

Opinion

Human ageing and the origins of religion

Robin Holliday

12 Roma Court, West Pennant Hills, NSW 2125, Sydney, Australia (e-mail: RandL.Holliday@bigpond.com)

Received 26 June 2000; accepted in revised form 23 July 2000

Key words: death, immortality, longevity, moral codes, mortality

Abstract

During the evolution of hominids, the population could be sustained even with an expectation of life at birth of less than 20 years. Under these circumstances very few individuals reached old age. In these hunter-gatherer communities, altruistic behaviour was encouraged because it increased the likelihood of survival, whereas self-interest did not. An early moral code benefited the community as a whole. As social evolution progressed, the chances of survival increased, and for the first time very elderly individuals appeared. However, the reward for survival to old age was merely decrepitude and death. Under these circumstances, new incentives became a social necessity, and these took the form of a belief in an eternal afterlife. Religion then became the basis for the moral code, and it provided an assurance of continual survival after death.

Introduction: Human evolution

Amongst animal species, humans are unique in knowing that every individual will eventually die. Even quite young children are aware that very elderly relatives do not have long to live, and that when they die they will never see them again. The situation was not always so clear cut as it is in human societies today. During the early evolution of hominids in hunter-gatherer societies, very few reached old age because death was normally due to disease, starvation, drought, predators, or perhaps local wars. It can be calculated that the population size could be maintained with an infant mortality rate of about 25% and an annual mortality rate of 7% (Holliday 1996). The expectation of life at birth was only 16 years, and for females who reached reproductive age of 17 years, the expectation of life was about 28 years. Females who survived this long would have produced, on average, six offspring. About 3% of all males and females might be expected to reach an age of 45–50 years. The documented life expectancies of primitive hunter-gatherer communities is fairly close to these calculated values (Meindl 1992).

It is probable that hunter-gatherer societies consisted of a few families with many important kin-

relationships. They were nomadic, depending on the one hand on hunting in co-operating groups, and on the other in the search for, and collecting of, edible plant components. In both cases, the group would have been more successful than an individual, so it was very important from an early stage that a strong sense of altruism and co-operation became part of the culture in which children were raised. Assuming that language was in existence at this period of human evolution, an important part of communication would be to explain the benefits of helping others in the community, and also the folly of selfishness and self-interest. In this way, a moral sense became part of the culture of the community.

Moral codes

It is fairly easy to envisage the form this moral teaching might take. It would be one of the roles of the more experienced members of the community, or it might be undertaken by the parents of children. It would be evident to all that the environment was overtly, or potentially, hostile and stressful. The benefits of successful hunting and the hard work of food gathering would be explained, as would the hazards of

predators. Also, the danger of being alone would be stressed, since the safety and survival of community depended in very large part on co-operative activities. The danger of the unknown in a hostile environment would be very important. This is in part built into our sensory system, since a substantial part of the retina is particularly sensitive to movement in our peripheral vision, just what is needed to detect danger approaching. It would not be surprising if the teachers in the society warned of unknown enemies, evil spirits and so on, which everyone must be made aware of. Such dangerous imaginary beings may well have been the first non-material creations in those early human societies.

The incentive to adopt these early moral values was very high. Those who followed the teachings would be much more likely to survive than those that did not. Thus, the acceptance of the normal morals of the community increased survival and longevity. However, at this early stage of human evolution, ageing itself would not have been an expected consequence of successful survival, because an extremely small proportion of individuals would have reached an age when physical deterioration became significant. In other words, old age *per se* would not have an important feature of the society, or any feature at all. One can go further, and suppose that individuals thought they might survive indefinitely, because the deaths they saw around them were due to intrinsic and extrinsic causes, other than ageing itself.

The key component of the evolutionary success of man was improved adaptation to the environment in which he found himself. Other higher primates live in social groups with complex family interactions, but the evolution of vastly improved communication through language and the use of tools greatly improved adaptive success. In numerical terms, this means a reduced rate of annual mortality, and an increase in population size. There are several evolutionary consequences of this. There is selection for females who reproduce for a longer period of time, simply because they have more offspring. This in turn is linked to a greater maximum longevity, and a slowing down of the rate of development to adulthood, which had indeed occurred throughout primate evolution (Holliday 1995, 1996). This trend benefits the acquisition of more skills and knowledge during childhood and adolescence, and also the evolution of greater brain size. All these features of human evolution have been discussed many times (see Wilson 1978; Jones et al. 1992). It is, however, worth pointing out that the

general argument is greatly strengthened by a consideration of the reverse situation. If annual mortality gradually increases, then the species will become extinct unless the rate of development and the rate of reproduction is increased, and it can also be shown that under these conditions there will also be selection for reduced longevity. (A clear-cut example of such an evolutionary trend in mammals is seen in specialised carnivores, such as stoats and weasels, which have a high metabolic rate, a high rate of development and reproduction, high mortality in their natural environment, and a reduced maximum longevity compared to other carnivores.)

The success of human adaptation to the environment increased inexorably, and then led to the ability to change the environment itself. This is particularly obvious in the development of agriculture. Instead of a nomadic existence, humans stayed in one location to plant, tend and harvest these crops, at least for one part of the year. The advantage, most obviously, was a more reliable food supply. Associated changes would have included the building of shelters, the increased size of each community, and finally, the division of labour into different activities within one community. For example, there would have been toolmakers, farmers and hunters, albeit no doubt with much overlap between them.

Ageing in the community

Successful exploitation of the environment and a reduced annual mortality, results in greater population size. This in turn results in greater and greater competition between different human communities. The results are immigration and war, but these features of human behaviour are not directly relevant to the argument being presented here. Instead the argument is based, in large part, on the altered age-structure of the most advanced human societies. More and more people in a community would survive to middle-age, and some would survive to old age, particularly as their basic requirements would be increasingly met by younger members of the community.

This trend would have had *very profound effects on the existing moral codes of behaviour*. As we saw, the teaching of the young revolved around the need for altruism and group interest, and the avoidance of acquisitiveness and self-interest. The reward was an increased likelihood of the raising of a family and a longer adult life. With the cultural evolution

I have discussed, the reward would finally become senility and decrepitude. Worthy hard-working individuals would feel cheated by the village elders or priests (if such existed), because it became all too clear that adult life could not be prolonged by altruism and community spirit.

The birth of religion

This, I believe, is the key to the evolution of human religions. *The social solution to the problem of senescence, old age and death, is simply to invoke an afterlife.* The existing moral codes would remain in place, but the eventual reward for virtue would be changed. Instead of the benefits of an increased likelihood of survival in a normal human community, the emphasis would be shifted to the benefits of survival in a non-material afterworld. In this context, immortality, paradise, reunion with long deceased relatives or friends become added incentives. It is all too easy to see how the elaborate superstructures of various religions came into being.

This is not to say that one or more individuals consciously devised a solution to the problem of old age. Everyone became aware of senility and death at the end of a long working life, and it would have been a few early thinkers who considered the problem seriously and proposed alternative scenarios. It is obvious from the contemporary world that people continually draw comfort from the belief in an afterlife. It would have been so many thousands of years ago as well, when humans had evolved most of their intellectual and emotional capacities. Those who first suggested the possibility of an afterworld wanted to believe in it themselves, and the advantages of that belief became apparent to all. Religious *faith* was born. Most modern religions are founded on the influence of a single person – a religious prophet. Such individuals believed they had God-given powers, and their success lay in their ability to persuade others that these powers were real and could override normal experience and expectations, as, for example, in the acceptance of miraculous events. It may well have been that very early in the origin of human religion such individuals also played a crucial role.

In this new context, the child became much more aware of death following old age. The answer to the question “why do we die?” can be dressed up within the context of any of several supernatural God-given or God-driven worlds. Previously, children were told

that relatives died because they got ill, were killed by predators, or starved. Indeed, if they were spared all these causes of death, and others, they might well live on this earth forever. This would have been a great comfort to them, but one, unfortunately, that became demonstrably false. It was necessary for parents and elders to provide new answers to the child’s question.

Diversity of religions

The general argument I have outlined does not depend on the details of the supernatural features of any particular religion. It applies to religions with one or many gods, religions which invoke re-incarnation, religions which state that all are eligible for an afterlife, or only the highly privileged or successful. The key features probably predate the religions we have information about, but it is very clear that those of the civilisations of Egypt and Mesopotamia placed great emphasis on the importance of the afterlife. Those cultures were highly advanced and sophisticated. We will probably never know in any detail the nature and the beliefs of all those less advanced cultures which preceded them.

Speculation about the exact form of any particular early religion is not helpful, as the following quotations show. “Granted the ubiquity of religion and its diversity, historians have found no universal essence expressible in terms of common beliefs” (Ramesy 1979). “An empirically based theory of religions origins is impossible since only remnants of archeological evidence are preserved to give hints of what the earliest forms might have been like” (Yinger 1979). We need to consider only those basic characteristics which would be necessary to define a clear social function. First, the religion would be based on a specific set of beliefs, formulated as dogmas that were not to be questioned. There would have to be uniformity of beliefs and dogmas within an established community, and those would be transmitted from generation to generation, with occasional modifications as appropriate. Second, there would be a specific function for priests or priest-like members of society. They would be responsible for teaching the beliefs to the rest of the community, since it would be essential for the beliefs to be uniformly accepted, the priest class would be endowed with authority, and most likely in direct contact with whatever gods were invoked. Third, the existence of omnipotent deities to provide a framework which answers the questions any conscious being might ask. Who created the world

and universe? Who created man? Why do men and women grow old and die? In all cases the answer is provided. The deity was responsible for creation and defining the course of life and death. Fourth, the religion would be closely related to the moral values that had probably predated the religion itself. Thus, worthy altruistic behaviour would be rewarded, and acquisitive, selfish or antisocial behaviour would be punished. This punishment might occur within the society itself, or it might become associated with the threat of a hellish afterlife, or re-incarnation to a lesser species. The invoking of evil spirits, unknown dangers and so on, might well be related to this aspect of religion, in order to deter antisocial behaviour. Fifth, the whole religious edifice would be built around a series of myths, about the origin of gods and humans, as well as visual symbolism. Instantly recognisable images of gods, or other mythical figures, would be essential components in gaining social acceptance, as would ceremonies and ceremonial events with individuals in elaborate dress. Many of these activities became intimately associated with art and music, and particularly, much later on, with architecture.

These five features of early religious faith are not at all isolated one from the other. There would be much overlap and interaction between them. The links between mortal beings and immortal gods would be very variable between different religions. Mortals can become god-like, and gods can enter normal communities. We know the potential power of one man, the prophet, is enormous. Yet this occurrence is likely to be rare, and for every successful prophet who founded a whole religion, there are probably thousands of cult figures who would themselves like to found their own particular religion by impressing their own beliefs on others. The complexity of modern contemporary society does not appear to have reduced the frequency of cults. Successful religion must have permanence in a particular community, or set of communities. Dawkins used the word *meme* to describe a belief which is transmitted from generation to generation, and he cited Judaistic memes as examples of some of the longest surviving ones (Dawkins 1976).

Further social evolution

The time scale of memes is minute compared to the time scale for genes. Although the emergence of hunter-gatherer communities with language and tools

may have occurred a quarter of a million years ago, it is likely that hominid evolution was quite slow during that period. Successive waves of human migration from Africa eventually occurred, with the replacement of one subspecies by another, although this is still a contentious issue. With regard to hominid evolution and the origin of religion, I propose here that the key factor was successful adaptation to the environment. This adaptation depended on the evolved brainpower of humans. The discovery and exploitation of agriculture and the establishment of increasingly complex settled communities was associated with a considerable increase in population size, eventually associated with the building of villages and towns. All this became possible because annual mortality was gradually reduced, probably at an accelerating rate as more complex and sophisticated communities were established. Evolutionary biologists and social anthropologists have discussed the origin and significance of human religions (reviewed by Evans-Pritchard 1968; Wilson 1978). It has not previously been suggested that there is a relationship between the first occurrence of senility and death from old age, and the social need to invoke immortality, as I have done here.

At the end of the twentieth century, it is appropriate to assess the current human situation in relation to the long period when religion was the dominant social force. We now have a very good understanding of the evolution of living organisms, including the evolution of all vertebrates and man. In the last decade or so it has become apparent why ageing evolved as an integral part of evolution itself (Rose 1991; Holliday 1995; Hayflick 1996; Austad 1997). In other words, we are aware not only of the inevitability of old age and death, but also of the reasons for the ageing of the body. Of course, only a minute fraction of humanity has this awareness, and most will continue with beliefs little altered from the past. These beliefs continue to revolve around the basic features of all religions. The belief is good and evil, and freedom of the will to make choices between them. The existence of a god or gods, and the means to communicate with them by prayer and revelation. A non-material soul or spirit which is immortal. In spite of the innumerable variations upon these basic faiths which now exist, I have argued here that all can be traced back to the earliest human religions.

Those that reject these ancient views have accepted the scientific facts that human individuals on this planet have finite survival time and that there is no non-material afterlife. This realistic view of ourselves

and the world we live in is not just a rejection of faiths, but encompasses the very strong belief that all human problems must be solved by human beings themselves (Holliday 1981). Human beings alone have knowledge and reason, and must act accordingly in the environment they find themselves, to face up to and solve their own problems. Resort to supernatural forces and a belief in fate will simply make these problems harder to solve in the end.

References

- Austad SN (1997) *Why We Age*. John Wiley, New York
- Dawkins R (1976) *The Selfish Gene*. Oxford University Press, Oxford
- Evans-Pritchard EE (1968) *Theories of Primitive Religion*. Oxford University Press, Oxford
- Hayflick L (1996) *How and Why We Age*. Random House, New York
- Holliday R (1981) *The Science of Human Progress*. Oxford University Press, Oxford
- Holliday R (1995) *Understanding Ageing*. Cambridge University Press, Cambridge
- Holliday R (1996) The evolution of human longevity. *Perspectives Biol Med* 40: 100–107
- Jones S, Martin R and Pilbeam D (eds) (1992) *The Cambridge Encyclopedia of Human Evolution*. Cambridge University Press, Cambridge
- Meindl RS (1992) Human populations before agriculture. In: Jones S, Martin R and Pilbeam D (eds) *The Cambridge Encyclopedia of Human Evolution*, pp 406–410. Cambridge University Press, Cambridge
- Ramesy JT (1979) Philosophy of Religion. *Encyclopaedia Britannica Inc*, 15th edition 45: 592–603
- Wilson EO (1978) *On Human Nature*. Harvard University Press, Cambridge, MA
- Yinger JM (1979) Social Aspects of Religion. *Encyclopaedia Britannica Inc*, 15th edition 15: 604–613