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Deriving Features of Religions in the Wild

How Communication and Threat-Detection May Predict Spirits, Gods, Witches, and Shamans

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Abstract
Religions "in the wild" are the varied set of religious activities that occurred before the emergence of organized religions with doctrines, or that persist at the margins of those organized traditions. These religious activities mostly focus on misfortune; on how to remedy specific cases of illness, accidents, failures; and on how to prevent them. I present a general model to account for the cross-cultural recurrence of these particular themes. The model is based on (independently established) features of human psychology—namely, (a) epistemic vigilance, the set of systems whereby we evaluate the quality of information and of sources of information, and (b) threat-detection psychology, the set of evolved systems geared at detecting potential danger in the environment. Given these two sets of systems, the dynamics of communication will favor particular types of messages about misfortune. This makes it possible to predict recurrent features of religious systems, such as the focus on nonphysical agents, the focus on particular cases rather than general aspects of misfortune, and the emergence of specialists. The model could illuminate not just why such representations are culturally successful, but also why people are motivated to formulate them in the first place.

Keywords Religion · Evolutionary psychology · Cultural evolution · Epistemic vigilance · Threat-detection

Religions "in the wild" or "wild traditions" are those religious activities that occurred before the emergence of organized religions with doctrines, or that persist at the margins of those organized traditions. These wild traditions include, for

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instance, shamanism, interactions with ghosts and ancestors, anti-witchcraft activities, protection against mystical harm, as well as divination. They form most of religious activity in all small-scale societies with subsistence economies. They are also persistent in large-scale societies and often in competition with the services offered by organized doctrinal religions. In this sense, "religion in the wild" includes not just most religious activities in small-scale communities before organized religions but also so-called peripheral or marginal activities that occur in places with religious organizations: for example, quasi-shamanistic healing in sixteenth-century European Christianity (Le Bras, 1956), possession and marabout healing in Islam (Lewis, 1966), or ecstatic cults in Rome (Beard, 1996; Vermaseren, 1977). The term also includes such modern phenomena as New Age healing cults (Pike, 2012), witchcraft beliefs in present-day London (Luhrmann, 1989), protection against the evil eye (Stein, 1974), anti-witchcraft activities in the twentieth-century French countryside (Favret-Saada, 1980), or belief in demons in modern Greece (Stewart, 1991).

The main reason to lump these apparently disparate traditions together is that they seem to share important characteristics, among which are the fact that (a) they focus overwhelmingly on the treatment of specific cases of misfortune and (b) they explain or remedy misfortune in terms of interaction with imagined agents (spirits, gods, ancestors, etc.), as well as (c) the services are provided by specialists construed as inherently different from other members of a community by virtue of inherent qualities rather than technical training. Naturally, these common features may not actually be diagnostic of a natural kind so that the model proposed here only applies to some of these traditions, which we can only discover once the model is clearly formulated, in this case as in all explanatory models.

Here we propose a speculative model of the construction and diffusion of such traditions that should account for these common features as the consequence of two aspects of our evolved cognitive systems, for which we have independent evidence:

1. Our epistemic psychology (or "epistemic vigilance") includes systems whose function is to seek valuable, fitness-enhancing information, but also to detect and reward the providers of such information, the Good Sources;
2. Our threat-detection and precaution psychology focuses on specific sources of potential danger in ancestral environments (e.g., contagion, predation, coalitional aggression) and relies overwhelmingly on information from others rather than direct experience to evaluate dangers as well as the costs and benefits of possible precautionary measures.

Combined, these evolved psychological systems would favor the production and diffusion of messages similar to the religious traditions considered here—notably the focus on potential danger from unseen agents such as spirits, the need for precautionary measures including rituals, and the special status of individual specialists such as shamans and diviners.

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Religious Traditions in the Wild—What Remains to Explain?

Typical Religious Activities in "Wild" Traditions

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A number of forms of religious activities recur in these traditions, in particular the following (which overlap to a large degree):

Dealing with ancestors, ghosts, spirits. People engage in social relations with deceased members of the group (ghosts or ancestors), or with local spirits said to dwell in particular places or to control particular activities.
Dealing with souls. These activities are the many varieties of (broadly understood) shamanism. This denotes traditions in which a specialist enters a trance or possession that allows him/her to deal with spirits and restore their clients' well-being (Winkelman, 1986, 1990).
Dealing with witches. One of the most widespread beliefs, in otherwise very diverse cultures, is the notion that some agents can inflict harm by physically undetectable means. A great deal of religious activity centers on detecting and fighting witchcraft.
Divination. Almost all human groups have some form of divination. People use a formalized technique to determine the contents of a statement and state that diagnoses produced following that procedure are more likely to be accurate than statements from other sources.

These activities constitute what anthropologists commonly call "religion" in studies of small-scale communities of foragers, horticulturalists, as well as in many agrarian societies. Historians and anthropologists have long distinguished between the traditions of, typically, small-scale communities and the so-called doctrinal religions (Bellah, 2011; McCutcheon, 1997; Platvoet, 1993; Whitehouse, 2000). The contrast could lead to oversimplification. One must keep in mind that this is not a contrast between cultures, but between types of religious activity that can be found next to each other in many places. Indeed, in most places with organized, doctrinal religious institutions, people maintain or reinvent "wild" traditions (Boyer, 2019).

Wild Traditions Differ from Organized, Doctrinal Religions

Wild religions differ from organized doctrinal religions, which are more familiar to most people in modern societies, in the following ways:

Doctrine is not Central As most anthropologists have found when studying such "religious" practices, there is simply no consensus description of the superhuman agents beyond some very rough features. For instance, spirits are described as invisible, but there is often no specific, agreed-upon understanding of what that implies.

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Shamans can contact spirits, but most people are content with the vaguest description of how that is done (e.g., what spirits look like, what language spirits speak, or other details of that kind). Naturally, people in any community agree on some fundamental principles: for example, that there are spirits around, that they are the souls of dead people, and that they are involved in protecting people's crops or making them fail. These highly abstract propositions generally are the basis for ethnographic constructions of "the" local religious system (Sperber, 1985), which may downplay actual variation in informants' representations (Aunger, 1994). Formal measures of cultural consensus allow a more precise evaluation of the consensual beliefs in a community (Dressler, 2020; Romney et al., 1986) as well as intragroup variation (e.g., see Dengah, 2013 for groups of Pentecostals believers in Brazil). Formal measures confirm the common anthropological observation, that consistency and explicitness are soon lost as one explores the implications of the consensual general beliefs. How the spirits see what is going on, whether they have eyes, how they manage to provoke accidents, and so on, are not specified (for example, see Evans-Pritchard, 1936 for witchcraft, Fortes, 1966 for divination, or Sperber, 1975 for spirits). Most people do not even consider it important to explore such questions, which is why vagueness or inconsistencies do not matter. The general principles (e.g., "invisible spirits are the souls of dead people") consist in meta-represented beliefs—that is, not a belief that '*p*' but a belief that "it is true that '*p*'" —which is why one can hold them true without being committed to any specific implications (Sperber, 1997, 2000). The centrality of doctrine, and the emphasis on coherence and deductive links between various tenets of belief, are traits of doctrinal religions (Whitehouse, 2000, 2004), typically found in religious organizations with specialized literate personnel.[1]

Practitioners are Individuals People often attribute the practitioner's skill at interacting with superhuman agents to individual qualities, especially in the case of shaman-like healers and other individuals with special access to spirits or gods. These specialists may place some emphasis on their training or initiation, as a guarantee of quality, but the ineffable internal qualities are generally required. In Winkelman's study of "magico-religious practitioners" in a subset of the HRAF cultural database, specialized healers or shamans are generally said to possess unique features, distinct from ordinary individuals (Winkelman, 1986, 1990). This special feature may be left undefined, or associated with special experiences, or in many African places, interpreted as possession of an extra organ (see, e.g., Evans-Pritchard, 1935).

[1] For instance, in a classic study, Ron Brunton (1980) pointed out that students of Melanesian religious representations produced coherent general principles from inconsistent specific comments made by informants, which suggests that Melanesian religions are "weakly integrated... subject to a high degree of individual variation and a high rate of innovation and obsolescence" (1980:112). In the same way, Evans-Pritchard states that talking about a "Zande theology" would be a gross distortion of Zande religious activities, which neither strive for nor achieve consistency beyond very general statements about spirits and witchcraft (Evans-Pritchard 1936, 1963). In the same spirit, Rodney Needham argued that statements of causality (the spirits caused *x*) are not accompanied by representations of causal processes (Needham 1976).

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The Goal is to Address Particular Cases In contrast to what happens in doctrinal religions, the point of these religious activities is pragmatic and focused on particular problems (Boyer, 1994b, 2001, 2019). For instance, people sacrifice to local gods because these have the power to dry wells or damage crops (Fortes, 1987). They "offer" pigs to the ancestors because the latter may get angry and make people sick (Rappaport, 1979). The point of a shamanistic ritual is to cure some specific person of some specific ailment (Winkelman, 1990). Transactions with superhuman agents are most often described in cool bargaining terms, as when illness is thought to occur because the ancestors found the most recently sacrificed animal insultingly small (Keesing, 1982).

There are no Unified Services Different shamans, healers, or diviners may provide their services in entirely different ways. They may also provide substantially different services to different people or at different times. This stands in contrast to the standardized services provided by doctrinal organizations. This obviously does not mean that, for example, all shamanistic sessions are entirely different—otherwise, no one would recognize them as, precisely, a shamanistic session. They may also have many features in common as a matter of fact, but there is no expectation that they should be highly similar. Again, the contrast is with organized doctrinal traditions that not only specify how to perform particular rituals but also stipulate that ritual efficacy depends on following those prescriptions. "Orthopraxy" is typically higher in organized religions, often for the simple reason that these activities occur in literate cultures, with the technical means to ensure unified performance (Goody, 1972, 1977).

Superhuman Agents are Local That is obviously the case for place-spirits such as the god of a river or mountain. Ancestors too are local in the sense that they are bound to a particular group. This would stand in contrast to the doctrines of organized religions, with cosmic gods whose jurisdiction is unlimited. This is not always a straightforward demarcation since many small-scale societies have a concept of a cosmic creator god—for example, among the Dinka (Lienhardt, 1987). In such cases, however, it is generally the case that people are mostly concerned with such local agents as ancestors and spirits. Cosmic gods become much more salient in the religious activities of ancient large-scale societies (Shariff et al., 2010).

There is Generally no Question of Membership, Adherence, or Commitment People who consult a shaman or healer do not generally join a community, no more than would the patients of a particular physician in a modern context. In the case of ancestor cults, the question is irrelevant as only people of a particular lineage participate in the ceremonies.

Recurrent Features

So far, these traditions are described mostly in terms of what they are not—for example, that they have no consistent doctrines, or no organized personnel with

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systematic training, that they do not focus on salvation, and so forth—a common way of understanding these traditions in the anthropological literature (Platvoet, 1993). This may lead us to think that, beyond this negative description, religious traditions outside doctrinal organizations might vary without limit. But that would be mistaken, and several recurrent features of such traditions cry out for explanation:

- [Feature 1] The Focus on Particular Cases of Misfortune

Witches are imagined agents that bring about illness or accidents. The activities of shamans center on curing illness and remedying misfortune. Most religious interaction with spirits and ancestors consists in placating them to get their protection against accidents and illness as well as bad crops or social strife. This is such a common feature that it is usually taken for granted in general accounts of traditional, nondoctrinal religions. But it is crucial all the same. Note that the focus is on explaining particular cases. As an illustration, consider Evans-Pritchard's well-known example of a granary that collapsed over some individuals sitting under its shade (Evans-Pritchard, 1937). People's attention and reasoning capacities focus on such questions as "Why did *this* particular event happen to *these* particular individuals, at *that* particular time?" Religious activities in wild traditions focus on why this individual got ill, why the roof collapsed when these people were underneath, why this person's crops failed. These religious traditions do not say much about the causes of misfortune in general.

- [Feature 2] The Association of Misfortune with Superhuman Agency and Intentionality

In these traditions, all specific cases of misfortune are described in terms of the actions and powers of superhuman agents—ancestors, spirits, gods, ghosts, etc. That of course is why we call these traditions "religious" in the broad sense of the term. Still, the association does require an explanation. People in most societies, for most of history and in most places, thought and talked about imagined superhuman agents mostly in terms of what went wrong and what could go wrong, and what to do about it (Boyer, 2019). Also, people generally construe cases of misfortune in terms of specific intentionality (e.g., someone fell ill because the gods or ancestors wanted *that* person to fall ill in *that* specific way).

- [Feature 3] The Existence of Specialists

Most societies worldwide have "magico-religious" specialists variously described as healers, diviners, shamans, ancestor priests, etc. In all these places, these social positions are relatively stable. The crucial point here is that there *is* specialization. That is, only some individuals provide information about specific cases of misfortune, and only they are deemed able to offer solutions, a point that is familiar for most varieties of shamanism (Singh, 2018) but also extends to healing or anti-witchcraft activities (Winkelman, 1986, 1990). In most cases, people construe the

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difference between such specialists and common folk in terms not of knowledge or technical training, but of special, inherent qualities—the religious specialists are just naturally different (Boyer, 1994b, 2001; Stépanoff, 2015; Winkelman, 1986)

Recurrent Features Require an Explanation: Cultural Attractors

Humans the world over are intensely interested in explaining, palliating, and avoiding misfortune. Why is that? To most of us, the question will seem absurd. How could humans *not* be interested in such issues, nor motivated to build some account of misfortune? But there is nothing self-evident about this focus. From an evolutionary standpoint, we would expect human cognitive dispositions and preferences to contribute to fitness, or more precisely, to have contributed to enhancements in individual fitness over millennia of human evolution (Tooby & Cosmides, 1992, 2005).

It is difficult, however, to discern the fitness advantages of the dispositions and motivations involved in culturally common representations of misfortune, which describe it as the outcome of deliberate actions on the part of imagined agents such as witches and spirits, or as a consequence of human feelings such as jealousy (e.g., through the evil eye). But these are not in most cases the actual causes of the problems at hand. It seems difficult to envisage how fitness would be enhanced by believing in those agents and processes. Thinking that a particular accident was caused by spirits does not by itself favor behaviors that would reduce the likelihood of similar accidents.

Also, religious explanations we consider here seem to resolutely avoid general principles and comparisons of cases. To return to the Zande example, Evans-Pritchard's interlocutors know very well that granaries collapse because termites gnaw their pillars, but they see this fact as irrelevant given the specific questions they ask (Evans-Pritchard, 1937). So Zande people know the relevant general facts that may help avoid future accidents—for example, that older structures are more likely to collapse. But they are motivated to seek answers to other questions, to do with the specifics of the case. Even if there were possible answers to such questions, they would not contribute to predicting or avoiding mishaps. In that sense, discourse about misfortune is quite distinct from the search for explanation, prediction and control of events that intellectualist models describe as a motivation for religious representations (Horton, 1967; Skorupski, 1975). This focus on the particulars of a case may well be related to some fitness gains—indeed, the model proposed here suggests such gains—but this requires a special explanation.

Here we consider recurrent misfortune explanations as a phenomenon of cultural evolution. In this perspective, some mental representations become cultural—that is, distributed in roughly similar form in different minds—when different people either select the same representations to attend to, or reconstruct their meanings in a similar manner. These aggregated processes of transmission and reconstruction result in cultural attractors—that is, particular combinations of mental and public representations more likely than others to occur in the same form, in otherwise different times and places—and also more likely to be periodically rediscovered, or corrected by

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cultural transmission toward the most common variant (Claidière et al., 2014; Sperber & Hirschfeld, 2004).

This "epidemiological" framework has been applied to various domains of religious representations, on the assumption that religious representations, like any other cultural representations are all the more likely to be acquired, stored, represented because they produce specific cognitive effects that can be experimentally studied in individuals (Boyer, 2001).[2]

In that perspective, what makes some explanations of misfortune culturally successful? The model proposed here highlights the contributions of two sets of mental systems that we know are components of human cognitive architecture—epistemic vigilance and threat-detection—and suggests that their combination results in a very specific way of communicating information about misfortune that is culturally successful and in turn constrains other aspects of religions "in the wild."

Background: Epistemic Vigilance and Threat-Detection

To understand why people send and receive particular kinds of messages, we must step back and describe two sets of evolved psychological mechanisms relevant to how humans generally deal with the quality of information transmitted, and how they specifically consider information about potential danger. In both domains, these are not ad hoc stipulations of the present argument, but independently documented findings and models.

Epistemic Vigilance

Psychologists and linguists have documented a suite of cognitive capacities geared to maximizing the benefits from useful information and protecting the mind against deception. The large amount of evidence for such mechanisms of "epistemic vigilance" allows an appreciation of the quality of sound arguments and the detection of misleading or misguided utterances (Mercier & Sperber, 2017; Sperber et al., 2010). The inferences produced by these epistemic mechanisms bear not just on the contents of utterances but also on the quality of the sources, attending to cues that suggest poor or, on the contrary, reliable informants (Bonaccio & Dalal, 2010; Harris & Lane, 2014). It is clear, for instance, that people detect inconsistencies and moderate their confidence in material provided by inconsistent sources (Mercier, 2012). But people also attend to intentions—as Sperber et al. put it, "a reliable informant must meet two conditions: she must be competent, and she must be benevolent" (Sperber

[2] For instance, this approach has provided us with models and hypotheses on such aspects of religions as concepts of gods and spirits and other superhuman agents (Atran 2002; Boyer 1994a; Pyysiainen 2001); notions of death and immortality (McCorkle 2010; White 2016); recurrent features of rituals (Lawson and McCauley 1990; Liénard and Boyer 2006); connections between differences in religious doctrines and differences in cooperation (Baumard et al., 2015; Purzycki et al., 2016)—for general surveys, see Barrett 2000; Boyer and Bergstrom 2008; Xygalatas 2014.

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et al., 2010). A crucial aspect of epistemic vigilance is that people attend to the quality of arguments and sources, primarily as a way of evaluating how the information they receive may benefit them (Vullioud et al., 2017). Vigilance appears very early in cognitive development; a growing body of evidence suggests that children use sophisticated implicit principles to evaluate statements and sources (Clément, 2010; Mascaro & Morin, 2014; Mascaro & Sperber, 2009).

The empirical evidence suggests the following important points:

1. *Epistemic vigilance systems are automatically activated* when we receive information, providing intuitive judgments about the value of statements.
2. *Source evaluation is crucial*. Obviously, inferences run in both directions since valuable content suggests that a source is valuable, and knowing that a statement comes from a reputable source enhances prior expectations of validity. But inferences from source to content value are the most relevant here. That is because people have vastly more information about, for example, a shaman or a healer [*sources*] than about the inscrutable matters these specialists describe—for example, how witchcraft made someone sick or why someone's crops are failing [*content*].
3. *Competence as a stable trait.* People often construe differences in epistemic quality between sources in terms of fairly stable, in some cases essential, differences between persons (Wojciszke, 2005). In all human communities, one routinely uses such terms as "competent," "knowledgeable," or "skilled." In other words, people consider that, all else being equal, having provided valuable information in the past predicts valuable information in the future, a crucial component of social status in many cultures (Henrich & Gil-White, 2001).

These features of our epistemic psychology are very general. They apply to any kind of referential information one receives, and therefore to the subset of information concerning misfortune. The effects of our intuitive representation of sources and source quality are fundamental to understanding religious traditions, as shown below.

Threat-Detection Psychology

Another set of evolved psychological mechanisms are crucial to understanding discourse about misfortune: our threat-detection and precautionary psychology, a set of evolved cognitive responses to direct and potential threats to fitness (Boyer & Bergstrom, 2011).

Threat-detection Motivates Attention to Information from Others Humans, like other complex organisms, evolved in contexts where they had to find appropriate behavioral responses to both direct and potential dangers, which themselves required different specialized circuits, appraising threats and motivating precautionary behaviors (Boyer & Liénard, 2006). The evidence shows that the appraisal of potential threats, and the emergence of appropriate precautionary behaviors at different stages

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of cognitive development, closely follow the actual threats encountered in ancestral environments (Boyer & Bergstrom, 2011).

Humans, like other animals, have "prepared" fears, activated by such evolutionarily relevant stimuli as spiders, snakes, and large predators (Öhman & Mineka, 2001). They can also learn to fear direct and potential threat via associations and conditioning (Watson & Rayner, 2000), as do other species, and through exposure to other agents' reactions (Rachman, 1991). Among humans, these limited repertoires of prepared and acquired fears are complemented by a much broader domain of threat detection, in which the main route to learning about potential danger is verbal communication, from early childhood and throughout development (Boyer & Bergstrom, 2011). In other words:

> [Feature 4] Humans are predisposed to receive most of their threat-related information from others, and to expect such information from others more than from individual learning

Threat Bias The way potential threats are handled in human cognition is the object of parallel research programs in experimental psychology, behavioral economics, and evolutionary biology. People pay special attention to negative information, a phenomenon traditionally described as a general "negativity bias" (Baumeister et al., 2001; Rozin & Royzman, 2001). The bias affects not just attention but also memory and reasoning, as well as the transmission of information (Bebbington et al., 2017). There is still no clear consensus in psychology as to the causes of this general preference. One plausible explanation is that so-called negative stimuli or items are in fact related to potential threats and activate our threat-detection systems (Fessler et al., 2014; Pratto & John, 1991).

This bias is related to loss aversion as described in economics and decision-making—the fact that losses seem to loom larger than gains in people's estimation (Kahneman et al., 1991; Tversky & Kahneman, 1981). As a consequence, people tend to be risk averse when considering possible gains (an assured gain of $950 for sure seems more valuable than $1,000 with a 95% probability) and reverse these choices when considering losses (a $950 loss seems more damaging than a 95%-probable $1,000 loss). Prospect theory describes the asymmetric values of gains and losses in formal terms (Tversky & Kahneman, 1979).

In biological terms, it may be possible to interpret human loss-aversion (as well as other apparently "nonrational" phenomena such as the endowment effect) as the outcome of fitness considerations (Kacelnik & Bateson, 1997) related to foraging and energy expenditure (Stephens & Krebs, 1986). In that "risk-sensitivity" framework, organisms in some circumstances cannot afford to abide by normative expected value considerations, above a certain level of need. For instance, a predator that requires 1000 cal to survive another day has an absolute need, such that a 20% probability of 2000 cal (e.g., chasing a robust deer) is valued higher than an assured gain of 500 cal (catching a rabbit) because the latter situation would

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lead to death by starvation (Mishra et al., 2012).[3] We know that changing levels of perceived needs affects people's propensity to engage in risky behaviors—for example, placing bets in lotteries with highly unfavorable odds (Mishra & Fiddick, 2012; Mishra et al., 2012; Rode et al., 1999).

In other words, fitness imposes valuations that often bypass or contradict the maximization of expected utility. To sum up:

> [Feature 5] People may engage in (normatively) high-risk, low-probability strategies when faced with potentially high costs, given a perceived level of absolute need

Note that precautionary thinking may influence behavior in a way that goes against the output of other cognitive systems—in particular, epistemic systems. A treatment recommendation from a healer may seem epistemically weak since it has little prior plausibility or verifiability, yet describe a high-benefit, low-probability outcome that is seen as the only recourse left in a particular situation.

Error Management In order to respond appropriately to information about potential threats, organisms must weigh the respective costs of misses and false alarms, a process called "error management" (Haselton & Buss, 2000). An intuitive comparison of the costs c of false alarms and misses makes people err on the side of over-detection if $c(\mathrm{FA}) < c(\mathrm{M})$ and on the side of under-detection if $c(\mathrm{FA}) > c(\mathrm{M})$. What determines the direction of this inequality are factors such as subjective probability estimates for the threat and the costs of precaution. In particular, in a situation in which the cost of potential danger is described as relatively high (so that $c(\mathrm{M})$ is high), but the cost of precaution is low (so that $c(\mathrm{FA})$ is low), listeners will behave as if (they thought) the information was accurate (Johnson et al., 2013). Many so-called superstitions are couched in such terms: for example, one should avoid getting out of bed on the left foot (small cost) to avoid potentially catastrophic misfortune (high cost) (Vyse, 1997). Their behavior may also send to others the signal that the threat information was credible, as we will see below. To sum up,

> [Feature 6] When considering precautions, high costs of potential misses will lead to accepting courses of action with a sufficiently low cost of false alarms

The Good Source Model: Hypotheses and Prior Evidence

At this point we proceed from the known, the background of capacities and dispositions described so far, to a speculative model of communication dynamics. Although this is formulated in very general terms, I will describe communication dynamics in

[3] This of course assumes an idealized game dynamic, a limiting case in which there is only time for one foraging expedition given the alternatives described.

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terms of what would happen in a simple situation, typical of most of our ancestral social life, in which a small group of individuals form a fairly cohesive community, know each other personally, have information about each other's past statements and behaviors, do not have access to mass communication, and are faced with the kind of contingencies typical of communities with fairly rudimentary technology. Given any such situation, communication will occur. Speakers provide information that Listeners may evaluate and on the basis of which they may decide to some specific course of action. This highly simplified situation should make it easier to discern the main dynamics expected.

Good Source Dynamics: Hypotheses

The activation of our epistemic psychology in a small group of personally known individuals—that is, in conditions most similar to our evolutionary past—may result in specific dynamics, in terms of costs and benefits of producing and consuming messages.

- [Hypothesis 1] There are benefits to having Good Sources in one's epistemic environment

To the extent that selecting information from good sources confers fitness, we should expect that humans evolved a preference for having as many Good Sources (GS) as possible in their epistemic environment. Because there are benefits to having GS around oneself, one could expect that agents will try to make that situation more likely. They could for instance pay more attention to some speakers rather than others. Also, since Good Sources are precious, one would have an advantage in channeling more rewards to the individual who seems to be a good source than to others, leading to the next hypothesis:

- [Hypothesis 2] There are benefits to being seen as a Good Source in other people's epistemic environment

Because people value Good Sources, they make it advantageous to be one. That is, to the extent that people are motivated to select GS-identified individuals more than others as social partners, benefits from cooperation will, all else being equal, flow to GS more than to others. This would predict that, just as there is an evolved preference for having Good Sources, there would be an evolved preference for being a Good Source.

This is familiar to us in modern societies since we pay experts in myriad domains; see Sobel (2013) for a survey of formal models. But the phenomenon is widespread in small-scale societies as well (Henrich & Gil-White, 2001). What is generally glossed as "prestige" or "reputation" or "authority" includes many clear advantages for people considered as Good Sources. So, preferring Good Sources is just another instance of the phenomenon whereby we prefer competence because it is profitable to us. Women known to be particularly competent at delivering babies,

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men said to be better at making arrow points, people who have special knowledge of plant remedies all derive some benefits from their perceived technical competence. In the same way, people who can provide reliable information are sought after. For instance, older people in most small-scale communities exert more influence than younger individuals since most people assume that they know more or know better.

- [Hypothesis 3] The probability that a Listener engages in a recommended course of action a is a direct function of the Listener's estimate of the Source's general epistemic quality

In the situations described here, messages sent by Speakers convey not just descriptions of the state of the world, but also descriptions of courses of action and their payoffs, given that state of the world. A Listener's decision to follow a course of action described in the Speaker's message is a function of prior beliefs about the world, about the value of such actions, but also, of the Listener's beliefs about the Speaker's quality as a Source. This is clearly the case for religious specialists, in the sense that there is no direct evidence for the validity of their claim.[4]

This has the important consequence that people may have to rely on the next best cue for competence, the fact that others seem to take the source to be competent. In other words:

- [Hypothesis 4] The perceived quality of a Source, for a Listener, is a function of the number of third-parties who follow his/her recommendations

There is no reason to assume that people have perfect information about other individuals' epistemic qualities. Specialists may claim to be competent, but there often is no way to verify to what extent they are. For any individual, an index of a Source's epistemic quality is that other individuals have followed the courses of actions described in (or compatible with) previous messages from that particular source. That is the case in all small-scale communities observed by anthropologists, and the effect is also found in modern, large-scale societies, with the added complexities of mass communication. The effect on one's epistemic evaluation of a Speaker of prior choices by third parties is also described in formal models of cultural evolution, in terms of indirect bias (Boyd & Richerson, 1985) and prestige (Henrich & Gil-White, 2001).

Naturally, perceived epistemic quality ("this Speaker is competent") is a direct function of success ("many people seem to follow this Source's recommendations") only if we hold other factors equal. Given evolved epistemic vigilance, we can expect that people consider such success as a reason to believe the Source,

[4] Note that in this model, people are more likely to follow a recommendation if it emanates from a source that has prior Good Source status, independently of that specific recommendation. This is the general phenomenon studied in formal models of advice-taking (Pornpitakpan 2004; Sobel 2013), distinct from those highly specific situations, in which an agent produces both a statement and a behavior that would be risky if the statement was false, therefore boosting their credibility (Henrich 2009).

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only to the extent that they consider the other "followers" as sensible rather than deluded, manipulated, etc.

Initial Evidence: Effects of Threat-Related Information

Different sets of findings support the model, suggesting that threat-related information is abundant (and low quality) in most human cultures, that sources of such information are indeed presumed to be Good Sources, and that there is some demand for further information of that kind.

A predicted consequence of the GS model and error management would be that Listeners tend to see sources of threat-information as providing useful information. A side effect would be that these sources appear, all else being equal, more competent than sources of other kinds of information. This is indeed observed in people's evaluation of sources for messages concerning various products or services. For instance, a tour guide who warns people of the dangers of a trek is judged more "competent" about the region than one who mentions other features. This difference is not driven by "negativity bias." Information that is negative but does not mention potential threats does not result in similarly high ratings of competence (Boyer & Parren, 2015).

A surprising consequence of our threat psychology is that people intuitively ascribe a higher probability to threats than to positive predictions, even when they describe the same probabilities. Both Fessler et al. (2014) and Hilbig (2009, 2012) independently observed that epistemic effect. People seem to estimate, for example, that the proposition "5% of heart attack victims die within ten years" is more plausible than "95% of attack victims survive after ten years," suggesting that that negatively framed information is processed as threat information. Intuitively perceived plausibility motivates people to pay special attention to threat information.

Another possible consequence of the GS model would be that, when given the choice of multiple items of information they can transmit to others, people will prefer to transmit threat-related items. This is observed in studies using an artificial cultural transmission paradigm (Blaine & Boyer, 2017). Across five generations of participants, threat information is chosen for transmission more often than positive, neutral, or even negative information about the same topics. Also, threat information is transmitted better, even when it is described as extremely low probability ("One person out of 10,000 reported this problem"), and therefore less relevant than other items.

If threat material is implicitly judged as more valuable than other kinds of information, people would want to know more about the threats a source mentioned, as opposed to seeking additional information about positive or negative information about the same topic. That too is observed in studies of information requests. When given choices of items on which they could receive additional information, participants choose the threat items significantly more often than other items (Blaine & Boyer, ~~2018),~~

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Consequences for Communication about Misfortune

We can now describe potential consequences of the background facts described above, given our general hypotheses about the motivations for having and being seen as Good Sources.

Attractiveness of Threat-Related Information

In many circumstances, especially in ancestral conditions with rudimentary technology, people are faced with situations such as illness or accidents over which they have little control, but which impose potentially dramatic costs on individuals and groups. Under these conditions, the default disposition to seek information about threats from others [see "Background"] is combined with the fact that people see themselves as facing potentially extreme costs, which leads to a higher than usual value placed on strategies with high potential benefits despite a low probability of success. Additionally, when people consider information about remedies against present misfortune or palliatives for further instances, they may err on the side of accepting precautions if the perceived cost of misses is much greater than that of false alarms.

Naturally, people may also ignore threat-related information. Indeed, in terms of actual benefits, that would in most situations carry either neutral or positive consequences. Rituals and other religious prescriptions may result in trivial costs (e.g., "sacrificing to the ancestors" a pig that would be slaughtered and consumed anyway) or immense costs (e.g., undergoing extremely painful ordeals to demonstrate one's commitment to the gods). But the actual benefits are largely nonexistent.[5]

In other words, there is a niche for the acceptance of threat-related information. This would predict that people seek threat-related information, attend to it, accept some of it (with limitations, to be described below), and even take courses of action based on accepting that information.

Production: Threat Information and Source Status

The argument so far has only been concerned with the reception or consumption of information about misfortune. But one may wonder why that information is available in the first place—that is, why people would volunteer such threat-related information, especially in domains such as accidents or illness, when the causes are largely inscrutable. In other words, we must describe the production side of this, which is where the Good Source model is relevant.

[5] This is not an exceptional situation in reaction to danger and misfortune. In a somewhat similar manner, people throughout history agreed to undergo medical treatments that brought about no clear benefits. Apart from some actually effective cures, based for example on empirical knowledge of plants, medicine until the beginning of the twentieth century had very limited therapeutic efficacy and in fact often compromised the patients' recovery (e.g., in the case of bloodletting). Nevertheless, few people considered it a viable option to ignore medical prescriptions and let nature take its course.

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To understand why individuals would be motivated to broadcast information that relates to potential threats and includes explanation or remedies, we must consider the effects of producing that information on the reputation of the Speakers. Specifically, in what way could providing such information get Speakers to be seen as Good Sources?

Consider a simplified dynamic of communication in which a Source broadcasts some information to the effect that there is a potential danger, or that some specific case of misfortune can be explained in terms of such potential hazard, or that some specific precaution should be taken to ward off such dangers. As mentioned above, there is a disposition for people to attend to information about potential threats. There is also, given our error-management system, a possibility that some people may take that information as a guide for behavior. Note that this does not require a strong belief on the part of Listeners. Even though Listeners may have private doubts, they only have one observable behavior, which often reduces to a binary choice between behaving as if the message from the Source is real or behaving as if it is not. Even if they believe the probability of the danger is low, their taking the precaution signals to others that it is sufficient for them to take the message as accurate.

Any behavior that suggests some (minimal) commitment to the validity of the message on the part of the Listener could be interpreted by third parties as a cue to the quality of the Speaker as a Good Source (Hypothesis 4). Conversely, the fact that people think of the Speaker as a good source would lead them to follow that Speaker's advice (Hypothesis 3).

In this model, people may be motivated to produce threat-related information because it has the potential effect of turning them into Good Sources in the eyes of others—an effect that is desired because Good Sources are beneficial (Hypothesis 1), which makes it beneficial to be seen as a Good Source (Hypothesis 2).

In formal terms, the combination of Hypotheses 3 and 4 would lead one to expect behavioral cascades. That is, the fact that one person follows a Source's advice makes that Source more authoritative in the eyes of others, who themselves are now more likely to follow that Source, providing yet more evidence in the eyes of yet more people that the Source should be followed. Such cascades are common in situations where people's behavior provides the cues that guide others' behavior (for formal models, see Bicchieri & Fukui, 1999; Bikhchandani et al., 1998; Kuran, 1998; Lee, 1993).

Effects on Cultural Transmission: Deriving Features of Religions

The Good Source model predicts a motivation on the part of Speakers to disseminate information about potential dangers, and, on the part of Listeners, to attend to such information and take it as a guide to behavior (under the conditions specified above). This may allow us to infer various predictions concerning the contents and the transmission dynamics for the kind of information we usually label "religious" in the context of small-scale communities with relatively simple technology.

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Here are a few of these predictions, with comments on the extent to which the anthropological record supports the model when we consider ethnographic studies of "wild" religious traditions.

- [Prediction 1] The focus of messages will be specific cases of misfortune

Positive and negative outcomes of all kinds are present in the social life of any group, but in this model they do not afford the same opportunities for reaping the benefits of Good Source valuation. This implies that there should be far more religious discourse about negative events, and that they can be related to sources of further potential danger, than messages about positive outcomes and their putative causes.

In nondoctrinal, "wild" religions, as noted above, most activity and communication does focus on misfortune. Spirits and souls are described as typically involved in illness or accidents or failures of all kinds. People propitiate ancestors to ward off misfortune or to provide cures for current problems. This situation is familiar to most anthropologists. A systematic study by Fessler et al. (2014) shows that threat material occurs much more often than positive-reward messages in most religious traditions.

- [Prediction 2] Explanations focus on inscrutable facts or processes

The Good Source model predicts that the cost of messages is made much lower, without an equivalent loss of potential benefits, when the information is not put to the test. So there would be an advantage in some aspects of the threat and precautionary information not being testable at all. That of course is not a sufficient condition, as mentioned above, but all else being equal, we expect that Speakers will tend to use such messages. As mentioned above, mention of inscrutable processes may initially trigger rejection from epistemic vigilance systems since such claims come with no supporting evidence. However, threat-detection systems may push someone to adopt the course of action recommended despite having a low degree of belief, which will then be seen as endorsement of the Source that provided it.

In religious traditions, this is certainly the case; people describe spirits and other such superhuman agents in terms that make their effects inscrutable. For instance, it is said that the spirits can make you sick by throwing darts into your veins, but these darts are invisible. Or, you experience misfortune because undetectable spirits have stolen your soul, but that process cannot be observed. The spirits made you sick, but there is no description of how that happened. In general, claims for causal connections leave the causal processes opaque (Needham, 1976). That feature is connected to the fact that such beliefs are metarepresentational, as discussed above.

- [Prediction 3] Explanations will be specific (though precautions may be generic)

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We should expect statements that explain misfortune (e.g., illness as a result of witchcraft) to remain focused on specific cases (i.e., what made this person ill) rather than general principles (i.e., what class of diseases this patient instantiates).

One might think that providers of information avoid generalizations because they are vulnerable to counterexamples. That, however, is probably not an important factor since explanations and predictions in terms of inscrutable agents and processes are largely beyond refutation anyway. As anthropologists have commented for a long time, even straightforward predictions can be reinterpreted to accommodate empirical failures.

A better explanation may be that providers of information gain Good Source reputation from specific statements, more so than from general ones. Consider a Speaker who formulates a general principle—for example, to the effect that "encounters with black cats are the cause of miscarriages." Listeners may take this as a valid piece of information, relevant to future situations, which would confer some initial reputation to the Speaker—but, crucially, it would affect that reputation only once. After this general principle is formulated, it can be communicated to others and is then known by everyone so there is no additional benefit to expect from stating it. By contrast, having a special insight into the specifics of each case means that the specialist is regularly re-demonstrating his or her special authority. Each case of illness or accident is unique and may result from an entirely novel combination of factors, so a Good Source is needed again every time.[6]

We mentioned above ("Background") the focus on specifics in the explanation of misfortune, a phenomenon long noticed by anthropologists and famously described in the Zande case (Evans-Pritchard, 1937). Religious providers and their customers do not focus on the generic principles of the case (e.g., what processes result in a similar illness in different patients) but exclusively describe the particular circumstances that led to the case at hand.[7]

For precautions, this limitation does not hold. Given the error-management disposition to adopt low-cost precautions against high-risk outcomes, people would accept and adopt so-called superstitious courses of action (e.g., avoid black cats or opening an umbrella inside a home), which are not actually put to the test. For that reason, the scope of what they guard against may be very general. Information taking the form "Do not do x, otherwise y will occur" is of the kind that maximizes the potential benefits for Speakers at the lowest epistemic cost. Many such rules take the form of a highly specific prescription (e.g., wear a vial of water from

[6] Note, again, the persistence of such dynamics in attitudes to medicine, even in modern contexts where practitioners make use of general findings from biology. In their interaction with patients, physicians do not derive their authority from their knowledge of the general facts of physiology and anatomy—which many biologists possess too, and sometimes in greater detail and accuracy. The authority of doctors is linked to clinical competence—that is, the presumed capacity to identify the unique features of each pathological case.

[7] Obviously, there may be reasons, other than Good Source dynamics that lead to this focus. For one thing, people may focus on the particular case because they need a consensus view on who might be responsible for the particular situation at hand (Boyer 2020).

the River Jordan) as a precaution against highly general, in fact often undefined, threats (because the sacred water will protect you against... all manners of illness and accidents).

Probably related to this, "superstitions" in many cultures combine highly specific precautions or danger cues (black cats rather than any cats, walking on the left of a monument rather than next to it, and so forth), on the one hand, with extremely vague descriptions of the potential effects of not taking the precaution, on the other (e.g., some misfortune will ensue, one may get sick, one will not be successful).

- [Prediction 4] Perceived differences between sources lead to specialization

In principle, anyone could send messages, and many people do. The GS model does not assume that the population is initially divided between Speakers and Listeners—these are just the two available positions in the game, and any individual can switch between them. There are, however, reasons to expect that the provision of such information will result in some degree of specialization.

Consider again the simple dynamic described above. A Speaker makes a statement about a specific situation, explaining it in terms of inscrutable processes. Some Listeners consider this information valid, which implies that they attribute Good Source qualities to the Speaker. Now, in principle, it could be the case that, in a human community, many different people—and, at the maximum, everyone—occasionally is a Speaker and is seen as a Good Source. But that is not really plausible because that would require all these different Speakers to be seen as exactly equal in reliability. If, as is more likely, people consider that two Speakers differ in quality, even by a very small margin, the one who has greater initial reputation will get more people to follow their advice, leading to more people ascribing high qualities to them. Initial differences would be amplified, leading to larger disparities in status. This in turn leads to a situation in which some Speakers will simply not bother to present themselves as authoritative sources on some matter (in this case, unexplained misfortune), as this would probably not bring them any reputational benefits, whilst others can still do it. Cascades of reputation create specialization in the domain of explaining and palliating misfortune.

Indeed, as mentioned in the introduction, religious specialization is very general in human cultures. In many cases, specialists themselves try to emphasize differences as a way to ensure beneficial specialization. For instance, as Singh (2018) points out, the capacity to easily fall into a trance and to some extent control that trance state may be rare among human beings, which would explain why shamans the world around make this special psychological capacity a marker of their unique capacities, and therefore the explanation for their special authority.

- [Prediction 5] People construe specialists in essentialist terms

An important aspect of reputational dynamics is that they are partly opaque to the very people who participate in them. Consider this. As described above, a cascade may occur when one's reaction to a Speaker is influenced by other individuals'

reactions, which in turn were caused by their perception of other people's reactions, and so forth. Many members of a community participate in that interaction, but it does not mean that they are aware of the emergent dynamics of those behaviors in the aggregate. All each person can perceive is that they made a decision (in this case, trust a particular Speaker) on the basis of what many people around them did. That is a common property of such emergent social dynamics (Bicchieri & Fukui, 1999).

In this case, as in many other domains, people do not engage in sociological theorizing, which is neither available not relevant to them; rather, they use "folk-sociology"—that is, a description of the social phenomenon that is compatible with, among other systems, their intuitive psychology, or intuitive physics or biology (Boyer, 2018). Faced with the fact that some Speakers are seen by many as Good Sources and others are not, most people conjecture that there may be some special quality that distinguishes those individuals from the common person.

Indeed, a highly recurrent cultural phenomenon is the use of essentialist explanations, whereby people describe social positions or categories as the consequence of stable and often inherited internal qualities (Boyer, 1993, 2001; Hirschfeld & Gelman, 1999; Rothbart & Taylor, 1990). As far as religious specialists are concerned, the anthropological record confirms that essentialist assumptions are indeed the most widespread explanation for the capacities and authority of religious specialists in the wild traditions considered here. Some people consider healers to have an extra organ that allows them to figure out the intentions and actions of spirits (Evans-Pritchard, 1937) or, in more abstract terms, that shamans must have some special qualities that are the ultimate cause for their observable capacities (see illustrations in Crocker, 1985; Ricci, 2014; Stépanoff, 2015). In his survey of magico-religious specialists across cultures, Winkelman systematically documented hundreds of features (e.g., monopoly of services, mode of training, association with deities, social influence). In Winkelman's comparative surveys, the co-occurrence of many of these properties supports a distinction between the cluster of shaman-like and healer-shaman specialists, on the one hand, and priest-like specialists (Winkelman, 1990; Winkelman & White, 1987). The shaman- and healer-like clusters group religious specialists whose activities are construed by most people as based on inherent or essential qualities (Winkelman, 1986, 1990).

These predicted features, and the corresponding observations, are of course not the only relevant features of religious traditions "in the wild." The point here is that these important features seem to derive from the general constraints of communication, as well as the special incentives described here as the Good Source model.

This model would provide a description of typical dynamics of what I have called wild religious traditions (Boyer, 2019). It does not consider the important question of how such dynamics change with the emergence of doctrinal organizations, such as priestly elites in ancient societies and organizations of religious scholars in literate religious traditions. The historical and anthropological record suggests a great variety of situations, including relative toleration in polities influenced by Hinduism (Fuller, 1992) and Buddhism (Tambiah, 1970), attempts to assimilate the competition in Christianity (Brown, 1981), and an alternation of toleration and exclusion in Islam (Gellner, 1981). Classical models of these

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interactions in terms of "great" and "little" traditions (Redfield, 1989) tend to reify the distinction between kinds of religion instead of considering differences in cognitive processes (Whitehouse, 2004). There is to date no synthetic survey of the dynamics of interaction between doctrinal organizations and their persistent "wild" competition.

Epilogue: Production and Consumption of Religious Services

If the model proposed here is valid, we can derive many common features of wild religious traditions from two independent sets of properties of human minds. First, our epistemic psychology motivates us to seek Good Sources and reward them, and also motivates us to optimize our own status as Good Sources in the eyes of others. Second, our threat-detection psychology makes it possible for some individuals to produce information that potentially enhances their status as Good Sources in the eyes of others. These two factors are sufficient to account for the emergence of claims of inscrutable processes that supposedly explain misfortune and allow one to remedy it, the main theme of "wild" religious traditions the world over. Predictions derived from the model seem mostly supported by the historical and anthropological records, although confirming this will require large-scale quantitative comparisons.

Although the model is inspired by cognitive studies of cultural evolution, the strategy is slightly different. Cultural evolution frameworks generally consider cultural trends in terms of the aggregated effects of people's reactions to what is on offer, so to speak, in their communities. Some models describe this process as consisting mostly of selection between alternatives (Boyd & Richerson, 1985, 1996), while others emphasize the role of inference and active reconstruction toward cognitive attractors (Claidière et al., 2018). In both cases, the main process observed is the reception or consumption of information. In such models, one explains the existence and features of culturally widespread information in terms of how receivers attend to it, remember it, reconstruct it. In that view, for instance, we could hypothesize that some explanations of misfortune become widespread because of their attention-grabbing contents, for example, the presence of superhuman agents with counterintuitive properties (Boyer, 1994a, 2001).

By contrast, the present model aims to explain the production of some symbolic products—in this case, messages concerning potential threats and the resulting misfortune. Adding Good Source dynamics to our current models of cultural evolution may allow us to understand not just how explanations of misfortune, the central point of wild religious traditions, are seen as compelling, but also why people propose them in the first place.

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