The Emotional Coherence of Religion*

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ABSTRACT

This paper uses a psychological/computational theory of emotional coherence to explain several aspects of religious belief and practice. After reviewing evidence for the importance of emotion to religious thought and cognition in general, it describes psychological and social mechanisms of emotional cognition. These mechanisms are relevant to explaining the acquisition and maintenance of religious belief, and also shed light on such practices as prayer and other rituals. These psychological explanations are contrasted with ones based on biological evolution.

Introduction

More than 85% of the world's people adhere to some religion, including Christianity with around 2 billion and Islam with more than 1 billion (Adherents, 2003). Why is religious belief so widespread? Why do so many people adopt and retain their religious doctrines, attitudes, and practices? This paper attempts to answer these questions by examining the role of emotion in human cognition. In particular, it offers an explanation of religious faith as a kind of emotional coherence in which people adopt religious beliefs that fit with their emotional needs as well as with their other beliefs. Emotional thinking involves both individual thought processes and social processes that transmit and help to maintain religious attitudes.

Before discussing cognitive and social mechanisms, I will provide evidence of the importance of emotion to religious thought, drawing on both primary and secondary sources. I then review current evidence from

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cognitive science that emotion is inherently part of cognition, and sketch some of the psychological and social mechanisms of emotional cognition. I then apply these mechanisms to explain aspects of religious belief and practice, including ritual. Finally, I discuss the limitations of explanations of religion based on evolutionary biology.

By "emotional cognition" I do not mean some special kind of thinking that involves emotions. I will argue that all thinking has an emotional component, so that emotional cognition comprises all of cognition viewed from the perspective that emphasizes the integration of traditional cognitive processes such as reasoning with emotional processes that attach values to mental representations.

Religion is Emotional

Perusal of religious texts shows that they are often highly emotional. For example, Psalm 23 proclaims "I will fear no evil. ... Thy rod and thy staff they comfort me." St. Paul's letters to the Corinthians contain many emotion concepts, including fear, love, shame, faith, hope, charity, comfort, consolation, sorrow, anguish, joy, grief, affection, cheerfulness, and jealousy. Different religions emphasize different balances between positive emotions such as love and comfort and negative emotions such as fear and shame.

Many commentators have noted the centrality of emotions to religion. The eighteenth-century theologian Jonathan Edwards (2003/1746) asserted that "True religion in great part consists in the affections." William James (1948, p. 95) remarked that the will to religious belief is based on people's "passional nature," and that "feeling is the deeper source of religion" (James, 1958, p. 329). Whitehouse (2000) noted that what he calls the "imagistic mode" of religiosity is emotionally intense. McCauley and Lawson (2002) described how religious rituals enliven our emotions. Boyer (2001) observed that religious concepts are connected to emotional systems, and Atran (2002) described how existential anxieties motivate religious belief and practice. None of these authors, however, provides a detailed account of the psychological and social mechanisms that foster religion.

Cognition is Emotional

It is commonly believed that emotions are inherently irrational, so that there is a sharp divide between emotional thought and rational cognition. This divide has been challenged by philosophers such as De Sousa (1988), economists such as Frank (1988), and neuroscientists such as Damasio (1994). Recent reviews of human decision making have emphasized the role of emotions in choosing among relevant actions and inferences (Loewenstein et al., 2001). There is a large body of psychological experiments showing that most concepts have attached emotional attitudes (Fazio, 2001). Neurological studies have revealed the close integration between emotional areas of the brain such as the amygdala and the areas for high order thought in the prefrontal cortex (Rolls, 1999; Wagar and Thagard, 2004). Even scientific thinking is highly emotional (Thagard, 2002).

In order to explain some of the ways that emotion and cognition interact, I have developed a theory of emotional coherence (Thagard, 2000, ch. 7; Thagard, 2003). This theory builds upon a cognitive theory of inference as explanatory coherence that has been applied to many cases of scientific and legal reasoning. Here I will describe its theological application. Two of the main arguments for the existence of God, the cosmological argument and the argument from design, can both be understood as supporting a kind of reasoning called inference to the best explanation. In this kind of reasoning, which is common in science and everyday life, a theory is accepted because it provides a better explanation of the evidence than competing theories. The cosmological argument says that the best explanation of the origin of the universe is that God created it. Similarly, the argument from design says that the best explanation of the complexity of the physical and biological world is that God designed and created them. In my view, the most powerful argument for the hypothesis of the existence of God combines these by saying that it explains both the existence and design of the world. It can then be argued that an assessment of the explanatory coherence of all the hypotheses and evidence requires acceptance of this hypothesis (Swinburne, 1990).

With inference to the best explanation, however, it is crucial to consider alternative explanations of the evidence. The argument from biological design was dealt a massive blow by Darwin's theory of evolution by natural selection, which provided an alternative account of how biological
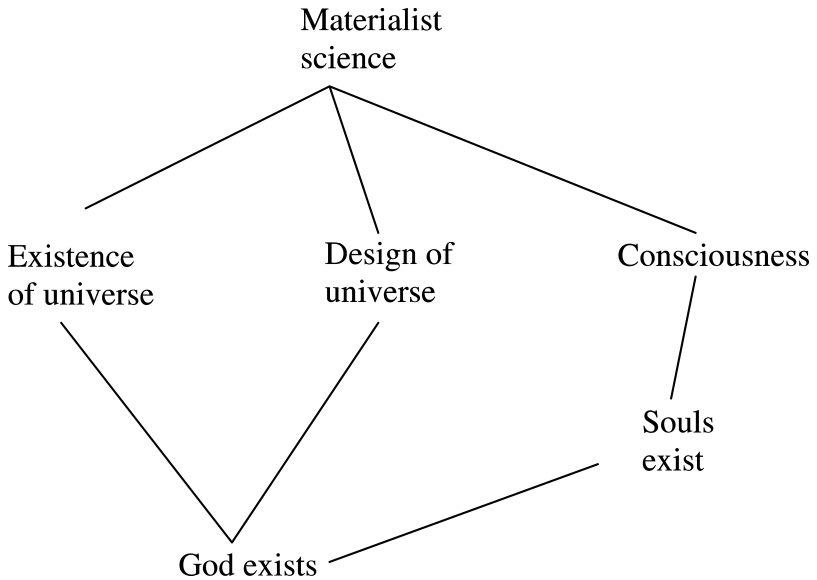
Figure 1. Approximate structure of the inference to the best explanation that God does or does not exist. The lines indicates that an explanatory relation exists between a hypothesis and evidence. The model in Thagard (2000) is much more detailed, with 35 propositions.

complexity could arise. Similarly, the cosmological argument must contend with alternative materialist explanations of the origin and nature of the universe. Assessing the explanatory coherence of competing hypotheses with respect to all the available evidence is a complex process, but I have developed a computer program called ECHO that maximizes explanatory coherence and performs inference to the best explanation (Thagard, 1992, 2000). ECHO has been used to simulate a very broad competition between theistic and dualist (mind is separate from body) beliefs, on the one hand, and materialist beliefs on the other (Thagard, 2000, ch. 4). Figure 1 shows in highly simplified form the structure of the competition between theism and materialism. My simulation ends by accepting the materialist hypotheses and rejecting the theist/dualist ones.

This simulation is obviously a poor model of the beliefs of the vast majority of human beings who believe in God, but a better model can be achieved by incorporating emotional coherence. When people make decisions, they choose actions that produce outcomes that have positive

and negative evaluations. Here positive/negative is not a purely cognitive calculation of relative utilities, but requires attaching emotional attitudes to the outcomes. For example, disease and death are emotionally negative, while health and pleasure are emotionally positive. According to the theory of emotional coherence, inferences about what to do and believe are affected not only by hypotheses and evidence, but also by the emotional values that are attached to representations whose coherence is assessed.

I have extended the computer model ECHO into a model HOTCO that assesses emotional as well as explanatory coherence. The HOTCO simulation of belief in the existence of God adds into the coherence calculation four of the emotionally desirable outcomes of religion: comfort, social belonging, ethics, and eternal life. When these are marked as emotionally valued, and the hypothesis of the existence of God is indicated to be conducive to them, then the HOTCO simulation reverses the ECHO result and accepts the existence of God. From this perspective, religious beliefs are both cognitive and emotional, incorporating both explanatory reasoning and satisfaction of desires. These desires include avoiding anxiety, maintaining social connections with other religious people, having a basis for distinguishing right from wrong, and hoping for a blissful afterlife.

Figure 2 expands figure 1 to display how the explanatory structure of the materialism versus theism conflicts can be supplemented with an emotional structure that takes into account the non-explanatory appeal of religion. It captures part of the explanatory/emotional appeal of religion, and shows how an inference can be made that incorporates both explanatory information and emotional content. It is consistent with current views in neuroscience that judgments integrate cognitive and emotional information. In line with the research of Damasio (1994) on defective decision making in people with brain damage, Wagar and Thagard (2004) present a neurocomputational model of how networks of spiking neurons can integrate cognition and emotion. On this model, effective decisions emanate from interactions between the brain's prefrontal cortex, which carries cognitive representations, and the amygdala and the nucleus accumbens, which process negative and positive emotions. Most inferences that people make, concerning what to believe as well as what to do, involve such cognitive/emotional interactions. It is therefore not surprising that religious inference should also be both intellectual and emotional, arriving at
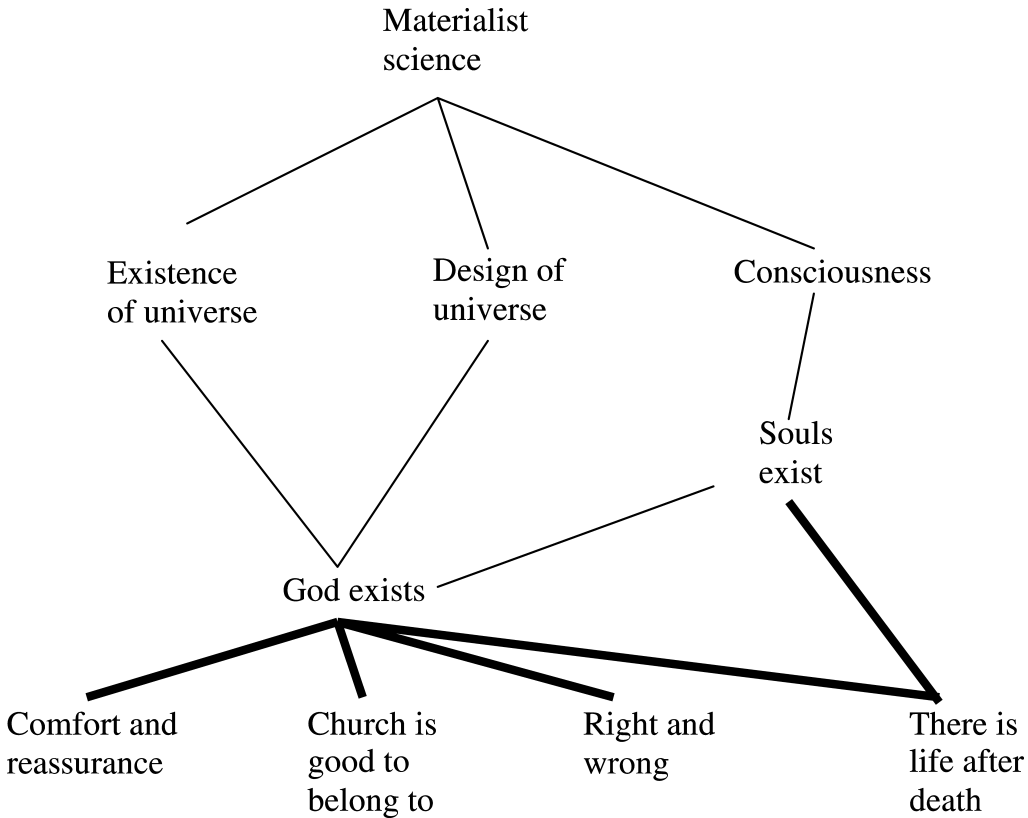
Figure 2.   Approximate structure of the emotional coherence that God does or does not exist. The thin lines indicate explanatory relations between a hypothesis and evidence. The thick lines indicate the connection of a hypothesis with an emotionally appealing factor.

beliefs that possess emotional as well as explanatory coherence. From this perspective, religious faith is based on emotional coherence.

Faith

My account of religious faith is more psychologically plausible than alternative accounts, including those reviewed by Hick (1967). The traditional Catholic view, due to Thomas Aquinas, is that faith is an act of the intellect assenting to divine truth by the grace of God. This view assumes that divine grace somehow moves the will to voluntarily choose religious

belief. It obviously begs the question of the existence of God, and leaves unexplained the means by which grace can be psychologically effective. Moreover, it fails to answer the question of which religious views to adopt in the face of conflicting claims by Catholics, Protestants, Muslims, Jews, Hindus, Buddhists, and advocates of other religions. They cannot all be right, and faith seems impotent to adjudicate among them.

The most prominent modern view of faith is William James' discussion of the "will to believe." He asserts: "Our passional nature not only lawfully may, but must, decide an option between propositions, whenever it is a genuine option that cannot by its nature be decided on intellectual grounds" (James, 1948, p. 95). According to James, we have a living, forced, and momentous option to choose or reject religious beliefs, but lack the evidence to make this choice rationally. He suggests that the possible gain of belief in God outweighs the risk of acquiring a false belief, so it is legitimate choose such a belief.

The main problem with James' view is that it makes a religious belief a kind of wishful thinking, a leap with no rational basis at all. In real life, people can have many evidential reasons for choosing religious beliefs, including traditional arguments about the existence and design of the world and the apparent occurrence of miracles. They also have many emotional reasons, including desires for comfort, belonging, ethics, and immortality. My emotional coherence account of faith says that people adopt and maintain religious beliefs for a combination of evidential and emotional reasons that provide satisfaction of cognitive and emotional constraints. Thus religious faith is not just wishful thinking or Pascal's wager, but an intuitive judgment that fits compellingly with a person's beliefs and goals.

My discussion of faith and the emotional appeal of religion assumes that notions of God and heaven are positively valenced, as they are in Christian and Muslim traditions. For religions in which gods are primarily objects of fear, and in which the afterlife is an object of dread, there is not the same kind of emotional appeal. An alternative explanation of the prevalence of such religious beliefs would therefore be necessary, perhaps based on the need for practices that reduce anxiety by placating vengeful deities. It is interesting, however, that the three religions that have been most successful by far in terms of global membership – Christianity, Islam,

and Hinduism – all present a fairly positive view of gods and the afterlife. Gods are not as malicious and capricious as they used to be.

The main gap in my psychological account of faith is that it neglects important social mechanisms for the transmission of cognitive and emotional information. I will now describe some of these mechanisms and show how they contribute to religious beliefs in individual and groups.

Social Mechanisms

It is obvious that the major predictor of religious faith of children is the religion of their parents. My discussion of faith and emotional coherence misleadingly suggested that each individual has to make a judgment of which religious beliefs to choose, but most people grow up with a set of beliefs that they may or may not come to question later on. We need a broader, more social account of the acquisition and maintenance of beliefs and attitudes.

Philosophers such as Coady (1992) have noticed that most of what people know is based on testimony rather than personal experience. My belief that Arnold Schwarzenegger became governor of California in 2003 is based on news reports from reliable sources, not on any observations of my own. Children acquire innumerable beliefs from their parents, including a great many that they never have subsequent cause to doubt. It is not surprising, therefore, that most children take it for granted that their parents are a reliable source of information, so that they can quickly infer from "Parent says X" to "X is true." Hence, when a child is told by parents that God made the world and established a doctrine as the true religion, it is natural for the child to believe them. Participation in a religious organization or school in which children encounter other authoritative people with the same beliefs will provide further testimony that supports those beliefs. Thus the repeated testimony that a child encounters from parents and other people is a main cognitive source of religious belief. See Thagard (forthcoming) for further discussion of testimony.

The structure of this kind of explanatory inference is shown in figure 3. The hypothesis that God really does exist can explain for the child why the parents and other relatives and teachers say that God exists. Because young children are usually not aware of competing religious and nonreligious beliefs, nor of sociological and psychological explanations of the sources of
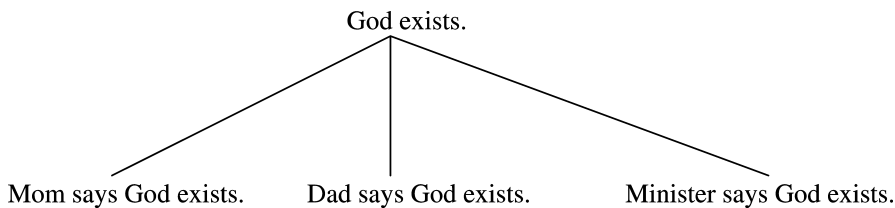
Figure 3.   Example of how testimony supports religious beliefs. For the child, the
hypothesis that God exists explains why parents and other say that he does.

religious belief, it is natural for them to accept religious beliefs on the basis
of testimony.

But religion is as much a matter of emotional attitudes as it is a matter
of beliefs. For example, a Catholic child learns to attach positive emotional
values to such representations as God, the Blessed Virgin Mary, the pope,
and good deeds; and negative emotional values to the devil, sin, Protestants,
and so on. How are emotional values transmitted?

One method of emotional communication is explicit argumentation,
although it may not be very common or effective. An example is means-
ends argument, which has the form: You like Y, and X is a means to
acquire Y, so you should like X too. Pascal's wager is a sort of means-ends
argument for belief in God, saying that people should choose such belief
because it improves their chances of acquiring a happy afterlife.

Another form of argument that can affect emotions is analogical, which
has the form: You like Y, and X is like Y, so you should like X too. Many
political arguments use emotional analogies (Thagard and Shelley, 2001).
Parables are a major kind of emotional analogy in religion, when a story
such as the good Samaritan is used to inspire emotional reactions that
are then transferred to ordinary life. Emotional analogies may supplement
religious education, but they and other arguments are less psychologically
crucial than other methods that are more emotionally direct.

I propose that one of the most powerful social mechanisms of trans-
mission of emotional values is *emotional contagion,* which is "the tendency to
automatically mimic and synchronize facial expressions, vocalizations, pos-
tures, and movements with those of another person and, consequently, to
converge emotionally" (Hatfield, Cacioppo, and Rapson, 1994, p. 5). Peo-
ple tend to catch the emotions of others because unconscious imitation of

physical states contributes to their own emotional judgments. For example, the abrupt and shrill behavior of a nervous person may make an observer feel nervous.

Emotional contagion enables children to pick up emotional values associated with religious ideas from their parents and other close associates. Parents who speak and behave warmly and enthusiastically about their deities and religious institutions will tend to inspire similar attitudes in their children. This happens not just because of their utterances and arguments, but because children naturally mimic their parents' facial expressions and body language and thereby come to associate the same values with religious concepts and institutions. Emotional contagion can also transfer negative emotions toward evil beings such as the devil and toward sinful behavior. We tend to assume that moral education consists largely of inculcating principles such as the ten commandments, but principles without attendant emotional attitudes are ineffective. Psychopaths, who have no sense of responsibility for their actions, are fully familiar with moral principles; they just do not care about them or other people.

Marvin Minsky (2003) has developed the concept of *attachment-based learning.* He suggests that basic goals arise in children as the result of praise from people to whom the children are emotionally attached. For example, when young children share their toys with their playmates, they often receive praise from their parents or other caregivers. The parents have positive values for the act of sharing, and the children may also acquire a positive emotional attitude toward sharing as the result of seeing that it is something cared about by people whom they care about and who care about them. It is not just that sharing becomes a sub-goal to accomplish the goal of getting praised by parents; rather, being kind to playmates becomes an internalized goal that has intrinsic emotional value to the children. Minsky does not tie attachment-based learning to emotional contagion, but it is plausible that a major reason why children pick up the emotional values of their parents, including religious values, is that people have a tendency to mimic the expressions and behavior of the people to whom they are closely attached.

Additional mechanisms of emotional transmission include empathy and altruism. Altruism is the unselfish regard for the welfare of others. If you care about a person, your altruism may lead you to acquire an emotional

attitude toward something that is valued by that person. For example, if you feel for a child, and the child wants a toy, then you may acquire a positive attitude toward the toy because it will make the child happy. Empathy is more complicated, in that it involves a kind of emotional analogy in which people understand the emotional states of other by comparison to their own (Barnes and Thagard, 1997; Thagard and Shelley, 2002). For example, if you are distressed because you just had a grant proposal rejected, I can understand your emotional state by remembering how I felt when I had a proposal rejected. Empathy does not guarantee emotional transmission, because it is possible for a person to understand another's distress without caring about it, but empathic understanding is often a path to altruism and compassion. Once you have gone to the effort to understand ways in which people are emotionally like you, you are likely to become able to care about them and hence altruistically to adopt some of their goals as your own. Transmission mechanisms such as altruism and emotional contagion can lead to emotional consensus in group decision making (Thagard and Kroon, forthcoming).

Religious emotions can be highly damaging to individuals and groups. If one group adopts extremely negative attitudes toward another, then the result can be hatred and even violence. Examples are Christian anti-Semitism and extreme Muslim fundamentalist attitudes toward infidels. Less extremely, some religious groups use emotional tactics such as shunning to discourage people from deviating from their beliefs and practices. Emotional transmission is essential for moral education and social cohesion, but it can be used for immoral purposes such as hatred and persecution. Social transmission of emotion-laden religious values can be facilitated by rituals.

Ritual

As many writers have observed, religious rituals have a strong emotional component (Whitehouse, 2000; McCauley and Lawson, 2002). Whitehouse (2000) contrasts rituals that are infrequent and emotionally intense, such as weddings and funerals, with ones that have low emotional intensity, such as everyday prayer. What do emotional coherence and emotion transmission tell us about the nature of ritual?

Different emotions are associated with different kinds of ritual. Weddings are usually associated with joy and the commitment of the spouses. At funerals, the dominant emotion is grief. Coming of age rituals such as Christian confirmation and the Jewish Bar Mitzvah are often associated with pride. The expectation of divine forgiveness provided to Catholics who go to confession can provide relief from fear of punishment. Thus rituals can generate experiences of positive emotions and relief from negative ones, and thus reinforce the association between religious beliefs and emotionally desirable goals such as comfort and hope for eternal life.

Public rituals such as church services can serve to encourage transmission of values by emotional contagion. For example, a group of people singing or reciting together can adopt similar bodily postures and expressions that bring the people performing them into emotional synchrony with each other, encouraging common attitudes and beliefs. Often a minister or other religious leader will provide a physical model that others can imitate, thereby encouraging the achievement of a common emotional state and socially unified values.

Even frequent and mundane rituals such as daily prayer can tie in with positive and negative emotions. I conjecture that such performances can serve to dampen the effects of anxiety about the vicissitudes of life, in the same way as transcendental meditation, Dampening can work by fostering hope for the future – God will provide, or simply by providing calm and distraction that can change the physiological inputs that are part of the brain's process of generating emotional reactions.

Evolutionary Irrelevance

It has become fashionable in recent years to try to use biological evolution to explain various aspects of culture, including religion (Atran, 2002; Boyer, 2001). I will now review some ways in which evolutionary psychology might be applied to explaining religious belief and practice, and argue that there is no good reason to apply any of them.

We can distinguish several possible ways in which evolutionary biology and psychology might be applied to religion.

1. Religion is an adaptation, built into the human brain as the result of natural selection for religious beliefs and practices.

2. Religion is not an adaptation, but it is natural given special-purpose adaptations that have been selected for.

3. Religion is a spandrel, an accidental by-product of psychological features that have been selected for.

4. Religion is an exaptation, which is the use of a structure or feature for a function other than which it was developed for natural selection.

5. Religion is independent of evolution by natural selection.

None of these views seems right to me, so let me now say more about the evolutionary status of emotional cognition.

It is easy to make the case that emotion is part of human cognition because of biological evolution by natural selection. There is much more to this case than simply generating just so stories about how humans with joys and fears might have been more likely to survive and reproduce. First, neurophysiology and psychology indicate that there are special brain areas such as the amygdala dedicated to emotional processing. Moreover, the anatomical interconnections with cognitive areas such as the prefrontal cortex have also been thoroughly investigated. Second, these emotional brain areas are not unique to humans, but have been largely carried over from our evolutionary predecessors. For example, the neural pathways for fear conditioning in rats are similar to the corresponding pathways in humans (Le Doux, 1996). Even fish have amygdalas, and there are behavioral reasons for thinking that higher mammals, at least, have many of the emotions that people do. Third, we know from studies of people with damage to emotional brain areas that their ability to function well in natural and social environments is impaired (Damasio, 1994). For example, people with damage to the amygdala are limited in learning to avoid and flee dangerous situations.

Contrast the situation with what is known about the evolution of religion. There are no known brain areas dedicated specifically to religious beliefs and practices, and no animal precursors of this areas. Being deficient in religiosity does not seem, at least in the current world environment, to impede the ability of people to survive and reproduce. (There does seem to be a correlation in Europe between decreases in religiosity and decline in birth rates, but both factors are probably caused by increases in education and economic security.) There is no evidence that religiosity is heritable, or

that religiosity favored individuals while our species was evolving. Hence there is no reason to believe that religion is an adaptation.

We could perhaps say that religion is a by-product or exaptation of emotional cognition. Animals such as humans naturally approach what is emotionally positive to them and avoid what is emotionally negative, so it might be possible to say that religion arises indirectly as the result of natural selection of emotions: evolution leads to emotional cognition which leads to religion. The problem with this sequence is that the second "leads to" is much weaker biologically and psychologically than the first one. We know little about the psychological origins of religion in preliterate cultures. A substantial portion of humans (15%) manages to get by without religious beliefs and practices. In technologically advanced cultures such as the United States, religion is less universal than watching television or using the telephone. Watching television depends on our evolved psychological abilities such as seeing and hearing, but no one would say it is a necessary byproduct of evolution.

The tightest relation that one can plausibly posit between emotional cognition and religion is perhaps that the former *encourages* the latter. But the connection between emotionality and religion is no greater than the connection between emotionality and other widespread aspects of human culture such as art, music, cooking, sports, politics, technology, and science. Biological evolution is not completely irrelevant to understanding these cultural developments, since they all depend on cognitive-emotional representations and processes that are wired into human brains. But, given how little is known about the early biological and social development of our species, the dependency relation is so speculative that it is best to say that evolutionary biology has little current role to play in the explanation of the prevalence and nature of religion. Talk of "evolutionary origins" and "evolutionary landscapes" adds nothing to psychological and sociological explanations. Our evolved cognitive-emotional capacities make human beings susceptible to religion, but they also make us susceptible to myriad other cultural developments; so the explanatory connection between evolution and religion is very weak.

As Richardson (1996) has argued, theorizing in evolutionary psychology on such topics as the origins of language and social behavior has fallen well below the standards of good evolutionary explanations. Evolutionary

psychology has generally failed to provide evidence that: (1) selection of psychological capacities has occurred; (2) ecological factors explain strength of selection; (3) differences between individuals have been heritable; (4) evolution was affected by ancient environments, population structure, gene flow, interbreeding, and mutation rates; and (5) psychological traits are primitive and ancestral. Unless there is a dramatic increase in historical and biological knowledge about the evolution of *homo sapiens,* evolutionary conjectures will remain uninformative.

Conclusion

There is an old joke about a Jewish man stranded alone on a desert island who builds two synagogues, one that he happily attends, and one that he scorns to enter. This story illustrates the positive and negative emotions that accompany religious cognition. I have described some of the emotions that attend religious beliefs and practices, and explained the prevalence of religious beliefs in part by a theory of emotional coherence that shows how emotion and cognition intersect. This chapter has also outlined the role that emotions and emotional coherence play in religious rituals, and argued that evolutionary biology has little to tell us about why and how people are religious. Emotional cognition is central to religion, and emotional cognition derives from brain structures that are the product of biological evolution, but evolution currently sheds little light on the structures and content of religious beliefs and practices.

REFERENCES

ADHERENTS
    2003 *Adherents.com.* Retrieved Nov. 26, 2003, from http://www.adherents.com/
ATRAN, S.
    2002 *In gods we trust: The evolutionary landscape of religion.* Oxford: Oxford University Press.
BARNES, A. & P. THAGARD
    1997 Empathy and analogy. *Dialogue: Canadian Philosophical Review* 36, 705-720.
BOYER, P.
    2001 *Religion explained: The evolutionary origins of religious thought.* New York: Basic Books.
COADY, C.A.J.
    1992 *Testimony: A philosophical study.* Oxford: Clarendon Press.
DAMASIO, A.R.
    1994 *Descartes' error.* New York: G. P. Putnam's Sons.

DE SOUSA, R.

    1988 *The rationality of emotion*. Cambridge, MA: MIT Press.

EDWARDS, J.

    2003/1746 *A treatise concerning religious affections*. Retrieved Nov. 26, 2003, from http://www.ccel.org/e/edwards/affections/religious_affections.html

FAZIO, R.H.

    2001 On the automatic activation of associated evaluations: An overview. *Cognition and Emotion* 15, 115-141.

FRANK, R.H.

    1988 *Passions within reason*. New York: Norton.

HATFIELD, E., J.T. CACIOPPO & R.L. RAPSON

    1994 *Emotional contagion*. Cambridge: Cambridge University Press.

HICK, J.

    1967 Faith. In P. Edwards (Ed.), *The encyclopedia of philosophy* (Vol. 3, pp. 165-169). New York: Macmillan.

JAMES, W.

    1948 *Essays in pragmatism*. New York: Hafner.

    1958 *Varieties of religious experience*. New York: New American Library.

LEDOUX, J.

    1996 *The emotional brain*. New York: Simon and Schuster.

LOEWENSTEIN, G.F., E.U. WEBER, C.K. HSEE & N. WELCH

    2001 Risk as feelings. *Psychological Bulletin* 127, 267-286.

MCCAULEY, R.N. & E.T. LAWSON

    2002 *Bringing ritual to mind: Psychological foundations of cultural forms*. Cambridge: Cambridge University Press.

MINSKY, M.

    2003 *The emotion machine*. Retrieved Dec. 4, 2003, from http://web.media.mit.edu/~minsky/E2/eb2.html

RICHARDSON, R.C.

    1996 The prospects for an evolutionary psychology: Human language and human reasoning. *Minds and Machines* 6, 541-557.

ROLLS, E.T.

    1999 *The brain and emotion*. Oxford: Oxford University Press.

SWINBURNE, R.

    1990 *The existence of God* (2nd ed.). Oxford: Oxford University Press.

THAGARD, P.

    1992 *Conceptual revolutions*. Princeton: Princeton University Press.

    2000 *Coherence in thought and action*. Cambridge, MA: MIT Press.

    2002 The passionate scientist: Emotion in scientific cognition. In P. Carruthers, S. Stich & M. Siegal (Eds.), *The cognitive basis of science* (pp. 235-250). Cambridge: Cambridge University Press.

    2003 Why wasn't O. J. convicted? Emotional coherence in legal inference. *Cognition and Emotion* 17, 361-383.

(forthcoming) Testimony, credibility, and explanatory coherence.

THAGARD, P. & F.W. KROON

(forthcoming) Emotional consensus in group decision making.

THAGARD, P. & C.P. SHELLEY

2001 Emotional analogies and analogical inference. In D. Gentner, K.H. Holyoak & B.K. Kokinov (Eds.), *The analogical mind: Perspectives from cognitive science* (pp. 335-362). Cambridge, MA: MIT Press.

WAGAR, B.M. & P. THAGARD

2004 Spiking Phineas Gage: A neurocomputational theory of cognitive-affective integration in decision making. *Psychological Review* 111, 67-79.

WHITEHOUSE, H.

2000 *Arguments and icons: Divergent modes of religiosity.* Oxford: Oxford University Press.