

A Scientific Definition of Religion

by

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Abstract

Religion is a collection of behavior that is only unified in our Western conception of it. It need not have a natural unity. There is no reason to assume, and good reason not to assume, that all religious behavior evolved together at the same time in response to a single shift in the environment. This article does not look at the religion as a unified entity and seek a definition of its essence. Instead, it looks at what science needs to know in order to discover how and why religion came into existence as a human behavior. What does science need to know about religion, or how should religion be defined so that science can look at it? A definition that refers to observable behavior is required. Then, a preliminary hypothesis to orient observations is proposed. I suggest a preliminary hypothesis consisting of three stages in the evolution of religion: (1) a cognizer of unobservable agents, (2) a sacred category classifier, and (3) a motivator for public sacrifice. Each one of these stages is a nucleus of modern anthropological theorizing. Although they all come together in the Western folk concept of religion, this article proposes that they are independent evolutionary complexes that should not be lumped together, but should be investigated as separate types of religious behavior.

Understanding Religion

Religion is a human activity that can be easily accepted only within the framework of reality that it creates for itself. If you accept the existence of whatever myth, god, spirit, or supernatural force that a religion proposes, then you can see the logic of all that follows. However, most of the entities, gods or whatever, that are the basis of religious thought and action cannot have their existence validated by direct observation. How do non-believers understand religion? Simply saying that the believers are crazy or living in a different world will not suffice. The believers are also normal human beings. They are no crazier than anyone else.

There is another way to look at religion, through science. Science has provided human culture with an excellent understanding of the natural world and human behavior. However, for the scientist, the logic of religious behavior is not simple. The scientist must understand religion as the

complex workings of a human brain that is not responding directly to observable reality. The cause of religious behavior for the scientist does not lie in myth but in an understanding of why human beings do and think what they do. Among other explanations, science has found that they do what they do because they have been made that way by evolution. Evolution is one key to understanding of religion from a scientific point of view.

Is religious behavior rational? Is it the mobilization of available means to achieve certain ends? The sociologists Stark and Fink (2000) argue that religious behavior is actually rational in an economic sense in spite of the fact that the believers work with unobservable actors and magical processes. The rationality is economic and can be seen in the social and material rewards that flow from participation in religious groups. When there is a market place for different faiths, individuals usually choose, consciously or unconsciously, the faith that brings them the most rewards. The rationality in this case is apparent when one measures the rewards that flow from different religious activities. So, despite its apparent irrationality, religious activity can have a latent economic rationality. However, economic rationality is the surface manifestation of underlying trophic tendencies built into the mammalian brain. This is seen in the optimal foraging behavior of most species. Thus, evolution can cause economic rationality.

Is religion an exclusively human behavior? Religion has some particularly human characteristics and some pre-human ones as well. It depends on the unique human ability to communicate with language. Religion, as we know it, needs language, but that does not mean that it has freed itself from pre-human behavior found among primates, mammals, and even reptiles. Religion has rituals and non-human animals have rituals. Birds have rituals, reptiles have rituals, and they communicate symbolically with other members of their species. They just do not use the same linguistic structures that humans use.

Does human psychology explain religion? Religion can be examined by psychological science. Psychological explanations satisfy many social scientists (eg. Hinde 1999; Kirkpatrick 2005). Religion has obvious psychological functions. It takes care of: the need for a comforting parent figure, the need to explain difficult things, the need to fight depression, the need to deny mortality, etc. However, psychology does not explain how humans got to be religious. Although psychological explanations tell us why people do religious things, they do not tell us how religion got started and why it continues. They do not tell us about religion's evolutionary past or future. They tell us how religion works in the mind, but they do not tell us how the mind got that way. The mind is a product of evolution, not its cause.

Evolutionary Science

Because the evolution of living forms takes place slowly, it cannot be easily observed. We understand it primarily through the traces that it leaves. Understanding the process that produces these traces is difficult. Darwin (1859) took a great step forward in recognizing one of these processes, natural selection. Natural selection takes place when inherited forms within a species duplicate themselves at different rates. Eventually, the fast duplicating forms become more numerous than the slowly duplicating forms. Variation within the species maintains the process

The human central nervous system permits another form of evolution, environmental learning. More complex species, like humans, have a large central nervous system that can receive information from the environment and alter behavior to meet the challenges of that environment. Human beings can also receive information from each other. When this happens, the learner does not have to pay the costs of the experience itself. What humans acquire culturally from each other comes at a much reduced cost than the original knowledge.

Until its evolutionary history is fully understood, we might regard religion as a type of irrational adaptation. It is irrational in the sense that it does not move individuals to solve problems rationally. However, adaptive behavior does not have to be rationally aimed at an obvious goal. Behaviors that appear irrational can evolve by increasing reproductive fitness, often called just “fitness”, which is a measure of the rate at which individuals reproduce. Evolving behavior may increase the fitness of an individual or the fitness of kin, who have a high probability of carrying the behavioral gene themselves.¹ If religion is adaptive, it must be irrationally adaptive in this way. Its ubiquity and its longevity argue in favor of its being adaptive in some way at this level.

To deal with the complex gene-culture evolution of religion, E. O. Wilson (1978: 182-185) postulated three types of selection: (1) ecclesiastic (2) ecological, and (3) genetic. They are given in the order of how rapidly they respond to environmental change. Ecclesiastic selection is the quickest. It is the response that religions leaders have to changing situations. It is the most irrational: There are hard times. A message from “god” is received, and people follow a new leader, hopefully, to a better life. Now, ecological selection sets in. The lives of some are improved. The lives of others are not. Ecology may favor some religious changes and punish others. After a long while, genetic change takes place. The genes that favored the successful religious responses are propagated, and those that did not favor them are lost. Nothing in this process appears as obvious rational behavior.

Religious behavior could be selected in other ways. It could be selected sexually. In other words, it could enhance the ability to attract mates. It could also promote the successful rearing of

1. This later measure of the total fitness effect of a gene is called its *inclusive fitness* (Eberhard 1975).

offspring. Religions do meddle in sexual behavior and relations within the family. All of this needs to be kept in mind when developing an evolutionary model of religion.

A Critique of Anthropological Definitions of Religion

Many social scientists prefer a single encompassing definition of religion, an essential definition. For example, Guthrie (1993) sees anthropocentrism as the essence of religion. He sees a projection of human attributes into the perceived world as the essence of religion. Kirkpatrick (2005) sees religion as psychological attachment, a powerful emotional relationship to things. Such essentialist authors do not confine themselves to discussing the narrow range of behavior signified by their concepts, but they use the concepts as a way of organizing the information that they present, and they concentrate on those aspects of religion that support these conceptualizations. However lovely to the inquiring mind they may be, essentialist definitions such as these have not been very useful to scientific theory (Saler 1993:81). They confuse evolutionary models by lumping together traits that may have different evolutionary origins. Evolution does not create essences. It creates new genetic codes, not grand conceptions.

A definition of religion is difficult to make, because religion has many facets, many of which do not appear to be religious by themselves. For example, religion involves gathering in groups. It involves communal eating. It involves theoretical discourse about the nature of the universe, and so forth. Countless definitions have been proposed by theoreticians. The most interesting thing is that the average person can tell when others are engaging in religious behavior while many scholars and scientists have problems defining it. The concept of religion is like the concept of culture. It is easy to use in ordinary discourse, but difficult to define precisely.

Looking back at the nineteenth and early twentieth century, Bronislaw Malinowski—often regarded as the father of modern empirical anthropology—concluded that anthropological definitions of religion in mid nineteen-twenties had become frankly chaotic. Cultural anthropology was not in good shape when it came to defining religion. Malinowski wrote:

Our historical survey of theories has left us somewhat bewildered with the chaos of opinions and the jumble of phenomena. While it was difficult not to admit into the enclosure of religion one after the other, spirits and ghosts, totems and social events, death and life, yet in the process religion seemed to become a thing more and more confused, both an all and a nothing. [Malinowski 1948:36]

The confusion of which Malinowski wrote was the result of other early anthropological theorists beginning with E. B. Tylor (1958[1871]) who defined religion as a belief in spirits. Spirits were gods, animating powers, animal-spirit companions, etc, all of which seemed to have a religious cast. He

attributed the origin of these religious ideas to dreams rather than to cultural evolution. This was a back-door admission that religion had some sort of biological origin since dreams are produced in the central nervous system.² Tylor spent time looking at world religions and reduced their fundamentals to his concept of *animism*. He theorized that human consciousness reached out to understand the world by projecting into it beings or souls with very human-like intentions. It was a logical way of thinking, based on the experience of dreams. Tylor saw humans as always improving their intelligences through rational thought. The primitives were basically rational in their idea of souls, but they had little scientific knowledge. Animism was rational but ignorant. Tylor believed that minds would improve as they acquired more scientific knowledge. Durkheim later followed this progressive tradition by declaring that science would eventually triumph over religion as the primary human representation of reality.

Nineteenth century ideas about the origins of religion left biology behind and began to speculate about the socio-cultural evolution of religion, a process that, at that time, was clearly connected to concepts of social “progress.” One of the first definitions of religion within this school of thought was proposed by Émil Durkheim (1963[1912]). He defined religion as a collective representation that made things sacred. Religion was a world view that created the sacred. The power to do this resided in the collective itself, society. So society had to create religion. Durkheim felt that religion was the foundation of society. The problem with Durkheim's definition was that some people practiced religious activities by themselves without the presence of others, without society. You could say that they were surrounded by a society in some environmental sense. But there were persons, shamans, diviners, prophets, charismatic cult leaders, and other holy folk, who communicated directly with the divine without the intervention of social convention and who created religion on their own. Durkheim lumped this sort of behavior into the category of “magic,” said that it was outside of religion, and so, preserved his society-oriented viewpoint at the cost of leaving out a vast panoply of behavior that most people would call religious. Durkheim ignored the possibility that religion was coming out of the human brain, the mind, without the help of “society.”

“Religion” is, in fact, a folk category in Western culture. Comparative analysis can flounder on efforts to use folk categories in scientific analysis. It is important for scientific investigation to have a clear definition of a phenomenon. Folk categories can be overgeneralized into essentialist definitions that are of little use. Today's anthropology has often been driven back to the idea that, although we can see basic human behavior in each cultural system, the cultural systems are them-

2. Tylor's book *Primitive Culture* was aimed at adducing evidence for the *great doctrine of animism*, his insightful theory about the “origins” of religion (Saler 1997). Many thinkers in the late nineteenth century were searching for these origins, a state of religion in its more pristine form out of which the more “enlightened” religions of the 19th century evolved. Thus, when so-called “primitive” beliefs such as magic or divination cropped up in 19th century European society, they were regarded as survivals carried over from earlier evolutionary forms in a manner akin to vestigial organs in animal physiology (Tylor 1958[1871]:112--159).

selves ultimately unique. This is true, but defeats the effort to discover the evolutionary history and adaptive processes in human behavior. One of the most well known proponents of an essentialist definition of religion that incorporates the idea of cultural uniqueness is Clifford Geertz, who put forward a definition that has been quite influential. Geertz (1993 [1966]: 90) defined religion as:

(1) a system of symbols which acts to (2) establish powerful, pervasive, and long-lasting moods and motivations in men by (3) formulating conceptions of a general order of existence and (4) clothing these conceptions with such an aura of factuality that (5) the moods and motivations seem uniquely realistic.

This is a restatement of the folk category of religion in Western European culture. Talal Asad (1983) writes that the folk category that Geertz elaborates is not only Western in origin but is distinctly Christian.³ Saler (1993: 96) disagrees with this interpretation somewhat and writes that Geertz's definition is a Western cultural idea but not necessarily a Christian one. In either case, Geertz's definition does not lead to the kind of systematic and objective observation that can support a scientific understanding of religion. Nevertheless, it feels right because it is a distillation of the Western folk category of religion. It feels right but has many problems in its application. As Geertz unpacks his definition, it appears that many of the five components of religion consist of interrelated "meanings." So the scientist is left with the task of studying and classifying meanings. Then the meanings act on people, so the observer now has to observe meanings acting on people, a very difficult task that cannot easily be carried out with objectivity.

Definitions and Theory

Definitions that are used in science are always provisional. New and better definitions of phenomena will always be accepted when they simplify and assist in the generation of better theory. The important thing to science, evolutionary and otherwise, is that the phenomena are identifiable and observable. There is no reason to start an analysis of religion with a definition that cannot be changed as later understanding develops. All that is needed is a way of identifying the phenomena being studied. For example a study of gravitational forces can start with the idea that objects fall down rather than up, to identify the phenomena to study. We don't have to specify the nature of gravitational fields. That comes later.

3. Asad may go too far in criticizing Geertz for leaving out power relationships. Geertz (1993 [1966]:109) does elaborate his idea of "clothing those conceptions with such an aura of factuality that ..." implying that he is thinking about the power that authorities have over believers. A difference between Geertz (1993 [1966]) and Asad (1983) is that Geertz sees religion as a phenomenon in the mind of the believer and Asad sees it as a social process.

Scientific approaches to knowledge often start with a provisional theory that points at phenomena to observe. The phenomena are observed, and the theory is developed further. The definitions are operational and not permanent. New concepts and entities with new definitions are proposed as understanding of the phenomena deepens. This paradigmatic framework has been outlined by philosophers of science such as Hempel (1966). It points in a very fruitful direction. There is proven potential in such an approach rather than the typical social science approach of making synthetic, essentialist, all-encompassing definitions that make unoperationalizable references to unmeasurable human experience. If definitions are to be made, it is better to begin with a provisional theory and then derive some categories of behavior to be observed and analyzed. The natural sciences have developed some excellent intellectual tools, and using them in the social sciences is far from foolish. Saler (2004) points the way to using natural science methods in the study of religion. He advocates abandoning a “standard social science model” that ignores human nature.⁴

Religious phenomena, religious behaviors, can better be defined by avoiding vague intuitive elements or unobservable subjective elements such as meanings. Anthony Wallace (1966:62-66), an anthropologist, in 1966 identified thirteen observable universal behavioral complexes that provide a minimal definition of religion. They are shown in Table 1. Wallace's behavioral categories show that religion can be defined by observable behavior. Every culture may not have a single concept such as *religion* to describe the totality of this collection of behavior; however these behaviors outline something that exists in most cultures. Wallace's behavioral collection puts the definition of religion on a much more operational and practical footing than definitions that refer to meanings. Myths and meanings are part of religion, but the observable behavior that goes along with them seems to be the thing that allows Westerners to perceive something that is acceptably “religious.”

A Definition of Religious Behavior

Religion is a collection of behavior that is only unified in our Western conception of it. There is no reason to assume, and good reason not to assume, that this behavior evolved together at the same time in response to a single shift in the environment. For example, Atran (2002) and Boyer (2001) see religion as a great potpourri of ideas and behavior with many independent evolutionary origins outside of religion itself.

The provisional definition herein is based on three behavioral modules. I use the term *modules* to refer to these behavior complexes in keeping with the vocabulary of evolutionary psychology (Tooby and Cosmides 1992); however, the range of behavior within each one is wide, and they could

4. The standard social science model asserts that all social behavior is learned from other members of one's social group and that people have no biologically determined social behaviors. For a critique of the standard social science model see Tooby and Cosmides (1992), Wilson (1998), and Pinker (2002).

also be called *complexes* to indicate the variety of behavior to which they refer. They are modules in the sense that they are solutions to particular problems of survival and reproduction. These modules evolved at different times and actually provide three separate means for identifying religion. Behavior that is produced by any one of these modules can be considered religious.

The three modules are listed in Table 2. They are derived from modern ongoing theories about the evolution of religion. Figure 1 shows them in two dimensions. The vertical dimension represents evolutionary time. The oldest is at the bottom and the newest, at the top. The horizontal dimension represents the rapidity of the adaptive response. Genetic responses are at the left and ecclesiastical responses are at the right.

The earliest module, a *cognizer of unobservable agents*, has been proposed by Scott Atran (2002). Humans have a mental capacity to create images of unobservable agents who cause real things to happen. There are countless examples of unobservable agents, gods, ghosts, witches, angels, spirits, dead ancestors, patron saints, demons, extraterrestrials, culture heroes, etc. in religion. The idea actually goes back to Tylor's theory of souls. Souls are animating agents. The idea of agents could be a pre-human adaptation to predators. The animal who imagined a predator lurking in the bushes would have a better chance of survival than one who did not.

The second module, a *sacred category classifier*, may also not be exclusively human. We know about it among humans because it is communicated symbolically; however it may be derived from animal devotion to a herd leader or parent. This mental ability separates things into profane and sacred categories. The sacred is higher, more powerful, and must be treated with respect. Rules of behavior toward sacred and non sacred objects are established in a social context. Behavior is oriented by a moral continuum of purity, with the most sacred on one end and the most sordid and impure on the other. Roy Rappaport (1999) has discussed sacredness at length and has developed the argument that it is an evolutionary adaptation. It controls how human groups interact with their environment. Sacred signals coordinate group responses to environmental change. Many others starting with Durkheim have written about it. Sacredness was central to Durkheim's definition of religion. Mary Douglas (1966), for example, is concerned with pollution and taboo, the antithesis of the sacred that is equally religious in context. Because it is communicated syntactically it is linked to the time that humans developed language.

The third module of religious behavior, *public sacrifice*, is highly symbolic. It seems to have evolved as a defense mechanism against symbolic deception according to the theories of Irons (2001) and Sosis and Alcorta (2003). Sacrifice demonstrates a commitment to the ideology of a particular group and activates cooperation within that group. According to Irons and Sosis, hard-to-fake acts of sacrifice prove to the group that an individual can be trusted. These are costly signals akin to costly signals among other members of the animal kingdom. In the case of humans, the

fitness benefits come from better cooperation. In the case of animals the benefits may come from an attraction of a better mate. Not all sacrifices are religious however. Religious sacrifices are altruistic, performed publicly, and guided by a shared philosophy of the sacred. Other non-religious sacrifices may be for the benefit of kinspersons such as offspring and are explained evolutionarily better as kin altruism. The complexity of the signaling in public sacrifice puts its development at a later date than that of sacred-symbol messaging.

Thus, religion is provisionally defined as behavior within any of these three separate modules. The systems have evolved at different times with different adaptive functions. The systems are maintained by modules in brain that are biologically reproduced in most humans. So they evoke a natural response when perceived by other people. Western culture puts all these responses into the folk category of religion, but some cultures separate them. For example, the Confucian religions of Asia seem to be focused on module 2, *acts of reverence toward sacred things*, and leave the other two modules aside.

Shamanic religions emphasize module 1, *acts and beliefs relating to unobservable agents*, and downplay modules 2, and 3, which have much more to do with maintaining cooperation in moderately-sized or large-sized social systems. Shamanism is often the only type of “religion” in hunter-gatherer cultures in which social relationships are local and organized primarily by kinship. The difference between shamans and priests is essentially the difference between religious practitioner in behavioral module 1 and practitioners in behavioral module 2. In Mesoamerica the native religious practitioners (shaman-priests) deal with both modules 1 and 2. This poses a serious conceptual problem for anthropologists who attempt essentialist definitions of shamanism (eg. Kehoe 2000; Eliade 1964[1951]). In some religions, such as folk Catholicism, the three modules are completely integrated. In Circum-Mediterranean and New-World-Iberian cultures where folk Catholicism is prevalent, Saints, supernatural agents (1), are treated with great reverence (2), and sacrifices (3) are offered to them during fiestas. This three-way synthesis is found in many peasant cultures such as those in India and China. In many cases, the agents are ancestors. There may be other behavioral modules yet delineated that are involved in “religion.” The ones outlined here serve to set out a preliminary definition for the evolutionary science of religion.

These modules should be studied separately, because their evolutionary history is very different. They have responded to different selective pressures on the central nervous system as were noted by Wilson in his schema. It looks like the evolutionary science of religion will lead in different directions; however, it should eventually be able to explain how and why human beings develop and maintain a panoply of complex irrational behaviors that are very influential in their lives.

Conclusion

Religion is not a single thing. It is a body of behavior unified by our failure to find a simple rational explanation for it when seen from the perspective of the individual. However, behavioral complexes within religion do have adaptive rationality when seen in evolutionary perspective. To move ahead with the scientific understanding of religion, these complexes, modules, should be defined and studied independently. The three outlined here appear to have evolved at very different times.

To understand the module *cognizer of unobservable agents*, comparative animal-human studies of fear reactions would help to understand how images of powerful unseen beings benefit the individual and the group. The flight of a herd of animals, or more appropriately, the flight arboreal primates might be compared with reactions to images of unpredictable gods. The module *sacred category classifier* varies from culture to culture and can be related to particular cultural ecologies. It seems to have evolved at a time that cultural information was becoming an important mechanism for human adaptation. Agricultural cultures have a group of sacred categories different from those found in hunter gatherer cultures. The module *public sacrifice* is part of a complex which organizes groups around charismatic leaders.

Religion should be defined according to modular complexes that have been set up by evolution to solve adaptive problems. The three described here are probably not the only ones; however they are a starting place, a set of hypotheses that organize the search for data that will reveal why human beings engage in the behaviors that they call religious.

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Tables

Table 1: Wallace's Behavioral Complexes

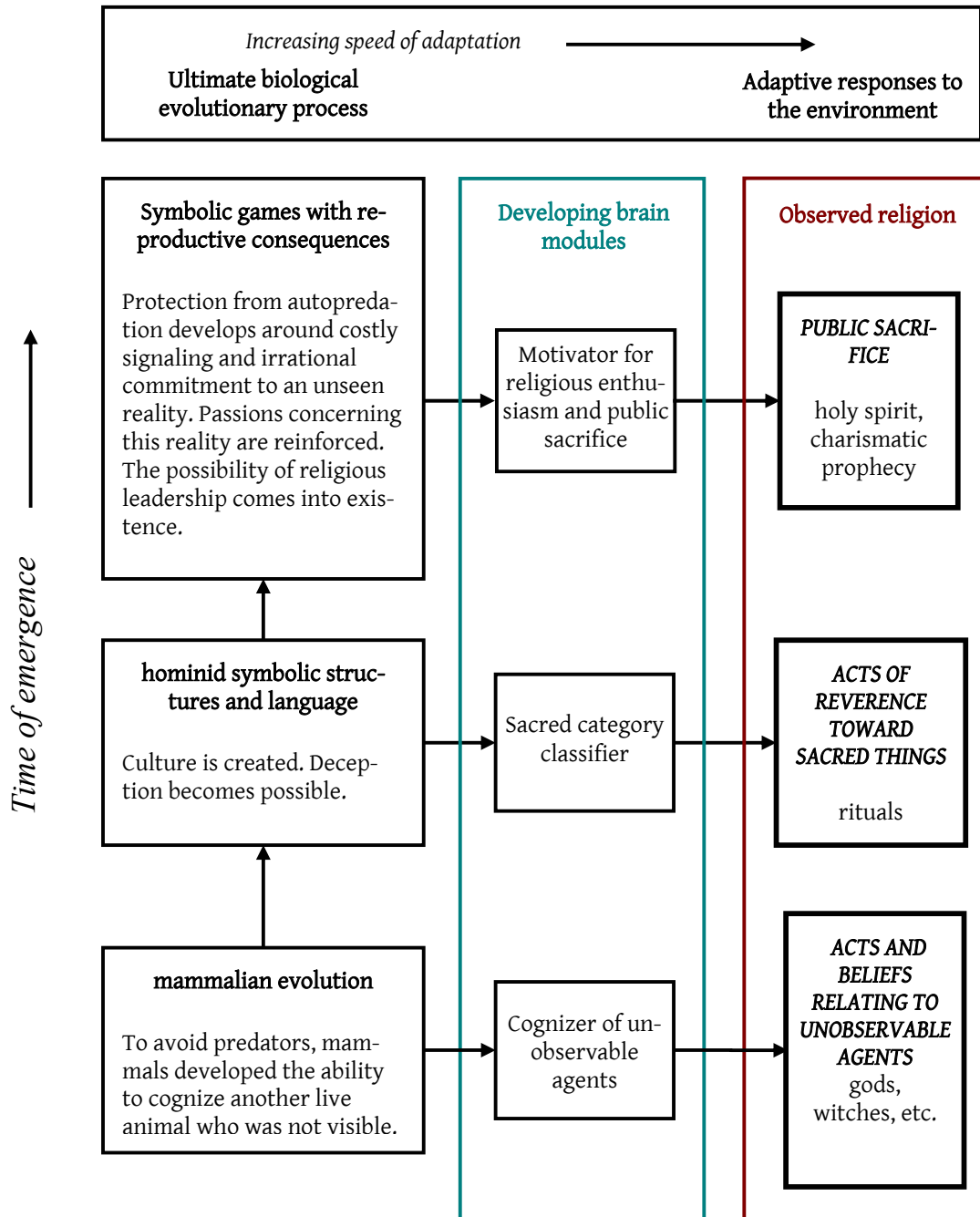
<p>Prayer: <i>Addressing the supernatural.</i> This includes any kind of communication between people and unseen non human entities.</p> <p>Music: <i>Dancing, singing and playing instruments.</i> Although all music is not religious, there are few religions that do not include it.</p> <p>Physiological exercise: <i>The physical manipulation of psychological state.</i> This includes such tools as drugs, sensory deprivation, and mortification of the flesh by pain, sleeplessness, or fatigue.</p> <p>Exhortation: <i>Addressing another human being.</i> This includes preaching by a minister, shaman, or other magicoreligious practitioner.</p> <p>Reciting the code: <i>Mythology, morality, and other aspects of the belief system.</i> Every religion has its myths, symbols, and sacred knowledge.</p> <p>Simulation: <i>Imitating things.</i> This is a special type of symbolic manipulation found particularly in religious ritual. It is similar to Frazer's (1911) concept of sympathetic magic.</p> <p>Mana: <i>Touching things.</i> This refers to the transfer of supernatural power through contact. Frazer's contagious magic is included.</p> <p>Taboo: <i>Not touching things.</i> Religions usually proscribe certain things, the eating of certain foods, contact with impure things, impure thinking, etc.</p> <p>Feasts: <i>Eating and drinking.</i> All celebrations are not religious, but most religions have them.</p> <p>Sacrifice: <i>Immolation, offerings, and fees.</i> Sacrifice is probably the single most definitive behavior.</p> <p>Congregation: <i>Processions, meetings, and convocations.</i> Religions organize groups. Their rituals identify groups and create group solidarity.</p> <p>Inspiration: Wallace (1966:66) writes “all religions recognize some experiences as being the result of divine intervention in human life.”</p>

Table 2: Provisional Determinative Behavior Modules and the Associate Behavior

	Brain module	Behavior
1.	Cognizer of unobservable agents	Acts and beliefs relating to unobservable agents
2.	Sacred category classifier	Acts of reverence toward the sacred
3.	Motivator for religious enthusiasm and public sacrifice	Public sacrifice.

Figures

Figure 1: Modules in an Evolutionary Sequence



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