The Teachers' File

COGNITIVE SCIENCE: WHAT ONE NEEDS TO KNOW

by Gregory R. Peterson

Abstract. Cognitive science is a new paradigm that informs and involves several disciplines, including artificial intelligence, neuroscience, cognitive psychology, cognitive ethology, and the philosophy of mind. Cognitive science studies the mind as an information processor, with the computer often operating as a metaphor for the operations of the mind. Developments in the cognitive sciences stand to affect tremendously how we think of the mind and, consequently, how we think of theological and religious claims that concern the human subject. The unity of self, claims of human uniqueness, the relation of mind and body, human nature, and the personal agency of God are all areas of religious import in which the cognitive sciences need to be taken into account.

Keywords: artificial intelligence; cognitive ethology; cognitive psychology; cognitive science; human nature; human uniqueness; information processing; mind of God; mind-body problem; neuroscience; philosophy of mind; unity of self.

Cognitive science represents something new under the sun. The basic principles, mindsets, and research that underlie cognitive science have in large part been present and used since the 1950s, but only in the last two decades has cognitive science achieved a unity of purpose and interaction sufficient to warrant regarding it as a single approach. In that period it has also influenced popular culture and scientific practice across disciplines.

That cognitive science is not currently drawn upon or referred to by most theologians or people working in theology from other disciplines may be confirmed by a perusal of the literature. I say "most theologians"

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because this is not universally true. Some, such as Eugene d'Aquili (1978, 1983), Donald MacKay (1980), and Arthur Peacocke (1993) have taken, or have begun to take, a serious look at the implications of cognitive science for certain theological claims. That cognitive science has some relevance to theology may seem less than obvious to some, and the primary task of this paper is to demonstrate this claim. To do this, I shall approach this task in two parts. First, I shall briefly delineate the theoretical foundations of cognitive science. Second, I shall consider five topics that are typically of concern to theology, exploring some of the results of the cognitive sciences that have significant implications.

A Brief History of Cognitive Science

A number of disciplines and historical factors contributed to the rise of the cognitive sciences. The oldest of these is philosophy, for there is a real sense in which cognitive science is philosophy of mind by other means. The classic philosophical disputes concerning perception, rationality, sensation, and even self-awareness are taken up by the cognitive sciences in one form or another.

More proximately, a number of events precipitated the development of the cognitive sciences. Developments in logic and mathematics allowed, for the first time, a formalized approach to reasoning and decision making, paving the way in the 1930s for three important contributions: Claude Shannon's development of information theory, Alan Turing's demonstration of the viability of a "Turing machine" that could carry out any calculation, and John von Neumann's invention of the stored program.

Amid (and because of) the carnage of World War II, two more scientific advances presented themselves. Neuroscience, which was swiftly coming into its own as a field, learned a great deal from the brain damage inflicted on injured soldiers. At the same time, the military's need for faster and more-complex calculations led to the development of the first computer, ENIAC, a monstrous vacuum-tubed exercise in unreliability that nevertheless paved the way for today's lap-top computer.

These and other factors coalesced to produce the Symposium on Information Theory in 1956, widely regarded as the official birth of cognitive science as a working framework. At this conference Allan Newell and Herbert Simon presented a paper detailing the first mathematical proof done by a computer, Noam Chomsky first introduced his transformational grammar, and George Miller first outlined evidence that short-term memory recall is limited to approximately seven items. That same year, Newell and Simon, John McCarthy, Marvin Minsky, and others attended the first conference on artificial intelligence (later known simply as AI), which established the research agenda on which the new discipline

was about to embark. These conferences together laid the groundwork and established the interdisciplinary connections for what would become cognitive science. The buzzword at that time, however, was not cognitive science, but *cybernetics*, a term that encompassed some but not all of the concerns that eventually came under the heading of *cognitive science*.

The decades that followed represented rapid growth in the formative disciplines of cognitive science. Much of this work, while informed by common themes and concerns, was done independently and with relatively little cross-disciplinary input. As time wore on, however, disparate disciplines increasingly came to recognize that they were frequently working on the same problems but from different angles. By the early 1980s not only were many becoming aware of other disciplines, but scholars were actively engaging one another across professional boundaries, holding interdisciplinary conferences, and writing books attempting to integrate the data into a cohesive framework.

The self-appointed leader of cognitive science has typically been the AI community. In its early years computers were shown to be able to do surprising things, from proving theorems and playing undefeatable checkers to imitating natural language production within limited domains. Early optimism, however, gave way to frustration as the heady goal of AI's founders, to produce a thinking machine, appeared increasingly out of reach. While computers were steadily improving in limited areas of expert knowledge (playing chess or producing medical diagnoses), normal everyday knowledge (how to order a meal at a restaurant or to determine from context whether the word *blue* means a color or a mood) remained surprisingly difficult to program. With the advent in the 1980s of parallel distributed processing (in which problems are broken down and worked on "in parallel" or simultaneously by different processor chips) along with "neural networks" (which acquire necessary information through experience rather than having information programmed in), AI has been imbued with new enthusiasm as it solves problems previously unresolvable through traditional methods.

Neuroscience, however, has threatened to take much of the limelight from AI, as new scanning techniques—Magnetic Resonance Imaging, or MRI; Positron Emission Tomography, or PET; and others—allow for radically new ways to study the brain in action. In its early years neuroscience emphasized the study of neurons, the "circuits" of the brain and body, as well as the development of a map of cognitive architecture through the study of brain-damaged patients. It quickly became apparent that certain functions—such as sight, hearing, motor control, and even language and higher reasoning—occurred primarily in certain localized areas of the brain. In recent years the pace and scope of neuroscientific research has been amazing. Some neuroscientists have even been willing

to speculate on neural mechanisms, functions, and locations for consciousness.

Alongside AI and neuroscience stands cognitive psychology, which has attempted to test perceptual abilities as well as reasoning processes and strategies. By testing for visual illusions or patterns of reasoning mistakes, cognitive psychologists draw up maps of the way information is processed by individuals, findings that may then correlate with the neurosciences. One area of recent and growing interest has been *metacognition*, the ability of subjects to monitor and report on their own behavior (Nelson 1992), which has produced interesting results regarding the relative accuracy (and inaccuracy) of our self-estimates and beliefs.

Cognitive psychology has its alter ego, cognitive ethology, in the animal world. Like cognitive psychology, cognitive ethology has emphasized testing the reasoning and perceptual abilities of animals. In the natural environment this has included cognitive mapping (e.g., remembering food-cache locations or dominance-subordinance hierarchies), communication ability, and rational features of social interaction (e.g., alliance formation and reciprocal altruism). In the lab, a great deal of effort has been put into testing logical discrimination and, among apes, language production and comprehension.

Less frequently anthropology and linguistics also have participated in the cognitivist approach. Behind them all, however, philosophy has remained a surprisingly active partner. Philosophers such as Daniel Dennett (1991) and Patricia Smith Churchland (1986) have actively engaged with scientists on conceptual and interpretive issues. Whereas the computer provided the model of the mind as software and the brain as hardware, it has largely been the task of philosophy to elaborate on this distinction and work out its difficulties. This level of engagement by philosophers in a scientific field is an anomaly, to say the least, and represents the extent to which cognitive science has become an interdisciplinary enterprise.

Nevertheless, it remains to be said exactly what cognitive science is, for it seems that cognitive science is not any one thing but merely a collection of disciplines working in related fields. There seems to be no one field that can be definitively called "cognitive science." After reflection, what becomes apparent is that cognitive science is not so much a field of study (although this is changing as colleges offer course programs) but a paradigm shared by several disciplines. A paradigm provides researchers with a disciplinary matrix and a set of research exemplars that informs the kind of questions that are asked and how they are asked by each of the involved disciplines (Kuhn 1970). The paradigm also links disciplines, allowing for informative exploration and cross-fertilization. That

these linkages are unusually strong in cognitive science can be seen by a simple survey of titles and bibliographies, where a neuroscientist can write a book titled *Descartes' Error* (Damasio 1994) and a philosopher can coauthor an introductory text to the neurosciences (Churchland and Sejnowski 1992).

At its core, cognitive science is about information processing and how information processing can be used to explain a variety of phenomena, including perception, decision making, and rational thinking. It follows that the cognitive sciences view the mind itself as primarily an information processor and that all or, depending upon those to whom you talk, nearly all components of human cognition can be explained in terms of information processing. Perception, memory, decision making, learning, and language can all be explained in terms of information processing. So too, the bold will assert, can cognitive science explain the mysteries of consciousness and emotions.

Concomitant with this is the viewpoint that both information and mind are real entities and objects of study. Cognitive scientists willingly speak of internal representations and mental content as well as of plans, doubts, intentions, hopes, and fears. This attitude stands in marked contrast to that of proponents of behaviorism, with which cognitive science is usually favorably compared. Behaviorists have either denied or remained agnostic about internal states and mental content. The approach of cognitive science, by contrast, emphasizes that good research cannot be done without at least provisional reference to what is going on "inside."

Despite this, cognitive science does inherit the behaviorist's concern for scientific rigor. Although many researchers are willing to make bold, speculative, and synthetic statements, the actual research is done carefully, and hypotheses must be testable. In cognitive psychology and neuroscience, introspection has been reintroduced as a tool, although a cautiously used one. As Dennett has remarked, subjective introspection does not make you an authority on what happens to you, but only on what *seems* to happen to you (Dennett 1991, 96).

Running through all the cognitive sciences, furthermore, is the metaphor of the computer. Although computer research has on occasion literally inspired insights in other areas, the metaphorical use of the computer has been much stronger, particularly with reference to the jargon that is used. Phrases such as "neural circuitry," "hardwired," or "programmed behavior" permeate and influence general discussions of the trade. Likewise, AI and computer science has felt free to borrow biological terminology, thus the existence of "viruses," "worms," and "neural nets."

At the lowest level, the brain and the computer seem to have much in common, and analogies based upon the computer provide a motivating framework for the disciplines. The logic gates of a computer operate on a binary system. A gate is either "on" or "off," and it is the proper organization and programming of these gates that allow the modern digital computer to process reams of data flawlessly or play a very good game of chess. The basic unit of the brain, the neuron, typically acts in a similar fashion, being in either an active or an inactive state, with the activation of certain collections of neurons giving rise to certain specific cognitive states.

This computational approach has been used to great effect in the study of human and animal perception, and neuroscientists can with great accuracy trace the many steps and the specific areas in the brain that contribute to the construction of a visual field. One of the interesting things that neuroscientists have learned in the course of this research is that a visual field is, in fact, constructed. The early empiricist's foundation of raw sensations has been ruled out just as much as the somewhat later idealist's apparently constraintless subjectivity. Kant, after a fashion, would be pleased.

But although the brain has numerous similarities to a digital computer, it is not exactly the same as a digital computer. Thus, it is recognized that neurons are not exactly like logic gates and that human vision and language are not exactly (and sometimes only remotely) like computer models of vision and language. Despite the differences, however, the computational model still holds throughout cognitive science, in part because of changes within the sciences themselves (such as the development of parallel distributed processing in computer science) and in part because of the recognition that there can be more than one type of information processing. The computer, then, functions both as a literal inspiration and (predominantly) as a metaphor, allowing scientists to borrow terminology back and forth.

This distinction between hardware and software, between the information and the physical substrate, gives the cognitive sciences the character of being reductionistic and holistic at the same time. Cognitive science is reductionistic to the extent that it tries to explain all behaviors and forms of cognition in terms of information processing. It is holistic, however, to the extent that it cannot totally reduce information to the laws of physics and chemistry. Indeed, quite different physical systems, whether made of neurons, computer chips, or wheels and gears, are quite capable of storing the same information even though they are all made of different materials with different properties.

Boundary Areas for Cognitive Science and Theology

Much more can be (and has been) said regarding the general program of cognitive science (see Gardner 1985, for example). Indeed, the foregoing may be a familiar thesis to many, if not most. Nevertheless, I contend that even if the very broad claims that underlie the practice of cognitive science are well known, they are not taken seriously enough. To demonstrate this, I shall now turn to four specific issues that illustrate the importance of cognitive science for theology and religion. Some of the issues should be familiar; but others, I suspect, are not. All need to be considered seriously.

Area 1: The Unity of Self and Soul. The unity of self and soul has been a basic (if often tacit) premise of Western thought. In Platonic thought the soul was the indivisible seat of reason and the part of the self that enjoyed the afterlife. In Christian thought the idea of a unified self is crucial for theological anthropology. Because we are unified persons, we are responsible for our past sins. Because we are unified persons, these sins can and need to be washed away through God's mercy.

That we are unified persons, however, is not so obvious from research in neuroscience. The most celebrated line of research has been the "split-brain" research of Roger Sperry, Michael Gazzaniga, and others. In an effort to reduce the severe seizures of those with pronounced cases of epilepsy, surgeons severed the *corpus callosum*, which serves as the connecting link between the left and right cerebral hemispheres. Subsequent testing of these subjects seemed to indicate that the two hemispheres continued to function, but independently. Objects flashed before the left eye (and thus the right brain) could not be verbally identified because language production stems largely from the left hemisphere of the brain. Subjects could, however, use their left hand (again controlled by the right brain) to identify the object by touch.

Equally interesting, subjects were highly prone to confabulation. If the written command "laugh" was flashed before the left eye and right hemisphere, the subject would laugh, and if asked to explain the behavior verbally (thus involving the left hemisphere), would respond with a comment along the lines of "You guys come up and test us every month; what a way to make a living!" Similarly, if the command "walk" was flashed, the patient would often get up and do so, giving an explanation for the behavior that seemed to be at odds with the true cause. Patients shown frightening scenes became agitated, whereas patients shown calming scenes (such as ocean waves) became serene —all the while invoking, if asked, alternative causes than those of the slides (Gazzaniga 1988, 234–36).

Confabulation is a key ingredient in another condition known as *anosognosia*, or hemineglect. In these cases, damage in the right hemisphere of the brain (usually from a stroke) causes paralysis to the left side of the body. What is startling about this condition is that patients systematically deny that anything is wrong and go to great lengths to explain the defects away. They insist that they are healthy, deny that the ineffectual limbs are theirs, and generally ignore all events that do not occur in the right hemisphere of vision (Damasio 1994, 62–69).

What is important about these two cases is that they indicate systemic defects in reasoning, defects that challenge our intuitions about ourselves as unified knowers. Some, such as Dennett, have used these experiments to argue against the notion that we are unified selves, arguing that "we" are simply a fiction produced by the ongoing activity of the separate but connected minor functionaries that make up the brain (Dennett 1991). Other interpretations, however, are also possible. Neuroscience, like all science, is *in medias res.* The difficulty with these cases, as well as with others, is that the results are not always clear-cut and, even when they are, the proper interpretation does not immediately stand out before us. Many of the split-brain subjects, for instance, reported none of the unusual behavior indicated above. That some did, however, needs explaining and requires us to rethink how we understand ourselves as selves.

Area 2: Human Uniqueness. It is popular nowadays to talk about human uniqueness vis à vis the computer and the possibilities of artificial intelligence. On a theoretical and imaginative level, this discussion has proved very stimulating. Artificial intelligence has indeed made great and often thought-provoking strides since its early development and grandiose claims in the late 1950s and early 1960s. Despite these advances, computers and robots do not appear even remotely capable of doing the types of things that we usually regard as indicative of our humanity. At present one might look at artificial intelligence as a continuous thought experiment for theologians and philosophers, challenging us to define better what we are about.

But, in contrast to the still-modest achievements of artificial intelligence research, we do cohabit with living, breathing, intelligent creatures. These are the other vertebrate animals that populate our world, and research has shown them to be, in some ways, strikingly intelligent indeed.

The foremost and most publicized trail of research is in the area of ape language and intelligence. Work in the 1970s (see Premack 1976) showed that chimpanzees are capable of a wide range of logical discriminations; they are able to count, categorize, recognize identity and difference relations, and use conjunctions and negations. Research in the

1980s with chimpanzees and bonobos, close relatives of the chimpanzee, has strongly indicated that basic language skills are available to the apes. Using a specially designed symbol system, they can use hundreds of words to indicate desires, announce plans, and request objects. Additionally, they can comprehend, at the very least, several hundred and perhaps more than a thousand (Savage-Rumbaugh and Lewin 1994) words of spoken English and can even identify basic grammatical relations.

Similar, though less spectacular, research has been done with vervet monkeys, African gray parrots, dolphins, and sea lions (summarized in Griffin 1992). Such research calls into question any absolute claim of human uniqueness—for if we grant some level of reason and language to animals, can we also deny them consciousness and self-consciousness? The great apes, at least, can recognize themselves in a mirror (Gallup 1977) and may be able to recognize deceit in others (Premack and Woodruff 1978). From a cognitivist standpoint, humans should be placed on a continuum that sets our abilities alongside of those that appear in the animal world.

Even the claim of moral uniqueness now seems not so strong as it once was. Chimpanzees and many other social animals form alliances, make peace, establish and subvert hierarchies, and engage in basic forms of reciprocal altruism. In chimpanzees and baboons, at least, kindness is repaid with favors, and in bonobos unwanted sexual advances by males can receive group censure. It is true that animals cannot form and articulate principles of good and evil, but they do seem to be able, at very basic levels, to carry them out.

As with the claim for the unity of the self, the claim for human uniqueness needs to be rethought. It appears necessary to abandon the claim for any sort of absolute uniqueness. Human beings are not "absolutely" unique; we share a wide range of traits, including cognitive ones, with the animal world. Human beings, like every creature in creation, may be said to be "relatively" unique—and distinctive in an interesting way—but it is precisely this claim that needs to be analyzed closely.

Area 3: Mind and Body. This hoary area of philosophical dispute has gone on for centuries with little constructive commentary from the sciences and will likely do so for centuries to come, even when constructive commentary is available. As mentioned earlier, cognitive science is strongly influenced by the software-hardware distinction available from AI and computer science, although the advent of neural networks potentially makes this distinction a bit fuzzier. The tremendous success of the cognitive sciences generally, and of neuroscience specifically, strongly suggests that there is some truth to this perspective for many of our rational and perceptual abilities.

The holdout, even among some cognitive scientists, is consciousness. Critics from a variety of perspectives deny that a solely computational

brain can alone produce consciousness. They attribute consciousness instead to an immortal soul, the operation of quantum mechanics, or some yet-unknown principle. Despite the divergencies, cognitive scientists and philosophers have produced several interesting theories of consciousness solely within the computational framework (examples: Dennett 1991, Baars 1988, Crick 1994).

The real losers in this debate seem to be traditional forms of dualism. Under the traditional conception, the soul is the seat of the emotions, rationality, and language; yet core aspects of all three of these are tied to certain areas or activities of the brain. Under traditional dualism it is not at all clear, for instance, why there should be a module in the brain for face recognition. But if the soul is no longer assigned these functions, its only remaining function is to serve as the repository of consciousness. Now even that function seems to be in danger of being usurped.

Area 4: Human Nature. Theology has historically made claims regarding both the unity of the self and human uniqueness. It has made, and continues to make, claims about human nature as well. Western Christendom is based, in part, on the doctrine of original sin and the possibility of the gift of redemption. Debates have ranged over the extent and nature of free will, as well as the possibility and exhortation to act for the good.

The idea of free will is connected to the idea of the unity of the self, and some of the same puzzlers posed to the latter issue apply also to the former. Additionally, research done by Benjamin Libet (1985) is quite intriguing. Testing for the onset of voluntary action, Libet had subjects record on a "clock" the time that they voluntarily decided to flex a finger, all the while hooked up to appropriately placed electrode sensors. What Libet found is that up to 300–500 microseconds prior to the stated time of decision, the patient's brain-wave pattern had already changed state (developing what Libet calls the "readiness potential"). When is the decision made and who is actually making it?

Antonio R. Damasio, by contrast, has worked to show how impairment of the frontal lobes affects emotional states and voluntary action (Damasio 1994). Damage to these areas can leave patients apparently calm and well adjusted on the surface yet incapable of setting priorities or making decisions. These patients are quite capable of explaining the pros and cons of each of the alternatives they face for any given task, but they are frequently unable to stop explaining or to pick one of the alternatives. Damasio explains the difficulty even in treating these patients, for it is nearly impossible to settle on an appointment date with them; and once the date is finally made, they are often incapable of keeping it.

On a more general level, the recent prominence of discussions about genetic determinism have their cognitive counterparts, for what genes

determine is the structure and the basic programming of the brain. The well-publicized case last year of the Dutch family apparently predispositioned to extremely violent behavior and the heated debates about the genetics of sexuality have their cognitive correlate in brain structure and activity. On a milder and more familiar level, the popularity and apparent success of such psychotherapeutic drugs as Prozac require us to reexamine essentialist claims about human nature. We may still confidently say that all human beings sin, even those who do take Prozac, but are we free *only* to sin, as Luther claimed? How does one analyze redemption or religious experience in a cognitive context?

Area 5: The Mind of God. Conventionally speaking, most Christians (indeed, most theists) conceive of God in terms of an analogy with humankind. That is, when we speak of God, we do so as if God is an intentional agent just like us, only better. Human beings believe, plot, deceive, love, and sacrifice. God loves, heals, redeems, answers prayers, and judges. This way of interpreting God, in terms of an intentional agent in some sense like ourselves, has deep roots in Christianity as well as Judaism and Islam.

The usefulness, for the ordinary believer, of describing God in this fashion should be fairly obvious. To describe God intentionally provides, at least theoretically, a powerful way of describing certain features of the believer's reality. That God purposefully, rationally, and lovingly created the world can say a great deal about how we should view the world. That God promises to redeem each and every one of us, not only in the present but also at the end of time, also similarly guides and informs personal behavior and the way the world is viewed.

Despite this, it may be argued that the existence of an intentional God is, philosophically and scientifically, highly problematic. The problem comes particularly to light as we examine the mind-body problem and begin to realize that mind, as we know it, requires the substrate of the body, particularly the brain, to exist at all.

But in what sense can we speak of the mind of God? Seeing God as being analogous to a human agent, but writ large, we come upon a problem. Even though a historical doctrine of the church has been the resurrection of the dead, in the history of Christian thought the tendency to contrast the physical and the spiritual has essentially become another dualism. Traditional language referring to God has tended to apply an analogy or at least parallelism in the relation of the human mind to the divine. Even more broadly, it has been said that God's relation to the world is analogous to the human relation of mind to body. Just as the human person is described as a nonmaterial soul that acts on the material human body, so too is God portrayed as a nonmaterial rational being or soul that acts on the world. But if this dualism is not true for human

beings, can it be true for God? If a brain is the prerequisite of a mind, in what sense can we speak of the mind of God?

The Organic Machine?

Cognitive science presents many challenges and possibilities for the religious thinker. It also poses many questions—but most theologians and religious thinkers are not asking them. There are, historically, several reasons for this. One lies in the simple antagonism that has generally existed between the disciplines of theology and the natural sciences throughout the modern period. Another lies in the difficulty of interdisciplinary dialogue. To be proficient in more than one discipline nowadays is something of a marvel, and some of the research literature of the cognitive sciences can prove to be particularly dense.

I would suggest, however, that a deeper reason also is at work. The course of theology in the modern period has sometimes been characterized as a retreat into subjectivity, and it is fair to say that at least some of the major currents of theological thought in the nineteenth and twentieth centuries have granted the sciences the natural world while staunchly defending human subjectivity as the last and rightful bastion of theologians. That the natural sciences should impinge upon on even this sacred territory is, for many, beyond the pale. Better to make friends with Freud than suffer more ignominy at the hands of greedy reductionists!

This type of attitude, unfortunately, is based upon many shaky premises. The hostility between religion and science has been shown to be as much the result of misunderstanding, politics, and prejudice as of any genuine conflicts in content. It is also based on the premise that the sciences leave no place for subjectivity, that they reduce the soft glow of our selves into clinking, emotionless machinery, minute cogs in a soulless, purposeless world.

Variations of the story that the sciences have historically promoted a mechanistic view of the world at odds with human values have been told by many authors, most notably Carolyn Merchant. Underlying this view is an implicit critique of science as a propagator of an impossible and inhumane world view (Merchant 1980). Fortunately, the sciences and the interpretation of the sciences have changed since the days of the Enlightenment and the controversies of the "beast machine," affording us a new opportunity.

Cognitive science is interesting in this respect, for its view of the mind is much more nuanced than the behaviorism and purely reductive approaches that preceded it. What is most interesting is that the old dichotomy between organism and machine no longer fully applies in cognitive science. We are organisms. We are also machines. Our bodies are huge masses of cooperating cells. Some of these cells, in turn, provide

the neural machinery that, through processes we do not fully understand, produce our conscious selves. The vocabulary of biology is used in computer science, and the vocabulary of computer science is used in biology. Having done away with the strict dichotomy between organism and machine, we perhaps need no longer fear that a scientific understanding of body and mind will lead to a dehumanized and impersonal world.

What, then, should every theologian know about cognitive science? Cognitive science challenges our complacent theological claims about human nature and the human relation to God. It challenges but need not threaten, and if we listen closely and think deeply, our theological understanding will be the richer for it.

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