

# Was ist der Mensch?

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## A View from Cognitive Science

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There are many ways to define human nature. The standard scientific approach defines the human species within the context of a larger classification system for terrestrial life, which was developed in the traditional field of cladistics, reinforced by modern genetics. This systematic biological approach is accurate, as far as it goes. It is a humbling experience to contemplate the great evolutionary theory that it has supported because it drives home the point with such force that human beings are very much a part of the biological world, and share a tremendous number of features, traits, and genes with many other species. Moreover, it parades before us the ephemeral history of life itself. Many, many species have come, flourished for a long while, and gone extinct during the evolution of life on Earth. There is no reason to believe that humans are an exception to this rule.

But this standard classification system is not the whole story. Understandably, our most revealing efforts at self-definition tend to dwell on our exceptionality, rather than on our common biological heritage. Our uniqueness lies especially in distinctive features of the human mind that make us a radically new force in the known universe. This brief paper will address the issue of precisely what is unique about our human mentality.

The unique feature of human mental life: cognizing cultures

Human beings are easily categorized alongside other species when it comes to questions of anatomy. We are classified first as vertebrates, then as mammals, and then as primates. Among primates, we are quite close to chimpanzees and bonobos, less so to gorillas, and much less to orangutans. This classification reflects our evolutionary history. As expected in such a classification, we share a great deal of the human genome with vertebrates in general. We share even more of it with social mammals, especially with primates. We are cast in the primate mold, not only in our genetics, but also in the basic architecture of our

brains, and in the organization of our sensory, motor, and motivational systems. Our vision and hearing are typical of primates; in fact, we are remarkably close to normative measurements of these capacities in chimpanzees. This is not surprising, given that we shared a common ancestor with them in the Miocene epoch.

Present evidence suggests that the distant ancestors of human beings, australopithecines, diverged from a common ancestor with modern chimpanzees between five and six million years ago. Australopithecines adopted the distinctive erect posture and bipedal locomotion of hominids. They did not leave any evidence of advanced mentation, or of a larger brain. However, their semi-erect posture makes it likely that they were living on the ground more than their ancestors did, exposing them to the dangers of large land predators. Their survival for millions of years, despite their small size, indicates that they had a very successful strategy for protecting and caring for females bearing children, suggesting some degree of cooperative social behavior.

A little over two million years ago the first members of our species emerged in Africa, and left behind convincing archaeological evidence that they had an improved capacity for manual skill, cooperative behavior, and a close-knit social structure, relative to their predecessors. Shortly thereafter, a series of larger-brained hominid species emerged, and migrated out of Africa for the first time. After this point, there is evidence of a radically new lifestyle, based eventually upon such achievements as complex toolmaking, the conquest of fire, cooperative big-game hunting, and the successful transmission and preservation of a variety of skills over many generations. These hominids were evolving in the direction of humanity as we know it, but left no evidence of rapid cultural adaptability and change.

Anatomically-modern humans emerged about 150000 years ago, and the first signs of radical cultural enrichment appeared approximately 50000–60000 years ago, when humans migrated to very difficult climate zones, learned how to build boats, and greatly increased the number and quality of manufactured tools. This was followed soon after by the simultaneous appearance of cave painting and sculpture in several disparate locations, and the emergence of elaborate built environments. The rate of cultural change and innovation has accelerated ever since. In fact, the distinguishing advance at the core of hominid cognitive evolution is human culture itself. Human culture has a *cognitive* dimension that constitutes an evolutionary innovation that has no equivalent in other species.

Humans are immersed in culture from birth. Viewed as a species, the cultural-cognitive lifestyle of anatomically modern humans is based on an unprecedented cognitive capacity: the ability to construct elaborate shared mental representations of reality. These representations are traded, modified, and displayed in a common cultural space. Individual minds reside in that cultural space, inasmuch as the ideas and mental habits of a given culture are imported into the minds of individuals during their growth and development. Human culture has assumed a major role in cognitive epigenesis: in effect, the human brain cannot realize its design potential outside culture. In modern society, shared representations are greatly enhanced by means of technological memory media, such as books and libraries, which exist external to the brain, and constitute a major change in the overall power of the human cognitive-cultural system. The integration of external memory technology has resulted in a hybrid system that is part biological, and part technological. Humans now construe reality, perceive, remember, and think in groups. Human cognition has developed a major dependency on its cultural and technological dimension.

Culture and cognition co-evolved in ancient hominids, so that the individual mind became more and more oriented toward group cognitive processing. We can justly be redefined as having a uniquely social style of cognition where higher mental processes are very closely interwoven with a shared cultural environment. Individual minds have thus been transformed into “carriers” of their particular cultures, and those cultures in turn have shaped the individual minds that both generate and transmit culture, a relationship that can only be termed symbiotic.

Our best evidence suggests that this complex cultural-cognitive process started to evolve at least 2 million years ago, and possibly much earlier, when hominid cognitive reactions to crises and challenges became collective, coordinated, and dependent to some degree on communication skills. Initially, this process evolved at a very slow pace: communication would have been nonverbal and very slow, as well as inherently ambiguous. Cultural change was also slow. Many features of hominid culture did not change significantly over the period extending from 1.8 million to 0.8 million years ago. But eventually the pace of accumulated cultural change accelerated, culminating in the remarkable phenomenon of our own species, which has generated a series of increasingly radical cultural and technological changes without signifi-

cant further biological evolution. No other known species has ever achieved anything remotely similar.

This aspect of human nature conveys a very different picture of humanity's real standing in the universe than the standard classification system cited above. When it comes to cognition, there is a vast gulf between humans and the rest of the biological world, and it has become wider in recent times. This gulf is our signature as a species. We may not be particularly special in our physique, diet, or basic instincts. It is our sharing of mind, mind and our cognitive-cultural symbiosis, that define us as a species.

Can we specify what is unique about our mentality with greater precision? Opinions on this tend to differ sharply, but there is general agreement that the elaborate mental representations of humans are qualitatively different from those of apes. There is no ape equivalent of human nonverbal gesturing and pantomime, or their collective manifestations in ritual, song, and reciprocal mimetic games. In addition, there is no equivalent of storytelling, and its public counterpart, myth; of visual art and music; or of the various deliberate attempts of humans to alter their physical environment, culminating, of course, in modern engineering and science. Nor is there any ape equivalent of governments, or for that matter of institutions – such as education systems and religions – that enforce cognitive governance on a group.

We are able to process the knowledge we accumulate as a group in many different ways; and using this knowledge, we have learned how to think, remember, and make decisions in groups, as evidenced in several recent industrial revolutions. Human cognitive activity has become highly organized at the group level. Even the process of creative invention has now been partially industrialized and placed under corporate control. In the relatively short history of our species, we have developed a unique ability to construct and manage “distributed” cognitive networks that have a degree of independence from any single individual mind. These semi-autonomous networks are especially evident in modern governments and large corporations.

The large-scale cultural-cognitive systems of human society now dominate our cognitive agenda, and the knowledge stored in our artificial memory technologies greatly exceeds the memory capacity of any individual mind. External symbolic storage systems now contain much more material than any individual can possibly comprehend, and that stored knowledge has come to dominate the formative educational processes that shape individual minds during critical developmental

periods. Viewed from an evolutionary perspective, this process is quite extraordinary. In fifty thousand years, a mere twinkling in evolutionary time, humans have revolutionized the cognitive apparatus of our species, and indeed, it seems, of the Biosphere itself. Therein we can identify our uniqueness as a species, and our special human nature.

Human nature is defined, above all, by our special mental and cultural properties. With some justification, we may be classified as vertebrates, mammals, primates and anthropoids, but these are incomplete labels that do not acknowledge our uniqueness.

The human cognitive-cultural system is unequalled in the terrestrial biosphere. We live in cognitive communities that can trade ideas and memories, and hoard knowledge for the common use of many. We construct representations collectively, and store them in technological memory media with novel storage and retrieval properties that have no equivalent in biological systems.

A human being is thus a remarkable paradox: bound by the laws of physics, chemistry, and biology like every other species; yet aware of being so bound, and quite capable of feeling anxious about that condition, while communicating that feeling in an infinite variety of ways within the cultural space it shares with other humans, and representing it in novel memory technologies that exist outside the brain. The cognitive-cultural networks of human society have gone far beyond the natural limitations imposed on human knowledge and thought during our speciation in the Upper Paleolithic, and radically changed the cognitive ecology of our species.

Finally, there are two important questions for future cognitive scientists to consider: Can the human mind manage this fast-moving new ecology? And if so, how?

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