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## The Cognitive Foundations of Religiosity

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In the cognitive science of religion, the challenge confronting us is to show that significant features of the content, organization, and spread of religious phenomena can be explained in terms of the ways in which panhuman, evolved psychological mechanisms are activated. This is not a simple task, however. We all know that one cannot explain variables in terms of constants, so how can theories about a universal mind help to explain variable religious outputs? Part of the answer is that religion is not as variable as all that: much of what we have learned from ethnography, historiography, and archaeology (for instance) points to a massive amount of cross-cultural recurrence not only in the forms that religious systems take but even in relation to some aspects of doctrinal content. Another part of the answer is that universal cognitive mechanisms can be activated in different ways, with predictably variable consequences for the way religions are organized and their concepts are formed and transmitted.

### OPEN AND CLOSED BEHAVIOR PROGRAMS IN THE TRANSMISSION OF RELIGION

Most cognitive scientists agree that the outputs of specialized mechanisms in the human mind are not equally malleable. More than twenty years ago, it was suggested that we should at the very least distinguish between “open” and “closed” behavior programs.<sup>1</sup> Closed behavior programs are ones that generate the same outputs in all known human environments, because those environments do not deliver inputs that vary in ways that the mechanisms in question would be sensitive to. Obvious examples would include

the behavior programs responsible for relatively involuntary reactions—like flinching, laughing, crying, and so on. True, we can try to exercise conscious control over these programs (by keeping a straight face or holding back the tears) and with some effort and practice we can even fake expressive behaviors like these so that it is hard or even possible to spot the difference between real weeping and crocodile tears. But the spontaneous outputs of these kinds of behavior programs do not vary all that much from one society to the next. Language, by contrast, is a somewhat more open program.<sup>2</sup> Although the processes by which children learn a mother tongue exhibit a wide range of fascinating regularities the world over, they do of course end up speaking different languages. But when we consider a wide range of cultural competences, it's clear that the behavior programs they require are not simply closed or open, but involve *varying degrees of openness*. Religion provides a good testing ground for this argument because it constitutes a domain of culture in which there is exceptionally broad variation across space and time, at least with regard to conceptual frameworks and beliefs.

Despite the great diversity in religious traditions, past and present, many simple religious concepts depend on what we might describe as relatively closed behavior programs. For instance, in the course of normal development, all humans come to display concerns about contamination from pollutants. These displays have been plausibly linked to evolved neural mechanisms dedicated to preventing the spread of disease (see Boyer, this volume). Although these contamination-avoidance programs do not rigidly determine which exact substances will be treated with special care and attention (although the handling of feces, blood, rotting flesh, and other potentially hazardous materials seems to be subjected to more or less stringent taboos in most societies), they do seem to specify a set of protocols for how to proceed. A typical list of behavioral outputs might include the following: attention to threshold or entrance, washing or grooming, touching, tapping, or rubbing, concern about symmetry or exactness, cleaning things, fear of harming others if insufficiently careful.<sup>3</sup> These sorts of behaviors are found in all human populations, and they are particularly prominent in ritualized behaviors. Moreover, there are other relatively closed behavior programs that seem to be activated in ritual settings. In this volume, Tom Lawson engagingly sets out a number of key features of the structure of religious rituals that derive from cognitive mechanisms specialized for processing the attributes of action and agency. Without necessarily being aware of it, we all make sense of actions in terms of the relationships between basic formal categories: agent (the one performing the action), patient (the one on the receiving end), action (whatever it is the agent does), and instrument (the artifacts, if any, that are used in the action). Religious rituals also activate these categories, but in ways that postulate the involvement of supernatural beings

by associating them with the patient, instrument, or agent roles in the ritual sequence. Over a number of years, Lawson and his coauthor McCauley have pioneered our understanding of the role of this kind of intuitive thinking in people's judgments of the efficacy and appropriateness of ritual behavior.<sup>4</sup> They have shown that many of these judgments are, like the concern with contaminants, largely unconscious, involuntary, fixed, and universal. These are therefore good examples of behavior programs whose outputs are somewhat closed.

Pascal Boyer has meanwhile shown that basic concepts of supernatural agency also arise from somewhat closed behavior programs, although they are not quite as closed as contamination-avoidance mechanisms. Supernatural agent concepts are based on perfectly ordinary agent concepts that emerge quite predictably in the course of normal development, regardless of cultural variation, but they also incorporate one or more added twists: in supernatural beings some standard property of the agent is missing or altered (e.g., the agent has no body), or some property from the intuitive categories normally appropriate to thinking about agents has somehow been exchanged for a property of an inappropriate category (e.g., a statue that can drink milk or hear people's prayers). Boyer refers to this as "minimally counterintuitive" concepts (also described by Slone in this volume as "modestly counterintuitive" concepts).

When we look at the range of minimally counterintuitive concepts across human societies, we find a certain amount of variability. Some populations devote a lot of energy and time to dealing with threats of witchcraft and sorcery, whereas others worry more about offending ancestral spirits, or propitiating deities. But even though there is quite significant variation in the kinds of concepts that can be labeled minimally counterintuitive, this category of concepts is not as rich and malleable as one might think. Some such concepts recur in lots of different societies, following patterns of cross-cultural recurrence that could not possibly be explained in terms of contact and diffusion. The range of all possible concepts of this kind may be sorted into a "catalog of supernatural templates,"<sup>5</sup> but the catalog is finite—indeed, somewhat limited. So we have a degree of openness—but the behavior programs are not as open as all that, because the range of possible breaches and cross-domain transfers of intuitive expectations is not very great. Some of us now refer to these sorts of limited open programs as "cognitively optimal" concepts.<sup>6</sup>

We now have a lot of evidence that religious traditions composed largely of cognitively optimal concepts should be quite widespread, because they deploy basic mechanisms in the human psyche that are both universal and ancient. But there is more to religion than that. Cognitively optimal concepts are, in a great many of the world's religions, *differentiated* from teachings and revelations that carry a heavier conceptual load (and thus require special mnemonic support in order to be transmitted). Some authors refer to this

as the difference between (a) relatively intuitive (or minimally counterintuitive) religious thinking and (b) more drastically counterintuitive and abstract theologizing (see Slone, Tremlin, Boyer, and others in this volume). And it is not simply a matter of difference. The “heavier” concepts are often the more highly valued ones. Since these heavy concepts tend to be especially variable cross-culturally, they would seem to be the outputs of even more open behavior programs than those involved in cognitively optimal transmission. But what kinds of programs are these, and how are they activated?

One way of tackling this problem is to look at ethnographic and historical variation in religious traditions and try to identify cross-culturally recurrent patterns in the way complex religious concepts come to be transmitted. Two patterns immediately stand out. One is *repetition*: many religious traditions are founded upon extremely frequent transmission of core concepts—indeed involving regimes of routinized verbal transmission that are markedly more intense and prolonged over the life cycle than in most other kinds of information exchange. The second is the use of *shock tactics*: some religious traditions, ancient and modern, place great store on rarely performed rituals that, almost without exception, involve exceedingly high levels of emotional arousal and (at least for those undergoing them for the first time) a marked element of surprise. Both patterns of transmission involve the reproduction of extraordinarily complex, cognitively challenging religious concepts. In the case of the routinized traditions, we generally find some sort of doctrinal orthodoxy at the core—typically controlled by recognized experts operating within a centralized priestly hierarchy. In the case of the more shocking rituals, by contrast, we find a far greater emphasis on the mystical revelations of individual participants. Instead of teachings being transmitted by word of mouth, from experts to laity, the pattern is more like a private esoteric journey—often a slow journey taking many years to complete—whereby adherents try to investigate religious riddles independently through personal contemplation. More often than not, we find complex interactions between these two patterns.

The bifurcation noted here is not in itself a new discovery. Over the course of several hundred years, but particularly since the seminal work of Emile Durkheim and Max Weber, it has been appreciated that religious traditions tend toward two major poles, subsequently described in a series of major dichotomous theories from such anthropological luminaries as Ruth Benedict, Ernest Gellner, Jack Goody, Victor Turner, Ioan Lewis, Richard Werbner, Robin Horton, and Fredrik Barth.<sup>7</sup> In this pioneering scholarship, many fine-grained details of patterns of religious transmission have been noted, but it remained necessary to draw all these details together into a single theory of religion and to provide a scientifically grounded explanation for their coalescence. What we needed was a theory that could anchor these patterns of religious behavior in the biological and cognitive theories introduced above.

From the viewpoint of evolutionary psychology and the neurosciences, the presence of two major strategies of religious transmission makes immediate sense. Not only in humans but in a wide range of other species with complex nervous systems, learning and memory (the building blocks of behavioral flexibility) depend upon the twin strategies of *rehearsal* (that is, repeating particular behaviors) and *arousal* (that is, being able to recall exceptional events associated with strong emotional valence). In the case of humans, these strategies are expressed in enormously complex cognitive systems that handle explicit knowledge—sometimes conveniently distinguished by the terms “semantic” and “episodic” memory.<sup>8</sup> Semantic memory is built around patterns of repeated rehearsal: it consists of general knowledge we have acquired about the world, based on experiences so varied and numerous we can seldom recall when or how we first learned any of it. By contrast, episodic memory consists of our recollections of distinct moments in our life experience, that stand out as somewhat unique. Experiences that are especially surprising, arousing, and personally consequential typically give rise to vivid and enduring episodic memories. To put it crudely, semantic and episodic memory are psychologically complex expressions of biologically ancient strategies of learning through repetition and arousal. Religious traditions clearly make use of these learning strategies in various ways, but the challenge was to explain how.

In a series of recent books, I developed a distinction between two contrasting “modes of religiosity”: doctrinal and imagistic.<sup>9</sup> The doctrinal mode is based around frequently repeated teachings and rituals. Religious knowledge is codified in language and transmitted primarily via recognized leaders and authoritative texts. Routinized transmission allows cognitively challenging ideas, even maximally counterintuitive concepts, to be learned and stored in semantic memory. But heavy repetition also makes it possible for theological or cosmological ideas to become rather rigidly systematized and standardized in a population. If the religious concepts, and the authoritative logical and interpretive connections that bind them together, are frequently reiterated, then it becomes easier to spot deviations from the standard account. At the same time, as ritual behavior in general becomes habituated, much of the procedural knowledge is activated implicitly—rather like the way competent cyclists know how to peddle and steer around obstacles without necessarily being able to express or communicate those skills at a verbal level. The ability to carry out procedures without conscious reflection—that is, without “knowing how” you do it—has consequences for the way people reflect on why they perform the actions in question. In particular, it appears that routinized participation in rituals tends to suppress certain kinds of creative thinking about the *meanings* of the acts, and also makes people more receptive to authoritative, verbally transmitted meanings.

The theory of the doctrinal mode of religiosity maintains that all these cognitive features are causally linked to a set of sociopolitical arrangements. The

emphasis on verbal transmission facilitates highly efficient spread of such traditions, so *routinized* religions are generally also relatively *large-scale* traditions. With only a little tweaking from other relevant variables, religions operating in this way can expand rapidly, through processes of evangelism and missionization. The doctrinal modality of codification and transmission emphasizes oratory and learning, and so it facilitates the emergence of venerable leaders and teachers: gurus, prophets, priests, messiahs, and so on. At the same time, it opens up the possibility for standardized creeds, and thus the emergence of religious orthodoxies over which leaders can exercise control. So the doctrinal mode tends to establish centralized ecclesiastic hierarchies, exerting influence over the content and organization of authoritative religious knowledge.

By contrast, the imagistic mode of religiosity is based on rare, climactic rituals—for instance, the hair-raising ordeals of initiation cults, millenarian sects, vision quests, and so on—typically involving extreme forms of deprivation, bodily mutilation and flagellation, and psychological trauma based around participation in shocking acts (such as ritualized cannibalism or murder). The imagistic mode figures especially in the religions of the ancient world and, until recently, in many small-scale societies and cults. Its practices trigger enduring and vivid episodic memories for ritual ordeals, encouraging long-term reflection on the mystical significance of the acts and artifacts involved. We know from detailed ethnographic research on these practices (for instance in aboriginal Australia, New Guinea, Africa, Amazonia, and many parts of Asia) that the esoteric revelations induced by the imagistic mode are seldom communicated verbally as a set of explicit teachings. It is not just that the practices are too infrequent to allow this kind of transmission but that their persuasiveness derives from the fact that they originate in internal mental processes of personal rumination. Such processes tend to be slow; indeed they may take many years to unfold, with the result that religious expertise tends to be concentrated in the hands of elders, who can only transmit the tradition by forcing others to go through similarly protracted processes of ritual participation and private reflection.

Imagistic practices are associated with very different sociopolitical arrangements from those found in the doctrinal mode. The revelatory knowledge is much harder to spread, for it emerges out of collective participation rather than being codified in speech or text. Its traumatic rituals create intense solidarity among those who experience them together, establishing in people's episodic memories who was present when a particular cycle of rituals took place. The tendency is toward localized social cohesion, based on patterns of following by example, and so we never find the same kind of scale, uniformity, centralization, or hierarchical structure that typifies the doctrinal mode.

Like many other models in the cognitive science of religion, the modes theory couches its hypotheses in terms of principles of *selection*. Doctrinal and imagistic modes are best understood as *attractor positions* around which ritual actions and associated religious beliefs *cumulatively* tend to congregate. New rituals and beliefs that fail to meet the requirements of memory and motivation proposed by the theory are simply selected out. Within these constraints, however, a very broad range of religious behaviors becomes possible. And this brings us back to the question of closed versus open behavior programs.

We have noted that some aspects of religious thinking depend on relatively closed programs—those concepts and other behavioral outputs that are much the same in human populations everywhere. In addition, we find that religious concepts may involve some small but cognitively salient violations of the inferences delivered by closed behavior programs. Such concepts may be described as “cognitively optimal” (in the sense of being especially easy to recall and pass on, all else being equal). Then again, we also seem to have religious concepts that are *exceedingly remote* from anything our evolved cognitive systems could anticipate. These hard-to-learn concepts can only be acquired if special mnemonic techniques are available, and at least two broadly contrasting kinds of techniques have been identified, built around the manipulation of performance frequency and arousal. When we look at the kind of concepts arising from our two modes of religiosity, it is clear that we are entering the realm of extremely open programs, and the constraints of biology seem to somewhat distant. The situation, though, is more complicated (and moreover far more interesting) even than that.

Some particularly illuminating perspectives on the contrasts between elaborate, explicit religious knowledge (as generated by the relatively open behavior programs postulated by the modes theory) and more cognitively optimal religious thinking (as generated by relatively closed behavior programs founded on tacit, generic mechanisms) are presented in this volume by Todd Tremlin and Jason Slone. Although Tremlin does not specifically couch the distinction in terms of the relative openness of behavior programs, he nevertheless identifies a wide range of ways in which much the same basic distinction has been developed in the cognitive sciences. The open–closed dichotomy overlaps, for instance, with distinctions between analytical and intuitive thinking, between abstract and inferentially rich representations, between slow and fast, reflective and reflexive, conscious and unconscious/automatic types of computation (Tremlin, 000). Further, Tremlin links these distinctions to the evolution of consciousness via a series of contrasts between rational/analytical thought and automatic/rapid/effortless processing, envisaging the former as language-based, relatively affect-free, highly abstract, propositional, and recently evolved, and the latter as essentially

nonverbal, affective, concrete, experiential, and biologically more ancient. The point is succinctly and powerfully made with reference to a wide body of literature in the cognitive sciences, although arguably some of the dichotomies that are piled on are more controversial than others. I have doubts, for instance, that levels of affectivity can be mapped onto the sequence of binary oppositions adumbrated by Tremlin—indeed, recent developments in the neurosciences suggest that even the most rational and abstract “higher-level” forms of cognition are necessarily emotion laden.<sup>10</sup> Nor do I agree with Tremlin that the outputs of implicit systems are more plausible or relevant than the outputs of explicit systems.<sup>11</sup> But Tremlin’s general argument fits well with the view, to which I also subscribe, that religious thinking derives from *both* relatively closed behavior programs (taking the form of online, intuitive, largely tacit operations, associated with the transmission of cognitively optimal representations), *and* much more open behavior programs (resulting in abstract, computationally challenging, counterintuitive, explicit discourse and offline rumination). Following Justin Barrett (1999), many of us now refer to religious thinking and behavior of the latter kind as “theologically correct,” and have noted how this contrasts with more intuitive kinds of religiosity.

Jason Slone, author of the recent book *Theological Incorrectness: Why Religious People Believe What They Shouldn't*, argues in his contribution to the present volume that “concepts within religious systems typically lie on a *continuum of complexity* from explicit offline theology to intuitive online religion” (000, emphasis added), a view that clearly accords well with the notion of varying degrees of openness of behavior programs. What seems to happen in religious traditions, when observed on the ground through ethnographic studies or over time through historiographical and archaeological research, is that different kinds of behavior programs of varying degrees of openness are continually activated, resulting in an array of different patterns of interaction, cultural transmission, and historical transformation. To my mind, this is one of the most fascinating areas in which the cognitive science of religion has made progress in recent years, and it is one in which particularly large-scale interdisciplinary collaboration has fruitfully unfolded (see Whitehouse and Laidlaw 2004; Whitehouse and Martin 2004; Martin and Whitehouse, in press). What is becoming increasingly clear is that some religious activities draw heavily on cognitively optimal concepts and practices while others place great store on more elaborate, theoretically correct forms of knowledge. Indeed, these differences of emphasis can sometimes be apparent across entire religious traditions. There are some religions, for instance, that eschew theologizing more or less across the board and seem, instead, to be preoccupied with the minimally counterintuitive properties of certain kinds of events, such as the nefarious activities of witches and sorcerers (as in some traditional African societies), or spirit possession and

magico-medical rituals (as in some contemporary Afro-Brazilian cults). There are also religious systems that are internally stratified, such that “highbrow” theological discourse is carried on mainly by educated elites, and cognitively optimal variants is the province of lay adherents (a pattern that has been noted, for instance, in medieval Christianity and many contemporary Asian religions<sup>12</sup>). At the other end of the spectrum, we find religious systems dominated at all levels by one or the other (or both) of our two modes of religiosity, placing great emphasis on the uniform dissemination of elaborate doctrinal knowledge codified in language (e.g., most fundamentalist varieties of the Abrahamic religions) and/or being greatly concerned with esoteric revelations arising from personal rumination (e.g., evangelical traditions that emphasize epiphanic episodes and conversion experiences, as well as imagistic practices in cultic organizations of various kinds). Matters are further complicated by the fact that individual worshippers can move almost seamlessly between these different types of religious thinking: drawing on doctrinal testimony in one context and personal revelation in another, and then falling back on tacit, theologically incorrect reasoning for certain other tasks and purposes. So the extent to which these different facets of religious experience exercise dominance in people’s religious experience varies at an individual level as well as across entire traditions.

A crucially important question is to what extent we can formulate generalizing theories about the *causes* and *consequences* of these different “layers” of religious thinking and behavior. In this volume, broadly two theoretical positions are taken up, differentiated by the degree of emphasis placed on cognitively optimal versus theologically correct religious transmission (and, correspondingly, by the relative importance attached to more closed behavior programs versus more open ones). On the one hand, there are those who argue that theologically correct religious discourse and revelatory experience are largely epiphenomenal. According to this view, the establishment of elaborate and explicit religious concepts may well result from particularly open behavior programs (e.g., explicit memory systems and mechanisms for high-level analogical thinking), but what makes these cognitively complex and somewhat indigestible outputs *widespread* is best explained by a combination of historical particularity (e.g., opportunities for establishment of religious guilds) and the way these environmental factors interact with tacit, intuitive (relatively closed) behavior programs (e.g., evolved mechanisms dedicated to coalitional thinking). One of the hallmarks of this perspective, which I shall call the “tacit religion hypothesis,<sup>13</sup> is that it upholds largely unconscious, intuitive mechanisms as the real causes of most (if not all) behavior, including religious behavior. We do what we do without knowing why, and our more elaborate religious beliefs and actions are mostly post-hoc rationalizations for things we would say or do regardless of what our doctrinal systems or personal theologies might stipulate or prescribe.

On the other hand, there are those who argue that our religious commitments are shaped by a *combination* of implicit inferences and explicit reasoning and that certain modes of transmission (e.g., doctrinal and imagistic) foster the emergence of especially elaborate religious belief systems that vie with our implicit cognitive mechanisms for control over our behavior. The extent to which they succeed depends on processes of cognition that are embedded in socially regulated contexts, and is apt to change over time in ways that may be increasingly predictable. This perspective, which I shall call the “layered religion hypothesis,” accords considerable weight to tacit, evolved cognition but does not regard this as the be-all and end-all of explanatory theory. Let us consider each of these perspectives in turn.

### TACIT COGNITION AND THE STUDY OF RELIGION

Undoubtedly the most persuasive champion of the tacit religion hypothesis is the justly renowned cognitive theorist, Pascal Boyer. In his chapter for this volume, Boyer argues that tacit, intuitive mechanisms and their cognitively optimal outputs constitute the *key* to explanation in the cognitive science of religion. To the extent that people’s actual religious concepts may vary somewhat from one community to the next, Boyer argues that the reasons for this must lie in the interaction between specialized cognitive mechanisms and historically particular circumstances. The challenge, accordingly, is to show how specific variations in historical circumstances affect the outcomes of fixed, generic cognitive mechanisms. Boyer contrasts this approach with my own, which (as we have seen) treats only some aspects of cognition (and their outputs) as relatively fixed, and implicit and others as inherently more flexible, conscious, and context sensitive.

Boyer goes on to draw a sharp but illuminating contrast between “religion in general” (properties that all religions have, at least beneath the surface, by virtue of generic evolved cognitive mechanisms) and “specific religious systems” (properties that religions overtly exhibit, such as particular beliefs, rituals, myths, and so on). Specific religious concepts vary somewhat, but in a way that is quite tightly constrained by the intuitive properties of religion in general. Boyer refers to the range of all possible minimally counterintuitive concepts, for instance, as a “catalog of the supernatural,” but the catalog is finite—indeed, somewhat limited. Minimally counterintuitive concepts, like other cognitively optimal aspects of religion, might be compared to common weeds: they spread and take root easily, unless efforts are made to control them. By contrast, official (theologically correct) religious concepts are more variable and distinctive, more like expensive plants with exotic-sounding names: they require much care and attention (e.g., special mnemonic and

pedagogic support) if they are to survive. Religious authorities are like gardeners who live in constant dread of weed infestation.

As far as cognitively optimal concepts are concerned, the gap between religion in general and specific religious systems is not all that great. Indeed, the fact that one group believes in statues that hear prayers, and another in carved masks that crave sacrificial offerings, is arguably trivial. Both groups share the same basic psychological mechanisms that made these minimally counterintuitive concepts appealing and memorable, and, according to Boyer, the fact that the surface-level concepts take slightly different forms in different places can be put down to historically contingent factors (including mere chance) that need not concern us too much. But what about the official, theologically correct concepts? Their diversity presents a bigger problem, opening a gulf between religion in general as postulated by cognitive science and specific religious systems as found on the ground. This is really the nub of the problem, and it is also where Boyer's and my intuitions about how to proceed start to look more radically different.

Boyer's argument is that we should stick with our conception of religion in general as a set of universal, largely unconscious cognitive constraints and turn to factors outside cognitive science (for instance, what he refers to as "cultural or historical factors" and "political conditions") to explain the emergence of theological concepts and other diverse outputs of religious experts. If we identify these "outside factors" correctly, then all that remains, according to Boyer, is to predict accurately how our generic, tacit cognitive mechanisms will respond to those factors, giving rise to well-known patterns in religious organization (e.g., as identified by the theory of doctrinal and imagistic modes of religiosity and/or by other theories that might augment or eclipse it). If, for instance, archaeologists and social theorists can tell us how centralized states and technologies of inscription emerge, then cognitive science can fill various remaining parts of the picture, by explaining how our cognitive capacities for managing coalitions and intergroup competition or for utilizing possibilities afforded by literacy for storing and organizing information, are going to drive us toward the formation of religious guilds with standardized theological products. According to Boyer, this would account for most (if not all) the features of the doctrinal mode, with reference to only a small number of cognitive mechanisms. Or, alternatively, if there are experts out there who can tell us why certain populations form themselves into warring factions or end up developing methods of hunting that are especially dangerous, then we can fall back on tacit, generic cognitive mechanisms specialized for coalitional thinking to explain why such populations tend to go in for initiation rituals (the answer would be that these rituals prove the loyalty and trustworthiness of those who undergo them). Boyer argues that this strategy will deliver a theoretically economical explanation for features of the imagistic mode.

Much as I can see the appeals of reduction to tacit, generic mechanisms—not least the neatness and simplicity of Boyer's arguments—the strategy ultimately depends on the presence of sociological and historical theories that really can deliver the premises we require. This is not, in my view, the case. The modes theory does not take centralized states or writing technologies as given (as “already explained”) for the purposes of the emergence of the doctrinal mode. It proceeds from the assumption that these are things that *still require an explanation*. The theory maintains that the emergence of the doctrinal mode, via intricate mechanisms of reinforcement among its component elements, provides some plausible starting points for a thoroughgoing explanation for the first appearance of states *and* literacy practices.<sup>14</sup> The environmental triggers required to kick-start this process<sup>15</sup> are far more parsimonious than Boyer's theory requires, depending on variables that archaeologists and other relevant specialists are well placed to account for (such as the developing impact of environmental and technological factors on increasing population densities and frequencies of productive and ritual activities). To take as our starting point, as Boyer suggests, immensely complex processes of state formation, including increasingly centralized and hierarchical patterns of social interaction and the emergence of increasingly homogeneous regional cultural systems, is to put the cart before the horse and to limit the relevance and explanatory scope of cognitive theories.

Similar problems are raised by Boyer's explanation for core features of the imagistic mode. Here too he takes as given something for which an explanation is urgently required: namely the presence of cohesive coalitions set against each other in relations of covert tension or outright conflict, for instance in conditions of chronic warfare. Universal mechanisms of coalitional thinking cannot account for such arrangements (recall the point that variables cannot be explained by constants). Nor do I think they could explain, as Boyer suggests, the presence of traumatic initiation rites in such coalitions. Boyer's argument on that front is based on the idea that participation in rites of terror, in the role of novice or victim, provides a public demonstration of one's loyalty to the group and thus one's trustworthiness in future situations of danger (e.g., on the battlefield or hunting ground). But in the vast majority (if not all) of ritual systems of this kind, novices are literally forced to undergo the tortures and privations of initiation, and the price of defection (usually a horrible death) is far greater than of compliance (temporary trauma). Not only do people *not choose* to be initiated, but, having been coerced into it, everyone knows it is more or less a forgone conclusion that they will pass the “test” (accidents notwithstanding). Even at the most implicit intuitive level, this is no demonstration of loyalty, though it may (as I have often argued) give rise to intense group cohesion and patterns of loyalty to the group that this entails. And that brings us to another set of thorny issues in relation to which Boyer's and my understandings diverge. These is-

sues concern the origins and nature of motivational states in religious transmission.

Much of my work on modes of religiosity is geared to showing that the complex, explicit religious knowledge that arises from doctrinal and imagistic forms of transmission has considerable motivating force. By contrast, Boyer would argue that what people think they believe, and what they say they believe, has little direct impact on what they do. In other words, according to Boyer the real motivations behind apparently religious behavior operate outside conscious awareness, at the level of tacit, intuitive thinking. Where I have argued, for instance, that imagistic practices gradually give rise to esoteric exegesis of an intensely revelatory kind which in turn drives the guardians of this sort of religious knowledge to pass on the tradition, Boyer argues that in fact the transmission of imagistic practices is explained by evolved contamination-avoidance mechanisms, operating largely below the level of conscious awareness.

Boyer maintains that ethnographic research has failed to deliver convincing evidence of revelatory knowledge generated by traumatic initiations and other rituals operating in the imagistic mode. As Hinde (this volume) points out, the claim that ritual exegesis is *secret* understandably arouses doubts about its existence and places the burden of proof on those who assert that it is really there. The point is well taken. Clearly we require more sophisticated methodological techniques to investigate the topic with greater precision and depth. Nevertheless, most ethnographers who (like me) have worked closely with ritual experts in cults of initiation are in little doubt that elaborate revelatory knowledge informs and shapes their activities. Given the general reluctance of participants to present esoteric exegesis as connected narrative, much of the work devoted to reconstructing these bodies of knowledge does so in a piecemeal fashion, putting together pieces of evidence gathered over lengthy periods of time in conversation with ritual experts and through direct observation of their activities. More recently, several of us have been trying to devise new techniques of investigating the nature (e.g., elaborateness and coherence) and developmental characteristics (emergence over time, including impact of age) of spontaneous exegetical reflection associated with high-arousal rituals. These techniques would seek to overcome the limitations of methods based on interview and anecdote. Moreover, we are designing experimental techniques of establishing the effects of low-frequency, high-arousal rituals on spontaneous exegetical reflection (see Whitehouse, Richert, and Stewart, this volume), so it is hoped that some of the empirical issues will be resolved satisfactorily in due course. In the meantime, there is still a broader theoretical issue to address, namely whether it is safe to assume that stable beliefs, religious or otherwise, have little or no role in motivating behavior.

In relation to this question, Boyer seems to regard the matter as something of a zero-sum game: if tacit, intuitive processing influences behavior, then explicit religious beliefs motivate nothing. But surely the reality is that both kinds of knowledge, implicit and explicit, can be implicated (perhaps to different degrees) in various kinds of religiously motivated behavior (see also Hinde, this volume). A major problem with the argument that contamination-avoidance mechanisms explain “the urgency of repetition of rituals” (Boyer, 000), at least as applied to imagistic practices, is precisely that there is little sense of urgency (in the sense of continual nagging) to repeat them. On the contrary, these are among the most *infrequently performed* rituals we know about. We could concede the point that all rituals tacitly activate contamination-avoidance systems to some extent some of the time, but that does not explain any of the peculiar properties of religious rituals in traditions dominated by modes dynamics. A prominent feature of our two modes of religiosity is the presence of elaborate exegesis, whether codified in language (doctrinal mode) or guardedly elaborated through private rumination (imagistic mode). Now, a striking feature of rituals in doctrinal and imagistic traditions, unlike those that genuinely lack elaborate exegesis (and which presumably must, as Boyer suggests, incorporate cognitively optimal traits in order to survive), is that people are willing to make massive sacrifices to defend them. Some of those sacrifices are made in isolated individual acts (“turning the other cheek,” resisting temptation, etc.), and others in more collective settings (organized sectarian violence, religiously motivated crusades, etc.) While one could in principle argue that the explicit religious convictions that people claim to motivate such behavior are purely illusory, I can see little reason to take that view and plenty of good reasons to take people’s statements on the matter seriously: not least the fact that many explicit religious commitments and the behaviors they are said to motivate often run directly against normal drives, calculations of self-interest, intuitive knowledge, and so on. To say that explicit religious ideas influence behavior is not to say anything radically implausible, either intuitively or scientifically, but it does raise the question of how such ideas come into being. The modes theory tries to answer that question, but it does not assume that these explicit ideas are *solely* responsible for the behavior of religious people. The tacit, generic mechanisms that Boyer identifies (and that may be relevant to understanding *all* kinds of behavior) must also be taken into account. Part of the challenge is to see how these various kinds of cognitive mechanisms (of varying degrees of explicitness) and their outputs (ranging from the intuitive to the massively counterintuitive) vie for control of our individual behavior and, at a collective or institutional level, help to shape the sociopolitical conditions in which religious behavior is embedded.

The tacit religion hypothesis surrenders a great deal of explanatory potential to noncognitive (and rather vaguely delimited) factors, such as “his-

torical contingency” and “sociopolitical arrangements.” Although this implies a division of intellectual labor generous to historians, anthropologists, and other kinds of social theorists, it does not really help them to get on with their part of the job. Historians and anthropologists (and I count myself among the latter) want well-founded theories to explain variations and transformations in explicit cultural (including religious) thought and behavior, since that is primarily what we study. We want to know not only what causes this diversity and change but also what effects it then has on the world around us. We know that these processes must involve complex interactions between cognition “in the head” and events in the environment, but we need theories that address both sides of the equation with equal resolve.

### LAYERED COGNITION AND THE STUDY OF RELIGION

In responding to the above debates, Robert Hinde cautions that some of the variables influencing religious transmission and transformation may always lie beyond the compass of cognitive explanations. He writes,

Human activities involve a number of levels of complexity—intraindividual (e.g., cognitive) processes, individual actions, short-term interactions between individuals, relationships between individuals, groups and societies . . . . Each of these affects, and is affected by, others. For instance, cognitive processes affect individual behavior, and how an individual behaves affects how he thinks; what goes on in an interaction influences, and is influenced by, the relationship in which it is embedded; and so on. Furthermore, each of these levels affects and is affected by the physical environment and by the sociocultural structure, including the morals and beliefs shared with others in the group. (p000)

Much depends, however, on what qualifies as “cognitive” phenomena rather than as “sociocultural structure” or “the physical environment.” The latter, I would argue, only impact human behavior insofar as their effects are mediated through cognitive processes. Environments and sociocultural systems do not affect people’s thoughts and actions unless they are somehow registered by their perceptual systems, resulting in responses generated by intricate and flexible processes of mentation. Designating some cognitive mechanisms relatively open and others relatively closed (see above) acknowledges that environmental variables, and perhaps most importantly socially regulated environments, are part and parcel of a great deal of cognitive development, processing, and resulting behavior, all the more so as the behavior programs in question become progressively more open. Rather than thinking of cognition as something that takes place exclusively in the mind/brain, it makes sense to think of it as “extended” and thus to talk about “cognitive environments” rather than purely interior cognition.<sup>16</sup>

Matthew Day attends to this point rather more directly than other contributors to the present volume. He observes that the tendency (following Boyer, Barrett, and others) to emphasize the naturalness of both language and religion masks the fact that not all aspects of religion are expressions of fixed, generic cognitive architecture. Spoken languages are certainly “natural” to humans in the sense that they exhibit many general properties that are more or less invariable, regardless of local or historical particularities. For instance, natural languages display similar levels of complexity regardless of the strikingly differing levels of technological development among the populations that sustain them. But religious systems vary much more strikingly in terms of levels of complexity, both in terms of theological content and social morphology. A more compelling analogy, Day suggests, might be drawn between religion and mathematical knowledge. To be sure, we require many standard evolved mental capacities to think with numbers, just as we do to think about gods and spirits, but to acquire an understanding of advanced mathematics requires elaborate cultural tools that are, quite literally, outside the brains of individual mathematicians. We need not only material tools of the trade (e.g., technologies of inscription and information storage) but regimes of institutional training through which would-be mathematicians are able to hone their skills under competent supervision. So, in turn, a great deal of religious innovation and transmission depends on forms of extended cognition, of the sort proposed by the theory of modes of religiosity.

Seen in this light, the gap postulated (in admittedly rather different ways) by both Boyer and Hinde, between historical contingency and cognitive causes, begins to narrow and we can imagine instead the possibility of a “cognitive historiography” (Whitehouse 2006) as well as a more comprehensive cognitive anthropology. The manner in which such projects might proceed is suggested by contributions to this volume that focus on the *layered* nature of religious experience and behavior.

Todd Tremlin observes that patterns of historical transformation in religious systems are likely to be influenced not only by modes dynamics (e.g., the tedium effect in the doctrinal mode or the strengths and weaknesses of imagistic coalitions in the face of larger-scale, routinized orthodoxies) but *also* by the pervasive allure of cognitively optimal concepts. This serves to underline the point, already noted, that the choice between tacit/intuitive and explicit/counterintuitive religious thinking should not be construed in zero-sum terms. Both kinds of thinking, and the patterns of religious transmission to which they give rise, are usually present simultaneously. What can change is their relative influence over religious transmission in the round, and thus their impact on the stability of religious systems over time. Further examples of this line of argument are suggested in this volume by both Jesper Sørensen and Jason Slone.

In an exceptionally wide-ranging discussion of the cognitive underpinnings of ritual behavior and its interpretation, Sørensen draws a series of fruitful contrasts between assessments of ritual acts that emphasize *magical efficacy*, on the one hand, and those that focus on *exegetical meaning*, on the other. Concerns with magical efficacy would appear to be driven by highly intuitive, largely tacit cognitive mechanisms concerned with attributions of agentive force, basic-level action representation concepts, and intuitive ontological knowledge. In an intriguing discussion of how these sorts of mechanisms are implicated in the formation of notions of charismatic authority and supernatural agency, Sørensen provides compelling grounds for supposing that evaluations of magical efficacy form part of our repertoire of *cognitively optimal* responses to ritual behavior. At the same time, however, rituals may trigger a quest for explicit exegetical meaning capable of hardening into routinized and doctrinally elaborated orthodoxies. Drawing on both my own work and that of Max Weber, Sørensen suggests that although concerns with efficacy and exegesis may seem to be mutually exclusive (and in practice, emphasis of one implies deemphasis of the other), they are in fact dialectically connected in the development of religious traditions. Thus, explicit exegetical and doctrinal knowledge, generated and transmitted through relatively open behavior programs, is always constrained and influenced by the ubiquitous presence of intuitive judgments of magical efficacy that are generated by rather more closed behavior programs. Religious history is, much as Weber originally suggested, a ceaseless oscillation between institutional arrangements dominated by one or other of these “layers” of cognitive processing.

In a comparable fashion, Slone considers the question of why many theological traditions develop free-will problems. Such problems, he observes, arise from explicit reasoning of a kind that is broadly analogous to the logical operations entailed in a scientific or philosophical argumentation. But because some of the crucial premises of this reasoning are delivered by relatively closed behavior programs (especially those delivering inferences about the freedom of agents to choose how they act), the conclusions of theological rumination on questions of divine omnipotence (running as they do against our intuitions about individual responsibility and choice) are likely to be convergent. Thus, he postulates an *interaction* between the outputs of implicit/intuitive thinking, on the one hand, and explicit, highly abstract reasoning, on the other. Insofar as the conclusions of this sort of theological rumination result in bodies of fixed, authoritative religious knowledge, they depend on the mnemonic gimmicks of the doctrinal mode of religiosity to be reproduced intact (although Slone attaches importance to uses of literacy in this regard). But the “theologically correct” position on free-will problems

never completely eclipses more intuitive ways of thinking about divine agency. Slone observes,

memorized theological creeds do not override noncultural conceptual schemata. In other words, learned theological conceptual schemes provide only one among many “multiple sufficient schemata” (Kelly 1972) for making sense of the world (Slone 2004). Likewise, theological concepts that postulate that the gods have agency that is greater than what humans possess do not override human bias toward self-agency. (000)

Slone’s example of the development of theologically correct solutions to free-will problems suggests one possible way in which the interaction of implicit and explicit cognitive systems can influence the direction of religious thought over time. But there are also a number of other ways in which a *layered* approach to cognition can shed light on the historical development and transformation of religious systems. Ilkka Pyysiäinen has made some particularly wide-ranging contributions in this area.

In a previous contribution to this book series, Pyysiäinen argued that the doctrinal mode of religiosity is vulnerable to broadly two kinds of motivational problems.<sup>17</sup> First, there are problems that result from excessive discipline and routinization. In some traditions, religious authorities insist on the observance of very frequent ritual obligations and patterns of doctrinal repetition, the appeals of which may be outweighed by the heavy demands they impose (in terms of time, energy, attention, etc.) Such a situation may be described as the “tedium effect.”<sup>18</sup> Second, there are problems that arise from too liberal an approach to the maintenance of the orthodoxy, expressed in lowered frequency of doctrinal repetition (and other routinized forms of transmission), and a general reduction in the vigor with which unauthorized innovation is detected and punished. This situation allows more “cognitively optimal” versions of the orthodoxy to spread and to become entrenched. Pyysiäinen has suggested that these two kinds of problems may be associated with contrasting patterns of historical transformation:<sup>19</sup> “over-policing” (manifested as tedium and demoralization) may give rise to imagistic splintering<sup>20</sup> and “under-policing” (manifested as loss of doctrinal coherence and uniformity) may result in programs of reform, aimed at restoring the disciplines of the doctrinal mode.<sup>21</sup>

In his contribution to the present collection, Pyysiäinen explores more closely the hypothesis that the tedium effect gives rise to styles of religiosity that are somewhat imagistic in orientation. He argues that the imagistic mode, *contra* Boyer, delivers high levels of commitment through processes of revelation and spontaneous exegetical reflection, and that people will be especially susceptible to its effects in conditions of flagging commitment. And yet he also points out that the tedium effect can be effectively counteracted by just *some* features of imagistic transmission, without necessarily ac-

tivating the entire nexus of features associated with the imagistic mode. Pyysiäinen observes that the phenomenon of “religious conversion” is an excellent case in point.

Typically, conversion experiences involve high levels of emotional arousal, giving rise to enduring episodic memory, and resulting in revelatory religious insights developing through internal rumination. Nevertheless, religious conversions take place mainly in religious traditions dominated by the doctrinal mode (for reasons that Pyysiäinen also discusses in some detail). As such, the revelatory ideas these experiences deliver is generated against a background of doctrinal knowledge and progressively integrated into it through the “schematization” of episodic encodings. For instance, conversion experiences can become somewhat stereotyped through subsequent narrative rehearsal, even if the motivational effects occasioned by high-arousal, epiphanic episodes are to some extent retained. Since these kinds of practices often serve to reinforce commitment to a widely distributed, already-established orthodoxy (and orthopraxy), they do not have the sociopolitical consequences that typify imagistic practices occurring in isolation from a doctrinal tradition. Although Pyysiäinen does not dwell on this point, it is also significant that religious conversions often take place in solitude, rather than involving sizeable ritual groupings (e.g., cohorts of initiates) as would be typical of *bona fide* imagistic traditions. And this too would help to explain why religious conversions do not produce cohesive ritual communities and other sociopolitical traits normally associated with the imagistic mode.

Pyysiäinen’s arguments are persuasive.<sup>22</sup> If I have any quibble, however, it is that he may exaggerate the vulnerabilities of doctrinal transmission—a tendency that is apparent also in Tremlin’s chapter. Both authors regard the theologically correct concepts of the doctrinal mode as lacking in motivational force, at least as compared with cognitively optimal concepts and imagistic revelations. As far as the latter comparison (doctrinal versus imagistic) is concerned, we are probably in agreement. Indeed, I have argued elsewhere at some length that religious commitments derived from internal rumination tend to exercise greater motivational force (at least on certain definable parameters) than commitments derived primarily from oral testimony.<sup>23</sup> What I find less convincing is the argument that theologically correct teachings are inherently less persuasive and motivationally salient than cognitively optimal religious ideas. Tremlin, for instance, talks about “the affect-free propositions of theological reasoning, whose abstract qualities both minimize their computational utility and reduce their psychological relevance” (000), all of which contrasts with the “inferential richness” of cognitively optimal concepts. And Pyysiäinen<sup>24</sup> describes theologically correct discourse as “an epiphenomenal overlay on natural religiosity” (000). There is little doubt that cognitively optimal religious ideas and practices are exceptionally robust

(hence the analogy with prolific weeds, suggested earlier) and that complex doctrinal systems (like rare and delicate plants) require careful maintenance if they are to thrive. But, properly maintained, doctrinal teachings can thrive rather impressively in the sense of being well remembered by large numbers of people but also in the sense that they can exercise a powerful influence on behavior. Malley, for instance, explains how the relevance of theologically correct discourse can be enhanced through specifiable techniques of rhetoric and sermonizing.<sup>25</sup> And Thargard shows that such concepts can acquire emotional as well as intellectual coherence.<sup>26</sup> Moreover, the very act of repeating particular bodies of doctrine can have enduring salience effects that have yet to be fully investigated.<sup>27</sup> So it may be judicious to keep an open mind about the motivational properties of doctrinal transmission, at least until more evidence on the matter is available.

#### FUTURE DIRECTIONS IN EMPIRICAL RESEARCH

Barrett's concise overview of the evidential needs of the modes theory (this volume) presents us with some daunting challenges for future research. Some of the topics he identifies, however, are now beginning to be addressed. Barrett distinguishes between three major categories of empirical evidence needed to test the theory adequately: ethnographic, naturalistic, and experimental.

In talking about "ethnographic" evidence, Barrett means not merely the kinds of research, much prized by anthropologists like myself, that is based upon long-term participant observation in rather small locations but, rather, all types of descriptive information on religious beliefs and practices over time and space. Such evidence might come from historiography or archaeology rather than from ethnography more narrowly defined. Moreover, it would also include quantitative evidence pertaining to sociocultural phenomena, including statistical studies of naturally occurring distributions of concepts, rituals, and patterns of social interaction.

Coordinated attempts to test the modes theory ethnographically (in Barrett's sense) have so far pursued two major strategies. First, we have sought to draw on the existing knowledge of significant cross-sections of experienced anthropologists, historians, and archaeologists by asking them to subject the modes theory to critical scrutiny in light of the bodies of evidence they command. This work, resulting in a series of recent collections of essays,<sup>28</sup> has undoubtedly gone some way to refining the predictions of the modes theory. It has shown, for instance, that doctrinal and imagistic modes (at least as "bundles of features," as Boyer puts it) are indeed *globally distributed* and *ancient* features of religious systems, but *also* that their operation is influenced by *cognitively optimal* religious transmission in the sorts of

ways briefly outlined above. We still do not know, however, if the samples of religious traditions covered by this research are representative of religious traditions everywhere. To assess accurately the extent to which modes of religiosity impact on patterns of religious transmission, past and present, we require a second type of ethnographic strategy, based on *surveys* of the ethnographic/historical/archaeological record and detailed *quantification* of the coalescence of doctrinal and imagistic features in all known religious traditions (or what might be suitably judged to be a representative sample of them). Work in this area is still in its infancy. To carry out surveys on the scale required is far from straightforward. We need, for instance, to establish methods of *codifying* the relevant features of doctrinal and imagistic modes and *measuring* degrees of coalescence in a reliable fashion, such that independent coders and measurers would make similar judgments. We also need to access reliable evidence from a sufficiently large (and representative) group of case studies. A potential problem here is that some variables of crucial importance, such as ritual frequency, are seldom recorded precisely in ethnographic and historiographical sources (and may simply be unavailable in the case of archaeological evidence<sup>29</sup>). One way of addressing these problems is to build new bodies of ethnographic evidence, rather than to rely on existing reports, and a start has been made on this attempting to establish a database on the Web (<http://www.qub.ac.uk/fhum/banp>) constructed around a fifty-point questionnaire designed to elicit information essential to testing the modes theory's predictions.

Barrett's category of "naturalistic" studies is also an area in which, thanks in large part to his creative suggestions over a number of years, concrete research plans have begun to develop. A difficulty with this kind of research is, of course, that it requires naturally occurring "controls" on key variables of a kind that the modes theory predicts will not occur (or that if they occur, will rapidly become extinct). For instance, we know that there are many low-frequency, high-arousal rituals in religious traditions the world over, but it is extremely difficult (if not impossible) to find versions of these same rituals in which performative frequency is greatly increased or levels of arousal greatly reduced. Much as the theory predicts, we do not find situations of imagistic transmission in which the two main variables we are interested in are naturally controlled. We can, however, sometimes identify circumstances in which what are normally high-frequency, low-arousal rituals are experienced for the first time, and it is also clearly possible to find high-frequency rituals in which arousal levels vary. To take the first of these scenarios, studies have been designed (but not yet carried out) to compare levels of spontaneous exegetical reflection among (a) fresh converts (or newly ordained ministers) and (b) established members of the tradition (or experienced ministers).<sup>30</sup> If "first timers" prove to be more reflective than "old hands" (and assuming this finding could be widely replicated) then this would support the

prediction that ritual frequency correlates inversely with spontaneous exegetical thinking. We might then consider whether elevated arousal amplifies these effects in low-arousal rituals, through similar studies of naturally-occurring high- and low-arousal variants of high-frequency rituals (e.g., based on existing variations in emotional response among religious congregations). Of course, such studies do not enable us to compare bona fide imagistic practices (i.e., traumatic, one-off ritual episodes) with low-arousal and/or high-frequency versions of the same activities. But they do, arguably, approximate to that ideal.

Experimental research, as testified by the contribution to this volume by Richert and others, is also well under way. As Barrett notes, however, work of this kind must deal with the problem that real-world religious activities are typically embedded in highly motivating systems, whereas activities contrived in the laboratory (e.g., artificial rituals) are unlikely to elicit the same kinds and levels of motivation and meaning among participants (and if they did, this would raise thorny ethical problems). Earlier experiments designed to investigate levels of verbal repetition necessary for successful doctrinal transmission produced extraordinarily poor recall for a small volume of fictitious theology delivered twice a week over seven weeks (see Whitehouse 2004, 84). But it is possible that recall would have been better in a group of more highly motivated participants, as for instance we might expect to find in a genuine religious tradition. More promising have been pilot studies to assess levels of spontaneous exegetical reflection (SER) with respect to artificial rituals (based on the Catholic practice of self-crossing), which suggest that SER levels correlate inversely with the number of repetitions (rates of SER dropping off as the procedures become increasingly familiar) (see Whitehouse 2004, 83). In this case we might assume that even if high motivation in genuine religious settings reduces (or, for that matter, amplifies) the effects of repetition on SER, the underlying trend is likely to be the same in naturally occurring rituals.

These are just some of the areas in which research is under way but it remains embryonic, and, of course, Barrett has identified many more issues that urgently require further empirical investigation. Perhaps the most prominent of these is the need to establish the extent to which *explicit* religious thinking motivates and influences behavior. This topic has been a recurrent theme of the present volume (as noted at some length in this concluding chapter) and provides the launching point for Barrett's survey of empirical needs. Ethnographic research, as broadly construed by Barrett, can contribute to our understanding insofar as it delivers detailed descriptive information on people's explicit knowledge (based on texts, interviews, documentation of speech in natural settings, and so on) and on actual behavior (whether directly observed or recorded in secondary sources). What ethnography cannot provide, however, is direct evidence on how tacit motivations influence behavior, perhaps overriding explicitly expressed commitments.

Experimental designs do rather better in this regard but are often set up in such a way as to demonstrate the motivating force of unconscious processes, rather than to provide a balanced portrayal of the role of both explicit and implicit processes in behavior. Perhaps this is because it is more interesting (in the sense of titillating) to show that people sometimes fail to practice what they preach, but to set up experiments solely to make that point (albeit in fascinatingly myriad ways) carries the risk of self-fulfilling prophecy. We also need research designs that show when and why preaching determines practice. The possibilities for naturalistic research in this area are many and varied. As a starting point, one might imagine studies that examine decision-making processes and their outcomes in relation to dilemmas of a doctrinally significant kind based on comparisons between participants who espouse the relevant doctrines and those who do not. Basic research of that kind does not, as far as I am aware, already exist. But there are also many more subtle problems to investigate, such as the relative sway of beliefs based on testimony as compared with those based on internal rumination, the effects of implicit mechanisms (e.g., coalitional thinking) on theologically correct decision making, and so on. Clearly, there is much work to be done. But as many of the *mysteries* surrounding religious thought and behavior come to be converted into potentially solvable *problems*,<sup>31</sup> there is increasing reason to believe that one day we shall justly be able to claim to have laid bare the cognitive foundations of religiosity.

## NOTES

1. Mayr 1976; see also Hinde, this volume.
2. See Tooby and Cosmides 1992, 46.
3. Fiske and Haslam 1997, 218.
4. Lawson and McCauley 1990; McCauley and Lawson 2002.
5. Boyer 2001.
6. For a fuller explication of this term, see Whitehouse 2004a.
7. For a summary of this scholarship, see Whitehouse 1995, chap. 8.
8. This distinction was first advanced in detail by Tulving 1972.
9. Whitehouse 1995, 2000, 2004a.
10. See Thagard 2004; Barsalou et al. 2004; Livingston 2004; see also Pyysiäinen, this volume.
11. See Whitehouse 2004a; Malley 2004; Pyysiäinen, this volume.
12. See, for instance, Howe 2004; Vial 2004.
13. It is tempting to call it the “Dumb Religion Hypothesis,” partly because it downplays the role of conscious, intelligent thought in religious discourse, but also because it regards the “real stuff” of religion as “dumb” in the English sense of being mute (in this case, unavailable to verbal report). But I have resisted that temptation since it might, very misleadingly, suggest a lack of respect for religious sensibilities.

14. Whitehouse 2000, 2004a.
15. See Whitehouse 2004b in response to Weibe 2004.
16. See Sperber 1996.
17. Pyysiäinen 2004.
18. Whitehouse 2000.
19. Pyysiäinen 2004, 187.
20. See Whitehouse 1995.
21. See Whitehouse 2000; Whitehouse and Laidlaw 2004; and Whitehouse and Martin 2004.
22. See also Whitehouse 2004.
23. Whitehouse 2004a, chap. 7; though see also McCauley and Whitehouse 2004.
24. Following McCauley 2000.
25. Malley 2004.
26. Thargard 2004.
27. See Whitehouse 2004a.
28. Whitehouse and Laidlaw 2004; Whitehouse and Martin 2004; Martin and Whitehouse 2004a; Martin and Whitehouse 2006.
29. But note Johnson's (2004) helpful suggestions on this front.
30. The designs for these studies were inspired by Barrett and refined through collaboration between myself and Rebekah Richert.
31. This distinction, first made by Noam Chomsky, has already been aptly applied by Pascal Boyer to the cognitive science of religion (2001, 2).

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