

MYSTICISM AND MIND: USING THE COGNITIVE SCIENCE OF RELIGION TO EXPLORE THE ORIGINS OF MYSTICAL EXPERIENCE

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Abstract. This article derives from a paper presented at the Philosophy of Religion and Mysticism Conference hosted by the Russian Academy of Sciences in Moscow, May 22-24, 2014. That paper introduced theories and methods drawn from the ‘cognitive science of religion’ (CSR) and suggested future avenues of research connecting CSR and scholarship on mysticism. Towards these same ends, the present article proceeds in three parts. Part I outlines the origins, aims, and basic tenets of CSR research. Part II discusses one specific causal perspective that informs a wide range of CSR research, Sperber’s ‘epidemiological’ approach to cultural expression, and connects this perspective to the example of creator deities. Part III discusses some possible future directions for CSR research concerning mysticism and mystical experience. Finally, a coda addresses two common misunderstandings concerning the ‘reductionist’ nature of CSR research.

The authors were invited to the Philosophy of Religion and Mysticism Conference to discuss theories and methods concerning the scientific study of religious expression drawn from the ‘cognitive science of religion’ (CSR) and to suggest future avenues of research connecting CSR and scholarship on mysticism. Towards these ends, this paper proceeds in three parts. Part I outlines the origins, aims, and basic tenets of CSR research. For this part we are indebted to Justin Barrett, a co-founder of CSR, for allowing us to present a modified version of his magisterial introduction to CSR appearing in a recent special edition of the *Journal for the Scientific Study of Religion* (Barrett 2011b). Barrett offers what is, in our estimation, the most thorough and accessible overview of CSR conceivable in fewer than fifteen hundred words. Then, to give a better sense of how CSR research presumes to ‘explain’ human religious

expression, Part II discusses one specific causal perspective that informs a wide range of CSR research, Sperber's 'epidemiological' approach to cultural expression, and connects this perspective to the example of creator deities. Part III discusses some possible future directions for CSR research concerning mysticism and mystical experience. Finally, the conclusion addresses two common misunderstandings concerning the 'reductionist' nature of CSR research.

We express again our deep gratitude to all those who made this conference possible and also our hope that this paper will not appear to be an imperious imposition of CSR onto the topic of mysticism. That CSR has to date had few intersections with mysticism studies and, accordingly, few opportunities to be enriched and broadened by scholarship on mystical experience is a circumstance of CSR's youth that will, we hope, be remedied in part by these proceedings. Certainly CSR has strong need of new theorizing on religious *experience*.

I. ORIGINS, AIMS, AND BASIC TENETS OF CSR

(Adapted from Barrett 2011b)

About 11 years ago anthropologist Emma Cohen conducted long-term field research in the northern Brazilian city of Belém, investigating the religious practices of Afro-Brazilian spiritualists. Through her observations and interviews she discovered something peculiar: the way spirit-possession was described and taught by the cult-house leader (*pai-de-santo*) did not resemble how it was described by the laity, and yet the lay spiritualists affirmed the authority and trustworthiness of the leader's teachings (Cohen 2007). For some reason what was taught was not the same as what was received, but why?

Fortunately for Cohen, she could draw upon insights and strategies from CSR to solve this problem. Humans in all cultures have a number of conceptual tendencies by virtue of being *Homo sapiens*, and these ideas inform and constrain religious expression (Barrett 2000; Boyer 2003). For instance, in the absence of the uncommon conditions experts enjoy, ideas that deviate too far from cognitively natural thought are subject to confusion and distortion, a phenomenon termed *Theological Incorrectness* (Slone 2004). The people Cohen observed were suffering from Theological Incorrectness because the taught conception of spirit possession (a fusing or mixing of two spirits in a host's body) was too

unnatural or *counterintuitive* to be easily communicated faithfully. Instead, people adopted a view of possession closer to the default settings of human thought: the spirit fully displaces the agency of the host when it enters the body because only one mind can occupy a body at a single moment. Cohen backed up this interpretation by doing something very unusual for an anthropologist: she conducted psychological experiments that indeed supported the claim that the understanding used by the laity was conceptually simpler and more natural than that of the house leader (Cohen and Barrett 2008a, 2008b).

Had Cohen conducted her fieldwork even seven years earlier, it is likely she would not have turned to the cognitive sciences for theoretical and methodological inspiration. CSR was in its infancy, and most scholars of religion and culture did not know it existed. Published harbingers of such an approach to the study of religion appeared decades ago (Guthrie 1980; Sperber 1975), but the sustained, collaborative effort to approach religion from cognitive *and* scientific perspectives did not emerge until the 1990s. Four important books taking cognitive approaches appeared in the first half of the 1990s (Boyer 1994; Guthrie 1993; Lawson and McCauley 1990; Whitehouse 1995). But the birth event of a joined-up movement featuring scholars from different disciplines and institutions working together to advance a cognitive, scientific approach was a small conference hosted by the Department of Comparative Religion at Western Michigan University in February 1996 called ‘Cognition, Culture, and Religion’. With E. Thomas Lawson presiding, the speakers were Justin Barrett (a psychologist), Pascal Boyer (an anthropologist), Brian Malley (a religion scholar), Robert McCauley (a philosopher), and Harvey Whitehouse (an anthropologist), who would all go on to write important books in the area in large part through mutual discussion and encouragement (Barrett 2004; Boyer 2001; Malley 2004; McCauley and Lawson 2002; Whitehouse 2000). By these lights, CSR turned 15 years old in 2011. In 2000, the general approach was dubbed ‘Cognitive Science of Religion’ (Barrett 2000), and in subsequent years closer ties with evolutionary approaches were forged, producing the research area we see today.

CSR in brief

Primarily, CSR draws upon the cognitive sciences to explain how pan-cultural features of human minds, interacting with their natural and social environments, inform and constrain religious thought and action.

For instance, how might belief in superhuman intentional beings (gods) be explained in terms of underlying cognitive structures? Additionally, CSR considers how particular religious, cultural, and environmental factors stretch or modify natural cognitive tendencies. To illustrate, perhaps early immersion in a thought-world populated by gods shapes the development of children's cognitive systems that pertain to understanding intentional beings.

Basic tenets of CSR

CSR is structured by three main tenets. First, drawing upon breakthroughs in the cognitive sciences over the past 60 years, CSR scholars reject full-bodied cultural relativism. Minds are not passive sponges or blank slates, equally able and willing to learn and use any type of information equally well. By virtue of their biological endowment as *Homo sapiens* plus regularities of the environments in which they grow up, humans naturally have numerous cognitive biases and predilections – independent of cultural particulars.

The second tenet, then, is that at least some important and content-rich aspects of human cognition are pre- or extracultural. Uncontroversial examples include preferential attention to and processing of human faces (Meltzoff and Moore 1983), reasoning about the properties and movement of bounded physical objects, and the distinction between ordinary physical objects and those that can move themselves in a goal-directed manner, or *agents* (Spelke and Kinzler 2007). Other well-supported domains of thought that appear largely invariant across cultures in terms of their basic parameters and developmental courses include language, folk psychology (or theory of mind), folk biology, and some aspects of moral thought and social exchange reasoning (Hirschfeld and Gelman 1994). Barrett has referred to these various extracultural, content-rich cognitive systems as *mental tools* (Barrett 2004).

Certainly, the operation of mental tools does not determine human cultural expression in all of its diversity. Rather, mental tools can be likened to the foundation and supports of a house. They give a basic shape and size to the house, but the particulars of room arrangement, exterior facades, dormers and roof pitch, interior decorating, and all of the features that make a house unique and beautiful are free to vary considerably. Similarly, identifying the relevant mental tools for religion (or other cultural expression) mostly helps explain basic patterns of

cross-cultural recurrence, and why specific cultural expression has the general shape that it does, but offers little concerning particulars. A third tenet of CSR, then, is that mental tools inform and constrain religious thought, experience, and expression. For those scholars interested in the variability more than the recurrent patterns, CSR is still helpful in identifying just which aspects of religious expression are more likely to be explainable in terms of cultural particulars – those that deviate considerably from the natural outputs of mental tools.

Fourth, drawing upon Sperber's epidemiological approach to explaining cultural expression (Sperber 1996), which we will revisit in Part II of this paper, CSR scholars typically focus on ideas that are distributed across individuals. An idea that is not shared by a community of individuals is not religious, but is idiosyncratic from this perspective. Jamesian individual religious experiences currently fall outside the purview of CSR.

It follows that the task for CSR is to account for recurrent patterns of religious expression – types of ideas, identifications, experiences, and practices – that are distributed across some population (or even across cultures). Explaining religion is explaining how mental tools working in particular environments resist or encourage the spread of these ideas and practices we might call 'religious'.

Additional characteristic features of CSR

But what is *religion* for cognitive scientists of religion? Typically, CSR scholars have avoided trying to define *religion* as a whole, but rather have chosen to approach 'religion' in a piecemeal fashion, by identifying human thoughts or practices that are generally considered religious and then trying to explain why those are cross-culturally recurrent. If the explanations turn out to be part of a grander explanation of 'religion', so be it, but there is no assumption that *religion* is a coherent natural kind that can be explained *in toto*.

The piecemeal approach of CSR makes it complementary to the activities of other religion scholars. CSR does not pretend to exhaustively explain everything that might be called 'religion' (provocative book titles aside; see Part II). Rather it seeks to detail the basic cognitive structure of thought and behaviour that might be deemed religious and invites anthropologists, historians, psychologists, sociologists, and other religion scholars to fill in the hows and whys of particular religious phenomena.

As CSR is an interdisciplinary enterprise, it is marked by methodological pluralism. To determine cross-culturally and historically recurrent features of human religious cognition, scholars in this field have turned to whichever data collection and analysis methods appear appropriate to particular questions, including archaeological (Whitehouse and Martin 2004); ethnographic (Cohen 2007; Malley 2004; Whitehouse and Laidlaw 2004); historiographic (Lisdorf 2001; Vial 2004; Whitehouse and Martin 2004); interview (Malley and Barrett 2003); and experimental (Barrett and Keil 1996), including cross-cultural (Astuti and Harris 2008; Knight 2008) and developmental techniques (Barrett and Richert 2003; Bering and Parker 2006).

Because of the focus of popularizing texts, it is often thought that CSR is concerned only with explaining religion as a whole or with accounting for belief in gods. CSR, however, has made starts on many topics, including: children's ideas about the design and origin of the natural world (Evans 2001; Kelemen 2004); death and afterlife beliefs (Astuti and Harris 2008; Bering, Hernández-Blasi, and Bjorkland 2005); magic (Sørensen 2005); prayer (Barrett 2001); religion and morality (Boyer 2001); religious development in children (Barrett 2011); religious ritual and ritualized behaviours (Liénard and Boyer 2006; Malley and Barrett 2003; McCauley and Lawson 2002); religious social morphology (Whitehouse 2004); scripturalism (Malley 2004); the relationship among souls, minds, and bodies (Bloom 2004); spirit possession (Cohen and Barrett 2008a); transmission of religious ideas (Boyer and Ramble 2001; Gregory and Barrett 2009); and various superhuman agent concepts (Barrett 2008b).

II. EXPLAINING RELIGION?

In 2001 the Basic Books publishing house created a stir when it gave Pascal Boyer's exceptional treatise on the CSR state of the field a rather bold title: *Religion Explained* (2001). This title (which Boyer neither chose nor liked) begs an important question: to what extents can CSR research *explain* human religiosity?

Sperber's epidemiological approach to cultural expression

Imagine a social mixer in a large hotel conference room. Approximately 400 attendees are socializing in or wandering between small groups.

Now, imagine that we select four people from this population of attendees with whom to share some news. We transmit Concept A to two of these people and Concept B to the other two, and leave them to resume socializing in the conference room.

Concept A: The nation's president and his wife went out to dinner.

Concept B: The nation's president cheated on his wife with another woman.

As the event wears on, which of these concepts would you consider most likely to become 'cultural' (well-distributed) within the ballroom? Concept A seems unlikely to make it beyond the first cycle of transmission (assuming this concept does not readily connect to an intriguing narrative – e.g., the president, under hospice care for some time, made it known an evening out with his wife would be among his final activities). Concept B, a moral violation that would generally pass for *gossip*, would likely be retold to the extent that a large percentage of attendees would be 'hosting' it in their minds by the evening's end. Gossip, like a contagious virus, has a way of manipulating host properties in ways (coughing ~ chit-chatting) that manifest its transmission to new hosts. A really juicy piece of gossip can spread to epidemic proportions.

Sperber's approach to explaining culture is 'epidemiological' in that it focuses on understanding why some ideas spread quickly and easily among individuals while others do not. In epidemiology, to understand how pathogens spread from person to person one must understand something about the nature of the host organisms. The properties of the host organism determine whether the host is a good environment in which a pathogen can survive, reproduce, and spread itself. By analogy, Sperber has argued that to understand which ideas will spread from person to person – that is, to understand which ideas will be *contagious* – we need to understand basic properties of the 'host' mind. The properties of human minds are what determine whether an idea is interesting, memorable, inferentially rich, compelling to retell, and so on.

In CSR, Sperber's epidemiological approach informs the hypothesis that cross-culturally recurrent religious concepts may, like gossip, manifest *cultural transmission advantages* relative to other concepts competing for human attention and transmission. Many in CSR believe that such transmission advantages were major factors determining cultural content in the oral traditions that characterized human societies in the Middle and Upper Paleolithic periods – periods when, good

evidence indicates, human religiosity was on the rise. Absent writing systems, cultural transmission in these societies was largely oral and constrained by the mind's attentional and mnemonic resources. In these conditions, cultural content would be biased towards those concepts that were inherently interesting, memorable, inferentially rich, and compelling to retell.

How might religious concepts leverage a transmission advantage? Answering this question requires a closer look at the properties of the 'mental tools' mentioned in the previous section. Research in the mind sciences is converging on the thesis that human minds comprise a suite of pre-cultural, highly specialized inference systems that guide human reasoning about evolutionarily salient domains of experience. Evolutionary psychologists Leda Cosmides and John Tooby provide examples:

For understanding basic human behaviour, there are systems for making inferences about agency, goals, beliefs, desires, and intentions (the cluster of adaptations usually known as 'theory of mind'). For social interaction, there are systems for understanding social exchange, coalitions (ingroups and outgroups), mating, and parenting. To negotiate danger, there are systems for avoiding contagion and toxins, systems for understanding predators and prey as agents (and death as the cessation of agency), systems for taking precautions against hazards. Other systems produce inferences about object mechanics and artefact function. (2003: 110)

These systems, or mental tools, detect phenomena that pose evolutionarily dilemmas and activate inferential rules and feelings that guide an adaptive response. For example, the 'hazard precaution system' (Liénard and Boyer 2006; Rozin et al. 2004) uses formal input criteria (e.g., sensorial indicators of bodily fluids or decay) as a heuristic for identifying possible sources of contagion. When activated, this system outputs a 'disgust' response comprised of: (1) actions that discourage entry into the body or encourage discharge (mouth gapes, nose wrinkles); (2) a feeling of nausea or revulsion, reinforcing distance from the object; (4) inference rules, such as *the source of danger is not necessarily visible and even limited contact, however brief, can transmit the whole of the risk*.

These mental tools structure human experience in three ways relevant to CSR theorizing about the transmission of religious concepts. First, when activated some mental tools *commandeer attentional resources*. It is always difficult, for example, to ignore a rancid smell, especially one

extending from one's food. Second, inferences generated by mental tools may impose an explanatory, moral, or precautionary conviction concerning the source stimulus. The 'disgust' response, for example, imposes an aversive stance that can be difficult to overcome: in China, for example, one *just knows* that *something is wrong* with the 'smelly tofu' (*chou doufu*), though in fact it is perfectly safe and delicious. Third and as mentioned in Part I, cultural phenomena that deviate too far from expectations produced by mental tools are typically subject to confusion, distortion, or rejection. The first author's Chinese in-laws consider 'smelly tofu' both delicious and safe, and yet on each occasion the family buys smelly tofu the author's mother-in-law so struggles to overturn her conviction that *something is wrong* with the tofu that she ultimately declines.

Some religious concepts are highly competent in engaging mental tools – those tools dedicated to reasoning about contaminants, social interaction (moral cognition), and non-human predators, in particular – and, in effect, accruing attention and convictions not easily displaced by time or cultural process. The anthropological record is replete, for example, with supernatural agents *qua* predators (e.g., witches, evil spirits, dragons). We can and do use mental tools dedicated to reasoning about natural predators (Barrett 2005) to reason about supernatural predators, but the supernatural aspects of the latter may render these concepts particularly compelling to human minds. By definition, supernatural agent concepts contain a supernatural, or 'counterintuitive' (Boyer and Ramble 2001), feature. Often this counterintuitive feature enhances the concept's capacity to activate mental tools. For example, in some cultural traditions witches are represented as *invisible* predators that stalk and visit misfortune upon people. An invisible predator is potentially everywhere and, accordingly, a possible cause of any event that calls to mind predation – a snap of twigs in the forest or a sudden misfortune – and for which causal agency is unclear.

Anthropological accounts of human preoccupation with witches or similar invisible predators are legion (for a classic example, see Evans-Pritchard 1976). By the lights of the epidemiological approach, this makes sense: witch concepts are interesting, memorable, inferentially rich, and compelling to retell in part because of their perpetual relevance to our mental tools dedicated to detecting and avoiding predators. These tools, when activated, focus attentional resources and a sense of epistemological gravity on the source stimulus. Finally, frequent thinking about witches

occasions opportunities to discuss witches with others: witch concepts, like gossip, tend to transmit rather well.

An example: 'explaining' creator deities and teleological reasoning

It follows from the epidemiological approach to explaining religion that much CSR research is concerned with identifying how and to what extents and effects religious concepts interact with our species-typical mental tools. Such research may start with an identification of a shared characteristic connecting a cross-culturally recurrent category of religious expression to a cross-culturally robust cognitive bias or tendency. This section discusses an example of religious expression familiar to Western audiences through its association with the Abrahamic traditions – creator deities – and its possible connection to a human reasoning tendency that may be buoying those concepts in cultural transmission.

Elohim (Judea) created the world in seven days; Mbombo (Congo) vomited up the earth after feeling an intense pain in his stomach; Kamuy (Japan) built the world on the back of a trout; Ngai (Kenya) fashioned humanity from a single tree. In the anthropological record, the idea that supernatural agents account for origins, design, and/or purpose in the natural world is a commonplace – but why?

A common response holds that creationist accounts of the natural world satisfy humans' intellectual curiosity about the origins of natural phenomena. Such an answer, which has modern roots in E. B. Tylor's 'intellectualist' approach to religion, is problematic, chiefly because creationist accounts arguably 'explain' nothing. If we think of an explanation as something that transforms something we don't know into something we do – as something that makes a phenomenon less surprising than it was before and in better agreement with the general order of things – then creation myths seem to work the other way, creating more mysteries instead of fewer. Consider the belief, found in several cultures, that thunder is the voice of the gods expressing their displeasure with human events. Such a belief hardly lessens the mystery surrounding thunder. To explain a limited aspect of the natural environment – thunder – one must assume an entire unseen world of supernatural agents and extraordinary occurrences. But who are these gods? Where did they come from? Why can we hear them but not see them? Do they have especially large mouths to facilitate such sounds? These questions may have answers, too, but these answers typically invoke

additional supernatural agents and extraordinary occurrences. These types of explanations seem to multiply rather than reduce the mysteries concerning the origins of thunder, so it is unclear why, if humans have a natural curiosity about origins (see Boyer 2001 for a rebuttal of this assumption), these explanations should satisfy that curiosity.

And yet, insofar as humans do wonder about origins, these explanations often do satisfy. Many Christians are quite fine with the belief that God created the world in seven days and to leave it at that. For many it simply makes sense that the natural phenomena we see around us – mountains, rivers, trees, and so on – were *created by someone*, whereas secondary questions concerning the origins of unseen things (Who created God? Who created the creator of God?) typically receive altogether less attention. For CSR, the trick to explaining our species' predilection for creator deity concepts lies in understanding why are we such good 'hosts' for these concepts.

A partial explanation may lie in our species' mental tools associated with teleological reasoning. Teleological reasoning is reasoning that attributes a purpose to an object or behaviour. For example, one might look at a hammer and reason that this hammer was designed for a particular purpose: driving nails into wood. One might look a shovel and reason that this shovel was designed for a particular purpose: digging holes in the ground. Even when we encounter foreign or seemingly bizarre objects that we suspect to be tools of some kind, we can reason about what these tools' function or purpose might be. At least as early as four years of age we seem to have the capacity to adopt an 'intentional design stance' (Dennett 1990; Kelemen and DiYanni 2005) and reason about what function the creator of this tool had in mind and, accordingly, what the tool is intrinsically *for*.

The mental tools responsible for teleological reasoning may have far-reaching effects on our perception of the world. There is evidence to suggest that we adopt this intentional design stance not solely when reasoning about manmade artefacts but also when reasoning about natural objects such as mountains, rivers, and trees. Developmental psychologist Deborah Kelemen has termed this tendency to overuse teleological reasoning 'promiscuous teleology' (Kelemen and Rosset 2009). In a typical experiment demonstrating promiscuous teleology, Kelemen shows elementary school-aged children photographs of natural objects – say, a pointy rock – and asks these child participants a simple question: 'Why is this rock pointy?' Children tend to prefer teleological

explanations over physical-causal explanations to such questions. In experiments using close-ended questions, for example, children endorse that rocks are pointy ‘so that animals won’t sit on them’, not because ‘bits of stuff piled up over time’ (Kelemen and Rosset 2009). Or, when asked about the origins of natural phenomena – say, ‘Why did the first thunderstorm occur?’ – children likewise prefer teleological explanations over physical-causal explanations, endorsing ‘to give the earth water so everything would grow’, not ‘cold and warm air all rubbed together in the clouds’ (Kelemen and DiYanni 2005). Other work suggests that promiscuous teleology predominates regardless of whether the children participants are from Christian fundamentalist or non-fundamentalist backgrounds (Evans 2000).

Most adults, of course, do not show overt signs of sharing children’s beliefs about pointy rocks and the origins of thunderstorms. However, evidence suggests that they do not simply outgrow this type of reasoning; promiscuous teleology seems to remain an explanatory default throughout development and relied upon in situations of uncertainty or in the absence of different explanations. For example, Kelemen has demonstrated that college-educated adults who possess scientific knowledge about natural processes typically prefer physical-causal explanations to the aforementioned questions. However, in speeded test conditions using the same questions, college-educated adults prefer the teleological explanations (Kelemen and Rosset 2009). Our intuitions operate quickly, effortlessly, and often without our awareness, whereas applying scientific knowledge requires slower, more effortful processing. Therefore, when processing is limited by speeded conditions, adults are more likely to resort to the more readily available answer and endorse scientifically unwarranted teleological explanations.

From where does this tendency to see intentional design in natural objects come? Theories abound, but this tendency likely has distal origins in our species’ unique and extraordinary ability to design and use tools. A more proximal cause may be that infants and very young children come to associate the purpose behind people’s goal-directed behaviours that involve objects (e.g., a man hammering a nail with a rock) as intrinsic properties of the artefacts themselves (e.g., the rock is *for* hammering nails), and as their experience in artefact-rich environments accrues children may, by age 5 or 6, naturally rationalize the existence of all objects in terms of function or intentional use (Kelemen and DiYanni 2005).

Whatever the exact reason, if a bias towards teleological reasoning *is* a pan-cultural feature of human cognition then one can make a strong case that this bias has found expression in the cross-culturally recurrent idea that the world and its objects were created by an agent, typically for some purpose. In our ancestral past, this tendency to reason that all objects have some innate function and purpose would have occasioned questions about natural objects. What are those trees *for*? What is the *purpose* of thunder? In the absence of obvious answers, the idea that someone – an invisible yet powerful agent – designed them with some purpose in mind might have resonated powerfully within minds and, in time, across populations.

Creator deities explained?

To what extent does this type of research ‘explain’ our species’ predilection for creator deity concepts? We offer three observations: First, the aforementioned amounts to a causal perspective, not a causal demonstration. From this perspective, however, future studies can examine the effects of teleological reasoning on reasoning about creator deities. For example, does priming teleological reasoning about ordinary artefacts (e.g., asking participants: *What is this shovel for?*) result in greater frequency of or confidence in endorsement of intelligent design arguments? If so, can we replicate these findings in different situational contexts and cultural milieus? In time the broad contours of a naturally developing causal relationship connecting teleological reasoning to creator deity concepts may come into focus.

Second, were future experiments to support such a causal relationship, this explanation would not eliminate other theories or explanations, including theological ones. Here we must distinguish between methodological reductionism and theory or ‘eliminative’ reduction. Methodological reductionism is the practice of analyzing and describing a complex phenomenon in terms of phenomena that are held to represent simpler levels. CSR practices methodological reductionism through attempts to understand cultural-/religious-level phenomena by looking ‘downstairs’ at the foundational psychological dynamics. Theory reduction, on the other hand, involves deducing the laws of one theory from those of another. Following such a reduction, one level of explanation is entirely reducible to another level and, hence, the reduced level is considered meaningless or ‘unreal’ and is thus eliminated.

Robert McCauley, a philosopher and co-founder of CSR, has argued that actual theory reductions occur only *within* their respective particular sciences, as one theory succeeds another (e.g., Stahl's account of combustion is succeeded and fully eliminated by Lavoisier's; McCauley 2013). Where attempts at cross-scientific theory reduction occur, the reducing theory invariably fails to capture the full spectrum of inter-theoretic relations. It follows that CSR need not and ought not conclude that other levels of explanation are irrelevant, causally impotent, fictive, or fully explainable by appeal to lower-level processes. When a scientist makes this eliminative move in the name of 'parsimony' or 'Ockham's Razor', defenders of the cultural or religious level are right to call foul.

Third, in science all explanations are partial. There is no such thing as an exhaustive scientific explanation in the natural or the social sciences. Were future experiments to support a causal relationship connecting teleological reasoning to reasoning about creator deities, this relationship would constitute only a partial explanation for creator deity concepts – only a single, recurring causal thread in the thick messes of ecological, psychological, socio-cultural, etc. (and supernatural?) agencies that result in the cultural significance of creator deity concepts. By these lights, CSR outputs are better viewed as explanatory contributions rather than as explanations *per se*, if and where the latter convey a sense of *in toto* or a denial of the explanatory pluralism that many, perhaps most, CSR researchers embrace.

III. CSR AND MYSTICAL EXPERIENCE

This section discusses possible future directions for CSR research concerning mysticism. These speculations come from the second author of this paper, who recently validated a scale for measuring mystical experiences in dreams (Sears 2015).

Are mysticism concepts highly transmissible?

There is indeed evidence to suggest that mystical *experiences* are highly memorable (cf. Barnard 1997; Bulkeley 2009; Hood 2001; Sears 2015). This memorability seems to obtain even in circumstances where the experiencer lacks an interpretive schema for making sense of the experience (cf. Barnard 1997; Hood 2001). One possible factor informing the cross-cultural salience of mystical experience, then, may concern

the relationship between mystical experience, memory, and cultural transmission. Why are these experiences so memorable, and does that memorability manifest a transmission advantage?

To the former question, it is possible that counterintuitive features of mystical experiences contribute to this mnemonic salience. Mysticism literatures are replete with descriptions of mystical experiences that would, as descriptive concepts, qualify as counterintuitive in Barrett's system for coding and quantifying counterintuitiveness (Barrett 2008, as applied perhaps to descriptions in Casto 1995; Dwyer 2004; and Stace 1960). For example, unitive experiences, in which 'the boundary between the self and world seems to dissolve' (Taves 2009: Kindle Locations 784-859), may be counterintuitive by virtue of violating the expectations of our *intuitive physics* (following Spelke and Kinzler, 2007) system. 'Inner subjectivity', a sense of life or consciousness in the surrounding environment (Hood 1975; Stace 1960), would be counterintuitive where *biology* or *mentality* was transferred to non-living or inanimate things respectively (e.g., a rock that breathes; a tree that thinks). Barrett's (2008) coding and quantification system would be a fine starting point for an assessment of counterintuitiveness in mystical experience description.

Do agency detection systems structure mystical experience?

Our species has a well-documented tendency to over-attribute agency to chance events – to see, for instance, 'faces in the clouds' (Guthrie 1993) and witchcraft in the collapse of a mud hut (Boyer 2001). From an evolutionary psychology perspective these attributions make sense: the consequences of false positives in agency detection are minimal; false negatives, by contrast, can bring disastrous consequences. If while walking through the woods one hears a snap of twigs or a rustling in the bushes, the safe bet is to assume that an agent, a predator, might be present and to take the necessary precautions. To ignore these signs could leave one open to an ambush.

Some in CSR have argued that mental tools dedicated to agency detection (e.g., Barrett's 'hyperactive agency detection device', or HADD) played an important role in the emergence of human religiosity (see Barrett 2004). Of relevance to mysticism, one study has connected hyperactive agency detection to unitive experiences. Petrican and Burris (2012) found a positive correlation between over-attribution of agency (measured by self-reported predispositions to anthropomorphize

non-animal entities and by performance-based responsiveness to gaze cues embedded in inverted faces) and experiences comprised of a sense of unity with a living environment (including non-animates – e.g., rocks and clouds – imbued with agency). Accordingly, it may be the case that people with especially hyperactive agency detective systems are more prone to mystical experiences characterized by natural environments imbued through and through with agency. This provocative study is the first of its kind and deserving of additional research attention.

Do mystical experiences enhance social cooperation?

Once religious concepts entered a population they may have been exapted in ways that conferred population-level fitness advantages. Some have proposed that religious concepts may have solved problems concomitant with social cooperation between genetically unrelated strangers to the effect that social groups with religious concepts out-performed groups lacking such concepts (e.g., Supernatural Punishment Theory, Johnson and Krüger 2004).

Fitness perspectives on mystical experiences might start with a survey of pro-social emotions or behaviours associated with mystical experience. Existing research examining the effects of meditative practice and mindfulness techniques on emotions such as empathy, social connectedness, and hope/optimism for others (for reviews see: Levenson and Aldwin 2013; Tsai et al. 2013) may offer a helpful jumping-off point, as meditation and prayer are sometimes gateways to mystical experience (Egan 1978; Gavrilyuk 2012; Hood 2001; Newberg et al. 2003). Future studies would need to be clear as to whether they are studying the effects of meditation generally or the effects of mystical experience in particular.

Coda: Explaining is not ‘Explaining Away’

I will not judge whether God is or is not present to the people I came to know. Yet I believe that if God speaks, God’s voice is heard through human minds constrained by their biology and shaped by their social community, and I believe that as a psychologically trained anthropologist I can say something about those constraints and their social shaping. (Luhrman 2012: xxiv)

At first glance, CSR perspectives may by virtue of their association with (methodological) reductionism seem incompatible with interpretive

perspectives or antithetical to religious practice in general and mystical experience in particular. This paper closes with two observations that build on the provisos listed at the end of Part II that will, we hope, dispel perceptions of inherent contrariety.

First, CSR and interpretive approaches need not have an inherent mutual antagonism. The first author of this paper is a social anthropologist by training and the first to defend the ethical and scientific merits of interpretive approaches. The mind sciences desperately need perspectives that interrupt, challenge, and broaden the conclusions emanating from North American and European laboratories, lest those sciences generalize about the nature of mind solely from commonalities observed in W.E.I.R.D. (Western Educated Industrial Rich Democratic; Heinrich et al. 2010) populations. Humanities scholars working in CSR have made major contributions to the evolution of cognitive models of mind. For example, Edward Slingerland's (2013) pioneering work on mind-body dualistic reasoning in ancient Chinese societies has had a strong impact on developmental psychologists' theorizing about the cognitive naturalness of mind-body dualism. (Slingerland's work indicates that dualistic reasoning is natural *by degree* and that the rather extreme form of dualism discussed by Descartes and observable in many studies using W.E.I.R.D. participants probably fits an outlier end of the dualistic reasoning continuum.) That CSR can benefit from the checks and balances realized through such work is testament, one hopes, to a *moderation* of partisanship engendered by a commitment to interdisciplinary, cross-cultural research.

Second, CSR need not be inherently antithetical to personal religious practice (the second author of this paper is a graduate student at a seminary). CSR employs a methodological naturalism that aims to 'see how far we can go' explaining religious thought and behaviour without positing the existence of supernatural entities. Methodological naturalism does not assume that there are no supernatural entities but remains agnostic on the matter. CSR outputs produced through methodological naturalism can be augmented or amplified by specific religious communities. Some scholars, for example, have opted to interpret CSR perspectives on the naturalness of human religiosity through the work of the Scottish Enlightenment philosopher Thomas Reid, arguing that cognitive dispositions towards religious expression may constitute a 'common grace' bestowed by God (Barrett and Church 2013). ... No scientific explanation is ever complete.

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