The Evolutionary Psychology of Religion

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Thank you very much; this is a tremendous honor. I look forward to displaying the Emperor proudly in my office at Harvard. It's a special honor to be here on the occasion that is recognizing the accomplishments of Anne Gaylor and I'd like to express my appreciation for the wonderful work that she has done in this Foundation.

Do we have a "God gene," or a "God module"? I'm referring to claims that a number of you may have noticed. Just last week, a cover story of *Time* magazine was called "The God Gene: Does our deity compel us to seek a higher power?" Believe it or not, some scientists say yes. And a number of years earlier, there were claims that the human brain is equipped with a "God module," a subsystem of the brain shaped by evolution to cause us to have a religious belief. "Brain's God module may affect religious intensity," according to the headline of the *Los Angeles Times*. In this evening's talk, I want to evaluate those claims.

There certainly is a phenomenon that needs to be explained, namely religious beliefs. According to surveys by ethnographers, religion is a human universal. In all human cultures, people believe that the soul lives on after death, that ritual can change the physical world and divine the truth, and that illness and misfortune are caused and alleviated by a variety of invisible person-like entities: spirits, ghosts, saints, evils, demons, cherubim or Jesus, devils and gods.

All cultures, you might ask? Yes, all cultures. I give you an example of a culture we're well familiar with, that of the contemporary United States. The last time I checked the figures, 25% of Americans believe in witches, 50% in ghosts, 50% in the devil, 50% believe that the Book of Genesis is literally true, 69% believe in angels, 87% believe Jesus was raised from the dead, and 96% believe in a god or a universal spirit. You've got your work cut out for you!

So what's going on? In many regards, the human mind appears to be well-engineered. Not literally well-engineered, but it has the *signs* or appearance of engineering in the biologist's sense. That is, we can see, think, move, talk, understand, and attain goals better than any robot or computer. You can't go to Circuit City and buy Rosie the Maid

from "The Jetsons" and expect to it to put away the dishes or run simple errands. These feats are too difficult for human-made creations, though they're things that a five-year-old child could do effortlessly. The explanation for signs of engineering in the natural world is Darwin's theory of national selection, the only theory we've come up with so far that can explain the illusion of design in causal terms.

The question is, how can a powerful taste for apparently irrational beliefs evolve? H.L. Mencken said that “the most common of all follies is to believe passionately in the palpably not true. It's the chief occupation of humankind.” This poses an enigma to the psychologist.

There is one way in which religious belief could be an adaptation. Many of our faculties are adaptations to enduring properties of the real world. We have depth perception, because the world really is three-dimensional. We apparently have an innate fear of snakes, because the world has snakes and they are venomous. Perhaps there really is a personal, attentive, invisible, miracle-producing, reward-giving, retributive deity, and we have a God module in order to commune with him. As a scientist, I like to interpret claims as testable hypotheses, and this certainly is one. It predicts, for example, that miracles should be observable, that success in life should be proportional to virtue, and that suffering should be proportional to sin. I don't know anyone who has done the necessary studies, but I would say there is good reason to believe that these hypotheses have not been confirmed. There's a Yiddish expression: "If God lived on earth, people would break his windows."

There have been other, more plausible attempts to explain religion as a biological adaptation. Even though I'm far more sympathetic to Darwinian explanations of mental life than most psychologists, I don't find any of these convincing.

The first is that religion gives comfort. The concepts of a benevolent shepherd, a universal plan, an afterlife, or just deserts, ease the pain of being a human; these comforting thoughts make us feel better. There's an element of truth to this, but it is not a legitimate adaptationist explanation, because it begs the question of *why* the mind should find comfort in beliefs that are false. Saying that something is so doesn't make it so, and there's no reason why it should be comforting to *think* it so, when we have reason to believe it is *not* so. Compare: if you're freezing, being told that you're warm is not terribly soothing. If you're being threatened by a menacing predator, being told that it's just a rabbit is not particularly comforting. In general, we are not that easily deluded. Why should we be in the case of religion? It simply begs the question.

The second hypothesis is that religion brings a community together. Those of you who read the cover story of *Time* might be familiar with this hypothesis because the geneticist Dean Hamer, whose new book *The God Gene* inspired the cover story, offered this as his Darwinian explanation of religion. Again I think again there's an element of truth in this. Religion certainly does bring a community together. But again it simply begs the question as to *why*. Why, if there is a subgoal in evolution to have people stand together to face off common enemies, would a belief in spirits, or a belief that ritual could change the future,

be necessary to cement a community together? Why not just emotions like trust and loyalty and friendship and solidarity? There's no a priori reason you would expect a belief in a soul or a ritual would be a solution to the problem of how you get a bunch of organisms to cooperate.

The third spurious explanation is that religion is the source of our higher ethical yearnings. Those of you who read the book *Rock of Ages* by Steven Jay Gould, who argued that religion and science could co-exist comfortably, are familiar with his argument: since science can't tell us what our moral values should be, that's what religion is for, and each "magisterium" should respect the other. A big problem for this hypothesis is apparent to anyone who has read the Bible, which is a manual for rape and genocide and destruction. God tells the Israelites invading all Midianite villages, "Kill all the men, kill all the kids, kill all the old women. The young women that you find attractive, bring them back to your compound, lock them up, shave their heads, lock them in a room for 30 days till they stop crying their eyes out because you've killed their mom and dad, and then take her as a second or third or fourth or fifth wife." So the Bible, contrary to what a majority of Americans apparently believe, is far from a source of higher moral values. Religions have given us stonings, witch-burnings, crusades, inquisitions, jihads, fatwas, suicide bombers, gay-bashers, abortion-clinic gunmen, and mothers who drown their sons so they can happily be united in heaven.

To understand the source of moral values, we don't have to look to religion. Psychologists have identified universal moral sentiments such as love, compassion, generosity, guilt, shame, and righteous indignation. A belief in spirits and angels need have anything to do with it. And moral philosophers such as Peter Singer (one of tomorrow's honorees) who scrutinize the concept of morality have shown that it is logically rooted in the interchangeability of one's own interests and others. The world's enduring moral systems capture in some way the notion of the interchangeability of perspectives and interests, the idea that "I am one guy among many": the golden rule; the categorical imperative; Singer's own notion of "the expanding circle," John Rawls' "veil of ignorance," and so on. A retributive, human-like deity meting out justice doesn't have a role in our best explanations of the logic of morality.

To answer the "why is *Homo sapiens* so prone to religious belief?" you first have to distinguish between traits that are *adaptations*, that is, products of Darwinian natural selection, and traits that are *byproducts* of adaptations, also called spandrels or exaptations. An example: Why is our blood red? Is there some adaptive advantage to having red blood, maybe as camouflage against autumn leaves? Well, that's unlikely, and we don't need any other adaptive explanation, either. The explanation for why our blood is red is that it is adaptive to have a molecule that can carry oxygen, mainly hemoglobin. Hemoglobin happens to be red when it's oxygenated, so the redness of our blood is a byproduct of the chemistry of carrying oxygen. The color per se was not selected for. Another non-adaptive explanation for a biological trait is genetic drift. Random stuff happens in evolution. Certain traits can become fixed through sheer luck of the draw.

To distinguish an adaptation from a byproduct, first of all you have to establish that the trait is in some sense innate, for example, that it develops reliably across a range of environments and is universal across the species. That helps rule out reading, for example, as a biological adaptation. Kids don't spontaneously read unless they are taught, as opposed to spoken language, which *is* a plausible adaptation, because it does emerge spontaneously in all normal children in all societies.

The second criterion is the causal effects of the trait would, on average, have improved the survival or reproduction of the bearer of that trait in an ancestral environment -- the one in which our species spent most of its evolutionary history, mainly the foraging or hunter-gatherer lifestyle that predated the relatively recent invention of agriculture and civilization.

Crucially, the advantage must be demonstrable by some independently motivated causal consequences of the putative adaptation. That is, the laws of physics or chemistry or engineering have to be sufficient to establish that the trait would be useful. The usefulness of the trait can't be invented ad hoc; if it is, you have not a legitimate evolutionary explanation but a "just-so story" or fairy tale. The way to tell them apart is to independently motivate the usefulness of the trait. An example: Via projective geometry, one can show that by combining images from two cameras or optical devices, it is possible to calculate the depth of an object from the disparity of the projections. If you write out the specs for what you need in order to compute stereoscopic depth, you find that humans and other primates seem to have exactly those specs in our sense of stereoscopic depth perception. It's exactly what engineers would design if they were building a robot that had to see in depth. That similarity is a good reason to believe that human stereoscopic depth perception is an adaptation.

Likewise for fear of snakes. In all societies people have a wariness of snakes; one sees it even in laboratory-raised monkeys who had never seen a snake. We know from herpetology that snakes were prevalent in Africa during the time of our evolution, and that getting bitten by a snake is not good for you because of the chemistry of snake venom. Crucially, that itself is not a fact of psychology, but it helps to establish that what is a fact of psychology, namely the fear of snakes, is a plausible adaptation.

Our sweet tooth is yet another example. It's not terribly adaptive now, but biochemistry has established that sugar is packed with calories, and therefore could have prevented starvation in an era which food sources were unpredictable. That makes a sweet tooth a plausible adaptation.

In contrast, it's not clear what the adaptive function of humor is, or of music. I think the explanations of religion that I've reviewed have the same problem, namely not having an independent rationale, given an engineering analysis of why that trait should, *in principle*, be useful.

The alternative, then, is that just as the redness of blood is a by-product of other adaptations, so may our predisposition to religious belief. A crucial corollary of the

theory of evolution is that conflicts of interests among organisms, of different species or of the same species, lead to the biological equivalent of an arms race. An organism evolves more clever or lethal weapons, another organism evolves even more ingenious defenses, and so on, spiraling the process spiral. At any given stage in an arms race, a feature can be adaptive for one organism but not for its adversaries, as long as the first is overcoming the defenses of the second. That's another reason why not everything in biology is adaptive, at least not for every organism. What's adaptive for the lion is not so adaptive for the lamb.

So a way of rephrasing the question "Why is religious belief so pervasive?" is to ask, Who benefits? Another way of putting it is that one must distinguish the possible benefits of religion to the *producers* of religious belief – the religious establishment of shamans and priests and so on—from the benefits to the *consumers* of religion -- the parishioners, the flock, the believers. The answer might be different for the two cases. One must distinguish the question "What good is an inculcation of religious belief by priests, shaman, and so on?" from the question "What good is an acceptance of religious belief by believers?"

A number of anthropologists have pointed out the benefits of religion to those causing *other* people to have religious beliefs. One ubiquitous component of religion is ancestor worship. And ancestor worship must sound pretty good if you're getting on in years and can foresee the day when you're going to become an ancestor. Among the indignities of growing old is that you know that you're not going to be around forever. If you plausibly convince other people that you'll continue to oversee their affairs even when you're dead and gone, that gives them an incentive to treat you nicely up to the last day.

Food taboos are also common in religious belief, and might be explained by the psychology of food preference and dispreference, in particular, disgust. If you withhold a food, especially a food of animal origin, from children during a critical period, they'll grow up grossed out at the thought of eating that food. That's why most of us would not eat dog meat, monkey brains, or maggots, things that are palatable in other societies. There are often ecological reasons why food taboos develop, but there are probably also reasons of control. Since neighboring groups have different favored foods, if you keep your own kids from having a taste for the foods favored by your neighbors, it can keep them inside the coalition, preventing them from defecting to other coalitions, because to break bread with their neighbors they'd have to eat revolting stuff.

Rites of passage are another intelligible feature of religion. Many social decisions have to be made in categorical, yes-or-no, all-or-none fashion. But a lot of our biology is fuzzy and continuous. A child doesn't go to bed one night and wake up an adult the next morning. But we do have to make decisions such as whether they can vote or drive or buy a gun. There's nothing magical about the age of 13 or the age of 18 or any other age. But it's more convenient to arbitrarily anoint a person as an adult on a particular, arbitrarily chosen day, than to haggle over how mature every individual is every time he wants a beer. Religious rites of passage demarcate stages of life, serving the function that we have given over to driver's licenses and other forms of ID. Another fuzzy continuum is

whether someone is available as a potential romantic partner or are committed to someone else. Marriage is a useful way of demarcating that continuum with a sharp line.

Costly initiations or sacrifices are also present in almost all the world's religions. A general problem in the maintenance of cooperation is how to distinguish people who are altruistically committed to a coalition from hangers-on and parasites and free-riders. One way to test who's genuinely committed is to see who is willing to undertake a costly sacrifice. To take an example close to home: To see whether someone is committed to an ethnic group I am familiar with, you can say, "You've just had a baby. Please hand over your son so I can cut some skin off his penis." That's not the kind of thing that anyone would do unless they took their affiliation with the group seriously. And there are far more gruesome examples from the rest of the world.

Yet another explicable feature of religion is signs of expertise in occult knowledge. If you're the one who knows mysterious but important arcane knowledge, then other people will defer to you. Even in non-religious contexts, most societies have some division of labor in expertise, where we accord prestige and perquisites to people who know useful stuff. So a good strategy for providers of religion is to mix some genuine expertise -- and indeed, anthropologists have shown that the tribal shaman or witch doctor really is an expert in herbal medicine and folk remedies – with a certain amount of hocus-pocus, trance-inducing drugs, stage magic, sumptuous robes and cathedrals, and so on, reinforcing the claim that there are worlds of incomprehensible wonder, power, and mystery that are reachable only through one's services.

These practical benefits take some of the mystery over why people like to encourage religious belief in others, without committing oneself to a specific biological adaptation for religion. The inculcation of religious belief would be a byproduct of these other, baser, motives.

What about the other side of these transactions, namely the consumers? Why do they buy it? One reason is that in most cases we *should* defer to experts. That's in the very nature of expertise. If I have a toothache, I open my mouth and let a guy drill my teeth. If I have a bellyache, I let him cut me open. That involves a certain amount of faith. Of course, in these cases the faith is rational, but that deference could, if manipulated, lead to *irrational* deference, even if the larger complex of deference can be adaptive on the whole.

There are also emotional predispositions which evolved for various reasons and make us prone to religious belief as a by-product. The anthropologist Ruth Benedict summed up much of prayer when she said, "Religion is universally a technique for success." Ethnographic surveys suggest that when people try to communicate with God, it's not to share gossip or know-how; it's to ask him for stuff: recovery from illness, recovery of a child from illness, success in enterprises, success in the battlefield. (And of course, the Red Sox winning the World Series, which almost made me into a believer.) This idea was summed up by Ambrose Bierce in *The Devil's Dictionary*, which defines "to pray" as "to ask that the laws of the universe be annulled in behalf of a single petitioner, confessedly unworthy." This aspect of religious belief is thus a desperate measure that people resort to

when the stakes are high and they've exhausted the usual techniques for the causation of success.

Those are some of the emotional predispositions that make people fertile ground for religious belief. But there also are cognitive predispositions, ways in which we intellectually analyze the world, which have been very skillfully explored by the anthropologists Dan Sperber, Pascal Boyer, and Scott Atran. Anyone who is interested in the evolutionary psychology of religion would enjoy Pascal Boyer's *Religion Explained* and Scott Atran called *In Gods We Trust*. Hamer's *The God Gene* is also good, but I am more sympathetic to Boyer and Atran.

The starting point is a faculty of human reason that psychologists call intuitive psychology or the "theory of mind module" – "theory" here not referring to a theory of the scientist but rather to the *intuitive* theory that people unconsciously deploy in making sense of other people's behavior. When I try to figure out what someone is going to do, I don't treat them as just a robot or a wind-up doll responding to physical stimuli in the world. Rather, I impute *minds* to those people. I can't literally know what someone else is thinking or feeling, but I assume that they're thinking or feeling something, that they have a mind, and I explain their behavior in terms of their beliefs and their desires. That's intuitive psychology. There is evidence that intuitive psychology is a distinct part of our psychological make-up. It seems to be knocked out in a condition called autism: autistic people can be prodigious in mathematics, art, language, and music, but they have a terrible time attributing minds to other people. They really do treat other people as if they were robots and wind-up dolls. There's also a concerted effort underway to see where intuitive psychology is computed in the brain. Parts of it seems to be concentrated in the ventromedial and orbital frontal cortex, the parts of the brain that kind of sit above the eyeballs, as well as the superior temporal sulcus farther back.

Perhaps the ubiquitous belief in spirits, souls, gods, angels, and so on, consists of our intuitive psychology running amok. If you are prone to attributing an invisible entity called "the mind" to other people's bodies, it's a short step to imagining minds that exist *independently* of bodies. After all, it's not as if you could reach out and touch someone else's mind; you are always making an inferential leap. It's just one extra inferential step to say that a mind is not invariable housed in a body.

In fact the 19th-century anthropologist Edward Tyler pointed out that in some ways, there is good empirical support for the existence of the soul, or at least there used to be, until the fairly recent advent of neuroscience, which provides an alternative explanation for how minds work. Think about dreams. When you dream, your body is in bed the whole time, but some part of you seems to be up and about in the world. The same thing happens when you're in a trance from a fever, a hallucinogenic drug, sleep deprivation, or food poisoning.

Shadows and reflections are rather mysterious, or were until the development of the physics of light with its explanation of those phenomena. But they appear to have the form and essence of the person but without any of their actual matter.

Death, of course, is the ultimate apparent evidence for the existence of the soul. A person may be walking around and seeing and hearing one minute, and the next minute be an inert and lifeless body, perhaps without any visible change. It would seem that some animating entity that was housed in the body has suddenly escaped from it.

So before the advent of modern physics, biology and especially neuroscience, a plausible explanation of these phenomena is that the soul wanders off when we sleep, lurks in the shadows, looks back at us from a surface of a pond, and leaves the body when we die.

To sum up. The universal propensity toward religious belief is a genuine scientific puzzle. But many adaptationist explanations for religion, such as the one featured in *Time* last week, don't, I think, meet the criteria for adaptations. There is an alternative explanation, namely that religious psychology is a by-product of many parts of the mind that evolved for other purposes. Among those purposes one has to distinguish the benefits to the producer and the benefits to the consumer. Religion has obvious practical effects for producers. When it comes to the consumers, there are possible emotional adaptations in our desire for health, love and success, possible cognitive adaptations in our intuitive psychology, and many aspects of our experience that seem to provide evidence for souls. Put these together and you get an appeal to a mysterious world of souls to bring about our fondest wishes.

Evolutionary psychology is a theoretical approach in the social and natural sciences that examines psychological structure from a modern evolutionary perspective. It seeks to identify which human psychological traits are evolved adaptations â€“ that is, the functional products of natural selection or sexual selection in human evolution. Adaptationist thinking about physiological mechanisms, such as the heart, lungs, and immune system, is common in evolutionary biology. Some evolutionary psychologists