6

Cognition

E. Thomas Lawson

Cognition is the set of processes by which we come to know the world. Cognitive science is the set of disciplines which investigate these processes and propose explanatory theories about them. Such theories display considerable variation depending upon whether they assume *classical* or *connectionist* forms, but both types of theorizing assume some form of *computational* account of cognition.

Computational accounts of the mind / brain employ the analogy of the computer to describe cognitive processes and products (Thagard 1996, 1998). They assume that we can model our cognitive processes and specify the products that these processes generate much like we specify mathematical operations. *Classical* computational theories employ rules to describe the conceptual operations of the mind without regard to their mode of implementation in the brain. Many classical theories argue that human beings possess innate mechanisms acquired via evolution and which require only environmental cues to trigger their operation. For example the dominant theory in linguistics argues that human beings come equipped with a universal grammar which constrains the construction of particular grammars. According to this approach, children acquire a language easily, efficiently and quickly because they are biologically equipped to do so. Classical theorists describe the process of acquiring a language by employing formal principles that account for why some forms of culture are readily assimilated whereas other forms are very difficult to acquire. *Connectionist* theories attempt to take into consideration, and, in fact, to model the mind / brain's processes by devising networks that in very limited ways simulate these processes in order to show how the mind/brain can rapidly acquire knowledge by exposure to aspects of the environment. Connectionist theories emphasize the plasticity of the mind/brain, and while not denying that human beings are born with certain predispositions, for example, the ability to acquire a language, nevertheless

argue that the evidence from developmental psychology shows that experience plays a fundamental role in the acquisition of the various forms of knowledge. Connectionists also employ computational principles to describe how such networks work (Bechtel 1991; Elman et al. 1996). Both approaches focus upon the acquisition of knowledge, but whereas classical theorists emphasize the *speed* of acquisition connectionists point to the processes of cognitive *development*.

Such approaches give rise to questions about the primary focus of the inquiry. One of the key issues in cognitive science involves the kind of knowledge, if any, that newborn infants possess or with which they come equipped. The facts of the situation seem reasonably clear. From the moment of birth, every infant is faced with the problem of appropriating the information provided by the world by engaging in the processes of interpretation and explanation. In the case of human beings, parents or their surrogates are typically available to nurture and instruct the child, but the world into which all of us are born is a very complicated place and consists of more than parents. From the child's point of view, the behavior of the parents, and all the other things in the environment requires as much interpretation and explanation as all of the other things and events that the child encounters. Who can deny that from the moment of birth infants are surrounded by massive amounts of information; sounds, colors, shapes, movements, people, physical and artificial objects, and events come and go with reckless abandon? This is the world that William James (1902) described as a booming, buzzing confusion.

Presented with such a world, infants have to be capable of acquiring a great deal of information rapidly and systematically. There are faces to recognize, languages to learn, foods to like or dislike, sounds to interpret, values to acquire and so on. Although some animals are ready to hit the ground running, it takes humans a little longer to get going. Nevertheless, as we examine the complex properties of the information that young children need to acquire in order to survive, we begin to realize that they acquire these various forms of knowledge with astonishing speed. At an early age, all things being equal, all children have already developed a significant command of their native language.

Because of the rapidity with which such knowledge is acquired, psychologists and other social and behavioral scientists have focused upon the issue of what is given by nature and what is acquired through nurture. Except for the behaviorists, most psychologists, and some social scientists now agree that the minds of infants are not Lockean blank slates; they appear, rather, to be predisposed to acquire certain kinds of information with ease and others with great difficulty. For example, as we have already seen, language comes easily and calculus is acquired only after strenuous effort. Learning how to talk one's native language requires very little instruction. By the age of five a mature grammar is in place. This fact has led some cognitive scientists to

develop theories about the constraints on the acquisition of various forms of knowledge. Whereas the empiricist tradition has placed a great deal of emphasis upon instruction, socialization and experience as the primary means of acquiring knowledge, cognitive science has placed much more emphasis on the non-cultural foundations of knowledge: a complex interaction between the environment and innate predispositions. In fact this has led to considerable investigations into the plasticity of the human mind / brain in order to attempt to separate the cognitive equipment that is in place from that which requires development.

The tendency in cognitive science, in order to deal with this problem of the initial conditions necessary for the acquisition of knowledge, has been to conceive of the mind / brain in modular terms. This means that the mind / brain is not conceived of as a general all-purpose mechanism for the acquisition of knowledge, but consists of a set of autonomous mechanisms each designed to acquire specific kinds of information. One of the reasons for adopting a modular approach is precisely that while some forms of knowledge come easily others do not. Those who postulate one mechanism for the acquisition of all forms of knowledge would have a difficult time accounting for differential learning. Jerry Fodor (1983), working in the classical tradition, has been a key figure in arguing for the mind/brain's modular organization. Fodor argues that modules are domain specific (that is to say, they respond only to information from a specific domain, for example, face recognition). One of the issues which divide connectionists and classical theorists is whether the mind / brain is modular to begin with, requiring only triggering events in the environment in order for specific competencies to develop, such as the acquisition of a language, or whether the modules are the *consequence* of cognitive development leading to domain specific forms of knowledge. The facts at present support both interpretations.

No one denies, of course, that the cross-cultural research engaged in by linguists, anthropologists and scholars of comparative religion has as its consequence the recognition of the considerable variation in the contents of knowledge that exists from individual to individual and from culture to culture. Languages, religions, political, economic and moral systems differ in significant ways geographically and historically. In fact this variation has led to the dogma of cultural and even conceptual relativism among students of culture. But while, for example, the linguistic forms and modes of expression differ profoundly from culture to culture, the science of linguistics has been remarkably successful in demonstrating that the grammars of particular languages are constrained by universal grammar. Their obvious diversity has been shown to possess an underlying unity.

Classical cognitivists have focused upon the rule-governed nature of the acquisition of at least some forms of knowledge and developed theories emphasizing the principles that aid in such acquisition and parameters that are

necessary to specify the particular forms acquired. Connectionists, on the other hand, have called our attention to the ability of neural networks to recognize patterns, to be trained by presenting them with a large number of examples, and then to recognize novel instances on the basis of such training. In this view knowledge of the world *becomes* modular rather than commencing as modular, at least in the case of language. But in both cases computational methods are employed to demonstrate that there are constraints on the acquisition of forms of knowledge.

As we have said at the beginning of this essay, computational approaches to describing the mind/brain employ the analogy of the computer. Just as a computer processes information according to a set of principles, so the human mind engages in the act of computation when it processes input provided by the senses. What distinguishes such a computational approach from behaviorism is the willingness of cognitive scientists to propose that an understanding of the mind/brain requires the postulation of theoretical (unobservable) entities. Such postulation, characteristic of the natural sciences, permits cognitive scientists to theorize about the internal processes involved in such processing from a number of perspectives (Thagard 1996).

The underlying unity that characterizes human mental processes is apparent not only in the universal principles that linguists have identified, but also in the categories that human beings employ in their on-line reasoning about the world. Cognitive scientists have thus also focused upon *category formation*. This is particularly the case when we study the *intuitive ontologies* that people employ (Boyer 1994). An intuitive ontology is an implicit theory of the kinds of things that there are in the world. (I say "implicit" because one can employ such a categoreal scheme without being aware that one is using it.) According to many cognitive scientists everyone employs an intuitive ontology of some sort in their conceptual traffic with the world. Some cognitive anthropologists (see, for example, Boyer) argue that people the world over employ the same sets of categories in their everyday traffic with the world. For example, all human beings distinguish between inanimate and animate things, and, more specifically between persons, animals, plants, artificial objects and physical objects. And they have the same basic expectations about the world based upon such an intuitive ontology. A case in point: no one thinks that a solid object can pass through another solid object except under very special conditions. People do not try to walk through walls. People also, unless they are engaged in metaphorical thought, avoid predicate spanning. Predicate spanning means applying predicates appropriate to one categoreal domain to another. Even very young children when told that an object of a certain kind sleeps know automatically that such an object cannot be made of metal. Or that an object made of metal cannot sleep. Our basic expectations or assumptions that we employ when thinking about physical objects made of metal would not be regarded as applicable to human beings or animals. In fact to say that the

teakettle is sleeping is automatically regarded as a non-standard mode of discourse. People know the difference between the literal and the metaphorical.

Some students of religion have paid attention to the findings of cognitive science and have begun to theorize about how religious ideas are structured, acquired, retained and transmitted and how such ideas are related to our common-sense notions. Rather than assuming that religious ideas require special mental operations radically distinct from all other cognitive processes, students of religion operating from within a cognitive perspective have suggested that our ordinary, garden-variety cognitive equipment provides sufficient representational resources to account for their structure, acquisition, retention and transmission. In other words, *whatever it takes to explain how minds work generally will be sufficient to explain how religious minds work* (Lawson and McCauley 1990). Not surprisingly perhaps, this has proven to be a controversial idea because some scholars of comparative religion have claimed that the study of religion constitutes an autonomous level of analysis which is neither related to, nor reducible to any other level. According to these "autonomists," religion is *sui generis* and requires special and unique methods for its explication not available in the other disciplines. Some go so far as to argue that scientific theorizing in general makes little if any contribution to our understanding of what they consider to be specifically religious ideas and practices. Obviously such an approach makes science irrelevant for developing an explanatory understanding of religious thought and practices.

The study of religion from a cognitive perspective is actually a relatively recent affair and a new form of the "science of religion." One reason for this is that the study of religion has been largely an activity in the context of the humanities which values interpretive rather than explanatory approaches to the subject matter of religion. According to this hermeneutic approach, proposing a reading of a text (and by extension the "reading of a culture") requires only the expertise acquired from literary analysis plus the historical and philological knowledge that accompanies it. (Although some would insist upon having a religious experience as a necessary condition for understanding religion.) But even when scientific theorizing is taken into consideration the focus of such research, that is, the theoretical object of study, has either been on unusual and extraordinary experiences or on processes of socialization. Much of the work on religion in psychology, for example, has focused upon unique religious experiences, such as trances, ecstatic states or mystical episodes rather upon widespread religious ideas and the practices they inform. To the extent that the mind is even an issue, the major search in this tradition of scholarship has been for neurological correlates for religious experience. Such work stands squarely in the tradition of William James who, in his *Varieties of Religious Experience* (1902), treated such extraordinary experiences as paradigmatic of religion.

In the social sciences the work on religion has either been of the hermeneutic variety, thus echoing the concerns of the humanities, or has focused upon the

processes of socialization (i.e., instruction and indoctrination) or has focused not upon the *structure* of religion and upon the constraints upon the acquisition and transmission of religious ideas, but upon the social *functions* of religion. Of particular interest has been the question of how religion fulfills psychological and social needs such as personal and social integration. Such approaches, unfortunately, have presupposed very simplistic theories of the mind as the conduit for the transmission of information and the functions such information serves, without paying much attention to the mind's architecture.

The first cognitive scientist to pay attention to religion was Dan Sperber (1975) who analyzed religious symbolism in the context of a general theory of the acquisition of knowledge. Sperber not only provided a critique of semiotic approaches to religious symbolism, but also argued for the importance of studying the inferential processes tacitly employed in religious modes of thought. Semiotics is the science of signs. In his critique of semiotics Sperber showed that the interpretation of symbolism was an extension rather than an explication of the symbolic process. His challenge was to rethink symbolism in such a way that it could lead to the development of an explanatory understanding of the epidemiology of religious representations. In such an epidemiological approach the issue involves the principles and processes by which some religious ideas are selected for transmission and others simply wither away. Sperber showed how some ideas achieve a remarkable stability and nearly everyone in a particular cultural context acquires them, whereas other ideas are entertained by only a few and, if transmitted at all, remain the purview of only a few—unless, by happenstance, they are recorded in literature. Otherwise they vanish from the scene. But even in literate cultures some ideas are transmitted even if they are never written down. Jokes and rumors spread with amazing rapidity. What is especially interesting about religious ideas is that they are so easily acquired no matter what the cultural context. This has led to research about what it is about human minds that makes them susceptible to religious ideas.

Pascal Boyer (1994) has primarily focused upon the relationship between religious ideas and the intuitive ontologies that people employ in their everyday affairs. Continuing the epidemiological theme proposed by Sperber, Boyer argues that an idea cannot be transmitted unless it combines two aspects. First, it must be sufficiently familiar so that it is not automatically rejected as nonsense. It must conform in most respects to our intuitive ontology. Second it must be sufficiently interesting or attention-grabbing so that it becomes memorable enough to be transmitted. What makes an idea interesting is when it goes against our expectations of what the world is like. Interesting ideas are counter-intuitive. They surprise us. Boyer calls this delicate balance between the intuitive and the counter-intuitive the state of *cognitive equilibrium*. Ideas that balance our standard intuitive ontological assumptions with notions that are quite uncommon have more chance of being transmitted than ideas that do

not. And religious ideas are particularly good at perpetuating themselves, hence their widespread occurrence.

What makes religious ideas attention-demanding, according to Boyer, is that they either violate one of the default assumptions normally associated with the categories in our intuitive ontologies, or transfer some of these default assumptions from one category to another. For example, given the category "person," the default assumptions of which are intentional, biological and physical, one only needs to violate one of these default assumptions, the physical, to produce the notion of a living, intentional being without a body. Or, to take another example, given the category "artificial object," the default assumptions of which are physical, to transfer the property of either life or mind to such an object permits religious people to entertain the idea that a particular statue might, for example, weep and even consider answering their prayers. Here an artificial object has transferred to it biological (weeping) and mental (considering) properties. Boyer's claims about the role that intuitive ontologies play in our on-line reasoning about the world are not merely speculative. He has engaged in cross-cultural research which seems to demonstrate that ideas that balance the intuitive and the counterintuitive are more memorable and, therefore, more transmittable.

Lawson and McCauley (1990) have also argued for some time that our garden-variety cognitive equipment is largely sufficient for the generation of religious representations, especially representations of religious ritual actions. They have couched their argument in the context of theorizing about religious ritual action. They have shown how our ordinary cognitive representations of action (agent acting upon patient by means of some instrument or other) are capable of being organized by a small set of principles to provide structural descriptions of religious ritual acts. The only significant way in which the structural descriptions of religious ritual actions differ from the descriptions of everyday actions is that the former presuppose the presence of agents with special qualities in these descriptions. For example "man washes baby with water" and "priest baptizes baby with water" have the same actional description. In each case someone is doing something to someone by means of something. No special representational equipment is required to describe the priest baptizing the baby with water. One only has to specify the quality of the agent involved. The priest is a real agent in the real world. One only needs to know that in order to engage in the act of baptism the priest needs to have been ordained. The significance of these claims lies in their ability to show that religious ideas and the practices they inform do not require special cognitive resources for their implementation. The minds that we have inherited from our evolutionary ancestors are sufficient to acquire, structure, store and transmit religious ideas from one person to another and from one generation to another. People are equipped to create and employ religious ideas because they are equipped to create and employ ideas.

Focusing upon religious ritual representations permits Lawson and McCauley to theorize about this religious ritual competence, this ability not only to conceive of a world of actors and their actions but also to show how such a world can be transformed into a religious one simply by focusing upon the quality of the agent, the action or the patient.

Of course there are also matters of performance. How do religious systems ensure that the ideas they contain are transmitted? What does it take in actual ethnographic situations for such transmission to occur? One technique that religious systems have evolved over time involves the frequency effect. Granted that people are already susceptible to acquiring religious ideas with ease (because, as Boyer has shown, they are attention-demanding enough to capture human interest and, as Lawson and McCauley have shown, they have available an action representation system), the frequency with which these ideas are emphasized and employed in religious contexts clearly makes them transmittable. People are born into a world replete with religious ideas. The more frequent the ideas are discussed, insisted upon, taught, the more likely it is that those ideas will be attended to, and the more that they are attended to the more likely it is that they will survive through time and be transmitted to succeeding generations. For example, ideas such as agents with special qualities, experiences with unusual power, moral systems with sufficient bite, all of which serve to structure a way of life, are particularly compelling if they are frequently emphasized in a large variety of contexts. Religious systems seem capable of consistently providing the conditions for their own transmission, and instruction plays an important role. But a number of other resources besides the frequency effect are also available to religious systems. Perhaps the most powerful of these is the manipulation of the emotions. Those ideas are held in memory most easily, and therefore transmittable most readily, that are acquired in powerful emotional contexts. Thus elaborate ceremonies, massive celebrations, as well as situations requiring pain, punishment, fasting and so forth act to ensure the memorability of the ideas—even if the ideas themselves are bizarre or out of the ordinary. One only has to consider the rites of passage in various societies in order to recognize the difference between those rites which require a great deal of planning and resources because they only happen once in the life of an individual and those rites which are performed frequently.

Agents with special qualities of various sorts play a fundamental role in religion and can be found in all religious traditions even those traditions which are thought to be "atheistic." Of particular importance are their role in bringing about changes in states of affairs. For example, in a particular tradition before a person becomes an adult she or he would have to undergo a rite of passage. Such a rite might very involve a ritual official who engages in a set of actions which enables the person to successfully pass from one religiously defined state to another. The ritual official involved in performing the necessary acts would be required to be qualified to perform these acts.

This would mean that the observed act of transition from one state to another presupposes a prior act in which the ritual official was the patient of a ritual act legitimating her or him to perform the act in question. This would apply to the entire series of acts in which a succession of ritual officials ritually acquired their legitimacy. Such a succession is not infinite and the hypothesis is that in a tradition such as this there would be an initial act by an agent with special qualities who instituted the successive series of acts culminating in the actions performed by the ritual official in the specific rite of passage under consideration. In many religious traditions this initial act is conceived of as being instituted by a superhuman agent, that is, an agent with special qualities. Unlike ordinary causal processes which can always be pushed back one step further, such religious series of acts presuppose a starting point. The buck stops with the gods. Of interest to the cognitive scientist is why such a concept of agency plays such an important role in religion. The answer is interesting. Agency is important in religion because it is important in ordinary life.

Considerable work in developmental psychology has demonstrated the important role that agency plays in human cognitive traffic with the world. Human beings consistently adopt the intentional stance in their dealings with each other. That is to say, they attribute both to themselves and to others a theory of mind. Agents have minds. They are capable of desiring, believing, wanting, knowing, intending, hoping and so on. It is precisely because human beings treat each other as agents (i.e., as having minds) that they are so efficient at predicting the behavior of others. Sometimes it only takes the recognition of a glance to expect another person to behave in a certain way. Even infants are experts, long before they are efficient users of language, at communicating by glance and expecting parents and others to respond to their glances.

Now, if the attribution of agency to others is so efficient, even when the other agent is not present, it becomes relatively easy to recognize that people can conceive of agents that are very much like us (i.e., they can know our thoughts, respond to our wishes, consent to our actions) even if they are not observable. The superhuman agents that populate religious systems are frequently represented in this manner. Many of their properties conform to our ordinary assumptions about what agents are like. But agents which are *just* like us would not possess the efficacy which we require to presuppose their role in bringing about the states of affairs which religious people regard as necessary. The fact that they are agents at all is a necessary condition for their efficacy. The fact that they are regarded as having special qualities makes it possible for them to ground the kinds of actions in religious ritual contexts which have the effects that they possess. Without such special qualities they would be nothing but fictional characters. Fiction might entertain us, but religious rituals make ordinary actions, and the ideas that inform them, serious business indeed.

Suggested Readings

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7

Deprivation

Harvey W. White

> How, then, do I seek You, Lord? For in seeking You, my God, I seek a happy life. I will seek You that my soul may live ... Is not the happy life the thing that all desire, so that there is no one who does not wish it at all? (Augustine, *Confessions* X.20)

In this famous statement, Augustine expresses a desire for complete fulfillment (*beatus*). Like Aristotle's notion of happiness (*eudaimonia*), it has the status of an intrinsic, basic and universal need for something not yet possessed or accomplished.

This view, which was part of the fundamental outlook of the classical and medieval periods, took happiness to be fulfillment of that which is properly needed and desired by persons. However, a distinction was made between what is properly needed and what is not. In Augustine's terms the distinction is between *beatus* and *gaudium*, the latter being—roughly—pleasure, while the former is fulfillment or, ultimately, beatitude—perfect happiness or, simply, specific perfection. Thus while *gaudium* seems to many people to be that which they need, in truth they need *beatus*, and this can only be acquired through faith. One might say that a person without faith is deprived of *beatus*. Thus Aristotle defines "privation" (*sterēsis*) as a lack of something that would be naturally possessed. (Aristotle, *Categories* 12.a.26ff.).

Similarly, in many modern theories, religion is deemed to be something that fulfills a need. However, such theories claim that that which can properly grant what is needed is not religiosity *per se* (or that which only religiosity can properly grant), but something else for which religion serves as a substitute, compensation or surrogate. Religion may be a reaction to a lack of something of great importance, but it is not religion that is the basic privation. A short analysis of the ways we use the terms "need" and "deprivation" will help clarify matters.