

Evolutionary Religious Studies (ERS): A Beginner's Guide

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Religion has been studied from a scholarly and scientific perspective for as long as there have been scholars and scientists. Early contributors such as Tyler (1871), Frazier (1890), Durkheim (1912), James (1902) and Weber (1930) were trying to explain religion from a *naturalistic perspective*, without invoking the actual existence of supernatural agents or events.

Today, there is an enormous body of information on religious phenomena from a naturalistic perspective. Much of it is descriptive but there is also plenty of quantitative information, gathered and analyzed by the tools of modern science. Some studies are conducted without any theoretical framework in mind but there are also numerous attempts to understand religion from a particular theoretical perspective, such as Marxism, Freudian psychology, or rational choice theory.

Against this background, studying religious phenomena from an *evolutionary* perspective is both old and new. Darwin and his colleagues were keenly interested in studying all aspects of humanity from an evolutionary perspective, including religion. However, this inquiry led in directions that can be recognized as false in retrospect. Cultural evolution was envisioned as a linear progression from “savagery” to “civilization,” with European societies most advanced (Carniero 2003). Herbert Spencer and others used evolution to justify a hierarchical society (“Social Darwinism”) and non-egalitarian social practices such as eugenics (Richards 1987). These views were probably inevitable against the background of Victorian culture, as Janet Browne’s (1995, 2002) magnificent 2-volume biography of Darwin and his times attests. Rather than challenging the support that evolutionary theory lent to such views, many scholars and scientists rejected the theory as a useful framework for understanding our species, however insightful it might be for understanding the rest of life. In this fashion,

evolutionary theory became restricted to the biological sciences and excluded from most human-related subjects for most of the 20th century. The controversy surrounding the publication of E.O. Wilson's *Sociobiology* in 1975 illustrates the tenor of the times.

The modern study of humans from an evolutionary perspective represents a fresh start that is based on a much more sophisticated body of theory and knowledge. To give an idea of its recency, terms such as “evolutionary psychology” and “evolutionary anthropology” were not even coined until the 1980's and 90's. Yet, the evolutionary perspective is proving so useful and spreading so fast that in a recent analysis of a premier behavioral science journal (*Behavioral and Brain Sciences*), over 30% of the articles were written from an evolutionary perspective during 2000-2004 (Wilson, unpublished data). Evolutionary theory is rapidly becoming a unifying theoretical framework for the study all human-related subjects, just as it unified the biological sciences during the 20th century.

The new field of evolutionary religious studies (ERS) is part of this larger trend. To give an idea of its recency, the 2004 meeting of the Society for the Scientific Study of Religion was attended by several hundred participants over a several day period, yet only a single sparsely attended symposium was devoted to the scientific study of religion from an *evolutionary* perspective. The vast majority of participants were using the tools of science to study religion, but had never thought about using evolutionary theory as an explanatory framework. In most cases, this was not because they were *hostile* to evolutionary theory, but because they had never *encountered* the theory in their disciplinary training, whether they had been trained as psychologists, anthropologists, economists, sociologists, and so on.

This article is written for scholars and scientists from all disciplinary backgrounds who wish to explore how religion can be studied from an evolutionary perspective. A remarkably short training period is sufficient to get started. In the aforementioned analysis of the *Behavioral and Brain Sciences*, most of the authors of evolution-related articles received their formal training in other disciplines and acquired their evolutionary expertise on their own initiative. It is therefore possible for any scholar or scientist interested in religion to become involved in the emerging field of evolutionary religious studies at the professional level.

SOME PRELIMINARIES

Readers who are newly encountering the field of evolutionary religious studies might come from a variety of backgrounds. Some might be religious believers, others might be primarily scholars and historians of religion, while others might already be employing scientific theories and methods. The following preliminary remarks are intended to get everyone “on the same page” with respect to approaching the subject of religion from an evolutionary perspective.

On the relationship between evolutionary theory and theological explanatory frameworks

Many explanations of religion are theological; that is, they assume the existence of supernatural agents that are capable of intervening in physical processes and human affairs. According to a literal interpretation of the Christian and Hebrew bibles, for example, all living terrestrial animals are descended from ancestors that survived the flood on Noah’s Ark. Supernatural explanations such as these are rejected by everyone who adopts a naturalistic perspective, not just evolutionists. Why? Because they so utterly fail to explain the facts of the world. The geographical distribution of terrestrial animals, for example, cannot be explained as originating from a single geographical location. In addition, the purpose of a theory is to make predictions about measurable properties of the world. Unless we know the will of hypothetical supernatural agents in considerable detail, then we cannot make predictions about their actions. The failure of theology to function as a scientific theory was widely acknowledged before Darwin. For example, Darwin quoted the following passage written by the Anglican Priest William Whewell in 1833 on the frontspiece of the first edition of *Origin of Species*: “But with regard to the material world, we can at least go so far as this—we can perceive that events are brought about not by insulated interpositions of Divine power, exerted in each particular case, but by the establishment of general laws.” Modern-day creationists and “intelligent design” proponents have done nothing to alter this assessment (Pennock 1999).

On the relationship between evolutionary theory and traditional religious scholarship

Much traditional religious scholarship, like historical and cultural scholarship in general, is particularistic. The primary effort is to describe and understand a particular religious system (such as early Calvinism), usually in relation to a larger domain of knowledge (such as the Protestant reformation) but not with the goal of explaining religion as a whole on the basis of a general theoretical framework. Mistrust of grand theorizing is understandable, because a succession of grand theories of history, religion, and culture have come and gone. Nevertheless, the fact that evolution is an authentic grand theory for the rest of life on earth suggests that it might also succeed with respect to our own species, even if previous grand theories failed.

On the relationship between evolutionary theory and other theoretical frameworks

When we confine our attention to formal theoretical frameworks, such as Marxism, rational choice theory, and evolutionary theory, it is important to realize that these are not like alternative scientific hypotheses that invoke different processes, such that one can be right and the other wrong on the basis of empirical observations. Consider rational choice theory, which assumes that human behavior can be explained in terms of individual utility maximization. When challenged to explain this assumption, most rational choice theorists would say that utility maximization evolved as a genetic and/or cultural adaptation—those who maximized their utilities survived and reproduced better than their suboptimal competitors. In this fashion, rational choice theorists assume that their ideas are *consistent* with evolutionary theory, *without requiring much knowledge about* evolutionary theory. This is very different from regarding them as alternative hypotheses, such that one can be right and the other wrong. More generally, when the assumptions of *any* naturalistic explanatory framework are challenged, all roads lead to evolutionary theory.

The case of rational choice theory is instructive because it has been severely challenged within the field of economics. Many economists have decided that human behavior cannot be explained entirely on the basis of individual utility maximization. In

this sense, rational choice theory is just plain wrong. The field of experimental economics was initiated to empirically discover the actual preferences that drive human behavior in different cultures and environmental situations. This was such an important development that two pioneers, Daniel Kahneman and Vernon Smith, were awarded the Nobel Prize in Economics in 2002. Any experimental research program requires a theoretical framework, however. Where do the human preferences revealed by experimental economics *come* from? Economists such as Samuel Bowles (2003), Ernst Fehr and Simon Gächter (2003), Herbert Gintis (2000), and Peter Hammerstein (2003) are providing a new theoretical foundation for the field of economics that is based explicitly on evolutionary theory. Moreover, their work draws heavily upon anthropologists (such as Boehm 1999) biologists (such as Richerson and Boyd 2005), and psychologists (such as Gigerenzer et al. 2000) in a merging of disciplines that is the hallmark of evolutionary inquiry.

Evolution, learning and culture

A similar story can be told for theories of learning and culture. A common formulation is that biology sets broad limits on human behavior, while everything within those limits is determined by learning and culture. According to this formulation, it is true but boring to point out that we like to eat and have sex; much more interesting is our rich cultural diversity, about which evolution has nothing to say. In the same vein, evolution is often equated with genetic determinism, in contrast to the human capacity for change, which is therefore imagined as an alternative to evolution.

As with rational choice theory, this formulation relies upon evolution to justify its own assumptions. The human capacity for short-term change had to come from somewhere, presumably genetic evolution. Less flexible humans existed in the past but were not among our ancestors. The evolutionary account need not rely upon adaptation and natural selection; evolutionists Stephen Jay Gould and Richard Lewontin (1979), for example, emphasized chance and developmental constraints in their speculations about human evolution. Either way, those who regard “learning” and “culture” as alternatives to “biology” and “evolution” are in the precarious position of relying upon the very theory that they reject.

Unsurprisingly in retrospect, the human capacity for fast-paced change is better understood from a sophisticated evolutionary perspective than as an imagined alternative to evolution. Consider an analogy with the immune system, it is a mind-bogglingly complex genetic adaptation for fighting disease organisms, yet its centerpiece is an open-ended process of random antibody formation and selective retention based on their ability to bind to antigens. The immune system is a fast-paced process of antibody evolution, built by the slow-paced process of genetic evolution. Suppose that someone were to argue that the immune system could be understood without recourse to evolution, because it is capable of fast-paced change. This would be deeply wrong for two reasons. First, the immune system could not possibly function without its elaborate, genetically evolved architecture. Second, the immune system's capacity for fast-paced change is itself an evolutionary process. As for the immune system, so also for the human capacity for fast-paced behavioral and cultural change (Wilson 2005).

The immune system metaphor is highly relevant to the study of religion. One objective of evolutionary religious studies is to explain the genetically evolved psychological architecture that underlies religious belief and practice, such as the propensity for young children to believe in an afterlife (Bering 2006) or the propensity of all people to attribute agency to the events that take place around them (Boyer 2001, Atran 2002). Another objective of evolutionary religious studies is to explain the properties of particular religions in relation to their physical and social environments; for example, why belief in an afterlife features more prominently in Christianity and Islam than ancient Israel, from which they were derived. These rapid cultural changes—at least compared to genetic evolution, since they can still require decades and centuries to take place—are comparable to antibody formation. Both objectives are integral to the study of religion from an evolutionary perspective.

Is evolutionary theory *too* general?

The evolutionary perspective is sometimes criticized for being *too* general. If it includes any kind of human genetic, cultural, or behavioral change, doesn't it explain nothing by explaining everything? To answer this question, consider an analogy with genetic evolution, which is defined as any kind of genetic change, whether by mutation,

selection, drift, linkage disequilibrium, and so on. It is important for the definition to include everything to provide a complete accounting system for genetic change. Nevertheless, the definition is not empty because specific categories of genetic change can be determined on a case-by-case basis. Thus, we might decide that guppy spots (and their associated genes) evolve primarily *by selection*, that mitochondrial genes evolve primarily *by drift*, and so on.

The same principle applies when we expand evolutionary theory to include both human genetic evolution and the more fast-paced processes described above. We need to begin with a definition that is sufficiently general to provide a complete accounting system for all kinds of behavioral and cultural change. Then the accounting system needs to include a number of meaningful categories that can be determined on a case-by-case basis; for example, that a given element of religion evolved *by selection*, *or drift*, *or* as a non-adaptive byproduct of another trait, and so on. The generalities that emerge when a large number of cases are assigned to the categories save evolutionary theory from the criticism of being *too general*.

With these general considerations in mind, we can now proceed to the specific subject of religion.

APPLYING BASIC EVOLUTIONARY PRINCIPLES TO THE STUDY OF RELIGION

Six major evolutionary hypotheses

Evolutionists examine a number of major hypotheses for all traits, which therefore can be applied to the study of religion, as shown in table 1. Perhaps the most basic question is whether the trait is an adaptation that evolved by a process of selection. Does a given element of religion exist because it helps an entity (such as an individual or a group) survive and reproduce better than competing entities? If so, then we need to determine the relevant entity. Does the given element of religion increase the fitness of whole groups, compared to other groups (between-group selection), or by increasing the fitness of individuals compared to other individuals within the same group (within-group

selection)? With cultural evolution there is an interesting third possibility. A cultural trait can spread by benefiting whole groups or individuals within groups, but it can also spread by enhancing its own transmission at the expense of human individuals and groups, as if it were a parasitic organism in its own right (Dawkins 2006, Dennett 2006). The concept of religion as a disease is highly novel against the background of traditional religious scholarship.

If a trait is not an adaptation, it can nevertheless persist in the population for a variety of reasons. Perhaps it was adaptive in the past but no longer in the present. For example, our eating habits make excellent sense in a world of food scarcity but have become a major cause of death in modern fast-food environments. Perhaps some elements of religion are like obesity—adaptive in the tiny social groups of our ancestral past, but not in modern mega-societies (Alexander 1987).

Alternatively, a trait can be a non-adaptive *byproduct* of another trait. An architectural example made famous by Stephen Jay Gould and Richard Lewontin (1979) is a spandrel, the triangular space that inevitably forms when two arches are placed next to each other. Arches have a function but spandrels do not, although they can acquire a secondary function such as a decorative space. As a biological example, moths use celestial light sources to navigate (an adaptation) but this causes them to spiral inward toward earthly light sources such as a streetlamp or flame—a highly destructive byproduct. Perhaps some elements of religion are like a moth to flame (Dawkins 2006).

Finally, a trait can have no effect whatsoever on survival and reproduction and simply drift into the population. Many genetic mutations are selectively neutral, enabling them to be used as a molecular “clock” for measuring the amount of time that species have been genetically isolated from each other. Some elements of religion might similarly have no rhyme or reason, other than the vagaries of chance.

These six major hypotheses are summarized in table one and provide an excellent framework for the study of religion. In fact, they can even be used to categorize theories of religion that were formulated without evolution in mind. Consider Durkheim’s (1912/1995, p. 44) definition of religion: “[A] unified system of beliefs and practices relative to sacred things...which unite into one single moral community called a Church, all those who adhere to them.” Durkheim and the tradition of functionalism that he

helped to initiate clearly imagine religion as a system that is adaptive at the level of whole groups. Nevertheless, it was not classified as “evolutionary” at the time because cultural evolution was associated with other ideas, as outlined above. From a modern evolutionary perspective, Durkheim might have been on the right track, but his theory of group-level functionalism requires an explanation in terms of group-level selection.

As a second example, modern sociologists tend to rely upon rational choice theory as their theoretical framework for explaining religion. According to Rodney Stark and William Bainbridge (1987; Stark 1999), the human mind is designed to formulate explanations that are good at obtaining benefits in a non-religious context. Some benefits cannot be had, such as rain during a drought or everlasting life. That does not prevent us from wanting them, so we invent gods with whom we bargain for that which we can’t have. This is clearly a byproduct theory of religion as something that is not adaptive by itself but connected to something else that is adaptive. Evolutionists such as Pascal Boyer (2001), Scott Atran (2002) and Lee Kirkpatrick (2004) have a different conception of the mind than Stark and Bainbridge, based on evolutionary psychology rather than rational

RELIGION AS AN ADAPTATION	RELIGION AS NONADAPTIVE
1) Group-level adaptation (benefits groups, compared to other groups).	4) Adaptive in small groups on related individuals but not in modern social environments.
2) Individual-level adaptation (benefits individuals, compared to other individuals within the same group)	5) Byproduct of traits that are adaptive in non-religious context.
3) Cultural parasite (benefits the cultural trait at the expense of human individuals and groups).	6) Neutral traits (drift)

Table 1. Six major evolutionary hypotheses about religion, which can apply to traits that are inherited either culturally or genetically.

choice theory, but they also envision the elements of religion as byproducts of mental “modules” that evolved in non-religious contexts. More generally, it is gratifying that the

evolutionary framework can accommodate all naturalistic theories of religion, past and present, without requiring additional major hypotheses. If this seems to make evolutionary theory *too* general, remember that real progress occurs when we assign particular cases to particular categories—that a given element of religion *is* a byproduct and *not* an adaptation, for example. There are facts that can be agreed upon and hypotheses that can be rejected as just plain wrong, but they need to be organized within a single theoretical framework that acts as an accounting system.

Ultimate and proximate causation

All adaptations require two explanations. Why do flowers bloom in spring? The “ultimate” explanation, based on survival and reproduction, is that spring is the best time to bloom. Perhaps flowers that bloomed earlier were nipped by frost, while those that bloomed later didn’t have time to develop their fruits. The “proximate” explanation is based on the physical mechanisms that actually cause plants to bloom in spring, such as a hormone that is sensitive to day length. Notice that day length by itself has no effect on survival and reproduction. It is merely a signal that reliably causes flowers to bloom at the best time with respect to other environmental factors. In general, the proximate explanation for a trait need bear no relationship whatsoever to the corresponding ultimate explanation, as long as it reliably produces the trait that survives and reproduces better than other traits.

Returning to religion, a given belief or practice might exist because it enhances survival and reproduction—for example, by causing the group to function well compared to other groups—but this is only the ultimate explanation. A complementary proximate explanation is required that need bear no relationship to the ultimate explanation, other than to reliably cause the trait to occur. Perhaps a religious believer helps others because she wants to help others, or perhaps because she wants to serve a perfect God who commands her to help others. If these two proximate mechanisms are equally effective at motivating the adaptive behavior, then natural selection will be indifferent as to which one evolves. If wanting to serve a perfect God is more powerfully motivating than directly wanting to help others, then it is likely to evolve as the proximate mechanism,

even though it is less obviously related to the behavior that it produces and requires belief in an agent for which there is no tangible proof.

The ultimate/proximate distinction bears an intriguing resemblance to a distinction that is often made between the “vertical” and “horizontal” dimensions of religion, as in the following definition of the word Islam (Eliade 1987, v 7, p 119, italics ours):

A noun derived from the verb *aslama* (“to submit or surrender [to God]”), designates the act by which an individual recognizes his or her relationship to the divine and, at the same time, the community of all those who respond in submission. It describes, therefore, both the singular *vertical* relationship between the human being and God and the collective, *horizontal* relationship of all who join together in common faith and practice.

This passage suggests that the *psychological* religious experience can exist on a very different plane than the *behaviors* typically associated with religion. Yet, they are also tightly yoked to each other. The same idea is expressed in a more homespun fashion by the bluegrass lyric “If you don’t love your neighbor then you don’t love God.” The two-dimensional nature of religious belief and practice is exactly what is expected on the basis of the ultimate/proximate distinction.

Often, a *single* adaptive trait can be implemented by *numerous* proximate mechanisms. Not all plants that bloom in spring are sensitive to day length; some species are sensitive to temperature, others to internal biological clocks, and so on. The same one-to-many relationship can potentially explain important differences among religions. For example, belief in a glorious afterlife appears to be central in some religions but peripheral and even absent in others. This makes sense as soon as we regard belief in a glorious afterlife as one of numerous proximate mechanisms capable of motivating adaptive behavior. In general, the ultimate/proximate distinction plays a fundamental role in ERS, along with the six major evolutionary hypotheses.

Tinbergen's four questions

Niko Tinbergen (1963), who received the Nobel Prize in 1973 for his pioneering research on animal behavior, famously divided evolutionary inquiry into four questions, which he termed “survival value,” “causation,” “ontogeny,” and “evolution.” In modern terms, “survival value” corresponds to what we have already described as ultimate causation. “Causation” and “ontogeny” together comprise what we have described as proximate causation, but distinguishes between the final proximate mechanism (causation) and their *development* over the lifetime of the organism (ontogeny). “Evolution” refers to the *phylogeny* of a given trait; how it is derived from the traits in ancestral species. Tinbergen’s four questions are still much cited today as a description of fully rounded evolutionary inquiry. The journal *Animal Biology* (2005, volume 55, issue 4) includes a reprint of the original paper and a number of articles discussing its relevance to modern research. His emphasis on *development* and *phylogeny* certainly needs to be included in the study of religion, along with the distinction that we have already made between ultimate and proximate causation.

EXAMPLES OF RESEARCH PROGRAMS WITHIN THE FIELD OF EVOLUTIONARY RELIGIOUS STUDIES

This beginner’s guide will conclude with a sample of specific research programs that comprise the emerging field of ERS. They are diverse in their specific aims but unified by the basic principles outlined above. There is plenty of disagreement within the field; some regard religion as primarily a byproduct, others as a group-level adaptation, others as a cultural parasite, and so on. What’s new and important is that these debates are taking place within an overarching theoretical framework that enables a convergence of views on the basis of empirical information.

The Afterlife Project

Belief in an afterlife is one of the most characteristic elements of religion that sets it apart from most other belief systems. Yet, religious conceptions of the afterlife are also

highly diverse. The Afterlife Project is an ambitious effort to understand this diversity in terms of the basic evolutionary principles outlined above. It is also intended as a model research program that can be used to study other elements of religion. It is funded by the Templeton Foundation and administered through the Metanexus Institute as part of the same grant that established the ERS website and this beginner's guide.

The goal of the Afterlife Project is to gather information on a large sample of specific conceptions of the afterlife, providing a database for evaluating evolutionary hypotheses on a case-by-case basis. The project is coordinated by David Sloan Wilson (an evolutionist) and William Scott Green (a religious scholar), who are also the co-authors of this essay. During phase 1 of the project, a team of evolutionists representing diverse views within the field (Jesse Bering, Lee Cronk, Russell Gray, Dominic Johnson, Peter Richerson, and Richard Sosis) met to agree upon the information that would be required to test the relevant hypotheses. This team then met with a group of religious scholars (Douglas R. Brooks, Dexter Callender, John T. Fitzgerald, Th. Emil Homerin, David Kling, and Michelle Gonzalez Maldonado, with evolutionist Michael McCullough joining the project at this point) to develop a survey for obtaining the information in a standardized fashion for specific conceptions in the afterlife, as they originated and spread at particular times and places in world history. The survey consists of 22 questions that are answered in a narrative format with supporting references, and 76 questions that are answered on a numerical scale for quantitative analysis. During phase 2 of the project (in progress) the survey is being sent to religious scholars who are best qualified to provide the information. The responses will be posted on the evolutionary religious studies website in a format that allows discussion and modification by other qualified individuals. In this fashion, comparable information will be gathered for conceptions of the afterlife, for the religions of indigenous societies in addition to the major religious traditions.

This project illustrates the central role that traditional religious scholarship can play in the field of evolutionary religious studies. Evolution is fundamentally about the relationship between organisms and their environment. In the case of religion, it is about the relationship between religious groups and their environments, conceived broadly to include physical, economic, and social factors. Traditional religious scholarship provides

this kind of information, comprising a fossil record of cultural evolution that is often so detailed that it puts the biological fossil record to shame. The Afterlife Project provides a model for gathering and quantifying this kind of information to test evolutionary hypotheses—for many elements of religion in addition to conceptions of the afterlife.

The psychological development of conceptions of the afterlife

Are conceptions of the afterlife purely a social construction, or are they more deeply embedded in the psychological architecture of the human mind? Developmental psychologist Jesse Bering (2006) is attempting to answer this question by studying conceptions of the afterlife in young children. In one experiment, children aged 4-12 viewed a puppet show in which an alligator eats a mouse and then answered questions about the mouse. Now that it has died, does it miss its Mom? Is it still hungry? Can it still taste the grass that it ate before it died? Curiously, the younger the children, the more likely they were to attribute mental states to the recently deceased mouse. This is the opposite of what one might expect if the mind begins as a blank slate and all beliefs about the afterlife are culturally acquired.

In another set of experiments, children were told that a friendly invisible magic princess named Alice might tell them when they make the wrong choice in a guessing game. The room was rigged so that a picture fell off the wall or a light flashed on and off after the children made their initial choice. In this case, it was the *older* children (age 7) and not the younger (age 4), who treated the mysterious event as a message from Alice to switch their choice. This is probably because the younger children had not yet developed the higher-order reasoning required to infer that “Alice knows that I don’t know where the ball is.”

These and other experiments, which are conducted in the spirit of Tinbergen’s “development” question, turn conventional wisdom on its head. To an adult non-believer, it might seem that belief in an afterlife is weird because it has no basis in observable reality, and therefore must be taught. The experiments suggest that children begin life with a default belief in an afterlife and must be taught otherwise to become nonbelievers. Why should this be so? Perhaps because the human mind is innately adapted to think of

people and other animals as active agents; continuing to regard them in this way after death might be a non-adaptive *byproduct* of genetic evolution.

Even if this hypothesis turns out to be correct, the status of adult beliefs in the afterlife remains an open question. Evolution has been aptly described as like a tinkerer, building new structures out of old parts (Jacob 1977). Genetic evolution has resulted in an innate psychological architecture that provides the “parts” for subsequent cultural evolution. It is possible that an innate non-adaptive propensity to believe in an afterlife was elaborated by cultural evolution into highly adaptive specific beliefs about the afterlife. On the other hand, it is also possible that culturally derived adult beliefs in the afterlife are also non-adaptive. Only empirical research can settle these issues. Bering’s studies on child development and the Afterlife Project illustrate how very different research programs can be productively related to each other within the framework of evolutionary theory.

Religion as an adaptation for promoting cooperation and altruism

Taken at face value, many religious beliefs and practices appear designed to promote cooperation and altruism, at least among members of the religion and often more widely. Evolutionary theory offers a comprehensive explanation of how cooperative and altruistic traits can evolve, despite their vulnerability to exploitation by self-serving individuals, which can be brought to bear on the study of religion.

Human cooperation and altruism are strongly dependent upon social control mechanisms, including the ability of group members to monitor each other and effectively punish transgressions at small cost to themselves. The watchful presence of others has such a powerful effect on human behavior that even the presence of disc-shaped objects resembling eyes increases the amount of cooperation in controlled laboratory experiments (Haley and Fessler 2005)! Belief in supernatural agents that are always present and motivated to punish transgressions can have a similar effect (Johnson and Bering 2006). In one test of this hypothesis, college students who were casually told that the ghost of a dead graduate student has been spotted in their private testing room were less willing to cheat on a computerized spatial reasoning task than those told

nothing (Bering, McLeod and Shackelford 2005). In another test, subjects first performed a scrambled sentence task and then played the Dictator game, which involved being given ten dollars and deciding how much to keep for oneself and how much to give to an anonymous second person. One version of the scrambled sentence task included religious words such as *spirit, divine, God, sacred, and prophet*, while another version included words that were unrelated to religion. Subjects who were implicitly primed with religious words in the scrambled sentence task gave an average of \$4.22 to the second person, compared to only \$1.84 for subjects who were not primed with religious words. Self-reported atheists were as susceptible to religious primes as self-reported believers (Shariff and Norenzayan (2007)).

Another mechanism for insuring cooperation within a group is by requiring commitments that are hard to fake, often because they are so costly that the only way to recoup the cost is by remaining in the group as a cooperator (Irons 2001, Sosis 2004). Numerous elements of religion that appear bizarre and dysfunctional to outsiders make sense in terms of costly signaling theory. For example, in a historical study of 19th century communal societies, Richard Sosis and Eric Bressler (2003) found that religious communes demanded more of their members than their secular counterparts, such as celibacy, relinquishing all material possessions, and vegetarianism. This cost had a collective benefit, however, since religious communes survived longer than their secular counterparts. Among religious communes, those that demanded the greatest cost survived longest, but this relationship did *not* exist for secular communes. Thus, there appears to be something about religious belief per se that makes costly signaling effective.

As an additional test of costly signaling theory, Richard Sosis and Bradley Ruffle (2003,2004) conducted experiments on cooperative behavior in ongoing secular and religious Israeli kibbutzim (Sosis and Ruffle 2003,2004, Ruffle and Sosis 2007). Controlling for effects such as the age of the kibbutz, privatization, size of the kibbutz, and numerous other variables, religious kibbutzniks exhibited much higher levels of intra-group cooperation than secular kibbutzniks. Furthermore, religious males were more cooperative than religious females, whereas a sex difference did not exist in among the secular kibbutzniks. This pattern makes sense, based on the fact that Jewish ritual

requirements are largely publicly oriented toward men and privately oriented toward women.

In a third test of costly signaling theory, Richard Sosis, Howard Kress and James Boster collected data from 60 geographically dispersed societies on the cost of religious practices, intensity of cooperative food production and consumption, warfare frequency, and a number of other control variables (Sosis et al 2007). Warfare frequency—a strong indicator of the *need* for cooperation—was the strongest predictor of the costliness of a society’s male rites. Moreover, Sosis et al. discovered a relationship between the *kind* of warfare present within a society and the *type* of religious practice adopted as a commitment signal. Societies with a high degree of *external* warfare (against other cultural groups) adopted signals of group identity that resulted in permanent badges such as tattoos or scars. Permanent badges were avoided in societies marked by a high degree of *internal* warfare (within the same cultural grouping), since one’s enemy on one occasion might become one’s ally on another.

Religion as an adaptation for war—and peace

As we have just seen, between-group conflict has been a recurrent event in human history, all the way back to our pre-human ancestors. Nevertheless, between-group conflict is not inevitable; instead, it is part of the full range of relationships that can exist among groups. An analogy with biological species is instructive. Ecological relationships among species include predation, competition, parasitism, mutualism, and coexisting without interacting. The *particular* relationship between any two species depends upon the underlying environmental circumstances. Some species of ants, for example, forage for food and defend their colonies without aggressively attacking other colonies. Other species of ants aggressively attack other colonies to take their resources, territory, and even the ants themselves, which are made into slaves. Both species are highly adapted to their respective ecological niches. The reason that the non-aggressive species persist is because aggression is not the most adaptive strategy in many environmental situations. Also, calling aggression adaptive (in some environmental situations) does not mean that it is benign or morally acceptable when exhibited in our species. Adaptations frequently result in long-term negative effects, such as the ability to harvest food leading to the

depletion of resources. The relationship between adaptation and morality is complex and certainly not direct. Understanding the concept of morality from an evolutionary perspective is an emerging field in its own right, which is developing in parallel with evolutionary religious studies (e.g. Joyce 2006, Haidt 2007).

Cultural evolution differs from genetic evolution in many of its details, but it similarly results in a diversity of forms that are adaptive in their respective environments. This is obviously the case for subsistence technologies, such as the ability to make boats in maritime cultures but not desert cultures, but it can be equally true for the ability to make war.

As soon as we start employing the ecological/evolutionary paradigm for cultural evolution in general, two common claims about religion emerge as highly unlikely. First, it is unlikely that religion categorically disposes people toward universal brotherhood. Second, it is equally unlikely that religion categorically disposes people toward between-group conflict. Both of these claims, which are easy to understand as expressions of fondness or hatred toward religion, make little sense as serious scientific hypotheses from an evolutionary perspective. Instead, to the extent that religions adapt human groups to their environments at all, they should adapt groups to the full range of environmental situations; war *and* peace, not war *or* peace.

An essay titled “The Disarmament of God” by Jack Miles (<http://www.jackmiles.com/default.asp?id=28>), who won the Pulitzer Prize for his book *God: A Biography*, shows how these ideas can be applied to a specific case such as early Christianity. According to Miles, the Hebrew God was essentially a warrior who commanded his people to fight and promised them victory in the future, no matter how many defeats they had endured in the past. The Christian God reflected the reality that military victory was no longer possible and the only strategy for survival involved a more peaceful coexistence. The Christian God could be said to be a different God entirely from the Hebrew God, as some scholars have noted. Cultural evolution seldom involves such radical discontinuities, however, so Christians imagined their God as continuous with the past. In any case, “turn the other cheek” can be a successful non-militaristic strategy as the spread of early Christianity amply confirms. Once Christians became politically

powerful, cultural evolution promoted the resumption of militaristic strategies, as in the Crusades.

More generally, every major religious tradition has the flexibility to tailor prescribed behaviors to environmental circumstances. This very basic statement follows directly from evolutionary theory, but it is not always obvious from other perspectives. When we take it seriously, it becomes clear that the way to eliminate between-group conflict is not to foster religion (if you love it) or eliminate religion (if you hate it), but to manage the social environment so that war is not an adaptive strategy.

Individual benefits of religion

The behavioral consequences of religion include, but also go beyond cooperation and altruism. Numerous studies show that religious beliefs and practices increase individual health and other aspects of wellbeing (e.g., Post 2007). While these are certainly individual benefits of religion, they are not necessarily individual-level adaptations in the evolutionary sense of the term. If the individual benefits are provided by the activities of other individuals or by the culture as a whole, then they are manifestations of group-level adaptations.

Other elements of religion might be individually advantageous in the less benign sense of increasing the welfare of some individuals (often the leaders) at the expense of other members of the same religious group (Cronk 1994). The Catholic practice of selling indulgences prior to the Protestant Reformation was clearly a form of exploitation that enriched the elites at the expense of lay members of the religion. This kind of behavior, which benefits individuals *compared to other individuals within the same group* is found to some extent in all social groups, and therefore all religious groups. The degree to which it occurs is a question that must be answered empirically on a case-by-case basis. At one extreme, a religious system might be so well designed to promote cooperation that within-group exploitation becomes a rarity and is conceptualized as a corruption of the religion when it occurs. Alternatively, the entire religion could be designed as a tool of exploitation, like a well-planned sting operation. As yet another possibility, a given religious system—like any cultural system—could be a largely dysfunctional byproduct of individual striving within the system. It is so easy to think about culture in functional

terms that the following passage by anthropologist Lee Cronk (1995, p. 187-8) is worth keeping in mind as an antidote:

As part of my continuing effort to find an improved metaphor for the role of culture in human affairs, I place tongue in cheek and offer the following: Culture is to human social interaction as mud is to mud-wrestling. The metaphor of wrestling conveys the idea that social interaction is in many ways a contest or struggle between people with competing goals. But wrestling of the non-muddy variety does not do the metaphorical job. The mud is needed to stand for culture in order that the analogy may more fully convey the nature of human social interactions as they take place in cultural contexts. Just as mud drastically changes the nature of the contest when it is introduced into a wrestling match, so does culture drastically change the nature of social interaction in humans compared to non-humans. Just as mud-wrestlers are coated in mud, people are coated in culture: It shapes who they are and how they interact with others in profound ways, which of course is an old lesson to anthropologists. Like mud, culture can get in your eyes, leading you to do things that may not be in your own best interests. Just as mud-wrestlers may use the mud itself in their contest—flinging it, wallowing in it, using it to blind their opponents—so do people use culture as a tool in social interaction. Just as one wrestler covered in mud is likely to muddy others in the ring, so do culture traits cling to people and move from one to another through social contact. The mud-wrestling analogy also inspires some interesting questions about culture. For instance, how deep is the mud? That is, to what extent does culture limit and guide human actions? Are we up to our necks in mud, able to move only in culturally prescribed ways, or is the mud down around our ankles, causing us to slip now and then but not influencing our basic strategies in meaningful ways? Or is it somewhere in between? As apt as the mud-culture metaphor may be, the wrestling part of the metaphor needs some modification because it makes

it appear that all social interaction consists of contests in which only one person may win. That of course, is not the case. A better image might be an n-person mud melee, in which cooperation and coalitions (tag teams?) are possible.

One insight that emerges from thinking about cooperation and exploitation from an evolutionary perspective is that they can actually be arranged in a temporal sequence. In a remarkable book titled *War and Peace and War*, Peter Turchin (2006) outlines an ambitious theory of human history as a process of multilevel cultural evolution (see also Turchin 2005). Geographical zones of extreme between-group conflict act as a crucible for extremely cooperative cultures, which spread at the expense of less cooperative cultures. Their success is their undoing, however, as exploitation, free-riding, and factionalism spread by cultural evolution *within* the society—the rise and fall of empires. Turchin’s theory applies to all cultural systems, religious or otherwise. If we confine our attention to religious systems, we can observe the same cycle of cooperation, corruption, and renewal (Wilson 2002 pp 182-187).

Religion on a moment-by-moment basis

The psychologist Mihaly Csikszentmihalyi pioneered the Experience Sampling Method (ESM) which involves signaling people at random times during the day, prompting them to record where they are, what they are doing, who they are with, and a checklist of cognitive and emotional states on a numerical scale. The method has been used on large numbers of people, enabling the effects of religion to be studied on a moment-by-moment basis. In one sample of American high school students, religious believers were more prosocial than non-believers, felt better about themselves, used their time more constructively, and engaged in long-term planning rather than gratifying their impulsive desires. On a moment-by-moment basis, they reported being more happy, active, sociable, involved and excited. Some of these differences remained even when religious believers and non-believers were matched for their degree of prosociality (Wilson and Csikszentmihalyi 2007).

In addition to comparing religious believers vs. non-believers, the ESM can be used to make even finer comparisons between religious denominations. Using the same sample of American high school students, Storm (2007) demonstrated substantial differences between members of liberal vs. conservative Protestant denominations. For example, conservatives spent less time alone and their psychological mood quickly started to deteriorate when they were alone. Liberals appear to have internalized their value system so that they were less dependent upon the physical presence of others. In general, the differences between varieties of religion (such as conservative vs. liberal) can be as great as the differences between religions and cultural systems that are classified as non-religious.

But what about religion *per se*?

One issue that is sometimes raised about ERS is that the basic principles are so general that they apply to all cultural systems. If the same principles can be used to explain religious systems, political systems, military systems, and business systems, then what does evolutionary theory tell us about religion *per se*? We think that the generality of evolutionary theory is a strength, rather than a weakness, when it comes to explaining a particular phenomenon such as religion. Religion is decidedly a fuzzy set. Any particular feature that seems to be part of the essence of religion can be found in cultural systems that are conventionally regarded as non-religious. Moreover, religious systems compete with non-religious systems in the real world of cultural evolution. The best theoretical framework for understanding religion is one that can situate the big picture of religion within the even bigger picture of all human cultural systems.

Summary

Our sample of specific research programs shows how diversity of methods, drawn from virtually every human-related academic discipline, can be integrated within a single theoretical framework for the study of religion. Please consult the ERS website (<http://evolution.binghamton.edu/religion/>) for a directory of researchers and research programs, some of which invite your participation. The fact that evolutionary theory *integrates* disciplines rather than *excluding* them means that virtually anyone with a

serious interest in religion can join the emerging field of ERS with a manageable amount of initial training.

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