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## The Role of Symbolic Capacity in the Origins of Religion

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### Abstract

The scientific investigation of the human religious predisposition has recently been augmented by considering it from an evolutionary perspective. This approach has provided new insights but has also generated controversy because of its reductionist goals. Here we explore the religious predisposition in terms of its emergent characteristics, specifically those that we consider to be a consequence of the evolution of symbolic abilities.<sup>1</sup> We argue that the evolution of symbolic capacity has resulted in three unprecedented modifications of hominid cognitive and emotional predispositions that are particularly relevant for explaining some of the more distinctive and enigmatic characteristics of religion: (1) a predisposition to understand worldly events and one's own identity and place within the world in narrative terms; (2) a predisposition to conceive of the world as two-layered, so that some objects and events of mundane experience are like signs expressing meanings that concern a hidden and more fundamental level of existence; and (3) a capacity for what we describe as emergent emotional experiences that are of a higher order than primary evolved emotions, and which are in turn the source of transcendent forms of experience—often considered to be the most exalted aspects of a spiritual life.

1. In this essay, we can only briefly hint at the basic logic of emergence (for in depth treatments, see Deacon 2006b and Sherman and Deacon 2007). In this usage we use the term *emergence* in a fairly standard sense to refer to the spontaneous generation of a higher-order novel synergy arising from the interaction of component processes. Processes are also described as emergent when they exhibit characteristics that are discontinuous with or even contrary to properties and tendencies observed at component levels.

*Evolutionary Approaches to the Origins of Religion*

There has been a recent growth of interest in using evolutionary approaches to attempt to explain many of the distinctive and uniquely human attributes that constitute religious traditions, as these are understood in a broad sense. Included in this broad definition are the world's major literate religious traditions as well as the many sacred activities, spiritual beliefs, magical practices, animistic identifications, demonic accounts of disease and disaster, and so on, that characterize the way people in essentially all of the world's societies appeal to powers they deem to be intangible in the usual sense. Although only rough statistics are available, we can be reasonably sure that the vast majority of people living today (e.g. 86% according to Barrett, Kurian, and Johnson 2001) hold some sort of religious belief, as opposed to those explicitly claiming to be atheists or non-believers. There is a long tradition in anthropology and folklore studies attempting to organize these traditions according to various categorical systems, in order to demonstrate the diversity and commonalities of their major features (see, e.g., classic theories by Tyler 1873; Frazer 1890; Durkheim 1912; Evans-Pritchard 1965; Eliade 1978–85). However, the recent interest in utilizing evolutionary analyses to develop hypotheses concerning the most common shared attributes of religious traditions differs from anthropological and comparative approaches in that its goals are explanatory and causal, not merely descriptive (e.g. Boyer 2001; Wilson 2002; though see Pals 1996 and Preus 2000 for an overview of some classic evolutionary approaches). They involve efforts to identify the psychological and social processes that contribute to these various commonalities of beliefs and practices. Because they are informed by biological theory, evolutionary approaches are primarily interested in the biases and constraints affecting the development of these phenomena rather than the specific content of these systems. Thus their methodological focus is on mechanisms that are in many respects a level removed from any specific beliefs or practices. Their starting point is noticing widespread commonalities among traditions that have developed independently of one another and asking whether these parallels reflect some common evolved psychological mechanism or social dynamic.

The various evolution-based approaches to religious phenomena can be distinguished by virtue of the way they are framed in functional terms. Broadly speaking, these approaches can be divided into three types of claims about the attributes of a religion:

- a. Religious phenomena are *by-products* of the way that human minds operate in ordinary non-religious contexts. Mental capacities and tendencies evolved as a result of selection pressures of everyday life in our Pleistocene past, such as the need to avoid predation and to anticipate the actions of other intelligent agents. The particular features of a religion are by-products of these tendencies that no longer have an adaptive role to play (i.e. they are out-of-context misapplications of evolved tendencies).
- b. Religious phenomena are *adaptations*, not just useless by-products. They continue to provide psychological and social benefits that contribute to individual and kin reproductive advantage. Such features may, for example, contribute to (i) alleviating the angst of uncertain identity and certain death, and in this way contribute to more effective day-to-day behavior (i.e. psychologically adaptive), and/or (ii) collective identity and thus provide mechanisms to maintain social cohesion (i.e. they may be socially adaptive). These are not mutually exclusive functions and their consequences would likely contribute to the effective transmission of religious systems and their underlying psychological supports.
- c. Religions are independently evolved and evolving *super-organisms*, which act as *social parasites* on the individual and collective human minds, and exhibit traits that have been selectively favored only because they tend to aid their own replication, from mind to mind and generation to generation, irrespective of their hosts. Thus, belief systems that promote universal reproductive abstinence are not in concert with individual or kin biological fitness.

These three kinds of accounts are not mutually exclusive and have been applied differently to different features of the same religion. Claim (a) treats religious features as epiphenomenal, or like vestigial organs that serve no purpose in their present form. This is the most common approach presented by evolutionary psychologists (e.g. Atran 2002; Boyer 2003; Tremblin 2006; Wright 2009), who see these features as inappropriate expressions of mental predispositions evolved for other purposes. Claim (b) treats them as functional attributes that are currently adaptive in some way. So, for example, a cultural trait might be presumed to persist because it is beneficial to the individuals and/or groups that adopt these practices, aiding either kin reproduction or at least reproduction and maintenance of the social group. This is

consistent with classical cultural ecology approaches to social practices (e.g. Rappaport 1999) as well as with more recent group selection theories (e.g. Wilson 2002). Claim (c) is purely a cultural evolutionary conception that, like (a), does not presume that the feature confers any individual, kin, or even social advantage, but rather persists simply by virtue of the way it 'tricks' certain human predispositions into aiding its propagation. This is consistent with what has been described as a 'parasitic meme' approach (following Dawkins 1976, 2003, 2006; e.g. Brodie 1995; Lynch 1998; Blackmore 1999).

We accept a number of the insights contributed by all three of these biologically framed explanations, but find them too restricted in the data they purport to explain and the paradigms they employ to be able adequately to characterize religion. Specifically, all three are reductive accounts that largely treat the content of religious reflections and spiritual experiences as mere incidental artifacts of more fundamental mechanisms, and not possessing intrinsic meaning or value beyond these instrumental ends. As a result, they offer impoverished accounts of what might be described as the transformational experiences and ultimate meaning that religious ideas and practices provide to their believers. If religious traditions were merely epiphenomenal, they would likely not be ubiquitously present and they would probably be far more diverse in content. If they were merely cultural adaptations or parasitic memes it would be difficult to explain the powerful social functions they serve and the apparent psychological value they provide. Moreover, the first thing to explain is why essentially all societies of humans have some form of spiritual tradition while the other species of social animals do not, at least as religion is conventionally understood (i.e. as having to do with perceptions and beliefs related to spiritual beings or forces). Obviously symbolic culture is a critical factor that must be taken into account. But another critical question is: Does symbolic conceptualization merely enable expression of these many attributes, or does our symbolic capacity play some more direct and fundamental role?

More importantly, however, the eliminative-reductionist approach that the dominant 'scientific' paradigms offer fails in a pragmatically serious way. These three approaches reduce all the conceptions of significance and value implicit in these religious-spiritual phenomena to instrumental value. They offer no explanation or place for any contribution to the creation of novel *meanings or values* derived from spiritual practices, beliefs, or experiences. In this respect, reductionistic explanations ignore the role of religious experiences in expanding the human perspective beyond the personal and the mundane. No wonder many religious believers and spiritual leaders feel that the secular

scientific and religious worldviews are at war. We hope to show that an evolutionary account of the formative processes underlying religion is compatible with the possibility that religion contributes a source of transcendental experience and insight into the mystery of existence. But to see how this can be the case, it is necessary to take into account and understand the emergent nature of religion.<sup>2</sup> This emergent character derives from the ways that our uniquely evolved symbolic capacities can be used to reorganize radically both cognition and emotion, thereby fundamentally reframing life experience.

### *The Salience of Symbolic Capacity*

The major oversight of these evolutionary accounts is their lack of attention to the human capacity to communicate and think symbolically. Indeed, each of the above ways of conceptualizing the evolution of religion depends on the assumption of this capacity. There are two by-products of our ease with complex symbols use that lead spontaneously to the generation of religion. The first is the tendency to create a symbolic narrative-self and narrative explanations of the world, with all that this entails. As we will explain below, this is a consequence of the way symbolic communication reorganizes the otherwise orthogonally functioning mnemonic systems of the mammalian brain. The second is the tendency to pay attention to, and to spontaneously search for, underlying structures and systemic relationships that are hidden behind surface appearances, as are the system of lexical interrelationships (e.g. word–word relationships as in a thesaurus or dictionary) and grammatical constraints of the language to which one is exposed. These systemic relationships are not overtly present in the linguistic corpus presented to the language-learning child in the speech of parents and peers, and so must be inferred in some way or other from this surface appearance.<sup>3</sup>

2. In this essay we can only briefly hint at the basic logic of emergence (for in depth treatments see Deacon 2006b and Sherman and Deacon 2007). In this usage we use the term *emergence* in a fairly standard sense to refer to the spontaneous generation of a higher-order novel synergy arising from the interaction of component processes. Processes are also described as emergent when they exhibit characteristics that are discontinuous with or even contrary to properties and tendencies observed at component levels.

3. Irrespective of accepting either strong innatist or environmentalist accounts of language learning, we note that even a strong innatist theory still requires considerable inferential work to internalize the network of relationships behind the lexicon of a language.

In addition to these augmentations to the previously discussed approaches, which will be amplified below by considering the evolved predispositions necessitated by the challenge of symbol acquisition, we propose that there is one more consequence of the human symbolic capacity that has been entirely overlooked by these more reductionistic paradigms: the symbolic facilitation of emergent experience. This can offer insight into some of the most distinctive core religious experiences, such as awe, reverence, a sense of the sacred, transcendence of self, certain mystical experiences, and so on. All of these experiences are highly prized by humans, and are considered values in themselves. For this reason they are likely to be among the most powerful factors contributing to the flourishing and propagation of religious traditions.

These experiences are emergent phenomena, namely, they are not presaged in the various evolved psychological mechanisms. They emerge out of the unique capacity of symbolization to imagine the juxtaposition and fusion of ideas and experiences outside of normal experience and, in the process, to induce otherwise mutually exclusive emotions to become simultaneously experienced. From the dynamical interactions of diverse emotions novel synergies can emerge in parallel with novel conceptions. One of us (Terrence Deacon) has argued that the distinctive emotional experiences associated with humor (ludic), fine art (aesthetic), and scientific discovery (eureka), among others, are examples of such synergies (Deacon 2003; see also Koestler 1964). He contends that they lack direct antecedents to experiences had by non-human species, or even by our pre-symbolic ancestors, though the component emotions are available to most mammals in some form or other. Because emotional experiences are dynamical neurological processes, the 'blended' interactions among two or more emotional processes that would normally be mutually exclusive results in something quite different from merely a little of one and a little of the other. The result is a uniquely unprecedented synergy. Curiously, we humans spend a great deal of our time seeking, encouraging, and cultivating these emergent experiences.

### *Seeking Hidden Foundations*

A human predisposition to seek to discover the system of connections and regularities behind and organizing language is a necessary evolved cognitive bias that has been selectively augmented in the human lineage in order to facilitate the acquisition and comprehension of symbolic systems (Deacon 1997). Lacking this capacity, it would be effectively impossible to move beyond rote concrete associations of specific speech

sounds with specific objects. This strong attentional predisposition to look for hidden symbolic regulatory relationships beneath the surface appearance of communications allows us automatically to treat symbols as buoys marking positions within an implicit submerged meaningful and relational landscape. The aspect of language expressed in the *physical world*, therefore, only makes sense as an expression of a more basic *invisible conceptual world*.

We argue that an over-extension of this evolved predisposition leads to the strong expectation that superficial attributes of physical objects and events are also in such a relationship to hidden webs of meaning and purpose, especially when these objects or events are of special salience. Thus, a predisposition to see things as symbols implicitly casts things and events as comprehensible in terms of some other more fundamental realm, for example, hidden spiritual or supernatural realities that underlie the phenomenal world. Furthermore, this predisposition frames these as more fundamental than the phenomenal world, analogous to the way that the world of meanings and purposes is more real than overt verbal symbols. Various versions of such a bi-layered reality are found in the history of European philosophies and religions, in the spiritual traditions of India, and in the spiritual beliefs and magical practices of peoples in essentially all preliterate cultures of the world.

### *The Roots of Narrative*

Narrative is uniquely human because it is an emergent by-product of the way that symbolic cognition provided by language confers a unique capacity to organize and retrieve the information in memory acquired in past episodes of experience.

Symbolic reference is often erroneously characterized as merely an arbitrary mapping between the signifiers (e.g. words) and signifieds (e.g. ideas or objects) of language. This is a vast oversimplification that ignores the most definitive feature of symbolization: *that it is reference mediated by a system of relationships among the signifiers themselves*.<sup>4</sup> This is why words of a language can be organized into a thesaurus or dictionary, each pointing to others in a virtual web of associations. It also makes possible combining words in nearly unlimited ways to form sentences

4. This systemic conception of symbolic reference and its relationship to other forms of communication is described in more detail in Deacon's 1997 *The Symbolic Species*, where it is hypothesized to be the fundamental distinguishing feature of human language.

capable of referring almost any conceivable thought. This combinatorial possibility requires the evolution of syntactic regularities to provide a kind of roadmap through specific nodes of this network. This exemplifies one of the most fundamental distinguishing features of human language. In contrast, the other major means of referring—icons (e.g. likenesses) and indices (e.g. symptoms)—do not depend on mediation by an acquired system of sign–sign relationships (unless they include symbolic components). Human language consists in a series of symbols generated in a forward-moving dynamic organized by these syntactical and lexical constraints. These underlying constraints and biases play an important role in facilitating the invocation of subsequent ideas and the facilitation of subsequent word selection. This dynamical disposition of human communication has emerged from a unique synergy of operations involving the two separate types of neurological memory systems, common to all mammals. Among the other mammals, however, these two memory systems do not function together as a unit. We argue, however, that they have been brought into synergistic relationship to one another in humans by language and that this unprecedented interdependency underlies the narrative character of symbolic communication. Narrative is not in this sense merely the logic of stories, but also of explanations, descriptions, instructions, and all kinds of recounting of sequential events.

The two major memory systems of the brain can be roughly divided into *procedural* and *episodic* memory, and are distinguished by their neural substrates.<sup>5</sup> In a complex information system, to be able to recover stored information one needs either precise and unique addressing to store and locate something or highly biased pathways and networks of associations to track down something. But brains are not organized like computers or filing systems. In a complex biological system like the brain, which has achieved its structure over millions of generations through loops of self-organizing process and natural selection, no such deterministically organized data recovery mechanisms are available. To store and recover information, brains rely on redundancy. Creating redundancy is the key to creating memories, but there is more than one way to create redundancies.

### *Diachronic and Synchronic Redundancy*

5. For an excellent recent non-technical introduction to the cognitive neuroscience of memory, see Eichenbaum 2008, and for a more technical introduction, see the collection of papers in Eichenbaum 2002 or Squire and Schacter 2003.

There are basically two kinds of redundancy used in the formation of retrievable memories: synchronic and diachronic. The diachronic kind of memory characterizes learned skills and acquired habits. It is found mostly in the form of motor programs, called procedural memory, that we can produce spontaneously and automatically. The neurology underlying procedural memory involves interaction between the basal ganglia, the motor cortex, and the cerebellum. It works by redundantly superimposing the traces of repeated processes 'on top of' one another, as when we learn something by rote, or by repeatedly practicing something, like learning to throw a baseball. The more often one does it, the more regularized the behavior becomes. In learning to throw a baseball, through many repetitions, motor behavior is progressively simplified and streamlined, so that after practice, fewer muscle movements are needed to accomplish the same thing, and with less variability from throw to throw. A kind of statistical sampling occurs that is almost like a regression analysis, reducing to the fewest common movements that still achieve the appropriate effect. Statistically, the differences of each of those repetitions cancel out and the process finds the mean path common to all those movements.

This has a parallel within the circuits of these linked brain areas. Progressive strengthening of the connections most redundantly activated in the activity enables largely invariant and automatic activation of the neural circuit when triggered by specific contextual factors. Such highly predictable 'programs' are, in a similar way, linked to the most probable circuits for other activity patterns that tend to precede or follow them in nested hierarchies of behaviors. As a result, we generally do not remember any individual instance of a highly practiced skill. Thus, when asked—'What is the first thing you do when you ride a bike?'—in order to remember and answer, we normally have to imagine ourselves getting on the bike. Once we get that 'motor feeling' we are able to re-experience what is normally done beneath our awareness, and notice what we tend to do. The 'how to' procedural memory is accessed automatically and largely stereotypically. Procedural memory is in this sense almost computational, in that it is very much like a fixed program. It is also efficient. The execution of highly skilled behaviors tends to demand support from far fewer brain areas and with far less metabolic expense than do unskilled behaviors.

Procedural memory is in many respects orthogonal to the kind of memory we more commonly consider, such as memories of individual events or relationships, like what we had for dinner last night. Last night's dinner happened once, was characterized by more or less unique circumstances, and will never happen again. Of course, you may do it

similarly at other times, and you may be able to use that similarity to help you reconstruct it in memory. But what we call *episodic memory* is memory of events that happened once, though there will be classes of episodic memories that we can access to help us figure out where we are.

For something to be remembered once, a different process must be utilized, since serial redundancy is unavailable. Memories of singular episodes must therefore also utilize different brain structures to generate a different kind of redundancy. Critical to this process is a brain structure called the hippocampus, which is basically the rolled up edge of the ventral part of the cerebral cortex. What it does, in effect, is to keep constant track of context, mostly positional and spatial context, involving all sensory modalities. When something occurs, there are automatically innumerable connections to other correlated and related aspects of that and other related events that get strengthened. When we remember things this way we remember them by reactivating some aspects of this synchronic redundancy, which in turn activates other aspects of the distributed network throughout the cerebral cortex. The hippocampus is reciprocally interconnected with many different areas of generalized neocortex. It can usefully be imagined to be a structure that correlates converging information from higher-order processing in each sensory modality, registering the synchronicities between these various diverse forms of input, and reciprocally tagging these distributed traces as linked, to aid their collective reactivation during recall. When we remember a one-off event, we do it typically by eliciting converging associations. We zero-in, starting with a few of the many correlated mnemonic pathways. If the network of associations has been well organized and new episodes of experience have been effectively embedded in the larger network of correlated memory traces, we can reconstruct the mnemonic path to a single event in experience, even though its specific combination of features was never repeated. This is possible given redundancy in context to other events to which it was linked.

All mammals and probably all birds have both kinds of memory, and use them well. But in non-humans, the memory systems are fundamentally separated in the way they function, the structures that are used, and how memories are produced and recovered, though in special circumstances the products of one can trigger features in the other.

### *What Symbols Add*

To understand how narrative is enabled by symbols, we will need to look at what symbols add to the operation of these two memory

mechanisms. We acquire the words of our language, over a long period of time, by repeating them many tens of thousands of times in the first years of childhood, although each time in a slightly different context. We eventually learn words so well that we never have to think about their production. Their associations are limited, due to their 'positions' in a semantic network and their tendencies to elicit or be elicited by other classes of words in syntactic relationships. Most uses rely on a tight cluster of the same basic semantic features in which the words and concepts are embedded. So, by the time we are adults, we have a rich procedural knowledge of language. We do not have to think about its production, if we have acquired it early in life, since the generation of words and their syntactic organization has become a part of our procedural memory system.

Here is the interesting thing: we use this *procedural memory* to sample our *episodic memories*. In other words, we have a system of linkages that is complex, but finite and constrained. When we produce a sentence, it is a bit like riding a bike; we do not actually think about what word comes before the next one or whether and where we need a determiner or a quantifier. It is proceduralized. But what we are doing with it is accessing and 'downloading' information from episodic memory in order to express an idea or accomplish a communicative action.

Human symbol use has thus allowed these two orthogonal mnemonic systems, which evolved in the brain to handle different kinds of mnemonic problems, to become thoroughly linked. Words and phrases have definite episodic linkages, but they also have procedural linkages, stored like skills. Consequently, conceptual and word associations spontaneously pop out of these two kinds of mnemonic associations, but according to quite different associative tendencies. There is a tendency to progress from one type of word to another (e.g. noun phrase to verb phrase) due to procedural association. The syntax forces development in certain directions and constrains us into certain kinds of sequences. Episodic associations have a different, more distributive synchronic logic, but this can now influence and be influenced by the serial logic required by spoken language and proceduralized during development. The interplay between the serial and distributed associative tendencies brought into interaction by language provides a way to organize episodic memory into sequences. Thus, concepts, abstract ideas, memories of events, and so on, can be organized into distinctively direct paths, which can in turn be recovered and further developed over time by renewed repetition, simplification, and embellishment. These can then begin to act as their own quasi-procedural

nodes from which to build progressively more complex mnemonic mazes.

Thus the narrative predisposition can be understood as an emergent consequence of the unique mnemonic synergy that language has made possible. It is both a powerful and efficient tool for storing and recovering diverse episodic memories, and the source of the spontaneous tendency to organize our experiences and knowledge according to complex directed sequences of ideas and events, namely, narratives.

### *Narrative and Religion*

How might this lead to certain religious tenets as a by-product? Most obviously, the predisposition to construct our identities and to organize our understanding of the world in narrative form is a central organizing feature of religion. The importance of religious narrative has long been recognized by anthropologists and philosophers of religion. It is so common that we often take it for granted, not realizing how unusual narrative is in the wider evolutionary context. One could almost say that religious narratives are inevitable for a species with our sort of cognitive bias if for no other reason than we demand narrative organization both of what we know and do not know about the world. We are embedded in stories told to us and generated during our lives, and these efficient packets of mnemonic information not only serve to create individual and social histories, but they also organize our conception of belonging in these contexts and create the ends that guide our actions. But consider a specific problem that is also created by this narrative predisposition: the tendency to believe in an afterlife might be a natural by-product of the narrative tendency. Because of its forward-moving, on-going, end-directed impetus, which is endemic to all motor skills, a mind predisposed to narrative organization will have the ability to discover that everyone's history both begins and ends. Everyone emerges, apparently new, and eventually dies. It does not take much more than a decade of life to discover that all personal narratives are finite. All people begin in the context of the narratives of parents, families, social groups, and their local geographic history, as these stories are passed from generation to generation. All personal narratives also come to an end. Yet, for one's narrative to include the end of one's own narrative has a paradoxical character. It poses a contradiction that can only 'make sense' when one's personal narrative is embedded in a larger story that links it with before and after events, and, thus, does not ever come to an unequivocal end. Few religious traditions fail to offer narratives of this sort. Their widely assumed value is providing context to lend meaning to one's individual

narrative and thus to calm people of the angst that follows from perpetually anticipating death. More importantly, narratives are teleologically organized. They do not simply stop arbitrarily, as do most lives. Instead, in the narrative of a life, whether real or imagined, birth and death are events that are usually subordinated to some *telos*, around which 'significant' life events are organized and made culturally intelligible. A narrative-driven mnemonic bias not only organizes self-conceptions in the timeless realm of purpose and meaning, it contributes to a predisposition to conceive of the world in terms of teleological organizing principles that are over and above worldly events, namely, in dualistic terms (discussed below). Folk psychological notions of an immortal soul may thus be partially a consequence of the way that the narrative predisposition aids identification with teleology rather than being socially or evolutionarily derived (see, e.g., Bering 2006, and associated commentaries).

### *Seeking Hidden Connections*

We know from scattered examples of 'feral' children who were raised in the absence of human interaction that language becomes almost impossible to acquire if not present in early childhood. If people are speaking around them, human children have an extraordinary ability to quickly learn the thousands of words and the basic system of syntactic patterns that characterize that language. Non-human animals, in comparison, have enormous difficulty learning even the simplest rudiments of word-object association; even basic syntactic facility is almost untrainable even in the most intelligent non-human species. Most animals live their lives without the need for language to recode their thoughts, memories, fears, and desires, so that they are available to others. Non-human species therefore live in a single world consisting of direct interactions with their environments, and the associations and emotions that constitute their solipsistic memories of them.

When a child first learns a word like 'mama', 'doggie', or 'spoon', the process is not greatly different from the way a dog learns the words 'food' or 'walk'. It is a simple memorized linking of a word with a thing. But symbolic understanding is not mere single words linked to an object, say, by pointing. A human toddler must develop the ability to grasp *the invisible system of connections behind* the words she/he hears spoken in sentences, and this invisible system is not explicit in the pattern of word occurrences. It must be inferred and discovered, using the surface patterns of word use as a clue to the meaning that lies underneath.

The amazing and unprecedented ability of children easily to divine and internalize the vast network of symbol–symbol associations that constitute the invisible system of meanings, grammar, and syntax for the language they hear is undoubtedly a product of evolutionary adaptations acquired over a long prehistory of language use (Deacon 1997). This prehistory has almost certainly produced many diverse sources of evolved biases of human attention, memory, and social cognition, all of which have converged to make this tracing of implicit connections a more tractable and natural process.

Understanding how this talent could have evolved has been aided by looking at it from a co-evolutionary perspective, in which brains have adapted to language use and languages have adapted to brains. In *The Symbolic Species* (1997), Deacon argued that symbolic communication has long been a part of hominid evolution, offering an estimate of roughly two million years of co-evolution linking language and brains. The universal ease with which children accomplish the task of acquiring linguistic competence despite individual and cultural differences suggests that this ability is not merely an evolutionary afterthought, so to speak, but an adaptation acquired over an extended evolutionary period. If this is true, then hominid brains would have been adapting to the unique cognitive demands that language places on learning, producing, and comprehending symbols long enough for natural selection to have significantly altered the ways we think, learn, and acquire language. A strong predisposition to expect, search for, and discover hidden connections behind the superficial events of speech would have been subject to intense selection in this evolutionary context.

As the child discovers this cryptic system of connections that allows the speech of adults to make sense, she/he effectively enters into a double world. Like all animals, children live in a tactile and visible world of real objects and living beings linked together by physical causes, while simultaneously inhabiting a world of symbols that are linked together by meaningful associations and constrained by the 'rules' of grammar. In this second world, children find 'meaning', 'significance', 'purpose' and the distinction between 'sense' and 'nonsense'. The principles that organize the two systems are different. Often, confusions about this difference remain for a lifetime.

#### *Evolutionary Adaptation to Symbolize*

If our contention is correct, that a significant period of evolution was required for the brains of children to adapt to the symbolic features of language, then we should expect human cognition to exhibit biases that

correspond to the unique and special challenges posed by symbolic language. We aver that when this proficiency had evolved to the point that basic symbolic communication was a reliable feature of hominid society, it had effectively become *an environment* in itself. Like beavers evolving to adapt to the aquatic environment of deep pools that were of their own construction, our prehistoric ancestors had to adapt to this virtual environment if they were to survive and procreate. Over hundreds of thousands if not millions of years, this virtual world of symbols, with their hidden connections, became a vital environment supporting survival. There would be a distinct advantage to those whose brains happened to possess an attentional bias to search for, and a cognitive bias to try to construct, a system of expectations and habits of interpretation able to make sense of the linguistic patterns they heard. As a result, gradually, a highly developed skill at discerning the invisible system of connections behind utterances and gestures, and a strong predisposition to expect this, became the common heritage in all humans.

Irrespective of whether language readiness includes an innate knowledge of grammar, we humans are adapted to this virtual world of social communication. This selection pressure explains why, considered physically, our species can be seen to be an upright African ape, while considered cognitively we are more like a whole new phylum. We possess unprecedented mental features that evolved in an environment radically unlike any other. We live in a double world, one virtual, consisting of symbols and meanings, and one material, consisting of concrete objects and events. No other creature has evolved in such radically divergent niches.

### *Symbolic Savants*

In *The Symbolic Species*, Deacon also argued that we should not merely look on this language bias as a skill, but rather also as a tendency to think along idiosyncratic lines—indeed, it is something more like a compulsion. He suggested that this unique evolutionary context left us with a compulsion to expect, and an unusual ability to grasp, the hidden logic of relationships behind symbols, much the same way as certain idiot savants are able to ‘see’ instantly the solutions to math problems. When we consider the sensory acuity of most other mammals, our own species looks like a retarded member of the class *mammalia*. Our olfactory abilities, hearing, physical strength, and speed are often inferior. But our ability to navigate in the largely hidden network of a symbolic world is utterly extraordinary. As we walk on earth’s surface, our brains are

simultaneously wandering through this symbolic world whose connections are invisible, and yet are to us as real as any physical landscape.

Like a savant, our one-sidedly brilliant talent-set has come to bias the way we see and what we feel about the world, not just the way we approach language. A recent proverb goes: when the only tool you have is a hammer, you tend to treat everything as a nail. It is our suggestion that the double world that we live in as a symbolic species leads humans to imagine that the world of animals, plants, rivers, mountains, weather, chance, and luck—in other words, the world we regularly and directly experience—as only the surface expression of deeper hidden realities.

Indeed, history shows that human societies all over the world tend to imagine that the material world they live in is in some way analogous to a symbolic expression of the meanings conceived in a world that exists ‘beyond’ and invisibly behind its mundane forms, analogous to the way words are merely the surface expressions of thoughts. We consider the tendency to such beliefs to be a spill-over, a by-product of our unique and elaborate adaptation to living in a world of symbolic relations that are crucial to our lives. This, we contend, is the primary source of one of the most ubiquitous features of religion and spiritual traditions in general. The near omnipresence<sup>6</sup> of what amounts to an intuitively compelling dualistic worldview in human societies, in contemporary folk psychology, and even in some of the most highly developed metaphysical theories in the history of Western philosophy, may ultimately have its roots in such a strong predisposition to see the universe as having a dual nature: both material and spiritual.

### *The Bi-Layered World*

Consider the example of the ‘Dreamtime’ of the aboriginal Australians—perhaps the oldest continuous human culture still extant. For roughly 40,000 years, these hunters have traveled the Australian landscape, following the Songlines. In *The Songlines*, the British novelist and travel writer, Bruce Chatwin, described the songlines as:

the labyrinth of invisible pathways which meander all over Australia and are known to Europeans as ‘Dreaming-tracks’ or ‘Songlines’; to the Aboriginals as the ‘Footprints of the Ancestors’ or the ‘Way of the Law’. Aboriginal Creation myths tell of the legendary totemic beings who wandered over the continent in the Dreamtime singing out the name of

6. We recognize, for example, that in some traditions, such as in China, there can be a spectrum of forms of quasi-dualistic beliefs, such as involving magic, dead ancestors, and invisible forces.

everything that crossed their path—birds, animals, plants, rocks, waterholes—and so singing the world into existence (1987: 2).

The Dreamtime is a hidden reality for them, more real than the visible world. Parts of the visible world function as symbols of the more real Dreamtime. Each part of the mundane world came into existence by being named by a totemic being in the Dreamtime.

The bi-layered world of the aboriginals is matched by analogous bi-layered worlds believed in and taught in nearly every culture. In many of these cases, the world of mountains and rivers and grandparents and children takes on the role of a set of symbols of a more real world hidden behind. Pagan priests, even the sophisticated and relatively secularized elected priests of ancient Rome, regularly performed official auguries, seeking in the entrails of sacrificed sheep and in the directions of the flight of large birds foresight into the future success of military or political campaigns. The entrails of the sheep were taken to be symbols that had meaningful relationships to the hidden powers and fates that guided human events.

The Hindu traditions teach that the mundane world we perceive as separated from us and diverse, is, in fact, illusion, *maya*. It distracts us from the hidden world that exists eternally behind the veil of our illusion, a world that is undivided and more real than anything we can perceive with our senses. Even Plato taught that what was *really real* was a world in which change never occurred, a world which exists behind this visible world of imperfect circles and triangles. In the *ideal* world, the perfect circle and triangle are what the imperfect ones here below are *about*.

Thomas Aquinas was one of the first to link our virtual world of linguistic symbols to the quasi Platonic world of pure ideas in the Mind of God, *through the medium* of the concrete world of horses, trees, and people. As our world of mental species represents the more real world of animals and plants and human beings, according to Aquinas, this real world of animals, plants, and humans is a set of representations of the Ideas of each of the species of creatures as they exist in the Mind of the Creator. These Ideas in the Creator's Mind are so real that their existence, coupled with God's ineffable Will, is the source of all the existing diversity in the natural mundane world (*Summa theol.* I, Q. xii, art. 9; Q. xiv, art. 5 and 8; Q. xv, art. 1-3; Q. lxxxv, art. 2.; *De Veritate*, Q. 10. X, art. 8; see also Boland 1996). Consonant with this notion, a series of Western scientists from the Renaissance on, for example, Galileo (1615), Kepler (Harrison 2007: 104), and even Einstein (Isaacson 2007: 384, 388), have each indicated that part of his motivation in trying to understand

the deepest patterns of nature was to be able, in a sense, to approach a mystery behind and beyond a discernable nature.<sup>7</sup>

In all cases of bi-layered worlds, to participate in the more real world is what is best if one wants to see things most clearly (or at least it is what the best of us should want to do). Whether it is the aboriginal Dreamtime, the Hindu Undivided Self, or the intellectual reading of the Mind of the Divine Physicist, an appeal to an invisible world of the 'Really Real' as the locus of meaning and value is found in a wide spectrum of societies and otherwise diverse religious traditions. We feel compelled to look behind the appearances of things and events, irrespective of whether we are trying to understand historical or natural phenomena. The tendency spontaneously to 'read' underlying meaning and value into things is, of course, expressed in realms other than religion. Consider music, for example. Music is not experienced to be just carefully structured sounds, it is a semiotic vehicle able to transport us into a world of fluid half-emotions lying behind and evoked by the sounds.

### *The Emergence of Religious Experience*

Our presentation so far fits within the schema of the reductionistic analyses described previously. The emergence of the capacity for narrative, on the one hand, and of the attentional bias to find hidden connections behind the overt words of a language, on the other, present religion as a spill-over effect, as a by-product. However, these two tendencies also clearly contribute features to human cognition that are particularly relevant to explaining the truly uniquely human aspects of spiritual traditions, whereas the invocation of cognitive tendencies shared with other species and simply re-expressed in mutated form in religious beliefs and practices does not. Where we differ most from the previous authors is in showing why religion is found in essentially all human societies, but in no other animal societies, and why its narrative and dualistic forms are so compelling. Religion arises not from modification of prelinguistic instincts alone, and would not have arisen at all if not from our species-specific predispositions to aid in the acquisition and use of symbolic information.

7. For example, Isaacson quotes Einstein as saying: 'Try and penetrate with our limited means the secrets of nature and you will find that, behind all the discernible laws and connections, there remains something subtle, intangible and inexplicable. Veneration for this force beyond anything we can comprehend is my religion. To that extent I am, in fact, religious' (Isaacson 2007: 384).

Efforts to explain attributes of religion in psychological or evolutionary terms (including our own), however, do a poor job of explaining how uniquely transcendent religious experiences emerge in the human psyche from experiences common to a wide range of primates whose brains differ little from our own. The unusual states of piety, awe, equanimity, self-transcendence, and spiritual renewal (to name a few) that are commonly achieved in religious rituals and by spiritual reflection probably have no clear non-human counterparts, because these states depend on the intervention of symbolic forms of representation, not available to other species. Efforts to explain these phenomena as mere extrapolations from more basic adaptive mechanisms, evolved for more instrumental purposes, or as mere by-products of these evolved tendencies, often implicitly diminish what millennia of believers have most valued about religious engagement. Thus, without an explanation of the unprecedented nature of religious emotions and experiences, and an account of their genesis and value to those who seek them, reductionistically framed explanations of the origins of religion ignore what most begs for explanation. More importantly, the effort to explain religious beliefs and practices in terms of corrupted predispositions originally evolved for other purposes not only casts an implicitly pejorative shadow over the subject, it also overlooks the significance of the *emergent* character of religious experience and value.

Religious experiences have a distinctive and unprecedented emotional character that most traditions believe is critical to the development of character and virtue. These experiences are sought after by mystics and are often considered to be the goal of participating in religious rituals. Such experiences are often described as transforming and 'transcendent'. They are considered to be both unusual and of a higher order than most everyday experiences. Unlike many believers, however, we consider these experiences to be thoroughly natural rather than supernatural in origin. Our analysis suggests that such experiences can more accurately be described as emergent, in the sense that they result from the interaction of more basic cognitive-emotional processes, producing consequent experiences that are fundamentally different from a simple mix of these component processes.

We believe that the reason that these experiential states are unique to humans is that their emergence is made possible via the human symbolic capacity.<sup>8</sup> By being coded symbolically, cognitive-emotional processes

8. This would imply that any species with a symbolic capacity equal or superior to that of *Homo sapiens* would likely also discover them, making such 'transcendent' experiences something of a universal possibility. Furthermore, we consider it likely

can become juxtaposed in ways that cause them to interact to generate new modes of experience, that are radically different from anything associated with the component neuronal processes. Because of having evolved with respect to normally unrelated and mutually exclusive social-emotional circumstances, the conjoint activation of otherwise incompatible emotions via symbolic thought can produce a distinct reciprocity in the way they constrain one another. Without the linkages made possible via symbols, these component processes would not interact, due to mutually exclusive generative contexts and antagonistic recruitment of brain systems.

This is essentially a more general form of the argument we used earlier to describe the emergence of narrative thought in human evolution, but in this case applied to the emotional systems. We likewise attribute this distinctive feature of religious experience to the evolution of symbolic communication and the ways symbols can reorganize cognition in unprecedented ways. Because of these phylogenetically unprecedented effects, they may be sought after and socially promoted even if they ultimately undermine personal comfort, social stability, and environmental sustainability—in other words, are mal-adaptive in both a social and evolutionary sense.

### *Emergent Emotions*

Emotion cannot be dissociated from cognition. In the other animals, there are strong links between sensory stimuli, behavioral adaptations, and arousal states. In *The Symbolic Species*, Deacon (1997) reviews evidence that there has been a disproportionate expansion of the prefrontal cortex and a consequent shift in the relative proportions of connections to other systems. He argues that this provides humans with greater independence of attention and working memory (primary prefrontal functions) from the influence of immediate emotional, perceptual, or behavioral associations. This enhancement of what are often described as 'executive' functions would have aided the learning of symbolic associations, because of the way it increases the capacity to analyze the relational structure of associative contingencies. But incidentally, it would have had other important consequences. This capacity to resist cognitive interference from arousal correlates of represented stimuli also loosened the intrinsic interdependencies and dissociations distinguishing different emotional states, making possible a much wider

that in any such species, these emergent experiences would be valued and sought after, as they are by humans.

and more facile range of represented emotional experiences—including emotional interactions that would otherwise be mutually exclusive. In conjunction with the flexibility of representation and mnemonic capacity provided by language, this emotional flexibility opens unprecedented possibilities. Among the many possible types of unprecedented emotional relationships that might arise (see, e.g., the discussion in Deacon 2006a), there is a special class of symbolically transformed emotions that are of relevance to the problem of religious emotions.

The capacity to think symbolically has vastly amplified the range of conceptual juxtapositions that are conceivable. One consequence is an unprecedented ability to conceive of what some investigators call conceptual blends (Fauconnier and Turner 2003). This idea can trace its roots to Gestalt theories of insight learning, and resembles closely the bisociation theory of Arthur Koestler, as well as Gregory Bateson's notion of double description (Koestler 1964; Bateson 1979).

As the various structural features of different conceptual 'spaces' or cognitive schemas can become reciprocally intertwined to generate a novel conceptual synergy, so their associated emotional correlates can also be brought into interaction. But the existence of structural reciprocities between symbolic relationships need not imply that there will be similar correspondences and reciprocities between the correlated emotions. For this reason, symbolic 'blends' can bring together otherwise incompatible or opposed component emotions. These juxtaposed, combined, or blended emotional states can be considered *emergent* if their interaction produces a synergistic effect that cannot be reduced to any simple additive relationship (e.g. not a simple 40% angry 60% surprised composition). What distinguishes them from other primary or secondary emotions is their basis in the interaction effects between the component emotional processes. They are transformed by their interactive relationships. A novel kind of experience, that was not previously part of the mammalian emotional repertoire, can come into existence as a result.

The emotion of fear and the appreciation of beauty or grandeur, for example, all contribute to the experience of *awe*, yet this feeling is distinct from these contributing emotions. The person who experiences awe holds at the same time the elation of appreciating something immense and exhilarating and also the terrifying recognition of one's insignificance and fragility. Another emotional experience that we would consider emergent is the experience of *nostalgia*. A recollection of happiness, in a time past, and a sense of present or potential loss, become blended in this experience. This requires the mental representation of mutually exclusive emotions associated with present, past, and imagined experiences. This brings about emergent synergies of blended cognitions and

emotional experiences, which the mind transfigures by using symbolic juxtapositions to *re*-represent them as entangled and interdependent processes.

How the mapping occurs, and how valences in each cognitive schema interrelate in the bisociation/blend, matters for the emotion generated. In the cases of both humor and sudden scientific discovery, two distinct conceptual schemas are brought together, but differently in the two cases. The bisociation in a joke brings together two mutually incompatible schemas and yet is carefully constructed so as to disguise the ways that the narrative moves in the one to exactly track an allowed set of moves in the other, cryptic, and usually trivial one. That the apparent narrative structure is actually based in another incompatible schema is suddenly exposed by the punch line linked by an otherwise spurious logic. In a scientific discovery, by contrast, the bisociation involves a similar parallelism of logic, except that the primary and secondary schemas are ultimately concordant and the bisociation involves an unexpected recognition of this compatibility. In the case of humor, the emotional eruption (associated with incompatible arousal states) results from suddenly pointing out the implicit, absurd mapping. The rug is pulled out from under one emotional frame, and all moves are reframed in the absurd alternative, often undermining some threatening connotation of the now irrelevant context—hence the importance of the schemas' emotional load. In the case of a scientific discovery, the fusion may be as sudden as in the joke (hence 'eureka!'), but the result is actually a fitting of one schema within another, often larger, theoretical scheme, with a corresponding expansion of scope and explanatory power.

Aesthetic experience derives from a third mode of cognitive and emotional interaction between schemas. The critical difference between the cognitive–emotional juxtaposition of jokes and the cognitive–emotional juxtaposition of aesthetic experience is that whereas jokes result in a replacement or substitution of one cognitive-emotional pairing with another previously cryptic one, the artistic experience juxtaposes them explicitly without immediate resolution, perhaps even creating a sort of necker-cube oscillation effect of alternating or transforming interpretations and emotions.<sup>9</sup> The dimensions that define

9. The necker-cube is a well-known visual illusion created by a line drawing of a three-dimensional cube. Staring at it for any length of time will cause the viewer to experience periodic reversals in what appears to be the front or back surface of the cube. This is attributed to the fact that the neural systems sustaining each of these ways of interpreting the drawing in three dimensions will tend to fatigue alternatively and recover.

emotional spaces and their relations, and those that define the associated cognitive relations, are mostly based on non-concordant logics. So a cognitive blend that shapes a correlated emotional juxtaposition will often do so in an emotionally atypical way.

Along with aesthetic experience and the 'eureka' experiences of discovery, human ethical experience can also be seen to derive, at least partly, from conceptual blending. In non-human primates we observe prosocial emotions and behaviors such as empathy, strategic reciprocity, nurturing, and hierarchy. These serve as the pre-symbolic bases of certain human ethical experiences. Once framed within a cognitive symbolic system these prosocial emotions are often lifted, and broadened in scope, to become the compassion, fairmindedness, and reverence for life that is characteristic of the more virtuous members of any society.

Fairmindedness might be seen to arise from a blend created by taking different personal and impersonal perspectives on a social relationship and generating the conflicting emotions that each different perspective would entail. An experience like righteous indignation might arise from generating a blend between an actual effect of someone's actions that is judged to be morally suspect and an imagined alternative that is judged to be one's own moral response in that same circumstance, and the associated anger-distaste versus self-satisfaction. The incompatible ethical emotions that are, in effect, brought into interrelation with each other are additionally modulated by the correlated abstract principles that also are brought into the blend. Reverence, which is often associated with religious experiences, might in this way be understood as the awe felt in contexts that are larger and more important than ourselves, overlapping with feelings of respect and gratitude associated with the conception of being the subject of beneficence. One of the most extreme cases of symbolic synergy in the ethical realm is the religious virtue indicated by the request: 'Love thine enemies. Do good to those who harm you' (Matt. 5.44). Clearly, this is an injunction that juxtaposes some of the most deeply ingrained but mutually incompatible emotional predispositions. What the reductionist explanations of religious origins overlook, then, is the authentic human value of the emergent emotional experiences that are the intended effect of certain religious symbols and practices.

We believe that the self-transcending capacity of some religious experiences results from similar emergent emotions. This phenomenon needs to be acknowledged, even in a scientifically framed analysis. Many of the religious/spiritual experiences, such as awe, reverence, a sense of the sacred, selfless action for others, a sense of unity with the cosmos, charity, humility, and loving-kindness are emergent responses

to the universe that follow a similar logic involving the employment of symbolic methods for manipulating emotional experience and undermining the more mundane and normal relationships with the physical world. Both the powerful narratives and their striking juxtapositions of emotionally laden imagery have likely developed within religious communities over the millennia for their capacity to induce powerful emergent emotions. Because of their potential dissociation from evolved emotions, this power to transform identity and reorient priorities does not guarantee that they will function in ways that help communities to flourish. Their promulgation within a community may even initiate collective processes whose self-organizing dynamics are ultimately destructive, although we might expect that self-undermining consequences will tend to be historically short-lived, though not necessarily without having vast consequences.

A particular established religion may require belief in one God or many gods, or neither; revelation through historical sacred scriptures or through personal inspiration, or neither; or in eternal heaven and hell or finite serial reincarnations, or neither. As emergent phenomena, many religious experiences relate the practitioner to a larger whole, where his or her individual interests are relativized. The individual can find his or her *place* in an imagined (yet believed) symbolic system with meanings more communal and/or more lasting than experienced in their immediate, temporal life with its mundane expectations and possibilities.

We know, however, that this kind of transcendence does not always lead to human and ecological well-being. The natural potential for emergent religious experience in the symbolic animal can be manipulated by selfish leaders or effective propaganda. As Diamond in his book *Collapse* (2004) hints, religious energies can distract from needed social-ecological action toward sustainable social and ecological systems.<sup>10</sup> Some religious emotions can even be harnessed for the cause of hatred and revenge. But we also recognize the ability of a few individuals in every society, irrespective of their particular religious affiliation, to rise above selfish interests. It is generally believed that cultivation of these characteristics is aided by the sense of transcendence from the single-level egoistic perspective that is afforded by these emergent experiences. This transcendence may be one of the reasons that these emergent experiences have been honored, celebrated, and cultivated, at least by a minority, throughout history.

10. We thank the editor for pointing out this potential socio-ecological impact of certain religious practices, as it elegantly exemplifies the power of emergent emotions to both run counter to and overwhelm more conservative social processes.

Beyond the instrumental value for promoting social harmony, aiding personal identity formation, and providing some equanimity in the face of suffering and impending mortality, is there any additional value that emergent experiences of this sort can uniquely provide? Like the other emotional experiences that arise from conceptual blending—such as the ‘ha!’ of humor, the ‘aha!’ of scientific discovery, the ‘ah!’ of aesthetic appreciation, and the ‘uh huh’ of moral discernment—the emergent emotions associated with spiritual life also facilitate a sudden expansion of experiential scope in ways that embrace a larger domain. Sacred works of art and activities that elicit these emergent experiences are desired and cultivated in almost every human society and are often deemed the most exalted and prized of a culture’s achievements. Why? Is there something valuable about emergent experiences, beyond psychological satisfaction and social benefit? We believe there is.

This special value derives from the way that emergence bridges between levels and integrates formerly divergent component attributes into a larger unity. There seems to be a natural predisposition to seek cognitive and emotional integration, thus resolving uncertainty and incompatibilities. There seems as well to be a natural desire to gain the most encompassing perspective on a given situation, especially when the concerns are of great personal significance. This may derive from the pragmatic value of knowing the full range of options when faced with serious choices, or simply from a general attribute of brain function that tends to the reduction of mental effort and the easing of emotional tensions in unresolved dilemmas or unpredictable contexts. The generation of emergent emotions provides complex ways of achieving states that transcend immediate experience, and so provide a sense of expanded perspective. Moreover, the functional re-organization that follows this ascent in level also provides an expansion of scope that may offer novel means of cognitive integration and emotional synergy, analogous to that generated in aesthetic or eureka experiences. Unlike mere artistic or discovery processes, however, this involves a transformation of one’s personal identity, not merely ideas and percepts, and in this respect, one’s own subjectivity undergoes an emergent transition of a sort. When this occurs in the context of conceptualizing one’s own tenuous and dependent existence, there is effectively an opportunity to transcend the conflict of emotions associated with self-identity and mortality, and at least momentarily, to experience an emergent emotion of integration with a larger reality.

### *Conclusion: Religion, A Synergy of Synergies*

We have argued that nearly all the evolutionary approaches to religion up to the present have largely ignored the three natural synergistic and predispositional consequences that emerged uniquely with the evolution of the capacity for symbolic language:

- The role of language in creating a novel synergy between two previously orthogonal modes of memory storage which is the basis for the narrative predisposition that is distinctively characteristic of human reasoning, identity, and culture.
- The evolved attentional bias toward discerning a pattern-behind-the-pattern; a bias required for language learning, which makes metaphysical dualism intuitively natural, and also makes the double-world metaphysics common to most religions a likely leap of symbolic imagination.
- The dramatic expansion and transformation of the mammalian emotional repertoire by virtue of the use of symbolic blends to induce unprecedented emotional interactions and novel experiential synergies that we describe as emergent emotional experiences.

The consequence of the convergence of these unprecedented synergies and predispositions can help to explain some of the more enigmatic and striking features of religion, from its dualistic tendencies to its power to evoke transcendent experiences and reorient identity and values. With the interaction of narrative, a dualistic bias, and emergent emotions in individuals and societies, the potential is enormous for further, novel, synergistic effects.

What we hope we have accomplished is to identify factors that are highly relevant to the origins of religion, but which seem to have been overlooked in recent, biologically framed accounts of religion. We believe that once these special attributes of our symbolic capacities are taken into account, a vastly richer understanding of religion is possible. Indeed, a case might be made—and we would make that case—that these are the most significant factors contributing to the emergence of religion in our species, and indeed in whatever context these capabilities might arise. We speculate that something like a religious predisposition, in the most general sense of the term, should be considered a universal consequence of the symbolic capacity.

### *References*

- Aquinas, St Thomas. 1952a. *Quaestiones Disputatae de Veritate: Truth* (3 vols.; Chicago: Henry Regnery Co.)
- \_\_\_\_\_. 1952b. *Summa Theologica*, in R.M. Hutchins (ed.), *Great Books of the Western World*, vol. 19 (London: Encyclopedia Britannica).

- Atran, Scott. 2002. *In Gods We Trust: The Evolutionary Landscape of Religion* (New York: Oxford University Press).
- Barrett, David, George Kurian, and Todd Johnson. 2001. *World Christian Encyclopedia* (2 vols.; New York: Oxford University Press, 2nd edn).
- Bateson, Gregory. 1979. *Mind and Nature: A Necessary Unity* (New York: Bantam Books).
- Bering, Jesse. 2006. 'The Folk Psychology of Souls', *Behavioral and Brain Sciences* 29: 453–98.
- Blackmore, Susan. 1999. *The Meme Machine* (New York: Oxford University Press).
- Boland, Vivian, OP. 1996. *Ideas in God according to Saint Thomas Aquinas, Sources and Synthesis* (Leiden: E.J. Brill).
- Boyer, Pascal. 2001. *Religion Explained: The Evolutionary Origins of Religious Thought* (New York: Basic Books).
- Brodie, Richard. 2004. *Virus of the Mind: The New Science of the Meme* (Seattle: Integral Press).
- Chatwin, Bruce. 1987. *The Songlines* (New York: Penguin Books).
- Dawkins, Richard. 1976. *The Selfish Gene* (New York: Oxford University Press).
- \_\_\_\_\_. 2003. *The Devil's Chaplain* (New York: Houghton Mifflin).
- \_\_\_\_\_. 2006. *The God Delusion* (New York: Houghton Mifflin).
- Deacon, Terrence W. 1997. *The Symbolic Species: The Co-Evolution of Language and the Brain* (New York: W.W. Norton & Co.).
- \_\_\_\_\_. 2006a. 'The Aesthetic Faculty', in M. Turner and S. Zeki (eds.), *The Artful Mind* (New York: Oxford University Press): 21-53.
- \_\_\_\_\_. 2006b. 'Emergence: The Hole at the Wheel's Hub', in P. Clayton and P. Davies (eds.), *The Re-Emergence of Emergence* (Cambridge, MA: MIT Press): 111-50.
- Diamond, Jared. 2004. *Collapse: How Societies Choose to Fail or Succeed* (New York: Viking).
- Durkheim, Émile. 1912 [2001]. *The Elementary Forms of Religious Life* (trans. Carol Cosman; abridged with an Introduction and Notes by Mark S. Cladis; New York: Oxford University Press).
- Eichenbaum, Howard. 2002. *The Cognitive Neuroscience of Memory: An Introduction* (New York: Oxford University Press).
- \_\_\_\_\_. 2008. *Learning and Memory* (New York: W.W. Norton & Co.).
- Eliade, Mircea. 1978–85. *A History of Religious Ideas* (3 vols.; Chicago: University of Chicago Press).
- Evans-Pritchard, E.E. 1965. *Theories of Primitive Religion* (Oxford: Clarendon Press).
- Fauconnier, Gilles, and Mark Turner. 2003. *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities* (New York: Basic Books).
- Frazer, James George. 1890 [1929]. *The Golden Bough: A Study in Magic and Religion* (London: MacMillan).
- Galilei, Galileo. 1615. 'Letter to the Grand Duchess Christina of Tuscany', *Modern History Sourcebook*. Online: <http://www.fordham.edu/halsall/mod/galileo-tuscany.html> (accessed 5 December 2009).
- Goodenough, Ursula, and Terrence Deacon. 2003. 'From Biology to Consciousness to Morality', *Zygon* 38: 801-19.

- \_\_\_\_\_. 2006. 'The Sacred Emergence of Nature', in P. Clayton and Z. Simpson (eds.), *The Oxford Handbook of Religion and Science* (New York: Oxford University Press): 853-71.
- Harrison, Peter. 2007. *The Fall of Man and the Foundations of Science* (Cambridge: Cambridge University Press).
- Isaacson, Walter. 2007. *Einstein: His Life and Universe* (New York: Simon & Schuster).
- Koestler, Arthur. 1964. *The Act of Creation* (New York: Penguin Books).
- Lynch, Aaron. 1998. *Thought Contagion* (New York: Basic Books).
- Pals, Daniel L. 1996. *Seven Theories of Religion* (New York: Oxford University Press).
- Preus, J. Samuel. 2000. *Explaining Religion: Criticism and Theory from Bodin to Freud* (New York: Oxford University Press).
- Rappaport, Roy. 1999. *Ritual and Religion in the Making of Humanity* (New York: Cambridge University Press).
- Sherman, Jeremy, and Terrence Deacon. 2007. 'Teleology for the Perplexed: How Matter Began to Matter', *Zygon* 42: 873-901.
- Sober, Elliott, and David Sloan Wilson. 1998. *Unto Others: The Evolution and Psychology of Unselfish Behavior* (Cambridge, MA: Harvard University Press).
- Squire, Larry, and Daniel Schacter (eds.). 2003. *Neuropsychology of Memory* (New York: Guilford Press, 3rd edn).
- Tremblin, Todd. 2006. *Minds and Gods: The Cognitive Foundations of Religion* (New York: Oxford University Press).
- Tylor, Edward B. 1958 [1873, 1871]. *The Origins of Culture and Religion in Primitive Culture* (vols. I and II of the 1873 edn of *Primitive Culture*; New York: Harper & Brothers).
- Wilson, David Sloan. 2002. *Darwin's Cathedral: Evolution, Religion and the Nature of Society* (Chicago: University of Chicago Press).
- Wright, Robert. 2009. *The Evolution of God* (London: Little, Brown & Co.).