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Guest Editor's Introduction: The Science of God: Natural Origins of Religion in an Evolutionary Perspective*

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Introduction

In contemporary academic and popular literature, the question of religious origins has taken center stage and prompted an emerging dialogue that encompasses an array of disciplines ranging from evolutionary biology to religious studies and even philosophy and theology. This issue of the *JSRNC* is entitled '"Natural" Origins of Religion' to help frame a certain subset of this discussion, one that entails as a central tenet the scientific exploration of origins, focusing on theory, substantiating empirical evidence, and following other important features of the scientific method. Basically, origins refer to the evolution of religion. For some involved in this dialogue, though, that often leads to disagreement, since some argue that the roots of religious behavior are apparent in early *Homo* activity, while others insist that the impetus for such behaviors also reaches into primate evolution and perhaps even earlier (King 2007; Winkelman and Baker 2008; Winkelman, this issue). For this issue, however, the editors decided on the trope of 'origins' to emphasize one important consideration of this view of religion: that religion has a biological basis in the

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human condition. This view may suggest that humans are genetically predisposed for religious behavior much like they are for other formative activities like play. This view obviously incorporates evolutionary mechanisms as explanations for why religiosity exists at all. The theories of the origins of religion presented in this volume postulate not only a biological genesis in ancient humankind, but also place the origination of religion and religious behavior in the biology of living humans. Exploration of 'origins', then, is both a means of locating religion among past hominid species and in modern *Homo sapiens*.

This issue includes four articles that span the breadth of academic inquiry into natural origins, each from a different discipline, including religious studies, cognitive science, evolutionary anthropology, and biocultural anthropology. Each article covers one of four different topical foci: shamanism (Winkelman), narrative and use of symbols (Deacon and Cashman), signaling theory (Bulbulia), and running and spirituality (Sands and Sands). Despite the diversity of perspectives and topics, the commonality that ties each to this issue is the supposition that the origin of human religion is grounded in the biology of our species as well as the unique path of our evolution. This universal human penchant or 'predisposition' for religion has certainly been culturally mediated and thus has yielded a great diversity of religious systems over time and space. Despite this ecological variation of religious content, natural origins strongly suggests that it is possible to find residuals of this biology of belief in contemporary human behavior.

This introduction is not designed as an exhaustive retrieval of recent research and publications—with all that is being accomplished, that would be a monumental task, both to write and for the reader to digest. The intent of this introduction and the accompanying articles is to provide readers with an array of topics and disciplines related to the study of origins, from early anthropological and archaeological approaches, to contemporary Darwinian debates, to the constructive dialogues forming between the cognitive sciences and theology. The article concludes with some 'practical' applications of recent origins research and a survey of further recent work on the subject. Hopefully, this introduction will provide the reader with a basic sense of the approaches and issues that permeate scholarly inquiry into the origins of religion. My disciplinary bias as a biocultural anthropologist has somewhat influenced the content of this introduction; however, the science of religion, specifically the science of origins, involves many players, each with a research agenda and methodology unique to the question of natural origins. For many of us who research and write on origins, such multidisciplinary collaboration is intoxicating and compelling.

The Origins of Religion: Differing Methodologies and Perspectives

Clearly, the question of the natural origins of religion is complex, involving a host of different disciplines and perspectives. At the core of this question of natural origins are more problems concerning the nature of religious experience and, even deeper, definitions of religious behavior itself. Anthony Wallace provided what is perhaps the most frequently used definition by anthropologists of religion, calling religious behavior 'a set of rituals, rationalized by myth, which mobilizes supernatural powers for the purpose of achieving or preventing transformations in man and nature' (Wallace 1966: 107). Anthropologists generally define religion as a universal human propensity, complete with evolved roles of religious specialists, ceremonies, and rituals. Broad definitions refer to 'ideas and practices' that posit a reality beyond that which is 'immediately available to the senses' (Bowen 1998: 5) and organized into a system institutionalized into the fabric of the culture (Haviland *et al*. 2005). Historically, definitions have generally included beliefs in supernatural agents like gods or impersonal forces. In fact, Pascal Boyer, Scott Atran, and others see this belief in non-physical beings as the most common feature of religion, bordering on universal (Boyer 1994, 2002; Atran 2002). This belief in non-corporeal entities is apparent in magic, animism (the belief that spirits and other beings inhabit inanimate objects), polytheism, and the monotheistic religions of the world. Definitions also frequently emphasize religious rituals. Some religious rituals and behaviors seem to be universal, such as prayer, music, dance, feasting, communal gatherings, the attainment of altered states, myths and origin stories, and use of naturally occurring (and sometimes artificially treated or synthetic) pharmacological agents. Such religious expression may manifest in institutionalized or socially approved ways, or in what many contemporary people refer to as 'spirituality', which may be mostly individualistic requiring little or no organization.[1]

Antiquity of Religion

Those searching for natural origins of religion must look far into human history. The roots of religion in human evolution have been postulated to appear with Neanderthals around 50,000 years ago, or even earlier in the evolution of *Homo sapiens*. Some primatologists and physical anthropologists probe other primates for behaviors that are identifiable as precursors to religious behaviors (Goodall 1986, 2000; King 2007). Most anthropologists and archaeologists would agree that physical signs of

1. For the distinction between religion and spirituality, see Taylor 2009 and Haviland *et al*. 2005.

religion and religious behavior appeared in the Middle Paleolithic; however, it is not until the Upper Paleolithic[2] that artifacts and cultural materials indicate the emergence of symbolic belief (Dickson 1996; Mithan 1996). The fields of archaeology and human paleoanthropology probe when and where humans first began believing in God and provide a timeline for origins through the association of cultural and biological material remains informed as well by paleoenvironmental reconstruction. In this light, religion as a behavior is only murkily connected with our past and is certainly not as empirically well supported as the origins of other behaviors, such as bipedalism and running, that leave calling cards on the fossil limbs. Even tool-making is directly observable in the archaeological record. Moving from these 'physical' certainties to more abstract phenomenon, such as symbolic thought (what can be called the 'archaeology of the mind'), can be inferred through tool construction, brain size, and symbolic representations found on cave walls and mobile art objects. Connecting the emergence of evidentiary symbols to the abstract human behavior of spirituality and then to this spiritual propensity in the form of religion can be tenuous, especially when the science of reconstructing the past is primarily based on association, inference, and what to many is the shadowy empiricism of archaeology.

In light of the lack of certain archaeological (material) evidence for the presence of neurobiological structures related to symbolic behavior, including religious behavior, structural anthropologists have turned to examining lifeways of living indigenous peoples such as the !Kung, the Inuit, and the Lapps to explain the evolution of different cultural behaviors (Lee 1979; Sahlins 2003; Shepard 2004; Leibenberg 2006; Ungar 2006). For these structural anthropologists and the evolutionary psychologists influenced by their work (see Tooby and Cosmides 1992; Whitehouse 2001; Buss 2003; Pinker 2002), certain social behaviors can be explained as residual holdovers from periods of Paleolithic adaptation. Others focus on the operations of the human brain visible through CAT scans and neuroimaging, or on unlocking the human genome, all of which often depend on observable human behavior. In other words, answers to questions about how and why religion emerged naturally tend to be based on 'evidence' from living humans and primates. Work in this area sometimes combines multiple approaches. Steven Mithan's *Prehistory of the Human Mind* (1996) offers perspectives informed by

2. Experts temporally define the Upper Paleolithic from 40,000–50,000 years ago ending with the advent of both a retreat from the last ice age and the precursor lifeways to agriculture. It is geospatially usually referred to as a European/Old World phenomenon. The Upper Paleolithic contains well-referenced 'physical' symbols, such as well-defined tool traditions, portable art, and cave paintings.

archaeology, paleoanthropology, and neurobiology, suggesting an overall theory of the cognitive evolution of the human mind that includes religion, art, and science. Morris Berman's *Wandering God* (2000) follows a similar integrative approach, combining prehistory of hunters/gathers, archaeology of art, contemporary child-rearing practices, and roles of women in agriculture to explore the development of nomadic spirituality. E.O. Wilson's theory of 'biophilia' (Wilson 1984; Kellert and Wilson 1993) argues that humans have a predisposition for the 'appreciation' of life and life processes that promotes a collaborative relationship for survival and introspection for our own biological 'value' to nature. This has recently prompted an intersection with emerging forms of 'nature religions', and in some ways, environmental or 'green religions' (Taylor 2009) may be replacing traditional religions systems of belief.

Darwinian Natural Origins

Examining origins through data gathered from contemporary human sources leads many researchers to a central question: why does religion persist as part of the universal human condition? There are several academic 'camps' exploring this question of religious origins; in the rest of this introduction I will explore three of these perspectives. All consider it from a 'Darwinian' perspective, allowing for the processes of selection and adaptation and the potential for unintended use. The first group argues that religion is a *by-product* of a neural architecture that was selected to fulfill some other need. The second camp, typically termed adaptationists or functionalists, posits that the emergence of belief affected the development of neural structures in evolutionarily advantageous, or *adaptive,* ways in particular environmental situations.[3] The third group can be termed maladaptationists and is comprised of strident unapologetic atheists led by Richard Dawkins and Sam Harris, who pose not so much a question of origins but highlight the damage religions have wrought on humanity over time (although initially for many in this group religiosity was a product of a useful and adaptive cognitive system). This system has, over time (especially recently), become *maladaptive*. These debates engage questions that move beyond the reach of current scientific tools. For example, is it possible to conclude whether the presence of a particular neural architecture is directly caused by the mechanisms of selection or by some postulated divine entity (or entities), or by something else entirely? Taking a closer look at the arguments of

3. There has also been some disagreement about whether such adaptation occurs at the individual or group level. For more discussion, see Wilson 2002; Sosis and Alcorta 2003; Bulbulia *et al*. 2008.

those who believe that religion is a by-product, adaptation, or maladaptation elucidates the various ways some have answered such questions.

Religion as a Spandrel (Byproduct)

Two of the most strident Darwinists, Stephen Gould and his colleague Richard Lewontin, invoked the metaphor of *spandrels* to explain the emergence and continued existence of human traits that seem to be without contemporary usefulness (Gould and Lewontin 1979). A spandrel is the space at the intersection of two rounded arches providing structural support to a building. Often decorated with sculpture or paintings, the spandrel itself is a by-product of other functional features of the architecture. The spandrel's beauty is merely an inadvertent consequence of the structural function of the arch. To Gould, the human response to natural selection eventuated in the development of an abnormally large brain respective to the rest of the mammalian order (specifically primates). Given time and the impact of evolution on our cognitive development, many features of contemporary human thought and behavior may be spandrels resulting from the development of that neural complexity.

Evolutionary psychologists and cognitive scientists take a similar approach and posit interconnected mental modules that individually developed for certain tasks (Sperber 1975; Tooby and Cosmides 1992; Wright 1993; Cosmides and Tooby 1996; Pinker 2003, 2009). Specific to religion, they follow the assumption that through evolution, certain cognitive apparatuses developed that responded to very particular environmental and social problems (Boyer 1993, 1994, 2002, 2005; Dennett 1996, 2007; Atran 2002, 2006a; Barrett 2000, 2004; Boyer and Lienard 2007). These include the mental modules that have become known as agent detection, causal reasoning, and theory of mind.

Agent detection is a behavioral response to the environment that triggers the assumption that there is some 'agency' in traditionally inanimate entities. Guthrie, Barrett, and others call this a 'hyperactive agent detection device' (HADD) (Guthrie 1993; Barrett 2000, 2004), where detection of presence often occurs in places where agents are least likely expected. Accepting presence when empirically grounded senses suggest otherwise seems counterintuitive, but such perceptions may appear more logical if one imagines that among early hominids, attributing agency to, say, a tree stump or bush (overestimating agency) was better for survivability than not attributing agency to, say, a predatory cat (underestimating agency) in a particular habitat. If the brain is built to perceive 'agents' (even in their actual absence), this primes humans to accept religious agents who also confound the empirical.

The second cognitive module, causal reasoning, is based on the human need to construct narratives informed by a chronological series of causes and effects that leads us to seek explanation for what we encounter. Humans seem to be driven to explain occurrences that happen to or around us. Attributing strange or unknown events to supernatural agents with mysterious powers and perspectives of the world meshes well with our need to explain.

The third module is theory of mind, or 'folkpsychology' (Atran *et al*. 2002; Medin and Atran 2004; Henig 2007). Humans are capable of attributing social action to a mind similar to their own that cannot be seen or felt, and from this attribution, are able to anticipate others' actions and influence their beliefs. Research shows that as children age, they cease to view their own parents as omniscient but retain the increasing awareness of other minds. Theory of mind has an obvious evolutionary application in discriminating friends and foes. It allows a separation of body and mind which, when accepted, lays the foundation for a belief in the non-corporeal, the soul, and eventually the mind(s) of God(s). For the spandrelists, all three modules developed to assist human survival in an increasingly hostile environment. As our brains and behaviors evolved and adapted to an increasingly complex world, religion became a 'spandrel'—a human behavioral relic that co-opted functional neural architecture for other uses.

Another example of the by-product approach is the recent work on human ritual. Boyer (2005) and Boyer and Lienard (2007) posit that rituals, including those specific to religions, are elaborated in many forms and are integrated in many cultural domains despite the resources invested in their expression. Following McCauley and Lawson's (2002) work on a psychology-based theory of ritual as a means to establish continuity and consistency of behavior through emotional investment, Boyer and Lienard construct a cognitive model fed by work in evolutionary anthropology, neuropsychology, and neuroimaging. They posit that human cultural rituals, such as individual or collective religious rituals, as well as ritualized behavior found in human developmental and pathological conditions, such as Obsessive Compulsive Disorder, are actual by-products of threat-precaution systems through action-parsing systems. The authors define a precaution system as a cognitive system that has evolved to detect and then react to inferred or indirect threats to fitness, 'distinct from systems for manifest danger' (2007: 612).

Religion as an Adaptation

The second camp argues that religion evolved due to the survival advantages it bestowed on ancestors far removed from today's religious

landscape. Escaping the bind of contemporary functions of religion predicating past functions, the adaptationists suggest that religion may not function today as behavior originally selected for in human evolution. Advantages may have promoted solidarity of social groups for feeding, mate selection, or security. David Sloan Wilson (2002, 2008) is one of the more vocal of the adaptationist camp and suggests that the time, resources, and energy devoted to religion and rituals by individuals could be recouped through a unified group that out-competes other groups. Religious rituals are seen by Sosis (2004) as adaptations that promote cooperation and greater commitment than secular ritual, since commitment to religious ritual is based on belief rather than proof. Many rituals also signal individual obligation to foundational beliefs and are means of assuring group members will not stray from the group's commitments. Sosis and others have posed the 'costly signaling theory of ritual' which suggests that because of the costs in energy and resources, rituals are engagement activities that signal to the group that those who participate are committed to group success (Sosis 2003, 2004; Sosis and Alcorta 2003). From an evolutionary perspective, the benefits of solidarity to the group outweigh the costs of ritual.

Religion as an Evolutionary Deviance (Maladaptationists)

A third group is composed of scientists and atheists whose message is not so much focused on the evolutionary origins of religion but on the destructive effect organized religion has wrought and continues to exert in contemporary society. Richard Dawkins, the eminent evolutionary biologist, is perhaps the most noted of this 'maladaptationist' group, and his 2006 book *The God Delusion* is a vitriolic exposé of the social and cultural devastation religion has been responsible for through the ages. Three other authors, philosopher Daniel Dennett (*Breaking the Spell* [2007]) and authors Sam Harris (*End of Faith* [2004] and *Letters to a Christian Nation* [2008]) and Christopher Hitchens (*God is Not Great* [2009]) join Dawkins in a secular crusade to illuminate the ills of religion. Although Dawkins suggests that religion has become a toxic evolutionary accident, he admits that it may have been once a by-product of useful psychological 'tendency' in an evolutionary landscape, but that it is no longer selected for or even possibly useful in situations not defined by contemporary religious behavior.

Religion and Origins Research in Cognitive Science and Neuroscience

As is clear from the previous discussion on the evolutionary functions of religion, the sciences of the human brain, such as neuroanatomy, cognitive science, and genetics, inform recent discoveries related to the natural origins of religion. Such scientific investigations, paired with research

from scientifically inclined religious studies scholars, have promoted what many call a 'science of God', a subject that has become very popular even outside the scientific academy. Periodicals such as *Time*, *Newsweek*, *Wired Magazine*, *New York Times Magazine*, and others have covered the science of God in detail (or at least in as much scientific detail as their format and readership allow) (Hitt 1999; Begley 2001; Goleman 2003; Kluger 2004; Elliot 2007; Henig 2007). Evocative and visceral labels, such as 'wired for God' or the 'God gene' (Hamer 2004), promote interest at a time when, at least in the United States, the relationship between religion and science, exemplified in debates on creationism versus evolution, are prominent in culture wars and political discourse. One of several Republican national debates in the 2008 presidential campaign featured a question asking how many candidates did not believe in evolution. Three candidates raised their hands. While recent events suggest increasing cooperation between formerly oppositional groups, such as conservative religious organizations and evolutionary scientists, it is clear that questions about the origins of religion cut to humanity's core.

Scientifically explaining the complex phenomenon of consciousness and all its variants through 'demystifying' the workings of our brains and reducing our experiences and behaviors to a neurological level is at the foundation of recent work in brain science.[4] In probing origins through the anthropology and psychology of human behavior, many of these 'brain' scientists have focused their research on exploring the 'neurogeographical' origins of religious experience. Most work in the neuroscience of religious experience posits that the brain is 'hardwired' for such experience, and thus, humans are predisposed to 'believe' in God(s). Interested neurologists, neuroscientists, and theologians have staked a new field they term *neurotheology*. Neurotheologians point to the limbic region—the emotional seat of the brain (which includes the hypothalamus, amygdala, and hippocampus)—as the 'God' part, and highlight the role of neurotransmitters in 'conveying' religious experience through this neural substrate.

The neurotheologians focus on emotions often ties with other research. An integral part of any religion is the set of emotive experiences felt while engaged in religious behavior. Usually these experiences occur during individual and group rituals such as prayer, meditation, and trance, commonly leading to what are labeled 'altered states of consciousness' (ASC). These behaviors seem to produce a sense of transcendence

4. By 'scientific', Dean Hamer states, 'I mean [explanations] that can be expressed in terms of basic principles of chemistry and physics. Proponents of this view are called "materialists" because they believe all mental processes can ultimately be accounted for by a few basic physical laws' (Hamer 2004: 94).

or unity, and feelings of fear and self dissolve. Most research in this area involves neuroimaging, locating those neural structures that 'light up' in response to ritual behaviors such as prayer and meditation. The most visible and 'popular' research accomplished in this area includes work by Persinger (1987) and, more recently, Andrew Newberg and his colleagues (D'Aquili and Newberg 1999; Newberg, D'Aquili, and Krause 2002; Newberg and Waldman 2006, 2007, 2009; Alper 2008).

Charting these neurogeographies provides little data for extrapolating to a more origins-driven explanation. Newberg and others, however, have produced an adaptationist agenda that links rhythmic aspects of human ritual with neurological processes that produce experiences of transcendence and unity. D'Aquili and Newberg (1999) and Newberg, D'Aquili, and Krause (2002) suggest that a biological need to act out stories as a means to quell existential uncertainty, coupled with the meaning derived from the stories, makes emotive ritual experiences more compelling than everyday activities. Recently, others, such as Kelley Bulkeley (2004, 2005) and Patrick McNamara (2006, 2009), have ventured into the interface between neuroscience and religion, promoting further exploration of neurotheology and the biology of spiritual experiences.

Certain well-documented drugs produce an ASC in humans and have been implicated in the biology of belief. Psilocybin (a hallucinogen derived from a naturally occurring mushroom), LSD, and certain amphetamines such as ecstasy produce emotive feelings akin to those that many find in experiences that form the foundation of what humans universally attribute to religious experience, transcendence, alternate realities, and unification with nature (Griffiths *et al*. 2006). There has also been much related ethnohistorical and ethnographic work done in the use of naturally occurring pharmacological agents, such as mescaline and peyote, exploring and defining the ASC experienced by shamans (Castenada 1971, 1973; Schultes, Hofman and Ratisch 2001; Whitehead and Wright 2004).

Recent research sheds light on the body's internal neurobiological system that engages opioid neurotransmitters, including dopamine, serotonin, and endocannabinoids in human movements and shamanic rituals (Winkelman and Baker 2008; Winkelman 2000, this issue), running (Dietrich and McDaniel 2004; Jones 2006; Sands and Sands, this issue), surfing (Kotler 2006), and sports in general. In many of these studies, following the prehistoric and historic trajectory of the development of sport as religious ritual (Sands 1999), contemporary sport is viewed as having a similarly religious underpinning (Prebish 1992; Novak 1993; Sands 1999). Some research even suggests that the 'integrity' of the serotonergic

and dopaminergic systems is critical for the construction of 'theory of mind' (Abu-Akel 2002). At a genetic level, Hamer's 2004 book the *God Gene: How Faith is Hardwired Into Our Gene*s, identified a gene (or genes) responsible for making a protein that aids in packaging all of the monoamine neurotransmitters—endogenous molecules that Hamer argues factor into self-transcendence and spirituality. Those with a polymorphism of this gene seemed more predisposed for religious experience.

Criticism of neurotheology and its related theories usually highlights its reductionist perspective and exposes the difficulties involved in producing scientifically rigorous experimentation and translating empirical data into meaningful theory. Reducing religious experience, and ultimately a proclivity toward belief in the supernatural, to a gene or suite of genes that help package neurotransmitters or the neurobiology of other brain functions suggests limits to the influence of culture on neurobiology and on the role of culture in structuring and interpreting seemingly universal emotions. Neurotheology stretches across the discontinuity of the brain–mind divide that many scientists still consider problematic. Studies of brain function are critical for understanding the formation of consciousness and its variants, yet research in the neurobiology of religious beliefs, or on the generation of human consciousness generally, is at best problematic.

The field of the Cognitive Science of Religion (CSR) has undergone an expansion similar to the neurobiology of belief in the last decade and a half. Based on Dan Sperber's original treatise *Rethinking Symbolism* (1975), followed by the work of Lawson and McCauley (1990), McCauley and Lawson (2002), and Boyer's *The Naturalness of Religious Ideas* (1994), the foundation of CSR rests on the idea that the components of religious systems form a 'natural' system of framing our universe, one that over time has been selected for its evolutionary advantages (Bloom 2004, 2005, 2007). Cognitive scientists of religion approach how the human mind first generates then sustains and communicates religion across space and time. Unifying CSR is the underlying theoretical construct that human conceptual structures, or modules, are not solely a result of cultural shaping, but that they also mold and guide cultural manifestations such as religious thought and experience. Cognitive scientists of religion investigate the universal presence of religious systems and how they are manifested in similar beliefs and rituals across cultures. For cognitive scientists, universal cognitive regularities, such as language, are described as mental tools (Pinker 2002, 2009). Identifying similar cognitive tools at work in religious thought and belief allows CSR researchers to begin to understand a diverse array of religious variation. CSR advocates resist defining religious systems holistically, and instead identify singular or coupled behaviors that could be religious in nature.

To Barrett (2007), this has promoted a 'piecemeal' research agenda making the subject attractive to a number of disciplines (including ethnography, archaeology, history, computer modeling, and neuroscience applications). Specific research interests include how cognitive structures 'inform and constrain the transmission of religious ideas', questions of why beliefs in gods persist, why religious rituals and other religious behaviors follow similar patterns of expressions, and why the notion of an afterlife is prevalent across the human species (Barrett 2007: n.p.).

Recent research that informs the notion of religion as a 'natural' mental tool is based on concepts of theological correctness (TC) and minimal counterintuitiveness (MCI) advanced through the work of Barrett (in the former) and Boyer (in the latter). Barrett's work suggests a kind of 'political correctness-like' universal application of anthropomorphic representations of gods, while Boyer's model of MCI suggests that religious thought and its representations survive and are transmitted because they are only slightly off-kilter with regard to their intuitiveness to humans. Work by Barrett, Atran, and others (discussed above in agent detection) posits that gods and agents are part of this minimally counterintuitive system initially developed to account for intentional agency.

Cognitive scientists of religion have also investigated ritual. Lawson and McCauley (1990) and McCauley and Lawson (2002) suggest that religious rituals are more or less actualized universal arrangements of action sequences and can be predicted. Gathering the empirical evidence to support this theory, however, is daunting, and much like Levi-Strauss's work explicating the surface and deep structure of myth, explanatory power lies in both the number of cross-cultural examples and agreement on the meaning of conceptual components.

Scholarly work also continues on the different types of religious expression and their alignment with sociopolitical factors. Harvey Whitehouse (1995, 1996, 2000, 2001, 2004) has put forward a rather encompassing research agenda that posits two modes of religious expression, *imagistic* and *doctrinal*, and predicts what type of social and political structure is associated with each. Imagistic religiosity is characterized by visceral and emotion-laden experiences, such as violent rites of initiation or passage, where cultural cohesiveness is extracted from sharing the experience. Doctrinal expressions, as the name implies, are expressed through religious experiences that are far less emotionally activating, steeped in theology and backed by learning instruction, such as sermons. Whitehouse suggests that more egalitarian societies with little population growth tend to be more imagistic, while more statecentered, hierarchically arranged, and larger populations tend toward doctrinal forms of religious expression.

'Practical' Application of Natural Origins of Religion

Questions of the origins of religion continue to intrigue scientists and theologians alike, and challenge research programs innovatively to explore the relationship of human biology to cultural influence in religious expression and behavior. Perhaps the questions that divide believers and non-believers—such as the existence of supernatural agents such as God, or gods, or spirits, or forces, or the argument that science had no place in postulating origins for religion—are really questions with no real answer satisfactory to all. Perhaps the real value in discussions of natural origins is the application of research exploring how and why humans engage in religious behavior today, consideration of the role religion plays in many conflicts around the world, and exploring the constructive role religion can play in promoting stability in post-conflict and peace-keeping situations. In my current position as Culture Chair at the Air Force Culture and Language Center (AFCLC), my responsibilities include designing and delivering a culture-general curriculum across the spectrum of professional military education (PME), and assisting with similar tasks in the development of pre-deployment or Expeditionary Skills Training (EST). Other military services such as the Army, Marines, and Navy, as well as organizations such as Department of State, USAID, and NGOs like the Peace Corps, offer similar education and training programs. The growing realization by the military that conflict is not the only or final step in building peace and stability has placed military personnel in non-traditional roles in humanitarian and peace-keeping missions, resulting in selection for a more cross-culturally competent soldier.

Culture general is the foundation of cross-cultural competence (3C) (Selmeski 2007; Abbe 2008; Abbe *et al*. 2008), providing enlisted soldiers and officers knowledge of the processes and domain of culture, and teaching them to apply practical skills, such as intercultural communication, conflict resolution, and the use of systematic ethnographic skills to help promote peaceful resolution of conflict situations around the planet for the sustainment of peace. In the development of this curriculum, we look at universal human behavior and institutions such as religion as important human repositories for core beliefs and behaviors, as well as active and visible 'nodes' where intercultural interactions can either promote active intercultural awareness and understanding, or facilitate the collision of core beliefs and the dissolution of peace and stability. Instructing on the natural origins of religion may not be part of this culture general curriculum, but relevant research explains how and why religion—perhaps the most visible of all cultural domains—plays such a

critical role in contemporary intercultural relations around the world, and why it is pivotal to aid Airmen and USAID field staff alike in understanding why religion is so important in all human cultures. Teasing out religious human behavior—magnified by conflict, whose surface expressions are considered irrational to different cultures—is critical for developing appropriate reasoning skills for successful intercultural relations, which highlights the value of teaching these skills to Airmen and others.

In another example of practical application, Scott Atran (2006b) has looked at the development of modern terrorism and extreme religious groups, such as al-Qaeda, through a biocultural lens, and has also appeared before Congress (2008) and British parliament (2007) to discuss his findings (see Atran and Axlerod 2008). Funded by a variety of sources, such as John Jay College, University of Michigan and Air Force Office of Special Research (AFOSR), and the National Science Foundation, and informed by ethnographic research in the Middle East, Atran and others posit that religious values (or core beliefs) are not inviolable and that negotiation of conflict situations where such values are predominant should consider the incongruity of non-like terms, such as terms related to material resources, monetary resources, or land. In this case, belief systems have grown up around these sacred values. Their importance is expressed symbolically and negotiation requires like-kind symbolic concessions. In this vein, the suggestion could be made that cohesiveness and sustainment of religious groups through time has been in part due to adherence to sacred values that transcend immediate social and cultural change. This also encourages conservative sustainment of core beliefs and suggests (as many anthropologists have argued) that fundamentalist and extremist religious groups are responses to rapidly changing internal and external movements spawned by globalization. Atran's work is just one example of applying ethnographic research on religion to understand contemporary conflict situations through a biocultural and evolutionary framework and to suggest resolution utilizing a cognitive science approach.

Continuing Efforts

Interdisciplinary work on the natural origins of religion remains ongoing. The first *International Conference on the Evolution of Religion* occurred in 2007 and brought together three otherwise disparate fields of studies: religious studies, cognitive science, and evolutionary science (Sosis and Bulbulia 2008). A lengthy conference volume, *The Evolution of Religion: Studies, Theories and Critiques* (Bulbulia *et al*. 2008) followed, and featured a smorgasbord of contributors that addressed a variety of key debates,

including whether religion is an adaptation or by-product, and the 'fit' of various evolutionary models to religious phenomenon, including 'sexual selection and signaling models, cultural group selection, and meme theory' (Sosis and Bulbulia 2008: 18).

At the 2008 American Anthropological Association (AAA) meeting, Michael Winkelman and Carol Weingarten organized a panel, 'Religion in Evolutionary Perspective', featuring papers by Winkelman, Barbara King, Phillip Stevens, John Baker, and others that explored the interplay between biology, culture, and religiosity. The underlying theme of all the papers was the role both biology and culture played in the development of religion in humans, from King's paper tracing the roots of religion in primate behavior, to Winkelman's presentation discussing the similarities in chimpanzee and shamanic rituals, to Baker's look at the future evolution of a biocultural religion.

In addition to international conferences, research projects, such as the three year 'Cognition, Religion and Theology Project' led by Justin Barrett and Roger Trigg through the Ian Ramsey Centre for the Science and Religion in partnership with the Institute of Cognitive and Evolutionary Anthropology at Oxford University, bring together interdisciplinary teams that ground their research in an empirical methodology. Barrett and Trigg's website describes the project as 'seek[ing] to support scientific projects that promise to yield new evidence regarding how the structures of human minds inform and constrain religious expression including ideas about gods and spirits, the afterlife, spirit possession, prayer, ritual, religious expertise, and connections between religious thought and morality and pro-social behavior'.[5]

Summary

This introduction has provided an inventory of recent work in the many academic approaches to the natural origins of religion. There are several emerging foci of origins, and even though the methods and theoretical underpinnings may be different, there is an overarching theme of connecting religiosity to the evolution of the human brain and the biocultural influence on the content, behavior, and expression of religious systems. In this issue, these themes are explored from a variety of perspectives and disciplines. The breadth of topics within this small collection reflects the larger tapestry of the study of origins.

Michael Winkelman's article introduces a unique perspective on natural origins by taking an evolutionary and biocultural look at sha-

5. See online: http://users.ox.ac.uk/~theo0038/Anthropology%20and%20Theology.htm (accessed 9 August 2009).

manism, one of the more ancient human spiritual behaviors. Acknowledging that there is a 'revival' of sorts of shamanism for many in today's 'anything goes' religious environment, Winkelman suggests that shamanism represents a collision of ancient past and future that reflects the 're-emergence of some of the most powerful of human capacitances, those related to spiritual healings'. At the foundation of shamanism is ritual, and Winkelman, like Barbara King (2007), finds precursors to human spirituality in animal ritual, especially in primate ritual drumming, dancing, and other behaviors. Along with this ritual underpinning, Winkelman sees shamanism as a by-product of the over-attribution of agency and the innate theory of mind, while its practice has expanded to include ASC with neurobiological correlates centered in the limbic system and fed by neurochemicals such as serotonin and dopamine. Shamanism ultimately promotes individual and group cohesiveness. Contemporary shamanistic rituals may not be adaptive responses to the extent they were for our ancient ancestors, but Winkelman believes that the fact that shamanism is practiced today reflects an innate need for healing and ritual performance that is not just a vestige.

Terrance Deacon and Tyrone Cashman find current theories of natural origins (the by-product, adaptationist, and 'maladaptationist' camps) reductionist and derivative from prior interpretive cognitive models. These reductionist approaches do not take into account the import of the human capacity for symbolism and, even more relevant to natural origins, the emergent capability present in religiosity. In essence, where the more popular theories of natural origins fail to take into account the means by which religion is communicated, Deacon and Cashman stress that through the emergent and generative capacity of human symbolic expression, including narrative, its synergy with innate human emotion creates a unique system for information exchange and perception. In this understanding of religion, the cognitive aspects of framing particular experiences or engaging with a particular text may manifest in transcendence and awe, suggesting that religion is an emergent and highly salient property of human cognition. The authors believe that when considering these symbolic capacities, a far richer and more contextualized understanding of religion and its origins becomes visible, and conclude that the capability of emergence may prove to be the most significant feature in the emergence of human religiosity.

Joseph Bulbulia presents a novel argument in the natural origins discussion. In his selection, 'Charismatic Signalling', religion requires large-scale cooperation among mostly anonymous practitioners and promotes a predictable behavior where uncertainty and risk is high. More times than not, it seems that religious elements, such as music,

dance, prayers, and other behaviors, work to automate cooperation. Anchoring this predictability in the face of the uncertainty and social risk that threatens cooperation are synchronous social signals and the act of communicating these signals. Social signals evoke the coordination of a predictable social response, either in individuals or among groups if meaning is shared. A social signal that empowers coordination of groups under risk is a 'synchronous signal'. These synchronous signals automate predictable responses, working especially well in large groups of people. Synchronous signals work best when anchored in sacred values, since these values are not likely to change or be modified through most interactions with other religions and/or cultures. Religious traditions preserve these signals through time.

Robert and Linda Sands look at the evolution of human running and the engagement of neurobiological pathways as both the emergence of human ritual and the development of a nascent system of belief concludes this issue. Traversing a more open and horizontal landscape, the evolution of long-distance running visible in the biology of hominids engaged the neural reward pathways that promoted a runner's high as a vehicle for not only cataloging a more diverse and wide-open environment, but also facilitated the development of ritual as a means to adapt to a more dangerous and risk-filled environment. In this scenario, running and the development of ritual are by-products of subsistence behaviors and an increasing environmental awareness.

Together, the articles in this volume provide a broad, if not completely unanimous, look at the state of the various disciplines that investigate the origins of religion in humans. Their variety hints at the remarkable diversity of human psychological and social expression, while their common features point to evolutionary and cognitive foundations that provide grounding for further empirical analysis.

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