

The Uniqueness of Humans and an Anthropological Perspective

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Introduction

Although I majored in physical anthropology during my undergraduate and graduate studies, the focus of my academic interest was not human beings. I studied the behavior of wild chimpanzees in Africa during my years at the anthropology department because I wanted to explore virgin territories and observe wildlife in its natural state. Later, I studied deer, sheep, peacocks, etc., and only after that did my interest eventually turn to human beings. This was because the study of various animal species instilled in me a renewed understanding of the peculiarity of humans as a strange species, and also because I felt a sense of responsibility as an anthropologist to study the evolution of the human species.

Human beings are animals that belong to the primate order among mammals. Humans' closest relatives are chimpanzees, whose ancestors branched from ours and started to follow a different path about 6 million years ago. Chimpanzees and other apes have since remained in tropical rain forests, and are now on the brink of extinction. On the other hand, after the human race experienced the emergence and extinction of several species, *Homo sapiens* that evolved about 200,000 years ago spread all over the earth and prospered to reach today's population of 6.8 billion.

Despite the sharing of a common ancestry

until 6 million years ago, chimpanzees remain in an ecological position similar to that of many other mammalian species, while humans have accomplished an “unnatural” success that may even endanger the global environment. Actually, no other animal species have caused such drastic alteration to the planet's surface in such short time, driven many other species to extinction, developed science, and deliberated about their condition. What have been the keys to the achievement of this ability?

Anthropology is the study of the evolutionary history of humanity. It is often regarded as the study of the past records of human evolution, such as fossils. Although this in itself is interesting, anthropology has been accumulating a large body of data on the history and culture of humans as a species in physical anthropology, involving genetics, endocrinology, ecology, evolutionary biology, and paleoenvironmental science, as well as in combination with humanity and social sciences, such as prehistory, cultural anthropology, and ethnography.

The essence of science lies in the explanation of the present reality and the prediction of the future. This being the case, anthropology as the science of human evolutionary history should be able to explain not only past evolutionary history but also the present reality of our life and predict some aspects of humanity's future. My interest in this approach developed slowly, and grew into a

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sense of responsibility to make it happen. In this article, I consider the present and future of humanity, based on the findings from recent studies.

A Brief History of Human Evolution

The human race is defined as “habitually erect bipedal primates.” All living and extinct habitually erect bipedal primates are called hominins. Genetic analyses suggest that the lineage of chimpanzees and that of hominins branched about 6 million years ago, and fossil evidence also supports this estimation, as the fossils of *Sahelanthropus*, unearthed recently in the African country of Chad, date back to about 6 million years ago. Various species subsequently emerged within the hominins. All but one of them have become extinct, leaving us *Homo sapiens* as the only surviving species of hominins.

The reason why hominins adopted bipedalism is still unknown, although several theories have been proposed. *Sahelanthropus* that lived 6 million years ago, as well as *Ardipithecus* and *Australopithecus* that followed, did not live exclusively in the savannas but depended partly on forests, and were adept at tree climbing. The evolutionary reason why they started to walk erect 6 million years ago, when they still lived in forests, remains unknown.

The life of the hominins in savannas began in earnest after the evolution of early *Homo* species about 2 million years ago. The remains of *Homo ergaster* dating back to about 1.6 million years ago provide representative fossil evidence. After that time, the human body began to resemble the proportions of modern humans, their feet and legs changed shape, and they were no longer adept at tree climbing. About the same time, they lost most of their body hair, and supposedly replaced it with numerous sweat glands instead. The body of *Homo* species adapted specifically to long treks in the hot African savannas.

About that time, a hominin species resembling *Homo ergaster* moved out of Africa and spread to the Eurasian continent. This was *Homo erectus*. After persisting for about one million years, they became extinct. Another hominin species then emerged about 500,000 years ago. Having larger brains than *H. erectus*, they are sometimes referred to as “archaic *sapiens*.” Neanderthals were part of this group, but they also

became extinct. We *Homo sapiens* emerged about 200,000 years ago in Africa, and then spread rapidly throughout the world. All people living in the world today are members of this species that originated in Africa.

Large Brains, Cognitive Abilities, and Language

A factor directly supporting the prosperity of humans all over the planet is civilization based on science and technology. While humans developed various technologies before the birth of science, scientific elucidation and technological progress have now become inseparably linked. These have been altering the world, making our lives safer and more comfortable, and reducing death rates.

Scientific-technological civilization was made possible by the abilities of the human brain to process elaborate information and communicate verbally. Humans were able to develop science fundamentally because of their sophisticated cognitive abilities. These include the abilities in abstraction, categorization, reasoning of causalities, application of knowledge to novel situations, and many other areas. Rudimentary development of these abilities is also seen in chimpanzees, which are humans’ closest relatives among the primates. These abilities did not develop suddenly after the emergence of the hominins. However, they were brought into full play in humans because of the acquisition of language. Chimpanzees also have some abstraction and categorization abilities and can perform reasoning to some degree. However, the presence of language dramatically enhances thinking, as it enables us to label objects, events, and concepts in definite terms and to have mental representations of them.

Then, what is the biological basis for language? Why did it evolve only in the lineage of humanity and not in that of other primates such as chimpanzees? To answer these questions, we need to investigate the uniqueness of humans, combining the knowledge from various fields of human study, including brain neuroscience, anthropology, prehistoric archaeology, ethnology, ecology, and psychology.

To begin with, the order of primates is a taxon characterized by larger brains in comparison with other mammals. Primates live in partially closed, permanent groups. The members of the

group recognize other members individually, and interact in close social relations. In order to deal with such social relations, primates evolved to have large brains so that they could deduce what others were doing and understand their relative social positions among other members. The primate brain increased in size not because of the use of tools or the understanding of the physical world, but because of the necessity to deal with this social complexity.

The size of the human brain is considered to be three times larger than that supposedly found in apes with the same body weight. It was about 200,000 years ago that a creature similar to modern man with this brain size first emerged. This means that our brains were completed in the milieu of human evolution long before the birth of scientific-technological civilization. Then, what were the milieus of human evolution? What problem-solving needs necessitated the evolving of larger brains in humans?

The Life of Human Ancestors

To consider these matters, we need to understand the basics of human subsistence. Throughout 99% of their history, humans have lived as foragers. That is, they roamed a wide range of land, occasionally hunted small games, scavenged left-over dead animals preyed by predators such as lions, and collected plant foods without the habit of storing foodstuff. Although they camped around fires every night, they did not settle in a fixed location.

About 2 million years ago, when our ancestors moved into the savannas and the Genes *Homo* evolved, they had to become fulltime hunter-gathers in the dry land. This must have been a tremendous change. The scarcity of water in the savannas meant there were few fruits and other foods. Although there were large herbivores as an abundant source of protein in the savannas, hunting them was extremely difficult. The hominin was forced to hunt despite the fact that they were not carnivores like lions. Plants, on the other hand, were protected by hard shells, and many potentially edible plants hoarded their nutrients in subterranean tubers and rhizomes under hard ground in the arid environment. These could be reached only by grueling digging. Obtaining water itself was also difficult, and many predators such as lions prowled the land.

The hominins moved into an ecological niche like this. To survive in such an environment, they had to form groups, in addition to developing individual advanced cognitive abilities. The hominins chose to live in places where solitary living was impossible. Hunting and gathering subsistence in this setting essentially necessitated extensive cooperative work in a group. Within such a group, it became extremely important to develop coordination of relations with others, understanding of others and self, and sympathy and affection.

Chimpanzees are ultimately individualists. Their diet mainly consists of fruits and foliage, which they can freely forage for and eat. Only a few types of foods require the use of tools, and there are no situations that have to be addressed by cooperative work. Their children start to feed themselves soon after weaning.

The Origin of “Childhood”

As it was difficult for adults to obtain foods and food had to be acquired using complicated techniques, it took years to learn such techniques. This resulted in the need for a long “childhood.” Techniques acquired through a long learning period would not have an adaptive value unless they could be used for a long period. Complicated living techniques, therefore, evolve hand in hand with long life and long childhood. In fact, the life history parameters of humans have undergone reorganization, resulting in a very long childhood after weaning, the presence of adolescence, and the presence of advanced age beyond the reproductive period.

Humans have large brains, take a long time to develop, and have to learn many skills in the growth process. Although this generally applies to primates as well, the childhood of humans is characterized by the continuing dependence after weaning both in terms of nourishment and locomotion. It is true that the young of other primates, including chimpanzees, must learn various skills after weaning. However, their weanlings live independently of other individuals for nutrition and locomotion. As mothers need to start the next cycle of pregnancy, birth, and lactation, the flow of energy to weanlings terminates soon.

Humans are different. The flow of energy from mothers and other adults to weaned children continues for a long time. In humans, the task of

raising a child does not end at the time of weaning. There are many skills that children must learn before they become able to obtain their own food and become independent, and this learning takes years to acquire. The entirety of this education is part of raising a child, which involves the participation of all adults in the child's life. Humans are communal breeders.

Language and Sharing of "Mind"

Language is a means of communication that can convey almost everything in the form of thoughts. A biological basis for language is a

crucially important inherent ability of humans. It is the understanding of triadic representation. This understanding, as shown in **Fig. 1**, means that one sees an event in the outside world, follows the gaze of another individual, and knows that the other individual also sees the same event. Furthermore, the two individuals look at each other, look together at the event in the outer world, and mutually confirm that both have mental representations of the same event.

This ability comes so natural to humans that its importance often goes unnoticed, but chimpanzees seem to lack this ability. It is actually because of this understanding of triadic representation that humans can have the same mind as others and share knowledge about the world. Cooperative work is possible because of the understanding of triadic representation, and one of the means to express one's "mind" is language. People would not use language, if they didn't want to share their "mind" and knowledge. Therefore, a chimpanzee that has been taught a sign language-like system does not particularly want to talk. Human children develop the triadic representation very early in their lives, deepening the understanding of the minds of others and learning to use language.

Culture is the collective body of knowledge and concepts about the world held by a group. It is renewed, accumulated, and supplemented with new knowledge from generation to generation.

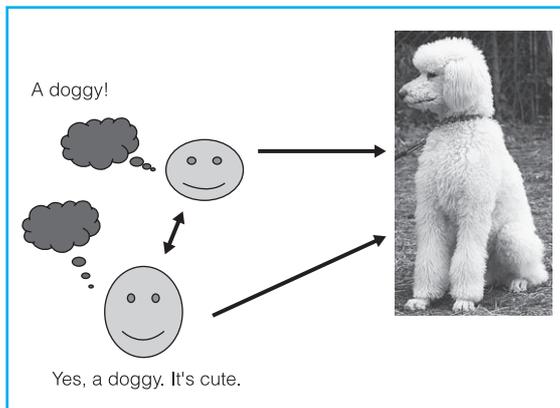


Fig. 1 Understanding of triadic representation

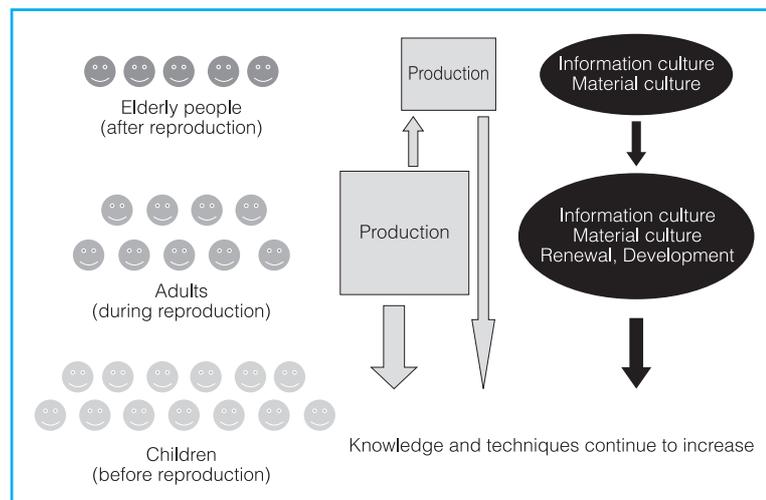


Fig. 2 Humans are following two concurrent paths: genetic evolution and cultural evolution

As a result, culture can progress at a remarkable speed (**Fig. 2**). In contrast, the genetic evolution of humans is not rapid enough to catch up with such progress.

Present and Future of Humanity

The above overview allows us to consider how our present is positioned in human evolutionary history. In the process of developing scientific-technological civilization through the sharing of concepts and knowledge about the world and cooperative working in society, we ourselves have cataclysmically altered the environment in which we live and our children grow. Newly created concepts and values are replacing old ones, and things that once were important are being lost. The problem is that the change is too rapid for genetic evolution to catch up.

The development of scientific-technological civilization has been satisfying the desires of humans and realizing various pleasures and comforts. Although humans must live in society, communal living has many kind of discomfort because of the presence of various discords and

conflicts among members. While science and technology have been moving in the direction of minimizing such difficulty, this has resulted in the individualization and isolation of people, impoverishing the social network. Science and technology may even be moving towards depriving our civilized society of the foundations for the sufficient understanding of social relations.

Child rearing does not end with weaning. It is not the matter of parents alone. If the understanding of triadic representation is the basis for the inherent abilities of humans, it begins with looking into each other's eyes, observing the world together, and sharing the mind we have. Although every human being is gifted with this ability, it can be brought to full fruition only when adults fully engage in interaction with children and train them through face-to-face communication, observing real-world materials. Such efforts help cultivate the understanding of the minds of others, enhance the use of language, and deepen one's own thoughts. Should this fundamental value be neglected in scientific-technological civilization, humans may one day cease to be humans.