Chapter 9

Matt Rossano

Abstract Anatomically modern humans (AMH) emerged about 200,000 years before present (ybp) in Africa, initially differing little from other hominin species. Sometime after 100,000 ybp, Neanderthals displaced AMH from the Levant region of the Middle East, ending their first excursion out of their African homeland. About 60,000 ybp, a more socially sophisticated strain of AMH expanded once again out of Africa and replaced all resident archaic hominin species worldwide. A crucial aspect of their increased social sophistication was religion. It was during the time between their retreat from the Levant to the conquest of the world (The African Interregnum) that religion emerged. Using archeological, anthropological, psychological, and primatological evidence, this chapter proposes a theoretical model for the evolutionary emergence of religion – an emergence that is pin-pointed temporally to the ecological and social crucible that was Africa from about 80,000 to 60,000 ybp, when Homo sapiens (but for the grace of God?) nearly vanished from the earth.

9.1 In the Levant 100,000 Years Ago

Anatomically modern humans (AMH) emerged sometime between 200,000 and 150,000 years before present (ybp) in Africa (Relethford 2008; McDougall et al. 2005). About 100,000 ybp, the first evidence of AMH venturing out of Africa is present. A drama unfolded in the Levant region of the Eastern Mediterranean, an area that includes parts of Lebanon, Syria, Jordan, Israel, and the Sinai Peninsula. Around 130,000 ybp evidence from Tabun Cave in Israel indicates habitation by Neanderthals (Shea 2006). Around 100,000 ybp, other sites in the region (Skhul and Qafzeh caves) show evidence of habitation by anatomically modern or near-modern

M. Rossano (✉)
Department of Psychology, Southeastern Louisiana University, Box 10831, Hammond LA 70402, USA
e-mail: mrossano@selu.edu

E. Voland, W. Schiefenhövel (eds.), The Biological Evolution of Religious Mind and Behaviour, The Frontiers Collection, DOI 10.1007/978-3-642-00128-4_9,
© Springer-Verlag Berlin Heidelberg 2009
humans. Their presence was short lived. About 30,000 years later the humans are
gone and Neanderthals again occupied the Levant. It is difficult to know the exact
nature of the interaction between the two species. Shea (2006) maintains that there
were probably brief episodes where Neanderthals and modern humans directly com-
peted for space and resources in the Levant. More often, however, climate probably
stacked the deck in favor of one or the other such that direct confrontation was
negligible. Warmer conditions gave the advantage to humans, colder conditions to
Neanderthals. As conditions changed, either one or the other probably sensed it was
time to move on.

The initial emergence of AMH is marked by no dramatic alteration in the arche-
ological record, nothing that clearly separates them from other hominins. Indeed,
their ordinariness was only reinforced by their Levantine failure and near sub-
sequent extinction. Physically, the AMH who re-emerged later from Africa were
basically the same as their less successful predecessors. The significant change was
far more social/cognitive than skeletal/morphological. The time between their ban-
ishment from the Levant to their definitive expansion from Africa – the African
Interregnum – was one of revolutionary social transformation. This transforma-
tion produced more socially complex, cooperative, and therefore competitive social
groups. The AMH who marched back into Levant and then across the world were no
more individually fit than the archaic hominins they replaced. They were, however,
collectively more fit and this made all the difference.

In the sections to follow, I argue that social sophistication was the key to the
success of AMH. Furthermore, religion was central to the evolution of this social
sophistication. I will do this by addressing three questions: (1) How do we know
that the ‘2nd wave’ AMH were more socially sophisticated? (2) Does social sophis-
tication matter in hominin evolution? and (3) How does religion increase social
sophistication?

9.1.1 How Do We Know That the “2nd Wave” AMH Were More
Socially Sophisticated?

Converging lines of archeological evidence support the hypothesis that the social
world of AMH increased dramatically in the late Pleistocene (about 80,000 ybp
or so). First, there is considerable evidence showing that by the Upper Paleolithic
(about 35,000 ybp) the campsites of AMH are larger, more frequent, more intensely
used and occupied, and more spatially structured compared to those of archaic
species (Dickson 1990; Stringer and Gamble 1993; Bar-Yosef 2000; Hoffecker
2002). Furthermore, many of these sites show evidence of seasonal aggregation,
larger group size, and increased social complexity and stratification (Hayden 2003;
Mellars 1996; Vanhaeren and d’Errico 2005).

Second, Upper Paleolithic humans may have engaged in more strategically coop-
erative hunting than their archaic counterparts (Klein and Edgar 2002; Mellars 1989;
Straus 1992). For example, the Upper Paleolithic marks the first evidence of ibex
hunting in the European archeological record. Straus (1992) contends that this particular species requires “elaborate strategies, tactics, and weapons,” for successful capture. A recent study (Adler et al. 2006) examined the putative differences in hunting strategies between Cro-Magnons and Neanderthals in the eastern Caucuses. Somewhat surprisingly, the results failed to uncover substantial differences in hunting strategies. Instead, AMH gained an advantage via greater social networking. The range of lithic raw materials procured by AMH indicated more far ranging foraging activity and the existence of wider, more extensive trading networks.

Evidence of expanded trade among AMH, however, pre-dates both the Upper Paleolithic and the 2nd wave expansion out of Africa. The “precocious” Howiesons Poort and Mumba tool industries, which emerge around 70,000 ybp, feature fine-grained, non-local, microlithic artifacts. The non-local origin of these artifacts suggests more extensive trade among local populations (Ambrose 2002). Ecological degradation, possibly associated with the massive Tober eruption (around 73,000 ybp), may have compelled human groups to establish wider trade networks in an effort to more effectively utilize dwindling, more highly scattered resources. As mentioned before, evidence of similarly extensive trade networks can be found among Upper Paleolithic humans, but significantly, is lacking among archaic hominins (Feblot-Augustins 1999; Soffer 1985).

9.1.2 Does Social Sophistication Matter?

That one group might be larger and better organized than another only matters if there is inter-group competition. Evidence suggests that group competition played an important role in hominin evolution. The AMH/Neanderthal jockeying over the Levant is but one potential example. Tens of thousands of years later, when AMH entered Europe, they coexisted for thousands of years with Neanderthals. At various times and places this coexistence appears to have involved varying degrees of direct competition (Stringer and Gamble 1993; Mellars 1996; Lewis-Williams 2002). Additionally, competition among various AMH groups also seems highly probable.

The massive Toba eruption mentioned earlier contributed to a population bottleneck among AMH in Africa around 70,000 ybp (Ambrose 1998). So devastating was this event, that human populations may have dropped to around 2,000 breeding individuals – as close to extinction as humans have ever come. However, genetic studies also indicate a rapid population expansion, in particular, AMH populations in Africa beginning at around this same time (Mellars 2006). Mellars argues that a socially and technologically advanced group of modern humans expanded precipitously at this time, absorbing or replacing both adjacent African hominin populations and, in time, archaic hominins worldwide (Mellars 2006). Moreover, evidence of ethnic or social marking among hominins may go back as far as 200,000 ybp or more (Richerson and Boyd 2005). Current anthropological and experimental evidences add further credence to the notion that group competition played a non-trivial role in our evolutionary past.
Ethnographically, one of the most commonly cited examples of group competition was the nineteenth century near-decimation of the Dinka of Southern Sudan by the Nuer. Though the two tribes were descended from common stock and shared much in terms of lifestyle, subsistence practices, and technology, a key cultural difference divided them (Kelly 1985). Unlike the Dinka, the Nuer kept bride-price payment distributions tightly constrained along patriarchal lines, thus fostering strong clan-based allegiances. These allegiances proved decisive in their conflict with the Dinka. The Nuer/Dinka conflict does not appear to be an isolated event. Evidence from traditional societies in both North American and New Guinea indicates that inter-group conflicts were not uncommon (Richerson and Boyd 2005). Soltis et al. (1995) report average 25-year extinction rates for tribes in various regions of New Guinea ranging anywhere from just under 8% to over 31%.

These historical/ethnographic data are complemented by recent laboratory findings showing that when people can freely choose which groups to associate with, groups that actively punish “freeloaders” out-compete others that do not (Gurerk et al. 2006). This provides an empirical demonstration that group norms matter. A group with a cultural norm of cooperation coupled with active punishment of non-cooperators can win out in direct competition with a group possessing more individualistic norms.

9.1.3 How Does Religion Increase Social Sophistication?

Recently, it has been argued that the mechanisms explaining cooperation in non-human species, (e.g., kin and reciprocal altruism) are inadequate for understanding human cooperation and that a form of group-level cultural selection may be required (Fehr et al. 2002; Gintis 2000; Sterelny 2003). For cultural group selection to work the benefit of individual selfishness must be kept below the gain in individual fitness achieved by being a cooperator in an altruistic group. To achieve this, within-group cooperation must carry little individual cost (“cheap” altruism) otherwise it will quickly lose out to selfishness. Cheap altruism requires two conditions: (1) defection (non-cooperation) must be punished by effective, cohesive, broad-based coalitions, where the cost to individual coalition members is low, and (2) defections must occur infrequently so that the need to punish is rare (Sterelny 2003). These conditions can be rephrased (and reverse ordered) in ways that are more religion-relevant: (1) people must conform to social norms and (2) they must be motivated to punish those who do not follow those norms. By putting it this way, images of commandments being handed down from mountain-tops or Puritans displaying people in stocks in the village square fall powerfully into place. But divine laws and inquisitor’s racks were not the first or even the most effective tools in religion’s arsenal for compelling conformity. In its earliest evolutionary stages, religion simply took advantage of a very natural and very potent mechanism of behavioral control – the public eye.

Considerable social science research shows that when people know their actions are under public scrutiny they adhere more scrupulously to group norms, and behave
more reasonably, courteously, generously, honestly, and bravely (especially for men) compared to when their actions are concealed (Burnham and Hare 2007; Rossano 2007; Andreoni and Petrie 2004; Rege and Telle 2004). So powerful is this effect that only the barest hint of public observation is necessary to compel people to behave more pro-socially – an image of a robot face (Burnham and Hare 2007), a picture of human eyes (Bateson et al. 2006), or just the suggestion of a ghost in the vicinity are all enough to do the trick (Bering et al. 2005). Our reaction to the presence or even the mere suggestion of public scrutiny is deeply primal – mediated by unconscious mechanisms honed by eons of evolution.

The AMH who emerged from Africa 60,000 ybp found ways to work together that were unprecedented in evolutionary history. Creating these more complex and cooperative groups required getting people to put group interests above individual ones. An effective strategy for doing this is to increase public scrutiny of behavior. The close-knit nature of hunter-gatherer life probably made the idea of constant social observation a natural one. Even so, human social scrutiny has its limitations – you just cannot watch everyone all the time. No, you cannot, but the Gods can. The AMH who emerged from Africa 60,000 ybp were not only more socially sophisticated they were also religious and their religion was crucial in their achievement of uniquely human levels of cooperation.


Three elements of religion – shamanism, ancestor worship, and animism – appear to be “primitive” in the sense that they are universal (or near-universal) among traditional societies and they also have deep evolutionary roots (Rossano 2007). While it is impossible to tell if these constitute religion’s original traits, evidence suggests that they may be religion’s oldest documented traits. Evidence for all three of these traits can be found in the archeological record of the Upper Paleolithic. Furthermore, shamanism very likely pre-dates the Upper Paleolithic. Thus, there is good reason to suspect that religion was already part of the social/cognitive make up of the AMH who emerged out of Africa about 60,000 ybp. Of even greater significance is that their religion represented a “supernaturalizing” of social life. Shamanism, ancestor worship, and animism all entail an extension of the social world into a supernatural realm. This supernatural layer of social life brought with it a “spiritualizing” of social scrutiny – ever-vigilant eyes constantly monitoring for proper behavior, adherence to tradition, and avoidance of taboo. Religion meant that social scrutiny was omnipresent.

9.2.1 Ancestor Worship: Archaeological Evidence

Upper Paleolithic burials provide some of the first evidence of ancestor worship. While there is (disputed) evidence of intentional burial prior to the Upper Paleolithic, burials unambiguously associated with grave goods (e.g., body
ornaments such as head dresses, beaded necklaces, armbands) increases significantly in the Upper Paleolithic compared to earlier periods (Riel-Salvatore and Clark 2001). Burial sites such as Sungir (White 1993), Dolni Vestonice (Klima 1988), and Saint-Germain-la-Riviere (Vanhaeren and d’Errico 2005) attest to the presence of an elite class whose members were laid to rest with great ceremony and copious grave offerings.

The Upper Paleolithic people associated with these burials had transitioned from being purely egalitarian hunter-gatherers (such as the !Kung San) to complex hunter-gatherers (Dickson 1990; Hayden 2003; Vanhaeren and d’Errico 2005; Klein and Edgar 2002). Complex hunter-gatherers typically use more sophisticated technologies for harvesting and storing seasonally abundant resources (e.g., nets or traps to catch large quantities of fish during spawning season). The Upper Paleolithic marks the first presence in the archeological record of hunting technologies such as traps, snares, and weirs used for harvesting large quantities of game (Hoffecker 2002) and storage facilities for keeping surpluses (Soffer 1985). In contrast to egalitarian hunter-gatherers, ancestors play an increasingly prominent role in complex hunter-gatherer societies as protectors of resource-rich territories (Hayden 2003). Among more recent complex hunter-gatherers, lavish burials with abundant grave offerings usually occur under the expectation that the deceased will soon become a powerful ancestor (Hayden 2003).

9.2.2 Shamanism: Archaeological Evidence

In traditional societies the shaman’s role is to enter an altered state of consciousness wherein he/she connects with spiritual forces in order to gain knowledge or effect cures. The shaman is the community’s spiritual emissary and ritually induced trance is his/her main tool. Shamanism is one of the world’s oldest forms of religious activity (Lee and Daly 1999). The deep cave sites associated with Upper Paleolithic art and imagery provide support for the presence of shamanism in these societies.

A number of researchers have argued that Upper Paleolithic cave art reflects the experiences and rituals of early shamanism (Dowson and Porr 2001; Hayden 2003; Lewis-Williams 2002). Therianthropic images (human/animal chimera) found in many of deep cave sites, such as the “sorcerer” image from Les Trois Freres or the “bird-man” image from Lascaux, are consistent with the shamanistic theme of “soul flight” where, in the midst of trance, the shaman’s soul leaves his/her body and unites with that of a spiritually powerful animal (Dickson 1990; Davenport and Jochim 1988; Townsend 1999; Vitebsky 2000). Other evidence such as the acoustic properties of many of these deep cave sites, the lack of evidence for routine use, the symbolic and animal imagery often present, and the handprints of children and adolescents, all support the notion that these deep cave sites were used for consciousness-altering rituals possibly of initiation or passage (Hayden 2003; Lewis-Williams 2002).
Two recent finds push the origins of shamanism to before the Upper Paleolithic. A 35,000 ybp image of what appears to be a person in the antlered headgear of a shaman was recently uncovered in the Fumane cave of northern Italy (Balter 2000). An even older and more intriguing find is that of a 70,000 ybp ritually modified snake rock recently uncovered in a deep cave site in the Tsodilo Hills of Botswana (Minkel 2006). The boulder’s natural appearance had been intentionally enhanced so that incoming natural light gave the impression of scales on its surface while firelight gave the impression of undulating movement. These modifications strongly suggest use of the site for consciousness altering rituals. Significantly, the oldest potential evidence for consciousness altering ritual dates to the very heart of the African Interregnum, offering support for the hypothesis that religion emerged during this period and was transported by our ancestors out of Africa to wherever they trekked.

9.2.3 Animal and Natural Spirits: Archaeological Evidence

Evidence for animal cults takes a number of forms in the archeological record of the Upper Paleolithic. First, Upper Paleolithic cave art contains thousands of animal depictions including the therianthropic and mythic images mentioned earlier. Second, at both Les Trois-Freres and Chauvet caves there are chambers that appear to be dedicated to specific animals (or animal spirits). The “Lion Chapel” at Les Trois-Freres contains a large feline mural along with the remains of a fire surrounded by apparently deliberately placed bones (Hayden 2003). In the “bear chamber” at Chauvet Cave, there is a bear skull carefully placed atop a large limestone block. Below the block are the remains of a fire and more than 30 other bear skulls that seem to be intentionally placed (Hayden 2003).

Third, at the Dolni Vestonice site in the Czech Republic, fragments of clay-baked animal forms dated to around 23,000 ybp were uncovered that seem designed to explode when heated (Hayden 2003). Hayden (2003) argues that these were probably used in some ritual associated with the celebration of animal spirits. Taken together, this evidence has compelled many investigators to argue that animal and other natural spirits played a prominent role in Upper Paleolithic religious practices (Hayden 2003).

9.2.4 Ancestor Worship, Shamanism, and Animism: Supernaturalizing Social Life

The critical point about religion’s primitive traits—ancestor worship, shamanism, and animism—is that they represent the addition of a supernatural layer to human social life. For example, the ancestors are typically thought of as fully participating members of the social community who play a critical role in the health, prosperity,
fertility, and future fortune of their earth-bound tribe (Parrinder 1976; Boyer 2001; Harvey 2000). Ancestors are ever-watchful, “interested parties” whose goals and concerns (especially when it comes to observance of tradition and avoidance of taboo) must be considered in the everyday affairs of the living (Parrinder 1976; Boyer 2001; Harvey 2000). Likewise, the shaman is the spiritual world’s earthly messenger, relaying critical information about the spirits’ desires and demands. Often these demands focus on proper recompense for violations of taboo and the necessity of practicing ritual and upholding tradition for the well-being of the community (Harvey 2000). By nurturing and repairing the tribe’s relationship to the supernatural and by binding supernatural authority to social norms, the shaman strengthens community and discourages deviance – or as Vitebsky (Vitebsky 2000) puts it “The mystic is also a social worker.”

Finally, an animistic view of the natural world incorporates nature into the human social world. There is considerable evidence that this sacred orientation toward the land and its resources can curb exploitation and enhance human cooperation over the sharing of scarce resources (Harvey 2000; Atran 2002; Lansing 1991). Examples as diverse as salmon fishing among Native American tribes of the Upper Klamath River Valley (California), the use of patchy resources among Australian aborigines, and rice cultivation in Bali show that scarce resources can be effectively managed among competing communities using ritual and spiritual sanctions. Furthermore, in many of these cases traditional religious regulations have proven more effective than modern bureaucratic/technological ones.

By at least the Upper Paleolithic (and very likely earlier), we have evidence that religion is present. The supernatural world is well ensconced in human social life. The spirits are watching. The ancestors are vigilant against violations of taboo. The shaman is on call to render spiritual adjudication. This pervasive social scrutiny reinforced social norms and curbed insidious individualism producing more cohesive, cooperative, and competitive social groups.

9.3 What Happened During the Interregnum?

AMH were banished from the Levant 100,000 ybp. About 30,000 years later, they re-emerged from Africa as a more socially complex and recognizably religious species. The elements of their religion—shamanism, ancestor worship, and animism—added an ever-vigilant spiritual “stare” to their social lives motivating them to scrupulous adherence to social norms. In this section I take up the question of what happened during the African Interregnum that prompted religion’s emergence. I argue that two critical events took place: (1) children “invented” the supernatural as a cognitive mechanism for acquiring greater social intelligence as adults and (2) adults retained supernatural thinking, incorporating it into already-present rituals of social bonding, intensifying those rituals and transforming them into rituals of individual and community healing.
9.3.1 “And a Child Shall Lead Them...”

If religion was an extension of social life to include the supernatural – from where did the idea of the supernatural arise? The tendency toward supernatural thinking has probably been a feature of childhood cognition even before the advent of AMH. However, it was only during the African Interregnum that retaining this form of thinking past childhood became selectively advantageous.

A body of work in developmental psychology indicates that children have a natural inclination to think supernaturally. This inclination appears to serve an adaptive purpose: it helps them hone the social reasoning skills essential for successful functioning as an adult. Childhood supernatural thinking became selectively advantageous as the complexity of the hominin social world increased around 100,000 years ago or so. Among our ancestors, those adults who were the most socially skilled were the ones who as children tended to think supernaturally.

Developmental research has documented evidence of childhood supernatural thinking in a number of different forms:

1. Twelve-month-olds treat computer-animated images as intentional objects with desires and goals (Gergely and Csibra 2003). Six-month-olds make primitive “moral” judgments based on the inferred intentions of those objects (Hamlin et al. 2007).
2. Infants treat an inanimate object that coordinates its movements with that of the infant as a true social partner (Johnson 2003).
3. Children aged 2–6 years display anthropomorphized/teleological reasoning – claiming that the sun shines in order to “keep me warm,” or the wind blows “to help me fly my kite.” (Piaget 1929). Older children readily link natural events with moral behavior, such as bridge collapsing, because the children on it behaved badly earlier (Piaget 1932/1965).
4. Seven- and eight-year-olds prefer teleological explanations for natural objects’ properties (rocks are pointy, so animals would not sit on them) even when specifically told that adults apply physical explanations like erosion (Kelemen 1999).
5. Cross-culturally, children prefer God as the cause of the existence of animate and inanimate objects over other causes (Evans 2001; Gelman and Kremer 1991; Kelemen and DiYanni 2005).
6. Children form a theory of mind about God (or other omniscient supernatural agents), prior to forming one about other humans (Barrett et al. 2001).
7. Cross-culturally, imaginary friends or pretend play partners are common among children and are associated with increased social competence, greater empathy, better coping skills, and better performance on theory of mind tests (Seiffge-Krenke 1997; Taylor 1999; Taylor et al. 2004).

Kelemen (2004) argues that childhood teleology is a reflection of human social intelligence. Thinking in terms of goals and intentions is highly functional in the social realm, so it is not surprising to see it over-extended into the natural realm.
during childhood. A key task of childhood is to prepare the child to successfully navigate an adult social world saturated in intentionality. In this regard, the imagi-native processes that lie behind childhood anthropomorphism, teleological thinking and pretend companions may be analogous to the over-extensions that facilitated language development.

Once children had envisioned a world teeming with life, purpose, and intention-ality, what did adults do with that vision? I have already reviewed evidence indicating that religion – through the mechanism of enhanced social scrutiny – served to increase social cohesion and cooperation. These benefits, however, would only seem to accrue after supernatural thinking was well-established within a group. How can we explain the initial retention of supernatural thinking in adults? An immediate, tangible, and direct individual benefit would be necessary for the first adult to decide that some retention of childhood supernaturalism was a good idea. This immediate benefit is actually not hard to find – the supernatural, it turns out, is good healthy fun.

9.3.2 Enhancing Ritual

About every 2 weeks, the !Kung San of Southern Africa gather for a traditional healing dance (Katz 1982). These eagerly anticipated events have about them the air of a community festival. The shamans who instigate healing claim that when they enter kia, the altered state of consciousness that produces healing power, it is an emotionally intense experience of utter transcendence. They claim to be more fully alive, more fully themselves when in kia than during their normal conscious state (Katz 1982). Furthermore, this feeling of transcendent joy is not reserved for just a few – among the !Kung more than half the men and 10% of the women are shaman/healers. And while these shaman/healers are achieving kia, everyone else is singing, dancing and getting healed. It is a good time for all at the !Kung healing dance.

The rhythms of group dancing, singing, and chanting can have powerful anal-gesic and healing effects (Mithen 2006). That fact that rituals of social bonding such as grooming, group pant-hooting, and mutual embracing are present among our primate cousins indicates that these and probably even more elaborate and well-coordinated social rituals were very likely present among our hominin ancestors (Goodall 1986; Smuts and Watanabe 1990). Moreover, ritualized behaviors such as these are known to affect consciousness both in humans and non-human primates (Rossano 2007). Thus, it is likely that consciousness-altering, health-enhancing social rituals were present in our hominin ancestors long before the arrival of the supernatural. These rituals provided a natural touch-point for incorporating the supernatural into the adult world. Evidence suggests that the supernatural would have enhanced and intensified these ritual experiences.

A recent study found that people randomly assigned to a spiritual meditation condition had significantly greater pain tolerance, anxiety reduction and mood eleva-tion compared to those assigned to a secular meditation condition (Wachholtz and Pargament 2005). If ritual is good, then “supernaturalized” ritual is even better.
During the African Interregnum our ancestors discovered exactly this: by incorporating the supernatural into their already established (and enjoyable) social rituals, those rituals became even more effective in promoting individual health benefits and community/social bonding. This provided the foundation for traditional forms of ritual healing.

Traditional healing practices involving shamanistic rituals and altered states of consciousness are ubiquitous among traditional societies. The positive physical and psychological effects of healing rituals documented among extant hunter-gatherers offers support for the notion that shamanistic healing served an important adaptive function in our ancestral past (Katz 1982). McClenon (2002) has marshaled considerable evidence indicating that those of our ancestors who were most susceptible to the beneficial physical and psychological effects of shamanistic rituals had a selective advantage over others in surviving illness or injury, overcoming debilitating emotional states, and enduring the rigors of childbirth. This "ritual healing" theory is based on a number of converging lines of evidence, including (McClenon 2002):

1. The universality (or near-universality) of ritual healing practices across traditional societies.
2. The fact that ritual healing always involves hypnotic processes and altered states of consciousness.
3. Evidence showing that hypnotizability or the ability to achieve a mental state highly prone to suggestion is measurable, variable, and has heritable components.
4. Evidence showing the effectiveness of ritual healing for maladies involving psychological factors including chronic pain, burns, bleeding, headaches, skin disorders, gastrointestinal disorders, and the discomforts and complications of childbirth.
5. The evidence from comparative and archeological studies indicating the existence of ritual, altered states of consciousness, and care of the sick among our primate and hominin relatives.
6. The fact that the earliest medical texts (from Mesopotamian and Egyptian civilizations) closely connect healing with religious ritual.
7. The finding that anomalous events associated with ritual, such as "miraculous" healing, are effective in inducing supernatural beliefs. Thus, healing rituals would have reinforced supernatural beliefs among our ancestors and encouraged their expansion.

It is not hard to imagine that our *Homo sapiens* ancestors were engaging in social rituals around a blazing campfire. At times these rituals may only have involved group chanting, dancing, or hypnotic silence before the flames (the benefits of which should not be casually dismissed). At other times these rituals may have involved intensely dramatic shamanistic rituals where soul flight, supernatural encounters, and "miraculous" healings took place. It was more than likely that the immediate positive psychological (ecstatic emotions/social bonding) and physical (placebo-based health benefits, "miraculous" healings) effects of these rituals provided the
motivation for their enactment. While these rituals pre-dated the supernatural, once included in them, the supernatural had immediate, potent practical value. This value was both fitness-enhancing and self-reinforcing: it encouraged the expansion of both the rituals themselves and supernaturalism behind the rituals.

9.4 Summary and Predictions

The proposed model can be summarized as follows:

1. Prior to their retreat from the Levant, our hominin ancestors already possessed the capacity for consciousness-altering rituals of social bonding.

2. During the African Interregnum, roughly 90,000–60,000 ybp, ecological degradation forced our ancestors to form more complex social groups and more extensive trading networks.

3. In this more complex social world, children’s natural tendency toward supernatural thinking became selectively advantageous as those children grew into more socially adroit adults.

4. Adults incorporated supernaturalism into their already present rituals of social bonding, intensifying them, making them even more effective as both social bonding and healing mechanisms.

5. Those whose brains were most capable of attaining a health-enhancing ritually induced altered state of consciousness gained a fitness advantage, thus progressively deepening our ancestors’ experience of the supernatural and their belief in it.

6. Furthermore, those groups with the most effective supernatural rituals achieved a fitness advantage over other more “secular” groups by virtue of stronger intra-group cohesion and cooperation due to the belief in constant supernatural social scrutiny.

7. These highly cooperative, sophisticated, competitive and religious social groups broke forth from Africa and conquered the world.

The proposed model leads to a number of testable hypotheses such as the following: (1) the social/emotional bonding functions of religion preceded and are more basic than notions of supernatural agency, (2) shamanism preceded and is more basic than ancestor worship, and (3) religion is fitness-enhancing. Space limitations preclude a thorough examination of these hypotheses, but supportive neuroscientific, comparative, anthropological, and psychological evidence is already present (Rossano, in preparation).

References


Balter M (2000) Paintings in Italian cave may be oldest yet. Science 290:419–421


