning. The attraction of the approach is that although learning is statistically driven, the outcome of the learning process is a system whose knowledge is generalizable to novel instances".[14] But the generalizability of knowledge leads us to a further critical issue. It is one thing to be able to account for innate predispositions (such as Chomsky on grammar or classical AI models) as sources of learning and to further attribute learning to interaction between the physical and socio-cultural/linguistic environment, but how does the mind enrich itself from within by exploiting the knowledge that it has already represented? Clark and Karmiloff-Smith (1993) argue that the mind appears to order and reorder the mental models from their special purpose origins to successively more abstract form so that they become available to process other information. The capacity to generalize from the particular to the general and to use analogy is a part of what they term representational redescription and underlies not only creative thinking but belief systems generally. But exactly how representational redescription works is a matter of some controversy as subsequent comments on the Clark and Karmiloff-Smith article demonstrated (see Commentary on Karmiloff-Smith, "Beyond Modularity", Behavioral and Brain Sciences, 1994, 17, 693-745).

When we jump from the mind to the brain, a necessary step for further understanding, we encounter still further only partially understood puzzles. While new techniques for brain imaging (neuroimaging techniques) have increased our understanding (and added a few new puzzles) of the

[14] Jeffrey Elman, "Connectionism and Artificial Life" , p. 496, in Bechtel and Graham, eds. 1998.

operation of neural networks in mental processes, there is still much that is not understood. [15] In fact, it is only quite recently that brain and mind scientists have come together to enrich their understanding. For example neurons in the brain are separated by synapses and communication across synapses is mediated by chemicals. "These have been shown to be critical to normal cognition , but a detailed understanding of how they figure in cognition remains to be developed."[16]

But enough on unresolved issues. Let us see what we can do with the tools and understanding that we possess.

V

The place to begin to build an integrated approach to the issues of this chapter is with an acknowledgement of Friedrich Hayek, whose book The Sensory Order (1952) pioneered in developing an understanding of the process of learning and the formation of beliefs long before cognitive scientists had developed connectionist theory. For Hayek beliefs are a construction of the mind as interpreted by the senses. We do not reproduce reality; rather we construct systems of classifications to interpret the external environment. "Perception is thus always an interpretation, the placing of something into one or several classes of objects... The qualities which we attribute to the experienced objects are strictly speaking not properties of that object at all, but a set of relationships by which our nervous system

[15] For a thoughtful and imaginative exploration of the interplay between brain and mind and its implications for consciousness see Antonio Damasio, The Feeling of What Happens, New York: Harcourt, Brace, 1999. Gerald Edelman's, Bright Air, Bright Fire is an impressive, and controversial, attempt to integrate an evolutionary theory of the brain (which he calls neural Darwinism) with a theory of consciousness. I shall build on their studies in the next chapter.

[16] Bechtel, William, Abrahamsen, Adele , and Graham, George, "The Life of Cognitive Science", p.95, in Bechtel and Graham, eds. 1998.

classifies them or, to put it differently, all we know about the world is of the nature of theories and all experience can do is to change those theories."[17]

For Hayek the mind is inseparably connected with the environment. "...the apparatus by means of which we learn about the external world is itself the product of a kind of experience. It is shaped by the conditions prevailing in the environment in which we live, and it represents a kind of generic reproduction of the relations between the elements of this environment which we have experienced in the past; and we interpret any new event in the environment in the light of that experience."[18] It follows that the experiences that have shaped the mental classifications in the mind can and frequently will lead to misinterpretations of the problems confronting the individual. "...the classification of the stimuli performed by our senses will be based on a system of acquired connections which reproduce, in a partial and imperfect manner, relations existing between the corresponding physical stimuli. The 'model' of the physical world which is thus formed will give only a very distorted reproduction of the relationships existing in that world; and the classification of these events by our senses will often prove to be false, that is, give rise to expectations that will not be born out by events."[19]

Hayek's views have an amazingly modern resonance in recent work in cognitive science. I begin by citing a recent study by Edwin Hutchins entitled Cognition in the Wild.[20] He argues that we cannot adequately understand cognition without accounting for the fact that "culture, context, and history...are fundamental aspects of human cognition and cannot be comfortably integrated into a perspective that priviledges abstract properties of isolated individual minds."(p.354) The basic task is

[17] Hayek, The Sensory Order, p. 143
[18] Ibid, p. 165.
[19] Ibid, p. 145.
[20] Cambridge: MIT Press, 1995. This section draws from an essay by Knight, J. and North, D. entitled "Explaining economic Change: The Interplay between Cognition and Institutions", Legal Theory, 1997

one of "locating cognitive activity in context, where context is not a fixed set of surrounding conditions but a wider dynamical process of which the cognition of the individual is only a part." (xiii) By doing so we can "show that human cognition is not just influenced by culture and society, but that it is in a very fundamental sense a cultural and social process." (xiv)

The fundamental building blocks of a culture begins with language whose categories and vocabulary reflect the cumulative experience of a society. Merlin Donald in an essay on "Hominid Enculturation and Cognitive Evolution" asserts that "Other species start at basically the same level with each new generation; not so humans. Semantic content and even the cultural algorithms that support certain kinds of thinking can accumulate, and the symbolic environment can affect the way individual brains deploy their resources. The process of enculturation must have started very slowly, presumably with very gradual increments to a primate knowledge-base, but has evidently accelerated in an exponential manner in the modern period." (Donald, 1991 p.12). Donald proposes successive stages in the evolution of primate/hominid culture using a cognitive criterion for classification. The first stage, labeled Episodic, characterizes primates. Apes are intelligent (as an immense amount of recent empirical research attests) but have a limited range of expressive outputs. This limitation must initially have been overcome by an increase in motor skills which he labels the Mimetic stage. "A second hominid cognitive transition led from mimetic culture to speech and a fully-developed oral-mythic culture. This emerged over the past several hundred thousand years culminating in the speciation of modern Homo Sapiens. Oral culture is a specialized adaptation that complements but does not replace the functions served by mimetic culture"(Donald, p.14). He labels this stage Mythic because it is characterized by a shared narrative tradition with language becoming a universal trait. It is the possession of developed language that sets humans apart and underlies the dynamics of cultural change.

The final, Theoretic, stage of symbolically-literate societies "has been marked by a long, and culturally cumulative, history of visuosymbolic invention" (Donald, p. 15). Symbolic invention did not trigger new innate mental capacities. "Rather, the new representational possibilities emerged from a developed symbiosis with the external symbolic environment, the basis for a particularly radical form of enculturation" (Donald, p.15). It is this last development that provides the foundation for the modern dynamic interplay between the mind and its external environment. It is worth quoting Donald at some length on the implications of a "theoretic" culture: "Theoretic culture is the realm of the professional and the theoretician, and its institutional structure depends on high levels of symbolic literacy, which, in its broadest definition, includes all the mental skills that are relevant to the effective use of symbolic systems. Theories emerge from pursuing the algorithms stored in these disciplines. Once developed, they are usually preserved in permanent form in various external memory media, such as legal codices. Theoretic culture is a large subsection of the larger culture. It engages many thousands of individuals whose lives are lived in its service. It includes many theoretic domains, including management, political and legal systems, and other specializations. These domains share the principle that, whatever their area of expertise, theories rule." (Donald, 2000, p.4)

Theoretic culture underlies Hutchins's vision of the culture of a society as encompassing a computational system of continuous interaction between mind and external structure. He illustrates this view by a lengthy account of navigating a ship into San Pedro harbor:

"The basic computations of navigation could be characterized at the computational, representational/algorithmic, and implementational levels entirely in terms of observable representations. On this view of cognitive systems, communication among the actors is seen as a process internal to the cognitive system. Computational media, such as diagrams and charts, are seen as representations

internal to the system, and the computations carried out upon them are more processes internal to the system. Because the cognitive activity is distributed across a social network, many of these internal processes and internal communications are directly observable."(128-9)

On this view "the proper unit of analysis for talking about cognitive change includes the socio-material environment of thinking. Learning is adaptive reorganization in a complex system." (p.289) For Hutchins, like Hayek, culture is an adaptive process that accumulates partial solutions to frequently encountered problems of the past. Such an approach highlights the important cognitive role of social institutions. The enhanced specification of how individual beliefs interrelate with social context provides a set of mechanisms by which culture and social institutions enter more directly into explanations of economic change.

When we move from Hutchins' dynamic social group embodied in a navigation team to the larger implications for the structure, functioning and process of change for a whole society we can see that the cultural heritage provides the artifactual structure--beliefs, institutions, tools, instruments, technology--which not only plays an essential role in shaping the immediate choices of players in a society but also provides us with clues to the dynamic success or failure of societies through time. In essence, the richer the artifactual structure, the greater the reduction of uncertainty in making choices at a moment of time. Over time. the richer the cultural context in terms of providing multiple experimentation and creative competition. the more likely the successful survival of the society. These generalizations require careful elaboration and qualification, but they are the foundation of this study.

The richer the artifactual structure the wider the range of routine decisions that can be made. In effect the game has been structured to relieve the individual of uncertainty in choice making. In contrast, an environment in disorder is one in which routines have been disrupted and uncertainty increased.

Modern western societies like the United States embody a rich cultural heritage which has led to the immensely complex artifactual structure that not only gives us command over nature in an unparalleled fashion but equally extends our range of "easy" decision making over space and time in ways that would be beyond the comprehension of our ancestors. In effect this artifactual structure has converted uncertainty into certainty or at least risk over an ever wider domain of human activity.

But if humans have extended their grasp over their environment they have done so by continually reaching out into the unknown; sometimes they are successful thereby widening the horizons of human control, and sometimes they fail and arrested development, decline or human demise is the consequence. We seek to understand in this study the conditions that can increase the likelihood of human success when confronting novel situations.

Antonio Damasio elegantly states the implications of the neurobiological foundations of the self that underlies cognition in the conclusion of his study The Feeling of What Happens as follows: "The drama of the human condition comes solely from consciousness. Of course consciousness and its revelations allow us to create a better life for self and others, but the price we pay for that better life is high. It is not just the price of knowing risk, danger, and pain. Worse even: it is the price of knowing what pleasure is and knowing when it is missing or unattainable.

"The drama of the human condition thus comes from consciousness because it concerns knowledge obtained in a bargain that none of us struck: the cost of a better existence is the loss of innocence about that very existence. The feeling of what happens is the answer to a question we never asked, and it is also the coin in a Faustian bargain that we could never have negotiated. Nature did it for us. "(p. 316)

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